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The association of women's empowerment dimensions and antenatal care utilization in Ethiopia; facility based cross-sectional study

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Abstract

Background Women's empowerment is a multidimensional global development goal. Women in low-income countries are often disempowered, which can lead to increased mortality and morbidity by inhibiting their access to essential maternal health care, such as antenatal care. It is impossible to decrease maternal mortality without sufficient and timely antenatal care. However, the association between women's empowerment and antenatal care utilization has been understudied. Therefore, this research aims to assess the association of women's empowerment dimensions with antenatal care use.

Method A facility-based cross-sectional study was conducted from July 1 to August 31, 2022, in public hospitals within Jimma town, Ethiopia. Participants were 305 women who attended childbirth and postpartum services, selected by systematic random sampling. A structured, interviewer-administered questionnaire was used for data collection. Bivariate and multivariable logistic regression analyses were employed to determine the association between variables.

Result Of 305 respondents, 301 provided complete responses, resulting in a response rate of 99.1%. Approximately 187 (62%) study participants utilized adequate antenatal care [95% CI: 56.4–67.6]. In multivariate logistic regression women's empowerment dimensions showed statistically significant association with antenatal care utilization. High general self-efficacy [AOR = 1.89 (1.02–3.50)], high self-esteem [AOR = 3.10 (1.67–5.76)], an internal locus of control [AOR = 2.13 (1.17–3.86)], and labor work participation [AOR = 1.98 (1.06–3.72)]. All these factors were associated with increased antenatal care utilization.

Conclusion Women empowerment dimensions have a positive and statistically significant association with antenatal care use. So, to improve recommended antenatal care utilization by mothers, empowerment of women by health professionals, hospitals, and other stakeholders is very important.

Keywords Women's empowerment, Antenatal care use, Empowerment dimensions, Ethiopia, Postpartum

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Introduction

Globally women empowerment and decreasing maternal mortality are key indicators of sustainable development [1]. Women's empowerment is a multidimensional construct that includes agency and access to resources; personal, relational, and societal empowerment; economic, political, and socio-cultural aspects; as well as participation, control, and a range of psychological factors [2, 3]. As acknowledged by different scholars and development organizations, the complex and multifaceted nature of women's empowerment requires ongoing investigation to support its advancement in diverse contexts [4, 5]. Naila Kabeer articulated: "*It is about the process by which those who have been denied the ability to make strategic life choices acquire such ability through agency, resources, and achievements*." [6] Oxfam GB explained the same domain as personal or 'power within, relational or 'power-to', and environmental or 'power-over' by the level it can happen [7]. The Sustainable Development Goal (SDG 3 and 5) underscores the pivotal role of women's empowerment in development, reproductive health, and pregnancy outcomes [8, 9]. Findings suggest a robust link between women's practical engagement in seeking antenatal care and the multifaceted dimensions of women empowerment [4, 10].

Women empowerment can reduce maternal mortality by approximately 7–12%, with additional benefits from impacting increased skilled birth attendance and antenatal care utilization [11]. In addition, it has been shown to promote greater use of antenatal care. This leads to reduced maternal mortality through enhanced health promotion, early diagnosis, and more effective management of pregnancy complications. Moreover, it fosters a healthier lifestyle, improves women's nutritional status, and reduces domestic [12–14].

Despite this, women in developing countries had been exposed to disempowerment and had lower access to health care. This includes lower decision-making power, low labor force participation, domestic violence, child marriage, adolescent pregnancy, poverty, and illiteracy [15]. Low women empowerment is one of the most critical attributes behind high maternal mortality and morbidity that can be prevented [16]. Low empowerment exposes women to mortality and morbidity by inhibiting them from life-saving care during pregnancy [17, 18]. Lack of empowerment is a barrier to antenatal care utilization [19]. Consequently, the primary reason for preventable daily maternal mortality is failure to utilize ANC [20]. But, if women empowered and utilized antenatal care, it can prevent three-fourths of maternal morbidity and mortality [21].

Evidence shows that, in Sub-Saharan Africa only 6.8% of women utilized currently recommended eight antenatal care contact [22]. Again, only 1% of rural Ethiopian women meet this recommended ANC standard [23]. This low utilization rate may be attributed to the limited empowerment of women in the country, as reports indicate that only 6% of married Ethiopian women are empowered [24].

Currently available evidence of women empowerment dimensions and their association with antenatal care utilization are inconsistent, limited to DHS data, and a majority of dimensions were not studied [25, 26]. Women empowerment is an important determinant for programs and policies to reduce maternal mortality and improve overall maternal health [19]. Therefore, this research intends to assess the association between women empowerment dimensions and antenatal care use.

Methods and materials

Study area and period

The study was conducted at Jimma Town Public Hospitals. Jimma town has two public hospitals, namely Jimma Medical Center (JMC) and Shanan Gibe Hospital located 356 km from Addis Ababa, the capital city of Ethiopia. Jimma Medical Center covers about fifteen million people under its catchment area in the southwest part of Ethiopia. Jimma Medical Center is the leading teaching and tertiary Hospital in Ethiopia, providing services for approximately 15,000 inpatients, 160,000 outpatient attendants, 11,000 emergency cases, and 3888 deliveries annually. Shanan Gibe Hospital is a general hospital on average it gives services to 2040 deliveries annually. The total estimated two-month average of women attending delivery and postpartum services at both hospitals was about 988 women. The data were collected from July 1-August 31, 2022.

Study design and population

This study employed a facility-based, quantitative, cross-sectional design. The source population comprised all mothers receiving delivery and postpartum services at public hospitals in Jimma town. The study population consisted of all eligible mothers attending these facilities for delivery and postpartum care during the data collection period, who met the inclusion criteria and were available to participate.

Eligibility criteria

The inclusion was based on attendance for delivery and postpartum care, and willingness to participate in the study. Mothers with major psychiatric conditions were excluded to ensure data reliability and ethical considerations.

Sampling procedures and data collection method

The required sample size was calculated using a single population proportion formula. To estimate the

population size, the average number of mothers attending delivery and postpartum services at Jimma University and Shenen Gibe hospitals was determined by reviewing one year of monthly reports from both facilities prior to the data collection period. Based on these records, the estimated population size for the two-month data collection period was estimated to be 988, which was used to calculate the final sample size.

The following assumptions were considered during calculations: Za/2 = standard score value for 95% Confidence level for two sides normal distribution which is 1.96; p = the proportion of recommended antenatal care utilization taken from relevant literature which is 47.5% [27];' d' margin of error, 0.05.

$$N = \frac{\left(\frac{za}{2}\right) 2 * p * (1-p)}{d2} \; then$$

$$N = \frac{(1.96)^2 * 0475(0.525)}{0.0025} \quad n = 383.$$

Given that the estimated population of mothers attending delivery and postpartum services in Jimma town public hospitals was 988 (which is less than 10,000), a finite population correction formula was used in the sample size calculation.

$$\mathrm{nf} = \frac{n}{1 + \frac{n}{N}} \; \mathrm{nf} = \frac{383}{1 + \frac{383}{988}} = 277$$

Then by adding a 10% non-response rate, the final minimum sample considered for the study was 305.

To select individual participants, a proportional allocation was first made to each hospital, based on the recent one-year average of delivery and postpartum service utilization. This resulted in a sample allocation of 648 participants at Jimma Medical Center and 340 at Shenen Gibe Hospital (Fig. 1). Subsequently, a sampling interval (K) was calculated by dividing the estimated total number of women by the target sample size ($N/n = 988/305 \approx 3$). Using systematic random sampling, every third mother attending delivery and postpartum services was interviewed. The first respondent was selected randomly using a lottery method. To minimize the risk of re-enumerating women, only immediate postpartum women who were being discharged were included. Data was collected as each selected participant prepared for discharge, and an exit interview was conducted.

Data were collected by a structured interviewer-administered questionnaire. The items regarding the justification of wife-beating, household decision-making participation, and other age-related variables have been adapted from SWPER Global which was validated by DHS [28]. Seven Locus of control items were adapted from Psychological Coping Resources by Pearlin and Schooler [29]. **Self-esteem** was measured by the Rosenberg self-esteem scale [30]. Self-efficacy was measured by using the General Self-efficacy Scale (GSES) developed by Schwarzer and Jerusalem and widely used across the world, including for women empowerment and it has reported Cronbach's alphas 0.76–0.90 [31, 32]. Women's participation in the labor force is adapted from the previous study and is measured through six items [33]. The tool for freedom of mobility has 6 items adapted from previous women empowerment research(reported Cronbach's α = 0.84) [34]. The tool for measuring ANC utilization and socio-demography was adapted from an existing survey in Ethiopia that reported Cronbach's alpha(0.976) [35]. Data was collected by three female midwives under the supervision of one more experienced Master of Science holder Midwifery professional. To maintain data

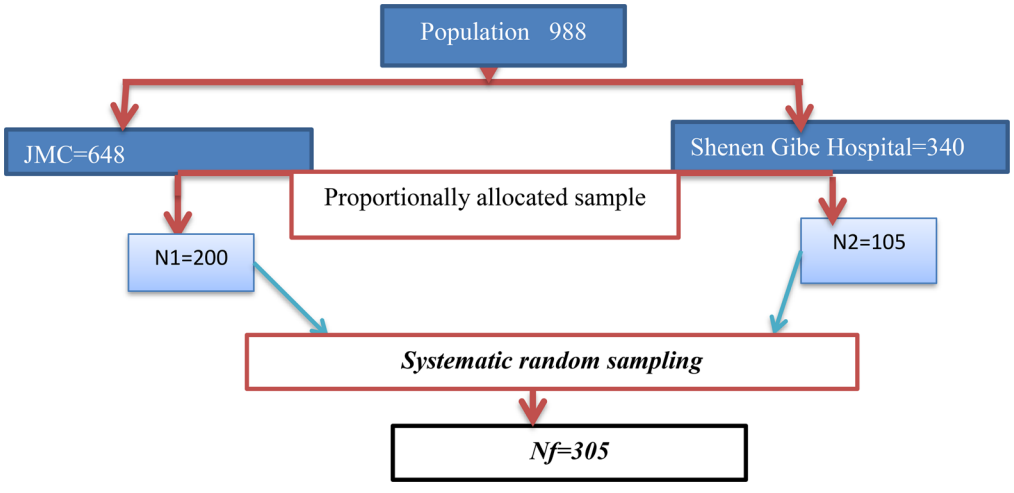

Fig. 1 Schematic presentation of sampling procedure of the study, association of women empowerment dimensions with antenatal care utilization at Jimma town public hospitals. Notes: N1 = proportion allocated for Jimma Medical Center (JMC), N2 proportion allocated for Shenen Gibe Hospital, Nf = over all sample size, Np = proportion for individual hospital

quality pretest was done on 10% of the sample population at Wallaga University Referral Hospital before actual data collection. Then, data collection time was estimated, and modifications of a tool such as rephrasing difficult-to-understand questions and logical order of questions were done depending on the pretest.

Study variables, operational definition, and measurements

The dependent variable was antenatal care contact ANC. It is the frequency of ANC contact pregnant women had with skilled health care professionals at health facilities and it is dichotomized based on previous research; if she has a minimum of 4 contacts it is coded as "1" and adequately utilized, otherwise coded as"0" under-utilized [35].Independent variables are Child marriage Adolescence pregnancy, education, household decision-making, attitude to violence, freedom of mobility, locus of control, self-esteem, self-efficacy, participation in the labor force and other covariates like personal related factors which include parity, the intention of pregnancy, awareness about importance of ANC. Obstetrics-related factors like pregnancy complications, family planning utilization, early initiation of ANC, knowledge of danger signs and complications and socio-demographic factors like residence, age, religion.

Operational definition

Women empowerment dimensions

Women empowerment dimensions are constructed and measured through eleven dimensions which include education(education can be considered as a sociodemographic variable; but in this study it is considered as a women's empowerment dimension), weekly media exposure, decision making, freedom of mobility, self-efficacy, self-esteem, locus of control, women participation in labor work, justification of wife beating, age at first marriage, adolescent pregnancy [7, 32].

Weekly media exposure

At least once weekly exposure of women to one of the media like radio, television, internet and newspaper and coded as '1' if they utilized otherwise coded as '0' [28, 36].

Household decision-making participation

The total score on decision making power items was 10. Hence, those women who scored five and above were categorized as having high decision-making power and coded as '1' whereas those who scored less than five were categorized as women with low decision-making power and coded as '0' [37].

Freedom of mobility

responses from the 6 items which coded as (0, not at all, 1 jointly and 2 alone) was summed; those with a total score of ≤ 9 were considered to have low freedom of movement (reported Cronbach's α = .84) [34] and coded as' 0' otherwise '1'.

The self-efficacy

tool is composed of ten items scored on a 4-point Likert scale. The overall score ranged from 10 to 40. The participants had to choose between four alternatives scored as exactly true = 4, moderately true = 3, hardly true = 2, and not all true = 1. The participant was considered to have high if she scored greater than 25 and coded as' 1' unless coded as '0'.

Self-esteem

Self-esteem is a subjective self-evaluation indicating an individual's sense of self-worth. It reflects the extent to which a person feels valued and important. This study measured self-esteem using a ten-item scale, with responses scored on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). Five negatively worded statements were reverse coded to ensure consistent score. Participants were then categorized as having either low or high self-esteem: a score ranging from 10 to 25 indicated low self-esteem, while a score of 26 to 40 indicated high self-esteem [38].

Locus of control

Locus of control refers to the extent to which individuals believe they can influence events and outcomes in their lives. It typically categorized into two types: internal and external. In this study, the focus of control was assessed using seven Likert-scale items, which were combined to create a single index. The total score ranged from 7 to 35, with scores above 17.5 indicating a more internal locus of control; these responses were coded as '1,' while all other responses were coded [16, 32, 39].

Women's participation in labor work

All items are scored from 18 and if a woman scored less than 9; she is disempowered and coded as "0"' and if she scored greater than 9 she is coded as "1" and empowered [33].

Postpartum care

Postpartum care encompasses the medical attention and support provided to a mother and her newborn baby following childbirth, typically defined as the period within the first 42 days after delivery. However, this study focused specifically on women in the immediate postpartum period, defined as within the first 24 h after delivery [40].

Table 1 Socio-demographic characteristics of mothers attending delivery and postpartum services at Jimma town public hospitals, Ethiopia 2022($n=301$)

Variables	Category	Frequency	Percent
Residence	Rural	144	47.8
	Urban	157	52.2
Religion	Muslim	221	73.4
	Orthodox	40	13.3
	Protestant	40	13.3
Education	Cannot read and write	55	18.3
	Primary	47	15.6
	Secondary	58	19.3
	Preparatory and above	141	46.8
Age	15–19	28	9.3
	20–24	91	30.2
	25–29	113	37.5
	30–34	48	15.9
	35–39	20	6.6
	40–44	1	0.3

Table 2 Personal and obstetrics related characteristics of mothers attending delivery and postpartum services at Jimma town public hospitals, Ethiopia 2022($n=301$)

Variables	Category	Frequency	Percent
Knowledge of danger signs	No	197	**65.4**
	Yes	104	**34.6**
Knowledge of complications of pregnancy	No	195	**64.9**
	Yes	106	**35.2**
Intention of pregnancy	Not planned	8	**2.7**
	Planned	293	**97.3**
Family planning utilization	Utilized	197	**65**
	Not utilized	104	**35**
Gravidity	Primi- gravida	101	**33.6**
	Multigravida	200	**44.4**

Knowledge of danger signs and complications

Respondents were asked a question consisted multiple-choice responses about danger signs of pregnancy and complications, those correctly mentioned greater and 5 were categorized as having good knowledge about it respectively [35, 37].

Education

Depend on their year of schooling they coded as '0' no formal education, '1' elementary,'2' secondary,'3' **tertiary** or above.

Data analysis, processing and presentation

The data were checked coded and edited properly and then entered into Epidata Version 4.6 and then exported to SPSS Version 26 for analysis. Then the data were recoded for analysis and further cleaning was done. A descriptive analysis was done. Then, variables were categorized depending on their operationalization and recorded. All women's empowerment dimensions and other covariates were entered into bivariate logistic regression analysis and independent variables with $P<0.25$ was considered as candidates for multivariable logistic regression analysis. In a multivariable logistic regression model, a variable with a $P<0.05$ were considered to have a statistically significant association with antenatal care utilization. Hosmer and Lemeshow's goodness of fit test stated that the selected model was a good fit for data set since the P-value was 0.316. The relationship between women empowerment dimension and ANC4 + utilization was evaluated after adjusting for the covariates by using an adjusted odds ratio at a 95% confidence interval, and a P-value < 0.05 to declare significant associations. Finally, the findings were presented in text, tables, and graphs.

Result

Study recruitment results and sociodemographic characteristics

Among a total of 305 study subjects 301 women were involved in the study which yields a 99.1% response rate. Four questionnaires were rejected due to incomplete information. The Maximum and minimum ages of participants were 15 to 40 respectively, while the mean age of participants was 26.35±4.94. More than half (53.4%) of them were in the age range 25 to 34 years, and the majority of them were Muslims (73.4%) (Table 1).

Personal and obstetric related factors

Regarding their knowledge of dangerous signs during pregnancy, only one-third of women (34.6%) know about pregnancy complications. In addition, 34.6% do not utilize family planning (Table 2).

Women empowerment dimensions

This study assessed various dimensions of women's empowerment. 60% of Participants reported freedom of mobility under different hypothetical circumstances. More than half of Participants had an internal locus of control (57.1%), low general self-esteem (55.1%), and low self-efficacy (33.2%). Approximately 70% (211) of Participants participated in major household decision-making. In addition, approximately 60.5% (182) of Participants accepted wife-beating, 64.5% had media exposure at least once a week, 36.9% had been married early, and 31.1% experienced adolescent pregnancy during their first pregnancy (Figure 2).

Antenatal care utilization

Majority of the study (62%) participants have utilized more than four antenatal care contacts (Figure 3).

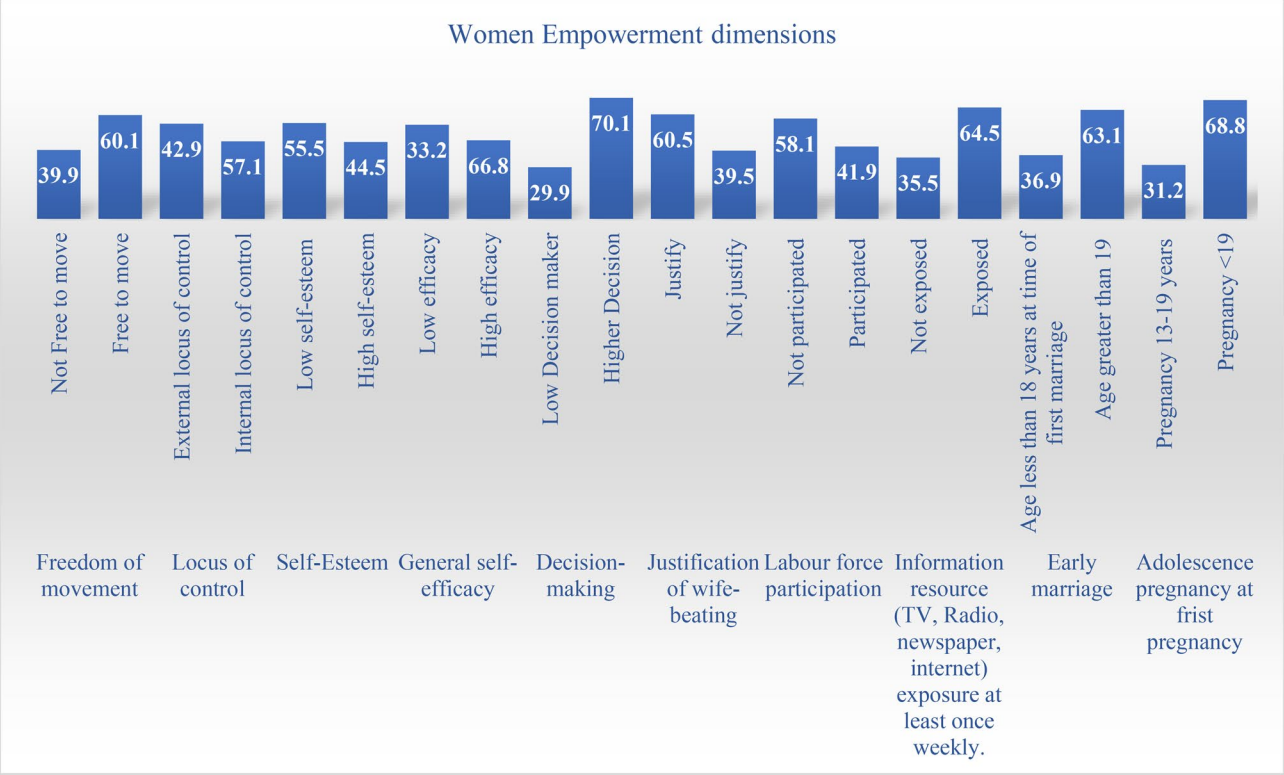

Fig. 2 Magnitude Women empowerment dimension of mothers attending delivery and postpartum services at Jimma town public hospitals, Ethiopia 2022($n=301$)

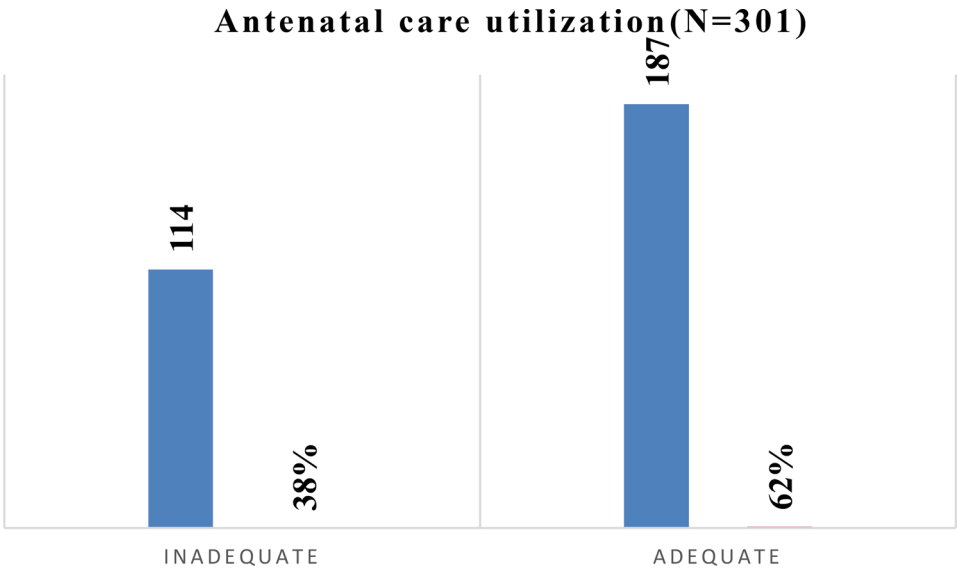

Fig. 3 Antenatal care utilization characteristics of mothers attending delivery and postpartum services at Jimma town public hospitals, Ethiopia 2022($n=301$)

Association of women's empowerment dimension and antenatal care utilization

Women's empowerment dimension and other variables (socio-demographic, personal and obstetrics-related factors) association with adequate antenatal care utilization were investigated by using bivariate and multivariable logistic regression analysis (Table 3).

During bivariate analysis, women empowerment dimensions (internal locus of control, self-esteem, general self-efficacy, labor work participation, freedom of movement, justification of wife beating, adolescent

Table 3 Bivariate and multivariate logistic regression result of the factors associated with adequate antenatal care utilization of mothers attending delivery and postpartum services at Jimma town public hospitals, Ethiopia, 2022($n=301$)

Variables	Category	Antenatal care contact		COR	AOR, C.I	P
		Adequate	Inadequate			
General self-efficacy	Low	40(21.4)	60(52.6)	1	1	0.033
	High	147(78.6)	54(47.4)	4.08(2.46,6.78) *	**1.89(1.02,3.50)**	
Self-esteem Esteem	Low	84(44.9)	83(72.8)	1	1	0.000
	High	103(55.1)	31(27.2)	3.28(1.99–5.43) *	**3.10(1.67,5.76) ***	
Locus of control	External	57(30.5)	72(63.2)		1	0.001
	Internal	130(69.5)	42(36.8)	3.91(2.39,6.39) *	**2.13(1.17,3.86) ***	
Labour Force Participation	Not participate	97(51.9)	85(74.6)	1	1	0.010
	Participated	90(48.1)	29(25.4)	3.16(1.90–1.86) *	**1.98(1.06,3.72) ***	
Residence place	Rural	69(39.9)	75(65.8)	1	1	0.002*
	Urban	118(63.1)	39(34.2)	3.29(2.02–5.36)*	**2.07(1.15,3.72)**	
Family Planning utilization	Non utilized	42(22.5)	62(54.4)	1	1	0.005
	Utilized	145(77.5)	52(45.6)	4.12(2.49–6.81) *	**3.55(1.8,6.77) ***	
Gestational Age at Initial Booking of antenatal care.	Booked greater 12 weeks	102(54.5)	85(74.6)	1	1	0.001
	Start less than 12 weeks	85(74.6)	29(25.4)	2.44(1.47–4.10) *	**2.62(1.31,5.20) ***	

Note: * Shows significance. Variables with a p-value ≤ 0.25 in the bivariate analysis (COR) were considered candidates for multivariable logistic regression. In the multivariable model, statistical significance was defined as a p-value **≤ 0.05** for the adjusted odds ratio (AOR). *AOR: Adjusted odds ratio; COR: Crude odds ratio; C. I: Confidence interval*

pregnancy, child marriage, freedom of movement, and education) were studied. In addition, variables like residency, education, family planning utilization, initial starting of ANC, knowledge of danger signs, and knowledge of pregnancy complications were assessed and significantly associated with the ability to utilize adequate ANC contact at a P-value less than 0.25. These variables were simultaneously entered into multivariable analysis using the backward method to determine independent predictor (Table 3). In multivariate analysis women empowerment dimensions were adjusted for other factors (stated above) in the model.

Multivariable logistic regression analysis indicated that those mothers who had high self-efficacy were about two times more likely to utilize adequate ANC contact compared to those who had low self-efficacy [AOR (95% CI)], [1.89(1.02–3.50)]. Mothers who have high self-esteem are three times more likely to utilize adequate ANC contact compared to those who have low self-esteem [AOR (95%CI)], [3.10(1.67–5.76)]. Mothers who have an internal locus of control are two times more likely to utilize adequate antenatal contact compared to those mothers who have an external locus of control [AOR (95%CI)], [2.13(1.17–3.86)]. Mothers who have participated in labour work are two times more likely to utilize adequate antenatal contact compared to those mothers who do not participate in labour work [AOR (95%CI)], [1.98 (1.06–3.72)].

Regarding other variables; mothers who were urban residents were two times more likely to utilize adequate antenatal care contact compared to mothers those from rural [AOR(95%CI)], [2.07(1.15–3.72)]. Mothers who utilize any contraceptive family planning are three times more likely to utilize adequate antenatal contact compared to those who do not utilize [AOR (95%CI)], [3.55(1.8–6.77)]. Mothers who report that they have started their ANC follow-up before 12 weeks of gestation are two times more likely to utilize adequate antenatal contact compared to mothers who have started ANC after 12 weeks [AOR 95% CI)], [2.62 (1.31–5.20)] (Table 3).

Women empowerment dimension was adjusted for covariates like the Knowledge of complication, danger sign, residence, family planning utilizations and initial booking of ANC in first trimester.

Discussion

Assessing the factors influencing antenatal care utilization is of utmost importance for improving maternal health outcomes. This study focuses on the critical association between women's empowerment dimensions and antenatal care service utilization. Given that only one in ten women meets the criteria for adequate antenatal care utilization, the association of various women's empowerment dimensions with antenatal care utilization is particularly significant.

A substantial proportion of mothers contacted healthcare providers for antenatal care on four or more occasions throughout their pregnancies. This finding is higher than those of studies conducted in different parts of Ethiopia, specifically the Sidama Region (47.2%) [41] and Mettu, South West Ethiopia (46.7) [42]. The higher prevalence in this study may be justified by the inclusion of both urban and rural mothers, offering potentially

greater access and awareness of antenatal care, whereas the previous studies were restricted to rural women. This due to the fact that access to and awareness of antenatal care may be greater in urban areas, leading to more frequent contact with healthcare providers.

When compared with other findings, the prevalence in this study is lower than that of studies conducted in Wolayita Sodo Town, Southern Ethiopia (77.01) [35],and Debra Brehan Town, North Shewa of the Amhara Region (78.5) [43]. This discrepancy may be explained by the restriction of those studies to urban populations. However, the finding is consistent with studies conducted in Benchi Maji Zone, South West Ethiopia (56%) [44], Gondar, Northern Ethiopia (59%) [45], and the neighbouring country of Kenya (60.3%) [46]. The consistency of our findings with studies from Benchi Maji Zone, Gondar, and Kenya, all of which included both urban and rural populations, provides a critical comparison. This shared demographic profile likely explains the similar ANC4 + utilization rates, suggesting that population diversity significantly impacts observed outcomes. Therefore, our study, by mirroring the results of demographically similar studies, validates Ethiopia's progress toward its ANC4 + utilization target, while simultaneously emphasizing the persistent urban-rural disparity requiring further attention.

A positive and statistically significant association was observed between women's empowerment dimensions such as locus of control, self-esteem, self-efficacy, labor force participation, participation in household decision-making, non-justification of wife-beating, absence of child marriage, and absence of adolescent pregnancy, and adequate antenatal care utilization. This finding aligns with previous findings from Bangladesh [47],Senegal and Tanzania [48], and Nigeria [39]. These results emphasise the critical role of women's empowerment in promoting maternal health and improving ANC service uptake.

The research results reveal a statistically significant association between women's general self-efficacy and antenatal care utilization: women with higher self-efficacy are more likely to utilize adequate ANC. This general self-efficacy refers to a person's belief in their ability to succeed in specific situations or accomplish a task and it capacitate the women to achieve their desired goal in life. The finding of current research aligns with previous research from Java, Indonesia [49], Iran [50], and other regions [51], suggesting a consistent pattern across diverse settings. While these previous studies focus on similar populations or health systems, our study strengthens the evidence base by demonstrating this link in a new context. The positive relationship between self-efficacy and ANC use might stem from self-efficacy empowering women to be more confident, motivated, and make informed decisions regarding their health during pregnancy [52]. This highlights the importance of promoting self-esteem in interventions aimed at improving antenatal care utilization.

The current study indicates that women who participate in labor work utilize more antenatal care. Mothers who participate in any kind of paid labor work, whether private or public, receive more comprehensive antenatal care than those who do not work. This is in line with the finding from East African countries [53],Sub-Saharan countries [54] Kenya [55], and Bangladesh [56]. This may be explained by the fact that labor work participation provides a chance to generate income to seek health care and widen their social network and increase their awareness.

This study shows that women with high self-esteem have higher odds of utilizing adequate antenatal care. This means that mothers with high self-esteem utilize adequate antenatal care more than those with low self-esteem. Other findings also state the same finding, for instance, two findings from Nigeria Nigeria [39, 57] and WHO [58]. A possible explanation for this might be that high self-esteem provides the strength and flexibility to take charge of their lives and the motivation to take care of themselves [57]. Specifically, women with higher self-esteem may place greater value on their health and well-being, leading them to prioritize antenatal care as a crucial component of self-care during pregnancy. An implication of this is that future ANC (antenatal care) provisions have to emphasize psychological and emotional support, which may possibly motivate mothers to utilize more ANC contacts.

The finding reveals that individuals with an internal locus of control utilize antenatal care two times more than those with an external locus of control. This aligns with findings from Nigeria [39], Thomas Jefferson University [59] and Egypt [16]. While methodological differences between studies may somewhat limit these comparisons, it possibly shows that having an internal locus of control has a significant positive association with antenatal care utilization. A possible explanation for this may be that mothers with an internal locus of control believe that they are responsible for their health, and not powerful others, chance, or luck [59]. Consequently, this belief in personal agency may lead women to be more proactive in seeking and adhering to antenatal care recommendations, as they perceive their actions as directly influencing their pregnancy outcomes.

This study examined the association between women's empowerment dimensions and antenatal care utilization, aligning with global development initiatives such as the Sustainable Development Goals (SDGs). Beyond the variables available in the Ethiopian Demographic and Health Survey (EDHS), the study incorporated additional, commonly accepted dimensions of women's empowerment to

comprehensively evaluate their association with antenatal care utilization. When generalizing these findings, the scientific community should consider the following limitations: First, social desirability bias may have influenced responses due to the nature of the questionnaire. Second, the study's design limit establishing causal relationships.

Conclusion

This study, conducted in Jimma town public hospitals, highlights a significant association between women's empowerment and antenatal care (ANC) utilization, even amidst a considerable proportion of women achieving four or more ANC contacts. Crucially, dimensions of empowerment such as self-esteem, self-efficacy, locus of control, and labor work participation were all independently linked to adequate antenatal care utilization. This underscores the limitations of addressing maternal health solely through socioeconomic interventions. Achieving the Sustainable Development Goals and reducing maternal mortality through enhanced antenatal care utilization requires a deliberate and comprehensive focus on promoting women's empowerment across all settings.

Recommendations

Implement Targeted Empowerment Programs: Design and implement community-based programs specifically aimed at enhancing women's self-esteem, self-efficacy, and locus of control. These programs should integrate culturally relevant strategies, such as peer support groups, mentorship initiatives, and skills-building workshops that address women's perceived barriers to accessing and utilizing ANC services. Focus should be on rural settings where women's autonomy tends to be limited. Integrate Empowerment Messaging into Antenatal Care: Train healthcare providers to incorporate empowerment-focused communication strategies into routine antenatal care consultations. Health extension workers should also be trained on how to support and promote women empowerment within their communities.

Abbreviations

ANC	Antenatal Care
DHS	Demographic and Health Survey
EDHS	Ethiopian Demographic and Health Survey
JMC	Jimma Medical Center
LMICs	Low and middle-income countries
DHS	Demographic and Health Survey
SDG	Sustainable Development Goal
SPSS	Statistical Package for Social Science
SNNPE	Southern Nation Nationalities and Peoples of Ethiopia
SWPER	Survey-based Women empowerment
UN	United Nations
USA	United State of America
WHO	World Health Organization
MCH	Maternal and child healthcare

Author contributions

Y.A. designed the research study, conducted the research, analyzed the data, and prepared the draft manuscript. A.D. conducted the research, participated in the data analysis, and prepared the draft of the manuscript. K.A. participated in draft preparation and data analysis and critically reviewed and revised the manuscript.

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Data availability

The data used and analysed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethical approval and consent to participate

Ethical clearance was obtained from the Jimma University Institute of Health's Institutional Review Board (JUIRB/64/22). Written permission was obtained from the respective hospitals. All participants were informed of the purpose of the study and that their participation was voluntary. Informed written consent was obtained from all participants of legal age, informed consent was obtained from those aged less than the legal age, and informed consent was obtained from a partner or guardian. The participants were informed about the objectives of the study, any harm that the study may cause, and that the information they provide will be kept confidential, as only the aggregate information will be revealed in the study report. Finally, the authors confirmed that this study was conducted in accordance with the Declaration of Helsinki.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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