

Determinants of Frequency and Content of Antenatal Care in Postnatal Mothers in Arba Minch Zuria District, SNNPR, Ethiopia, 2019

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Background: Antenatal care is one of the strategies for reducing maternal morbidity and mortality directly by affording increased chances of early detection of high-risk pregnancies. WHO recommends a minimum of four ANC visits. In order to make it effective, monitoring of the content and quality of the ANC is needed. However, a number of studies focus on the frequency of ANC, and evidence on core contents of the ANC was limited in this study area. The aim of this study was to determine factors associated with content of the ANC.

Methods and Materials: A cross-sectional study design was employed to collect data from a total of 432 respondents by using a semi-structured questionnaire. Data were entered in EpiData version 3.1 and exported to SPSS version 20 for analysis. Both binary logistic regression and generalized linear regression with Poisson type were applied to determine factors associated with frequency of the ANC and core contents of ANC, respectively.

Results: The majority of the mothers (78.7%) visited first ANC lately, and 25.2% of mothers attended ≥ 4 ANC visits. Only 17.1% of mothers received all the eight selected elements of ANC services. Predictors of the core contents of the ANC were the frequencies of ANC (AOR: 0.84 (95%CI: 0.76–0.93), pre-pregnancy utilization of contraception (0.63 (95%CI: 0.55–0.72)), pregnancy desire (AOR: 0.82 (95%CI: 0.71–0.94), and birth preparedness and complication readiness (AOR: 0.90 (95%CI: 0.82–0.98).

Conclusion: This study found that low level of WHO minimum recommended ANC and core contents of the ANC. This study suggests that identifying pregnant mothers early increases frequency of the ANC, which improves core content of care.

Keywords: antenatal care, content of care, Ethiopia

Background

Despite progress and efforts made to tackle maternal and neonatal mortality and morbidity they remain an urgent concern and become a major public health problem in low income countries.^{1,2} Globally, near to 100% of maternal deaths occurred in developing countries and out of this, around two third deaths occurred in sub-Saharan Africa.^{1,3} However, the majority of these deaths can be prevented with cost effective interventions.⁴

Evidence has shown that antenatal care (ANC) can improve pregnancy outcomes through implementation of the WHO recommended strategies like early recognition and detection of pregnancy danger signs, birth preparedness and complication readiness, offering of preventive measures like TT vaccination, iron provision, and so on.^{5,6} Although ANC in developing countries has been applied

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for a long time and has made observable achievements, most ANC programs established in low and middle income countries are largely underachieved. According to the WHO 2015 report, in high-income countries, almost all women have at least four ANC visits, while only 40% of all pregnant women in low-income countries had the recommended ANC visits.⁷ As per a 2016 EDHS report, only 32% of pregnant women utilized the recommended ANC visits in Ethiopia.³ Recently, a number of studies reported that attending ANC before 16 weeks as a predictor for adequate ANC utilization even if it is a challenging issue.^{8,9}

The WHO recommends a minimum of four visits of ANC to improve maternal and newborn health.¹⁰ Despite that previous studies have revealed that, in addition to the number of ANC visits, the essential services covered by ANC visits greatly affect the effectiveness of the ANC.^{11,12} In order to make it effective, monitoring of the content and quality of ANC is needed, which include blood pressure measurement, tetanus toxoid vaccination, urine testing, iron tablet supplementation, body weight measurement, HIV testing and counseling about danger signs.^{13,14} However, a number of studies from around the globe reported very low level of content of ANC^{15–18} even if it increases utilization of subsequent services such as maternal, newborn, and the child health continuum of care like skilled birth attendants and postnatal care.^{19–21}

Ethiopian guidelines on prenatal care recommends a minimum of four ANC visit and quality service for women who experience positive pregnancy. It also recommends weight measurement, blood pressure measurement, blood, and urine sample examination, minimum of two doses of tetanus toxoid vaccination, HIV test, counseling on danger signs and nutrition, iron (90+) provision to all pregnant women through respectful maternity care. However, according to the Ethiopia Demographic Health Survey (2016) report, it is underutilized. For instance, 49% of women's last births were protected against neonatal tetanus, 75% blood pressure measured, 73% blood sample taken, 66% Urine sample taken, and 66% were counseled about nutrition.³ However, there were no data on percentages of mothers who received all the essential elements of ANC care. Furthermore, the majority of studies in sub-national level, mainly focused on timing and frequency of ANC visits rather than the content of ANC care.^{8,9,22–24} In addition, in this study area, there was limited evidence regarding the level and factors of content of ANC. Thus, the aim of this study was to assess the magnitude and

factors associated with frequency of the ANC, and to identify factors that facilitate or hinder the provision of the full contents of ANC.

Methods and Materials

Study Area

The study was conducted at Arba Minch Zuria Woreda, Gamo Zone, Southern Ethiopia, 454 km south of Addis Ababa, the capital city of Ethiopia. The study area has a total of 29 kebeles, of which, two are semi-urban and the remaining 27 are rural.

Study Design and Period

A community based cross-sectional study was conducted from 15 February to 15 March 2019.

Population

The source populations for this study were all postnatal (1–42 days postpartum) women in Arba Minch Zuria Woreda. The study populations were all postnatal (1–42 days postpartum) women who had at least one ANC visit in nine randomly selected kebeles of the Arba Minch Zuria district. Those women reside for <6 months and are critically ill will be excluded from this study.

Sample Size Determination

The single population proportion formula was used to determine sample size for this study. Twenty-two percent proportion of the overall contents of the ANC were obtained from a study in Bangladesh, and assuming 95% confidence level, 5% margin of error, design effect of 1.5, and 10% of nonresponse rate. The final sample size for this study was 436.¹⁵

Sampling Technique

To obtain the sampling frame, we used secondary data from health facilities. A total of 1316 postnatal women registered at different health facilities were used as sampling frame. A simple random sampling technique using a computer generated number was used to select a total of 436 eligible women in this study.

Data Collection Techniques, Tools and Personnel's

Data were collected by nine diploma nurses and supervised by three public health officers. Both data collectors and supervisors were given a one-day intensive training on

the data collection methods and instruments. All data were collected from women using an interviewer-administered questionnaire. The questionnaire was adapted from an EDHS tool, other related published literature and after considering constructing from Anderson's model for health care seeking.^{3,25} The household wealth index tool was adapted from EDHS.³ The houses of women were assessed by a local guide. Before data collection, pretesting was conducted on 5% of the sample (41 women) outside the study area. After conducting pretest, some modifications were made to alter unclear and confusing questions.

Data Quality Management

Training was given to the data collection team by the team of investigators with particular focus on the content of the questionnaire. A practical role-play on interviewing skills was exchanged between the data collection team. The questionnaire was initially prepared in English and translated to the local language by an expert in the language and finally back-translated by another expert to English to check its consistency with the original meanings. The final questionnaire in the local language was used for data collection. To minimize social desirability bias, women were interviewed in a separate private place in their own household compound.

Data Analysis

The data were analyzed using univariate (frequency distribution), bivariate and multivariate statistical methods. In univariate analysis, percentages were calculated for categorical variables. Chi-squared test was used for checking statistical significance for categorical variables in bivariate analyses.

For the content of ANC received which was the primary outcome variable in this study, ANOVA was used to check statistical significance. Multivariate statistical analyses using generalized linear models (GLM) approach were carried out to identify the determinants of content of ANC.²⁶ Since the contents of the ANC were count variable, Poisson regression was used. When checking assumption for Poisson regression model, it fulfills assumption of equal dispersion. Because of that Poisson regression was used in this study. Finally, the odd ratios and its 95%CI were used to report the statistical significance of the independent variables. The statistical software packages SPSS 20 is used for all statistical analysis.

For frequency of ANC, bivariate binary logistic regression analysis was done, and variables with p -value <0.25

was considered as a candidate for a multivariate logistic regression model. In multivariate logistic regression, variables with p -value <0.05 were reported as statistically significant. The association between frequency of ANC and explanatory variables was reported with AOR and its 95%CI.

Measurements of Variables

Dependent Variable

Primary response variable: content of care received during ANC visit content of care received during ANC: eight essential elements of ANC services were included in this study; blood pressure measurement, blood sample collection, urine sample collection, weight measurement, tetanus toxoid (TT2+) vaccination, iron folate (90+) supplementation, HIV testing, health education on danger signs and nutrition. The variable was measured as composite variable and had 0 and eight minimum and maximum scores, respectively. If the mother scored zero, she did not use any services and if she scored eight, she had used all services during ANC.^{15,16,27,28}

Contents of antenatal care received during pregnancy were assessed as questions like "Was your weight measured? Was your blood pressure measured?". The answers were recorded as Yes or No.

Secondary response variable: frequency of antenatal care is a dichotomous variable which was measured as whether mothers had four or more ANC visit or not.^{28,29}

Independent Variables

Household wealth index: a composite indicator of socio-economic status of women derived using principal component analysis based on information from housing characteristics and ownership of household durable goods. In this study, the factor scores of the first component were divided into quintiles.

Autonomy in household decision making: a woman was said to have autonomous decision-making power on seeking MNH service if she alone or jointly (with her husband) decides on seeking MNH services; otherwise (husband alone or a third person decides on seeking MNH services) she was categorized as nonautonomous.³⁰

Knowledge on key pregnancy danger signs: women were classified as knowledgeable if they spontaneously mentioned at least two of the four key danger signs of pregnancy (vaginal bleeding, severe headache, blurring of vision and feet or face swelling) if not they were classified as not knowledgeable.³¹

Women were classified under “well prepared” for birth and its complications when they reported that they have implemented five or more components of birth preparedness and complication readiness (BPCR) otherwise she was classified under “not well prepared”. The components of BPCR considered in this study were identified place for birth, identified birth attendants, saved money, identified emergency transportation, identified labor and birth companion, identified blood donors if needed, and identified caregiver to children at home when the mother was away.^{32,33}

Ethics Approval and Consent to Participate

Before the study was conducted ethical clearance was obtained from Arba Minch University, College of Medicine and Health Sciences institutional review board (IRB). Written informed consent was obtained from study participants for those aged 18 and above. For those participants, less than 18 years of age written informed consent was obtained from a parent or guardian using standard disclosure procedures. The confidentiality and privacy of participants were actively protected. All participants were assigned a unique identification number. Every effort was made to emphasize the voluntariness of this study and decisions to stop or discontinue in the study was respected. We confirmed that the study was conducted in accordance with the Declaration of Helsinki.

Results

Characteristics of Mothers

Table 1. Shows the sociodemographic characteristics of the respondents, the majority of mothers aged under 35 (87.2%), married (96.3%), protestants (68.6%), more than 33% of mothers were unable to read and write, and only 16.2% were educated secondary grade. Regarding the accessibility of health services, most of the mothers walked as a means of transport (83.1%), around half (51.4%) were insured under community based health insurance system, 79.6% were made decision by both themselves and their husbands.

Level of Antenatal Care Utilization

Table 2 shows obstetric characteristics of the study participants. The majority of the mothers (78.7%) visited the first ANC late, more than three quarters attended ANC 1–3 times (75.8%), and had attended ANC at the health center (58.5%). Most of the mothers had parity 1 or 2 (70%), had

Table 1 Sociodemographic Characteristics of Postnatal Mothers

Respondents Characteristics		n	%
Age (n=432)	18–24	93	21.5
	25–29	197	45.6
	30–34	88	20.4
	≥35	54	12.5
Marital status (n=432)	Single/divorced/ widowed	16	3.7
	Married	416	96.3
Religion (n=432)	Orthodox	255	30.8
	Protestant	568	68.6
	Others	5	0.6
Maternal educational status (n=432)	Unable to read or write	173	40
	Able to read or write	51	11.8
	Primary level of education	155	35.9
	Secondary and above	53	12.3
Employment status (n=432)	Unemployed	267	61.8
	Employed	165	38.2
Husband's educational status (n=432)	Unable to read or write	106	24.5
	Able to read or write	64	14.8
	Primary level of education	192	44.4
	Secondary education and above	70	16.2
Household wealth status (432)	Lowest	57	13.2
	Second	120	27.8
	Middle	81	18.8
	Fourth	88	20.4
	Highest	86	19.9
Means of transportation to health facilities (n=432)	By motorcycle/car	73	16.9
	On foot	359	83.1
Perceived required time to reach health facilities (n=432)	<30 min	252	58.3
	≥30 min	180	41.7
Exposure to mass media (radio/TV) (n=432)	Yes	240	55.6
	No	192	44.4
	Once a week	115	47.9
Membership of community based health insurance (CBHI) (n=432)	Yes	222	51.4
	No	210	48.6
Women's autonomy to maternity care (n=432)	Autonomous	344	79.6
	Not autonomous	88	20.4

planned the pregnancy (78%), had not well prepared the pregnancy and its complication (69.8%), currently using family planning method (68.1%).

Table 2 Obstetric History of the Respondents

Respondent's Characteristics	Category	Frequency	%
Pregnancy utilization of contraception (any modern methods) (n=432)	Yes	294	68.1
	No	138	31.9
Women's knowledge about key pregnancy danger signs (n=432)	Not knowledgeable	261	60.4
	Knowledgeable	171	39.6
Birth order (n=432)	First	73	16.9
	Second	95	22
	Third	121	28
	Four and above	143	33.1
Women's desire on recent pregnancy (n=432)	Planned	337	78
	Not planned	95	22
Time for first ANC visit (n=432)	At or after 16 weeks.	340	78.7
	Before 16 weeks.	92	21.3
BPCR (n=432)	Not well prepared	301	69.7
	Well prepared	131	30.3
Place for ANC (432)	Hospital	47	5.7
	Health center	484	58.5
	Health post	297	35.9
ANC providers	Skilled	290	64.8
	Unskilled	152	35.2
Frequency of ANC	1–3 ANC visit	323	74.8
	=+4 ANC visit	109	25.2

Determinants of Frequency of Antenatal Care

In multivariable logistic regression analysis time of first antenatal visit, ANC provider, family planning utilization before recent birth, planned for pregnancy, and perceived required time to reach health facilities were identified as significant predictors of frequency of the ANC (Table 4).

Mothers who started first ANC visit early (before three months) were 3.8 times more likely to attend ≥ 4 ANC than their counterparts (AOR: 3.8, 95%CI: 2.2–6.7). The odds of receiving adequate ANC (four or more) among mothers with planned for pregnancy were 2.6 times higher compared to those who had an unplanned pregnancy (AOR: 2.6, 95%CI: 1.1–6.9). Mothers who had obtained ANC services from a skilled provider had 1.8 times higher odds of receiving four or more ANC

visits than the mothers who had obtained ANC services from unskilled health personnel (AOR: 1.8, 95%CI: 1.1–3.2). The likelihood of attending four or more ANC visits were 3.3 times higher for mothers who reported the perceived required time to reach health facilities was less than 30 minutes compared to the mothers who reported the required time was greater than 30 minutes (AOR: 3.3, 95%CI: 1.8–6.1). Mothers who used pre-pregnancy contraceptive were four times more likely to attend ANC visits ≥ 4 compared to mothers who had not used contraception before recent birth (AOR: 4.0, 95%CI: 1.7–9.2) (Table 3).

Contents of Antenatal Care

In the current study, only 17.1% of mothers received all the eight selected elements of ANC services. Among the elements of ANC, blood pressure measurement was the most frequently used item by 78.5% mothers, closely followed by education on danger signs and nutrition by 78% mothers, weight measurement by 77.8% mothers. More than two thirds (67.4%) of mothers were reported to have blood tests. More than half (56.3%) of mothers were reported to have an HIV test, 53.2% had been vaccinated for tetanus, 54.4% had urine test, and 50% mothers reported that they were taking iron (90+) during the ANC visit.

Determinants of Contents of Antenatal Care

The analysis of this study found that four variables that determine the content of antenatal care. Frequency of antenatal care, birth preparedness and its complication readiness, pre-pregnancy contraceptive utilization, and pregnancy desire as significant predictors of receiving the items of ANC services.

Mothers who had less than four ANC visit were 16% less likely to receive items of ANC content (AOR: 0.84, 95%CI: 0.76–0.93). Pregnancy desire of mother's also revealed significant association with the use of ANC service. Mothers were found to have at least 18% lower odds of receiving items of ANC services if the pregnancy was unplanned at the time (AOR: 0.82, 95%CI: 0.71–0.94). Mothers with no history of utilization of contraception before recent birth had a lower chance of using the elements of ANC services than the mothers with a history of contraceptive utilization before recent birth (AOR: 0.63, 95%CI: 0.55–0.72). Mothers who were not well prepared for

Table 3 Results of Bivariable and Multivariable Logistic Regression Analysis to Identify Determinants of Frequency of Antenatal Care Visits

Variables	ANC Frequency				
	1–3 ANC (%)	≥4 ANC (%)	p-value	COR (95%CI)	AOR (95%CI)
Women's education status (n=432)					
Unable to read or write	149 (90.2)	24 (13.9)		1	1
Able to read or write	32 (72.5)	19 (37.3)	<0.001	3.7 (1.8–7.5) ^a	1.8 (0.7–4.6)
Primary level of education	110 (77.4)	45 (29)	0.001	2.5 (1.5–4.4) ^a	0.9 (0.4–2.1)
Secondary and above	32 (73.6)	21 (39.6)	<0.001	4.1 (2.0– 8.2) ^a	1.5 (0.6–3.9)
Respondents age (n=432)					
18–24	67 (78)	26 (22)	0.02	3.1 (1.2–8.1) ^a	1.0 (0.5–2.3)
25–29	141 (71.6)	56 (28.4)	0.01	3.2 (1.3–7.8) ^a	1.1 (0.4–2.9)
30–34	67 (76.1)	21 (23.9)	0.06	2.5 (0.9–6.7) ^a	0.6 (0.2–2.3)
≥35	48 (88.9)	6 (11.1)		1	1
Husbands education					
Unable to read and write	92 (86.8)	14 (13.2)		1	1
Able to read and write	56 (87.5)	8 (12.5)	0.894	0.9 (0.4–2.4)	0.6 (0.2–1.8)
Primary level of education	127 (66.1)	65 (33.9)	<0.001	3.4 (1.8–6.4) ^a	1.5 (0.7–3.3)
Secondary and above	48 (68.6)	22 (31.4)	0.004	3.0 (1.4–6.4) ^a	1.3 (0.5–3.2)
Wealth index (n=432)					
Lowest	41 (71.9)	16 (28.1)		1	
Second	116 (96.7)	4 (3.3)	<0.001	0.08 (0.03–0.3)	
Moderate	53 (65.4)	28 (34.6)	0.42	1.3 (0.6–2.8)	
Fourth	56 (63.6)	32 (36.4)	0.31	1.5 (0.7–3.0)	
Highest	57 (66.3)	29 (33.7)	0.47	1.3 (0.6–2.7)	
Women's employment status (n=432)					
Nonemployed	191 (71.5)	76 (28.5)		1	
Employed	132 (80)	33 (20)	0.05	0.6 (0.4–1.0) ^a	0.9 (0.5–1.6)
Means of transportation (n=432)					
By foot	268 (74.7)	91 (25.3)		1	
By motorcycle/car	55 (75.3)	18 (24.7)	0.901	0.9 (0.6–1.7)	
Perceived required time to reach health facilities (n=432)					
≥30 min	159 (91.1)	21 (11.7)		1	1
<30 min	164 (74.6)	88 (34.9)	<0.001	4.0 (2.4–6.9) ^a	3.3 (1.8–6.1) ^b
Exposure to mass media (n=432)					
No	148 (77.1)	44 (22.9)			
Yes	175 (72.9)	65 (27.1)	0.32	1.2 (0.8–1.9)	
Women decision making (n=432)					
Autonomous	256 (74.4)	88 (25.6)	0.74	1.1 (0.6–1.9)	
Nonautonomous	67 (76.1)	21 (23.9)			
Membership of CBHI (n=432)					
No	168 (80)	42 (20)		1	
Yes	155 (69.7)	67 (30.2)	0.015	1.7 (1.1–2.7) ^a	1.1 (0.5–2.3)
Prepregnancy utilization of contraception (n=432)					
No	120 (86.3)	19 (13.7)		1	1
Yes	203 (69.3)	90 (30.7)	<0.001	8.5 (4.0–18.0) ^a	4.0 (1.7–9.2) ^b

(Continued)

Table 3 (Continued).

Variables	ANC Frequency				
	1-3 ANC (%)	≥4 ANC (%)	p-value	COR (95%CI)	AOR (95%CI)
Knowledge on key pregnancy danger signs (n=432)					
Not knowledgeable	203 (77.8)	58 (22.2)		1	1
Knowledgeable	120 (70.2)	51 (29.8)	0.07	1.5 (0.9–2.3) ^a	1.6 (0.9–2.6)
Birth order (n=432)					
First	52 (71.2)	21 (28.8)	0.16	1.6 (0.8–3.0) ^a	1.5 (0.7–3.4)
Second	72 (75.8)	23 (24.2)	0.47	1.3 (0.7–2.3)	0.9 (0.4–2.0)
Third	85 (70.2)	36 (29.8)	0.07	1.6 (0.9–3.0) ^a	1.2 (0.6–2.3)
Four and above	114 (79.7)	29 (20.3)		1	1
Desire on pregnancy (n=432)					
Not planned	81 (81.8)	18 (18.2)		1	1
Planned	242 (72.7)	91 (27.3)	<0.001	6.5 (2.7–15.4) ^a	2.6 (1.1–6.9) ^b
ANC provider (n=432)					
Skilled	196 (70)	84 (30)	0.002	2.2 (1.3–3.6) ^a	1.8 (1.1–3.2) ^b
Nonskilled	127 (85.6)	25 (16.4)			
Time for first ANC booking (n=432)					
At or after 16 weeks	277 (81.5)	63 (18.5)		1	
Before 16 weeks	46 (50)	46 (50)	<0.001	4.4 (2.7–7.2) ^a	3.8 (2.2–6.7) ^b
BPCR (n=432)					
Not-well prepared	239 (79.4)	62 (20.6)		1	1
Well Prepared	84 (64.1)	47 (35.9)	0.001	2.2 (1.4–3.4) ^a	1.3 (0.8–2.3)

Notes: p-value, ^aindicates variable candidates for multivariate logistic regression; p-value, ^bindicates variables significant in multivariate logistic regression; 1 reference category.

Abbreviations: AOR, adjusted odds ratio; COR, crude odds ratio.

pregnancy and its complications were 10% less likely to receive items of ANC (AOR: 0.90, 95%CI: 0.82–0.98) (Table 4).

Discussion

This study revealed low levels of WHO's recommended minimum ANC visits by mothers (25.2%). Receiving ANC from a skilled provider, perceived required time to reach health facilities, wanted pregnancy, modern contraceptive utilization, time for ANC visit were identified as predictors of frequency of ANC. However the recent report of the EDHS (2019) revealed four or more ANC of 43%.³⁴ This indicates unsatisfactory compliance with WHO's recommendations on optimal antenatal care visits in Ethiopia.

In this study, mothers who had received ANC care from health professionals were more likely to complete the recommended ANC visits compared to their counterparts. This is inconsistent with studies conducted

elsewhere.^{15,35,36} The result suggested that provision of ANC services by skilled professionals increased the chance of adequate ANC visit.

The current study found a significant association between time spent to reach health facilities and frequency of ANC visits. Mothers spending more than 30 min to reach health facilities were less likely to attend adequate ANC compared to their counterparts. Although there is a strong recommendation of universal access to health services and reducing financial hardship, still there is regional variation in easy access to health services.^{37,38} This implies that outreach service should be strengthened to avail maternal services to mothers who reside some distance from the nearest health facilities.

According to this study, time for an ANC visit is identified as a factor of the frequency of the ANC. Those mothers who started ANC early or before 16 weeks were more likely to attend ≥4 ANC compared to late visitors. This is in line with a study elsewhere.³⁸ This is may be due

Table 4 Results of the Multivariable Generalized Linear Regression Analysis with Poisson Log Link to Identify the Determinants of Utilization of Contents of ANC Visits

Variables	Mean of Number of ANC Items	p-value	AOR (95%CI)
Women's education status (n=432)		<0.001	
Unable to read or write	3.9		0.87 (0.73–1.04)
Able to read or write	5.3		0.92 (0.77–1.09)
Primary level of education	6.0		0.95 (0.83–1.04)
Secondary and above	6.5		1
Respondents age (n=432)		<0.001	
18–24	5.1		1.09 (0.88–1.34)
25–29	5.5		1.11 (0.93–1.32)
30–34	5.1		1.06 (0.89–1.27)
≥35	3.7		1
Husbands education (n=432)		<0.001	
Unable to read and write	3.7		0.98 (0.82–1.17)
Able to read and write	4.3		0.95 (0.80–,1.13)
Primary level of education	5.9		1.02 (0.91–1.16)
Secondary and above	5.8		1
Wealth index (n=432)		<0.001	
Lowest	5.1		0.97 (0.83–1.14)
Second	3.6		0.93 (0.79–1.10)
Moderate	5.4		1.02 (0.88–1.17)
Fourth	6.2		1.01 (0.88–1.14)
Highest	6.0		1
Women's employment status (n=432)		<0.001	
Nonemployed	5.5		1.02 (0.92–1.13)
Employed	4.5		1
Means of transportation (n=432)		0.096	
By foot	5.2		
By motorcycle/car	4.8		
Perceived required time to reach health facilities (n=432)		<0.001	
≥30 min	4.0		0.93 (0.83–1.04)
<30 min	6.0		1
Exposure to mass media (n=432)		0.019	
No	4.88		1.00 (0.91–1.10)
Yes	5.37		1
Women decision making (n=432)		0.027	
Autonomous	5.03		0.95 (0.86–1.06)
Nonautonomous	5.61		1
Membership of CBHI (n=432)		<0.001	
No	4.3		0.96 (0.85–1.09)
Yes	5.9		1
Prepregnancy utilization of contraception (n=432)		<0.001	
No	2.9		0.63 (0.55–0.72)
Yes	6.2		1
Knowledge on key pregnancy danger signs (n=432)		0.71	
Not knowledgeable	5.18		
Knowledgeable	5.10		

(Continued)

Table 4 (Continued).

Variables	Mean of Number of ANC Items	p-value	AOR (95%CI)
Birth order (n=432)		0.014	
First	5.16		0.98 (0.82–1.18)
Second	5.09		0.97 (0.84–1.13)
Third	5.64		0.98 (0.87–1.11)
Four and above	4.77		I
Desire on pregnancy (n=432)		<0.001	
Not planned	3.1		0.82 (0.71–0.94)
Planned	5.7		I
ANC provider (n=432)		0.007	
Skilled	5.36		1.04 (0.94–1.15)
Nonskilled	4.76		I
Time for first ANC booking (n=432)		<0.001	
At or above three months	4.88		0.94 (0.84–1.04)
Before three months	6.14		I
Frequency of ANC		<0.001	
1–3 ANC visits	4.5		0.84 (0.76–0.93)
≥4 visits	7.1		I
BPCR (n=432)		<0.001	
Not well prepared	4.66		0.90 (0.82–0.98)
Well prepared	6.28		I

Note: I reference.

Abbreviations: AOR, adjusted odds ratio; COR, crude odds ratio.

to early visitors having more time to attend. This is explained by community extension workers should screen and identify pregnancy early. Existing evidence indicates community engagement can be effective in increasing access to early ANC.

The study finding indicates the overall utilization of the items of ANC was 17.1% (95%CI: 13.2–20.6) which is consistent with a study in Uganda, while lower when compared to studies in Nepal and Bangladesh.^{15,28,39} This might be due to national variation on the minimum recommendation of ANC visits.

The number of antenatal visits is identified as a factor that affects the utilization of ANC content. This is explained as the higher number of ANC visits might maximize the likelihood of items of the ANC. This is supported by studies conducted elsewhere.^{15,17,18,39} Moreover, the WHO came up with the new ANC model, which recommends eight contacts which might increase utilization of contents of antenatal care so that this finding implies the policy makers should strengthen the implementation of the new model of ANC.⁴⁰ In addition, awareness creation sessions should be there to help mothers

understand the effect of frequent visits as recommended by a health professional.

This study shows that having of history of prepregnancy contraceptive utilization before recent birth positively predicts receiving of both adequate ANC and content of the ANC. This finding is supported by studies from Nepal, Bangladesh, and Uganda.^{15,28,39} This might be due to family planning helping mothers to have children in the right spacing and hence allow them the resources and time to attend the next antenatal visits with ease. Researchers also reflect on the provision of education on family planning during antenatal visits.

In this study pregnancy desire is significantly associated with both the frequencies of the ANC and utilization of items of the ANC. The probability of receiving a higher number of items and attending more ANC visits was lower for mothers who had an unplanned pregnancy compared to planned pregnancy. This finding is in line with studies elsewhere.^{15,22,41} The finding indicates that mothers are usually less careful about receiving ANC services in the case of an unwanted pregnancy. In addition, this might be due to women who had an unplanned pregnancy, attended ANC care late, and accessed fewer full

items of ANC.^{17,22,42} Thus, the policy makers should strengthen the implementation of strategies that decrease unplanned pregnancies. Moreover, early identification of women with unplanned pregnancy by health workers should be strengthened.

This study indicate that mothers who were well prepared for birth and ready for its complications were more likely to receive items of ANC. This might be due to well-prepared mothers who were more aware about preventive measures of pregnancy-related complications, and who seek care for it from health professionals.⁴³⁻⁴⁵ Moreover, the WHO recommends birth preparedness and complication readiness in order to increase skilled birth and to reduce postpartum related complications.⁷ Researchers also believe that BPCR increases visits for subsequent maternal health care.³³

Limitation of the Study

This study had both strengths and limitations. There was limited evidence on the determinants of the contents of ANC in this study area. Thus, it adds inputs at local and policy level. It also improves ANC service implementation at health facilities. Since this study is cross sectional, no cause and effect relationship was reported. In addition, social desirability bias could be another limitation.

Conclusion

The findings of this study showed a low level of WHO minimum recommended ANC and core contents of the ANC. This finding implies that the government should focus on not only on the frequency of ANC visits, but also give attention to care contents. In this study pre-conception care like prepregnancy contraceptive utilization was identified as a determinant for both frequencies of the ANC and the contents of ANC care. This implies policy makers and concerned government bodies should give attention to strengthening the implementation of pre-conception care.

Since this study is cross sectional, it is difficult to conclude as frequency of ANC does indeed influence the content of the ANC. Therefore, further study with analytic and experimental design might support these findings.

In this study, time for the first ANC visit was significantly associated with ANC frequency while not with core contents of ANC even if a number of previous studies found its association. Consequently, further study focusing on time for ANC visits.

Abbreviations

AOR, adjusted odds ratio; ANC, antenatal care; BPCR, birth preparedness and complication readiness; HEWs, health extension workers; MMR, maternal mortality ratio; PCA, principal component analysis; WHO, World Health Organization.

Data Sharing Statement

The data used to support the findings of this study are available from the corresponding author upon request via email address of derehaile2010@gmail.com

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave 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 work.

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