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Assessment of modern maternal health care usage in Ethiopia

Dessalew Sheferaw Yesuf * , College of Natural & Computational Sciences, University of Gondar, P.o. Box 196, Gondar, Ethiopia.
Biset Yalew Abera , College of Social Science and the Humanities, University of Gondar, P.o.Box 196, Gondar, Ethiopia.

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Abstract

Ethiopia, like many developing nations, has struggled with the problem of low utilization of maternal healthcare services. The main objective of this study is to investigate the awareness and application of modern maternal healthcare usage and to identify the determinant factors that affect the usage of modern maternal healthcare services in Ethiopia. A quantitative approach to the survey questionnaire was employed. A simple random sampling technique was used to select 240 respondents from a sample of women aged between 18 and 49. Using statistical software, the collected data were analyzed using categorical variable tests and binary logistic regression. The findings showed that, from the total of 240 respondents, some of the respondents had not attended Antenatal care, delivery care, and postnatal care. Therefore, from the findings of the study, the researchers have concluded that to increase health care utilization, the concerned bodies should be expanding access to health services, improving the quality of antenatal care services, conducting awareness-raising promotions, and providing training for health workers to increase their skills and professional ethics.

Keywords: Health care; maternity; modern health care service; women.

* ADDRESS FOR CORRESPONDENCE: Dessalew Sheferaw Yesuf, College of Natural & Computational Sciences, University of Gondar, P.o. Box 196, Gondar, Ethiopia.
E-mail: dessheferaw33@gmail.com

1. Introduction

Maternal health refers to the health of women during pregnancy, childbirth, and the postpartum period. The importance of maternal health care services in reducing maternal and infant morbidity and mortality has received increasing recognition since the International Conference on Population and Development (ICPD) in Cairo. The utilization of maternal health care is one of the important factors in reducing the incidence of maternal mortality (Mehari, 2012; August et al., 2022; Magunda et al., 2023; Li et al., 2023).

The concepts that apply to maternal death and its determinants have been well documented, and the health care solutions for preventing and treating complications during pregnancy are available. The majority of maternal and prenatal deaths could be avoided by accessing basic maternity care, which is supported by adequate medical and surgical care and some sort of knowledge or empowerment (Kwast, 1996; Sheikh et al., 2023; Das et al., 2024). Therefore, the problem related to the health of women is at the time of pregnancy, childbirth, and the postpartum period. According to WHO (2010) and Who (2004) estimation of 570,000 women die each year from carelessness related to women's health in Africa. The availability of maternal health care services and the usage of these services in a modern way should decrease maternal deaths. But good supply doesn't create demand by itself. This shows that there are factors other than healthcare service characteristics that influence the use of maternal healthcare services (Fathnezhad-Kazemi et al., 2022).

Furthermore, women are the most responsible body for the family's welfare. Women's health plays an important role in determining the health of the future population because women's health has an intergenerational effect. The utilization of the existing facilities for delivery was also low, which is inadequate to reduce maternal deaths and attain the MDG target in Gondar city. This indicates the service was not brought to the desired level shown by Meseret, et al., (2009).

1.1. Purpose of study

The objective of the study is to investigate modern maternal healthcare usage in Gondar City, Amhara National Regional State, Ethiopia. Consequently, this study was designed to address the following basic questions regarding modern maternal healthcare services:

- What are the factors affecting the utilization of modern maternal health care services?
- Which components of maternal health care services are more used by study area women (antenatal care, delivery care, or postnatal care)?

2. Methods and Materials

The methodology for the proposed study has been chosen to acquire information and demonstrate a pattern linking modern maternal healthcare usage and inadequate health service engagement over time. Past research has examined the links between these constructs in pairs but has not examined how modern maternal healthcare usage and service accessibility work together.

2.1. Participants

Thus, the study was conducted on 240 mothers in Gondar city. The outcome variables in this study are binary, assuming two outcomes (0 = not using, 1 = using healthcare. Sampling methods or techniques are the scientific technique of selecting representatives of the target population to provide the required estimation. The sampling method used in this study was a simple random sampling procedure and selected sample units (women) by using the random number method. Simple random sampling (SRS) is the most basic probability sampling technique, in which every individual unit (member) of the population has an equal probability of being included (Cochran, 1977).

2.2. Data collection instrument

A quantitative approach to the survey questionnaire was employed. Informed consent was sought from all participants. The data are organized by the objective of the study. The researchers used theme analysis to display only a subset of the questionnaire replies.

2.3. Analysis

The research should be described by using frequency and percentage. The second method is inferential statistics. *The researchers used logistic regression in this study.*

$$\theta(x) = \frac{e^{\beta o+\beta 1X1+\beta 2X2+\beta 3X3+\cdots+\beta kXk}}{1+e^{\beta o+\beta 1X1+\beta 2X2+\beta 3X3+\cdots+\beta kXk}}$$

Where, β_0 = the constant β_i = the coefficient

An alternative form of the equation is;

$$logit[\theta(x)] = log\left[\frac{\theta(x)}{1-\theta(x)}\right] = \beta o + \beta 1X1 + \beta 2X2 \ldots\ldots + \beta kXk$$

2.3.1. Model Assumptions

- ✓ Does not assume a linear relationship between outcome and explanatory variables.
- ✓ The Outcome variables are not normally distributed
- ✓ The outcome variables need not be homoscedastic and explanatory variables need no homogeneity of variance.
- ✓ Error terms are not assumed.
- ✓ The model is not negative that the explanatory variables be continuous.
- ✓ The outcome variables are dichotomous and the explanatory variables are categorical or continuous.

The analysis of the model is based on odds ratio.

$$odd = \frac{p}{1-p}$$

3. Results

This study assessed the modern maternal healthcare usage in the city of Gondar. The sample consisted of 240 women who were living in the city of Gondar, who were 18 to 49 years of age.

Table 1

Participant demographics

Components	Categories	Frequency(percent)
Antenatal care(ANC)	No	65(27.1)
	Yes	175(72.9)
Delivery care(DC)	No	69(28.8)
	Yes	171(71.2)
Postnatal care(PNC)	No	125(52.1)
	Yes	115(47.9)

Table 1 shows that from the total number of sample 240; 27.1% of the respondents did not attend ANC and 72.9% of the respondents attended ANC. 28.8% of mothers did not attend delivery care and 71.2% of mothers attended delivery care. 52.1% of the respondents not use PNC and 47.9% of the respondents used PNC.

Table 2

summary of descriptive statistics

		ANC	Delivery care	PNC
Explanatory variable	Categories	Frequency (Percent)	Frequency (percent)	Frequency (Percent)
age of mothers	15-24	103(42.9)	103(42.9)	103(42.9)
	25-34	78(32.5)	78(32.5)	78(32.5)
	35-49	59(24.6)	59(24.6)	59(24.6)
religion of mothers	Orthodox	95(39.6)	96(40.0)	95(39.6)
	Protestant	85(35.4)	84(35.0)	85(35.4)
	Muslim	48(20.0)	48(20.0)	48(20.0)
	Others	12(5.0)	12(5.0)	12(5.0)
marital status	Married	198(80.0)	198(80.0)	198(80.0)
	Divorced	27(11.3)	27(11.3)	27(11.3)
	Unmarried	15(8.8)	15(8.8)	15(8.8)
the educational level of mothers	Uneducated	93(38.8)	93(38.8)	60(25.0)
	Primary	71(29.6)	71(29.6)	87(36.3)
	secondary and above	76(31.7)	76(31.7)	93(38.8)
the educational level of husbands	Uneducated	10(4.2)	10(4.2)	36(15.0)
	Primary	48(20.0)	48(20.0)	48(20.0)
	secondary	154(64.2)	154(64.2)	138(57.5)
	First-degree and above	28(11.7)	28(11.7)	18(7.5)
occupation of mothers	Housewife	99(41.3)	99(41.3)	99(41.3)
	own business	74(30.8)	74(30.8)	74(30.8)
	private employee	28(11.7)	28(11.7)	28(11.7)
	public employee	38(15.8)	38(15.8)	38(15.8)
	Others	1(.4)	1(.4)	1(.4)
Occupation of husband's	own business	61(25.4)	61(25.4)	57(23.8)
	private employee	73(30.4)	73(30.4)	73(30.4)
	public employee	75(31.3)	75(31.3)	75(31.3)
	Others	31(12.9)	31(12.9)	35(14.6)
average household income	less than 500	77(32.1)	77(32.1)	54(22.5)
	501-1500	60(25.0)	60(25.0)	65(27.1)
	1500 and above	57(23.8)	57(23.8)	67(27.9)
awareness	No	128(53.3)	112(46.7)	128(53.3)
	Yes	112(46.7)	128(53.3)	112(46.7)
Source of information	mass media	30(12.5)	30(12.5)	30(12.5)
	from the society	20(8.3)	20(8.3)	20(8.3)
	health institution	51(21.3)	51(21.3)	51(21.3)
	Others	10(4.2)	10(4.2)	10(4.2)
mothers birth order	Once	42(17.5)	42(17.5)	42(17.5)
	Twice	49(20.4)	49(20.4)	49(20.4)
	Three times	75(31.3)	75(31.3)	75(31.3)
	Four times and above	74(30.8)	74(30.8)	74(30.8)
Intended of pregnant	No	126(52.5)	126(52.5)	126(52.5)
	Yes	114(47.5)	114(47.5)	114(47.5)
access to health service	No	126(52.5)	126(52.5)	121(50.4)
	Yes	114(47.5)	114(47.5)	119(49.6)
cause for don't attend	lack of awareness	96(40.0)	96(40.0)	95(39.6)

	waiting time	70(29.2)	70(29.2)	69(28.8)
	payment status	27(11.3)	27(11.3)	30(12.5)
	due to distance	47(19.6)	47(19.6)	46(19.2)
The quality of ANC	very good	58(24.2)	82(34.2)	59(24.6)
	Medium	80(33.3)	43(17.9)	67(27.9)
	Low	92(38.3)	69(28.8)	61(25.4)
Professional ethics of health workers	very good	71(29.6)	71(29.6)	87(36.3)
	Medium	64(26.7)	64(26.7)	74(30.8)
	Bad	105(43.7)	103(42.9)	78(32.5)
cause for don't attend	payment status	6(2.5)	6(2.5)	6(2.5)
	professional ethics of workers	80(33.3)	80(33.3)	80(33.3)
	ability of midwife	59(24.6)	59(24.6)	59(24.6)
	lack of equipment	94(39.2)	94(39.2)	94(39.2)
	Others	1(.4)	1(.4)	1(.4)
the ability of delivery	Low	143(59.6)	142(59.2)	154(64.2)
	Medium	79(32.9)	21(8.8)	70(29.2)
	High	18(7.5)	73(30.4)	12(5.0)

In Table 2, from the total number of sampled 240 mothers, the average monthly household income of 41.2%, 35%, and 23.8% of the respondents was less than 500 birr, 501–1500 birr, and 1500 and above, respectively. The awareness of respondents about maternal health care services was low; 53.3% of the respondents said "no" and 46.7% of the respondents said "yes". 52.5% of the respondents said that there was no full access to health services in kebele-18. 47.5% of the respondents decided that there was full access to health services in kebele-18. There was a lower number of respondents who said "yes" compared to those who said "no".

Regarding the quality of ANC, 24.2%, 33.3%, and 38.3% of the respondents said that it was very good, medium, and low, respectively. Regarding the professional ethics of health workers, 29.6%, 26.7%, and 43.7% of the respondents said that very good, medium, and bad were, respectively.

3.1. 2 Bi-variate analysis

The bi-variate results are presented as follows:-

Table 3

The results of the bi-variate analysis

Variables	ANC Sig.	Delivery care Sig.	PNC Sig.
Religion of mothers		0.049	
Husband occupation	0.024	0.000	
Household income	0.012		
Awareness about maternal health care	0.000		
Source of information	0.001	0.000	
Access to health service	0.04		
Quality of ANC	0.000	0.001	
Cause do not attend ANC	0.001	0.000	
Attended birth order	0.000	0.000	0.000
Ability of delivery		0.000	0.001
Professional ethics	0.000		0.08

3.2. 3 Test the overall goodness of fit of the model

Table 5

Classification Table for ANC

Observed			ANC		Predicted Percentage Correct
			no	Yes	
Step 1	ANC	No	135	13	91.2
		Yes	18	74	80.4
	Overall Percentage				87.1

From the total of 240 sampled mothers, 87.1% were correctly predicted (Table 5). The sensitivity is given by 80.4% and the specificity is given by 91.3%, which indicates 80.4% of ANC used and 91.2% of ANC not used.

Table 6

Model Summary for ANC

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	137.524(a)	.532	.722

Cox and Snell's R^2 has the disadvantage that for discrete models (such as logistic regression) it may not achieve the maximum value of one, even when the model predicts all the outcomes perfectly (table 6).

3.3. 4 Binary logistic regression analyses

Binary logistic regression result for ANC

Table 7

Variables in the Equation for ANC

Variables	B	S.E.	Wald	Df	Sig.	Exp(B)	95.0% C.I	
							Lower	Upper
Income			13.211	3	.004			
Income(1)	-.709	.714	.984	1	.321	.492	.121	1.996
Income(2)	1.139	.785	2.105	1	.047	3.123	.671	14.54
awareness(1)	1.893	.580	10.658	1	.001	6.638	2.131	20.68
Source of information			12.464	3	.006			
Source of information(1)	.914	.894	1.044	1	.307	2.493	.432	14.39
Source of information(2)	-1.600	.983	2.650	1	.104	.202	.029	1.386
Source of information(3)	-.235	.943	.062	1	.803	.791	.125	5.021
Access of health services(1)	1.589	.542	8.598	1	.003	4.900	1.694	14.17
Attended birth order			16.707	3	.001			
Attended birth order(1)	1.988	.767	6.727	1	.009	7.304	1.625	32.81
Attended birth order(2)	3.791	.951	15.897	1	.000	44.29	6.872	285.57
Attended birth order(3)	1.641	.843	3.788	1	.052	5.159	.989	26.92
Quality of services			13.023	3	.005			
Quality of services(1)	1.168	.796	2.149	1	.143	3.215	.675	15.31

Quality of services(2)	1.229	.684	3.230	1	.072	3.419	.895	13.06
Quality of services(3)	-1.307	.760	2.957	1	.085	.271	.061	1.200

In Table 7, the effect of each variable on the status of use of ANC services The results show that the age, religion, and marital status of mothers, mother education, husband education, and husband occupation are not significant indicators of the use of ANC services. The estimated ratio of those whose household income is greater than 1500 birr as compared to those whose household income is less than 500 is 3.123, 95% CI: (0.671, 14.54). This implies that the utilization of ANC by mothers whose household income is greater than 1500 are about 3.123 more likely to use ANC than mothers whose household income is less than 500 (reference group).

The mothers can have awareness about the health care services as compared to those mothers who have no awareness is 6.638, 95% CI:(2.131, 20.682). Utilization of ANC mothers who have awareness is more likely to use 6.638 relative to mothers who do not have awareness, controlling for all the other variables in the model. Controlling for all other variables in the model, mothers who said they had access to health care were 4.9 times more likely than mothers who said they did not. At their second and third birth orders, women are about 7.304 and 44.299 times more likely to use ANC as compared to the mothers at their first birth order. 7.304, 95% CI: (1.625, 32.818) and 44.299, 95% CI: (6.872, 285.575) respectively.

Binary logistic regression result

Table 8

For Delivery care

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I Lower	Upper
Religion			8.478	3	.037			
Religion(1)	2.936	1.24	5.555	1	.018	18.848	1.640	216.6
Religion(2)	1.961	1.24	2.478	1	.115	7.107	.619	81.66
Religion(3)	3.196	1.33	5.726	1	.017	24.428	1.783	334.6
Husband education			7.645	3	.054			
Husband education(1)	1.328	1.54	.739	1	.390	3.774	.183	78.03
Husband education(2)	1.874	1.49	1.577	1	.209	6.514	.350	121.4
Husband education(3)	3.093	1.35	5.179	1	.023	22.053	1.536	316.5
Husband occupation			10.95	3	.012			
Husband occupation(1)	-2.718	1.46	3.452	1	.063	.066	.004	1.161
Husband occupation(2)	-4.321	1.50	8.270	1	.004	.013	.001	.253
Husband occupation(3)	-2.922	1.40	4.307	1	.038	.054	.003	.850
Mother education			3.280	2	.194			
Mother education(1)	.481	.571	.709	1	.400	1.617	.528	4.954
Mother education(2)	-.548	.581	.887	1	.346	.578	.185	1.807
Awareness(1)	.908	.509	3.189	1	.074	2.480	.915	6.721
Attended birth order			35.56	3	.000	40.965	11.24	
Attended birth order(1)	3.713	.660	31.66	1	.000		2.313	149.2
Attended birth order(2)	2.448	.821	8.887	1	.003	11.566	7.785	57.832
Attended birth order(3)	3.452	.714	23.36	1	.000			
Quality of services	-2.222	.618	13.01	2	.001	31.553	.032	127.89
Quality of services(1)	-1.964	.748	12.91	1	.000	.108	.032	

Quality of services(2)	-5.857	1.611	6.904	1	.009	.140	.364
Constant			13.21	1	.000	.003	.607

The results of the overall sample show that the mother's religion, husband's occupation, quality of ANC, and attended birth order are predictors that affect the utilization of delivery care services in Gondar City (table 8). Other variables such as age, marital status, mother's occupation, education, and awareness, among others, are not significant. The odds of using a delivery care service are about 98.7% and 94.6% less likely when mothers whose When compared to mothers with the first birth order, mothers with the second, third, or fourth birth orders were 40.965, 11.566, and 31.553 times more likely to attend. Those whose husband's occupation is a public employee and others, as compared to mothers whose husband's occupation has their own business, is 0.013, 95% CI: (0.001, 0.253) and 0.054, 95% CI: (0.003, 0.850) respectively.

When mothers who attended second, third, or fourth or higher birth orders as is awarded to mothers for other birth orders is 40.965, 95%husband's 1.241, 149.2has their 11.5business, CI: (2.313, 57.832) and 31.553, 595% CI: (7.785, 127.893).

The odds of using services were about 90% and 86% less likely when mothers said "medium" and "low," as compared to mothers who said "very good. The quality of care services was 0.108, 95% confidence interval: (0.032, 0.364), and 0.140, 95% confidence interval: (0.032, 0.607), respectively.

Binary logistic regression result for PNC

Table 9

Result for PNC

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I	
							Lower	Upper
Ability of delivery			8.305	2	.016			
Ability of delivery(1)	1.663	.627	7.042	1	.008	5.275	1.544	18.016
The ability of delivery(2)	.650	.392	2.753	1	.097	1.916	.889	4.130
Professional ethics			6.969	2	.031			
Professional ethics(1)	-1.12	.445	6.294	1	.012	.327	.137	.783
Professional ethics(2)	-.679	.401	2.868	1	.090	.507	.231	1.113
Constant	-2.20	.606	13.196	1	.000	.111		

Table 9 shows the odds of using postnatal care services were about 5.275 more likely when mothers who said medium as compared to mothers who said low about the ability of delivery was 5.275, 95% CI: (1.544, 18.016).

The odds of using postnatal care services were about 67.3% less likely when mothers who said medium as compared to mothers who said very good about the professional ethics of health workers was 0.327, 95% CI: (0.137, .783).

4. Discussion

The findings showed that, from the total of 240 respondents, 27.1% of the respondents had not attended ANC and 72.9% of the respondents were attending ANC. 28.8% of mothers were not attending delivery care and 71.2% of mothers were attending delivery care. 52.1% of the respondents did not use PNC and 47.9% of the respondents used PNC.

Utilization has an association with the occupation of husbands, income, awareness about health care, access to services, quality of antenatal care services, and the professional ethics of health workers.

Utilization of delivery care is related to religion; educational level of mothers; educational level of husbands; occupation of mothers; occupation of husbands, quality of antenatal care services; and utilization of postnatal care is related to the occupation of mothers, awareness of maternal health care, ANC-attended birth order, professional ethics, and ability of delivery.

5. Conclusions

The utilization of maternal health care is one of the important factors in reducing the incidence of maternal mortality. The main objectives of this study were to determine factors affecting the utilization of modern healthcare services in kebele-18 in Gondar sub-town. From the empirical results, the major factors for ANC services were income, awareness, access to health services, and birth order.

The level of awareness of women about the utilization of maternal health care in the city was low. The utilization of maternal health care services in kebele-18 was different in different components of maternity. ANC services were used more frequently by kebele-18 women than delivery care and postnatal care services, while postnatal care services were used less frequently by Gondar city women than delivery care services.

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