Quality of antenatal care and associated factors among pregnant women attending government hospitals in Sidama Region, Southern Ethiopia

Assefa Philipos Kare(iD), Amelo Bolka Gujo(iD) and Nigussie Yohanes Yote

Abstract

Background: Good-quality antenatal care improves maternal health in the least developed countries. This study was aimed at assessing the quality of antenatal care and associated factors among pregnant women attending hospitals in the Sidama Region, Southern Ethiopia.

Method: A facility-based cross-sectional study was conducted from 1 February to 30 April 2020 among 372 pregnant women. A two-stage sampling technique—the first stage, selection of health facilities; the second stage, selection of respondents—was used. Trained data collectors administered exit interviews. Data were entered into EPI Info 7 and analyzed using IBM SPSS version 25. Quality of care was assessed using a validated questionnaire containing 68 attributes of quality. Good quality of care was determined by the proportion of respondents who scored ⩾80% of 68 variables. Bivariable and multivariable logistic regressions were used in the analysis. The outputs were presented using an adjusted odds ratio with 95% confidence intervals.

Results: This study revealed that 41.2% (95% confidence interval: 36.2%–46.2%) of pregnant women had received good-quality antenatal care. Increased odds of the utilization of quality antenatal care were observed among women who lived in urban areas (adjusted odds ratio = 4.32, 95% confidence interval: 2.58–7.21), attained primary education and more (adjusted odds ratio = 2.68, 95% confidence interval: 1.60–4.48), earned a monthly income >3000 Ethiopia Birr (US$93.3) (adjusted odds ratio = 3.86, 95% confidence interval: 2.28–6.51), and visited hospitals for antenatal care ⩾4 times (adjusted odds ratio = 3.68, 95% confidence interval: 2.21–6.10).

Conclusions: The proportion of women who received good-quality antenatal care was low. Good quality care was associated with residence, education status, income level, and frequency of antenatal care visits. Training care providers, strengthening counseling, and promoting women's economic empowerment to improve the utilization of quality antenatal care are recommended.

Introduction

Globally, maternal mortality remained unacceptably high. Three thousand women and adolescent girls died during pregnancy and childbirth in 2015. Maternal mortality was the leading cause of death among women aged 15–29 years. Ninety-five percent of all maternal deaths occurred in low-income and lower-middle-income countries, and most of the deaths could have been prevented.[1] The Africa continent contributed about two-thirds (65%) of maternal deaths to the globe. In sub-Saharan Africa, a woman's lifetime risk of dying during pregnancy or childbirth is 1 in 36 compared with 1 in 4900 in developed countries.[2] One in 41 women in sub-Saharan African countries died from maternal causes.[3]

Department of Social and Population Health, Yirgalem Hospital Medical College, Yirgalem, Southern Ethiopia

Corresponding author:
Amelo Bolka Gujo, Department of Social and Population Health, Yirgalem Hospital Medical College, Yirgalem, Sidama Region, Southern Ethiopia, P.O.Box 184, Ethiopia.
Email: amelobolka@gmail.com

Although progressive and coordinated efforts have been made to reduce pregnancy-related morbidity and mortality, these have not yielded much fruits.[4] Sustainable development goals (SDGs) aim to reduce the maternal mortality ratio to less than 70 per 100,000 live births and ensure universal access to quality sexual and reproductive health care services. The risk of maternal death can be reduced through better access to high-quality care before, during, and after childbirth.[1,5]

Antenatal care (ANC) is the care provided by skilled health care professionals to pregnant women and adolescent girls to ensure the best health conditions for both mother and baby during pregnancy. It promotes a basis for health promotion, risk identification, prevention, and management of pregnancy-related diseases to avoid health problems in both fetus and mother and promotes healthy behaviors and parenting skills.[4]

Quality maternity care services involve providing a minimum level of care to all pregnant women and their newborn babies and a higher level of care to those who need it.[6] It is the most important issue to achieve the SDGs related to maternal health.[1] Components of quality ANC vary from country to country.[7] The World Health Organization (WHO) recommends a core set of services which include client's history-taking, physical examination, and different laboratory investigations (urine testing, a blood sample taken to test blood group/Rh factor, stool samples taken to test parasite infestations). It also recommends at least two tetanus toxoid vaccinations, iron and folic acid tablet consumption for at least 90 days, and counseling (nutrition and rest, birth preparedness, complication readiness, postnatal care).[4,7,8]

The quality of care given to pregnant women in resource-limited settings has been a critical issue. Good-quality ANC, as one component of maternal care, is a key to improve maternal health and prevent maternal death. It enables health professionals to identify risk factors and give due treatment to pregnancy-related complications.[9–12] Improving the quality of ANC delivered to mothers seeking care in health institutions could avert 28% of maternal deaths.[13]

Ethiopia follows WHO recommendations of initiation of ANC within the first 16 weeks of pregnancy and at least four ANC visits during the course of an uncomplicated pregnancy.[14] Its guidelines on prenatal care recommend a minimum of four ANC visits and quality service for women who experience a positive pregnancy. It also recommends weight measurement, blood pressure measurement, blood and urine sample examination, a minimum of two doses of tetanus toxoid vaccination, HIV test, counseling on danger signs and nutrition, and iron provision to all pregnant women through respectful maternity care.[15,16]

Ethiopia has a very high maternal mortality, with 412 maternal deaths per 100,000 live births. One of the biggest challenge is low-quality maternal health care.[8] The provision of poor-quality maternal healthcare contributes to a high maternal mortality. It has become a barrier to ending preventable morbidity and mortality. According to the Ethiopia Demographic and Health Survey (EDHS), 20% of women had their first ANC during the first trimester. Only 32% of women had four ANC visits during their last pregnancy and 37% of women did not visit health institutions for ANC, suggesting that much more work needs to be done to address ANC utilization and quality in the country.[17]

Low quality care by itself is influenced by multiple factors.[18,19] Although the quality of ANC service is very important for further improvement of maternal health, limited evidence exists on the ANC quality and predictors of quality of care among pregnant women attending ANC in the region. Therefore, this study was aimed at assessing the quality level of ANC and identifying the predictors of quality of care in general hospitals of the region.

Methods and materials

Study design and setting

A cross-sectional study was held in two government general hospitals in Sidama National Regional State, Southern Ethiopia. It is one of the 10 regional states found in Ethiopia and is located 273 km south of Addis Ababa, the capital of the country. It is located in the southern part of the country. Hawassa City is the capital of the region. The region is bordered in the north by the Oromia region, in the south by the Oromia and south region, in the east by the Oromia region, and in the west by the Oromia and south region. Based on 2007 Ethiopia Central Statistical Agency of Ethiopia report estimation, the total population of the region was projected to be 4,369,214, of which 151,175 were pregnant women. The region has 553 health posts, 137 health centers, 13 primary hospitals, 4 general hospitals, a tertiary hospital, and 173 private facilities. All of the government health posts, health centers, and hospitals provide ANC, delivery, and postnatal care. This study was conducted from 1 February to 30 April 2020. The study populations were all pregnant women who attended general hospitals for ANC services.

Study population

All pregnant women who attended the hospitals for ANC visits and were willing to participate were included. Those who were seriously ill (unable to give a response) and started ANC visit on the day of data collection were excluded from the study.

Sample size determination

The sample size (n) was computed using the single population proportion formula[20] taking into account 95% confidence level, 5% margin of error, and 32.7% proportion of

pregnant women who received good-quality ANC[21] with the formula $n=z^2p(1-p)/d^2$, where n = sample size, $Z\alpha$ = standard normal deviate at 95% confidence interval (CI) (z = 1.96 at 95% CI), p is the proportion of respondents who were satisfied with ANC received from the results of a previous study (p = 0.32.7), and d = precision (if 5%, d = 0.05), and the sample size was 338. Finally, adding 10% non-response rate, a sample size of 372 was computed.

Sampling techniques

A two-stage sampling technique was used. At the first stage, the simple random sampling method was applied to select two from four general hospitals. At the second stage, the respondents were selected using systematic sampling technique. The sampling frame was obtained by referring ANC service registrations/records. The average number of clients who received ANC per month in Leku and Bona Generals Hospitals was 178 and 201, respectively. The sample size was proportionally allocated to both hospitals. An interval of two was used for both hospitals where the interval constant was obtained by dividing the total consumers of ANC services in the selected hospitals by the sample size ($k=N/n=355/175=2.03$ for Leku and $k=N/n=400/197=2.03=2$ for Bona General Hospitals). The lottery method was used to select the first study participant in each hospital.

Variables and measurements

The quality of ANC was the dependent variable. It was measured based on the essential elements of a focused approach to the ANC platform set by WHO: health promotion, screening and diagnosis; disease prevention; communicating with and supporting women's families to develop healthy behaviors; and a birth and emergency preparedness plan.[4] Investigators used these processes to measure the quality of ANC. It was measured by the extent to which the pregnant women received the essential ANC services in each visit using 68 attributes ("Yes/1" for correct and "No/0" for incorrect answers) of quality care. Investigators categorized candidates who scored ≥80% of total score were categorized as having received good quality care and the remaining as having received poor quality of care.

Data collection and quality control

The questionnaire was adopted from different related works of literature.[4,17,22] It has three parts: socio-demographic, obstetric care–related variables, and measures of quality of care. The questionnaire was translated to the local language, Sidamu Afoo, and back-translated to English language by individuals who have good command of both languages. Before data collection, the questionnaire was pre-tested among 5% of the respondents in a hospital which was outside the study area. Six public health officers (Bachelor of Sciences) and two public health experts (Master Degree in Public Health) were recruited for data collection and supervision respectively. Three days of training was provided to data collectors and supervisors; then, the pretesting of the data collection tool was done in Yirgalem General Hospital, which was not included in the study. Data were collected by administering exit interviews to ANC attendees using structured questionnaires. In addition to supervisors, principal investigators checked the consistency and completeness of the questionnaire on a daily basis during data collection.

Data management and analysis

All questionnaires were checked for completeness, coded, and entered into EPI Info 7 software, and the analysis was done using IBM Statistical Package for Social Sciences (SPSS) statistical software version 25. Frequency tables were generated to show the distribution of the socio-demographic and obstetric history of respondents. To determine the association between independent variables and an outcome variable, bivariable and multivariable logistic regression analyses were conducted. Variables in the bivariable model with a p-value less than 0.20 were taken for multivariable logistic regression to decrease the effect of confounding factors. Statistical significance was declared with $p < 0.05$. Finally, the result was presented using narration, tables, and figures.

Ethical consideration

Ethical clearance was obtained from the Institutional Review Board of Yirgalem Hospital Medical College (IRB Number-Y/M/C/153/160/3144). Written informed consent was obtained from each study participant before participation in the study after the objectives of the study were fully explained to them.

Results

Socio-demographic characteristics of respondents

A total of 369 ANC attendees participated in the study. The mean (±standard deviation) age of the respondents was 23.8 (±4.2) years. Slightly more than two-thirds, 252 (68.3%), of the participants were within the age range of 21–25 years. About half, 186 (50.4%), of the study participants were living in urban areas. Among ANC attendees, about three-fourths, 282 (76.4%), were Sidama in ethnicity. Eight in ten, 297 (80.5%), respondents were Protestant religion followers. Six in ten, 227 (61.5%), respondents were housewives. From all respondents, nearly half, 177 (48%), of the pregnant women and 145 (39.2%) of their husbands have not attended formal education. More than half of the respondents, 207 (56.1%) earned a monthly income greater than the median monthly income of 3000 Ethiopia Birr (ETB) (US$93.3) in a typical month and ranged from 1015 (US$31.55) to 5680

Table 1. Socio-demographic and economic characteristics of pregnant women attending antenatal care in general hospitals of Sidama Region, Southern Ethiopia, 1 February to 30 April 2020.

Variables	Category	Frequency (n = 369)	Percent
Age (years)	≤20	6	1.6
	21-25	252	68.3
	26-30	73	19.8
	≥31	38	10.3
Ethnic groups	Sidama	282	76.4
	Oromo	58	15.7
	Amhara	29	7.9
Religion	Protestant	297	80.5
	Muslim	38	10.3
	Orthodox	34	9.2
Place of residence	Rural	183	49.6
	Urban	186	50.4
Educational level	Illiterate	177	48
	Primary level and above	192	52
Education level (husband)	Illiterate	145	39.2
	Primary level and above	224	60.8
Occupation (respondents)	Housewife	227	61.5
	Merchant	51	13.8
	Government employee	91	24.7
Monthly income	≤3000 ETB (≤US$93.3)	162	43.9
	>3000 ETB (>US$93.3)	207	56.1
Family size	≤4 members	306	82.9
	>4 members	63	17.1

ETB: Ethiopian Birr; n: sample size.

ETB (US$176.57). The majority of the respondents, 306 (82.9%), had four or less family members (Table 1).

Obstetric history of the respondents

Six in ten, 222 (60.2%), respondents were multipara women. Regarding birth interval, 151 (41%) reported that they had a birth interval of more than 2 years. All of the respondents had information about the importance of ANC visit before starting visit and 81.3% reported health professionals as source of information on ANC. The mean gestational age was 24 (±2) weeks at the first ANC visit. About 154 (41.7%) respondents started their first ANC visit in the first and second trimesters of pregnancy. Slightly more than half of the study participants, 195 (52.8%), attended three or fewer ANC visits during pregnancy. Two-thirds, 247 (66.9%), of women had ANC at hospitals for maternal and fetal health. Fifty-two percent of mothers reported that they were served by medical doctors during care visits (Table 2).

Quality of ANC service

This study revealed that 41.2% (95% CI: 36.2%–46.2%) of pregnant women had received good-quality ANC services (Figure 1).

### Associated factors of quality of ANC

Both bivariable and multivariable logistic regression analyses were done to identify the associated factors of the quality of ANC. All the variables were analyzed in bivariable logistic regression analysis, and those with a p-value of less than 0.20 were considered in multivariable logistic regression analysis. In multivariable logistic regression analysis, significantly associated factors to quality ANC given to pregnant women were education level, place of residence, income level, and ANC visit frequency.

The odds of receiving good-quality ANC were 2.68 times higher among pregnant women who attended primary education and above (adjusted odds ratio (AOR) = 2.68, 95% CI: 1.60–4.48). Urban dwellers had about 4 times increased odds of receiving good-quality ANC (AOR = 4.32, 95% CI: 2.58–7.21). Similarly, a 3.86 times increased chance of getting quality ANC services was observed among pregnant mothers living in households earning a monthly income of ≥3000 ETB (AOR = 3.86, 95% CI: 2.28–6.51). Furthermore, pregnant women who visited hospitals for ANC four or more times had 3.68 times (AOR = 3.68, 95% CI: 2.21, 6.10) increased odds of using quality ANC (Table 3).

Table 2. Obstetric history of pregnant women attending ANC in general hospitals of Sidama Region, Southern Ethiopia, 1 February to 30 April 2020.

Variable	Category	Frequency (n = 369)	Percent
Parity	Primipara	147	39.8
	Multipara	222	60.2
Birth interval	≤2 years	218	59
	>2 years	151	41
Gestational age at first visit	1st and 2nd trimester	154	41.7
	3rd trimester	215	58.3
ANC visit frequency	<4 visits	195	52.8
	≥4 visits	174	47.2
Reasons for care visit	Maternal and child health	247	66.9
	Fetal health	52	14.1
	Maternal health	70	19
Care provides	Medical doctors	192	52
	Midwife nurses	177	48
Source of information on the importance of ANC visit	H/professionals	300	81.3
	Friends/relatives	69	18.7

ANC: antenatal care; n: sample size.
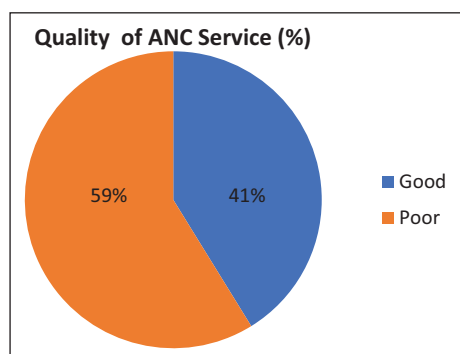
Figure 1. Quality of ANC Services received by pregnant women in general hospitals of Sidama Region, Southern Ethiopia.

Discussion

A cross-sectional study was conducted to assess the quality of ANC services provision at general hospitals in the Sidama Region. The proportion of women who received good-quality ANC was 41.2% in the study area. Maternal educational status, family income level, place of residence, and ANC visit frequency were predictors of quality care utilization.

This study assessed the overall prevalence of good quality of care provided to ANC attendees and came up with 41.2%, which was comparable with findings presented by studies conducted in the central zone of Tigray Region (41%)[23] and Nepal (42%).[24] Several studies conducted in different parts of Ethiopia[21,25–28] and Zambia[29] reported a lower prevalence of quality ANC than the present finding. In contrast to this, studies carried out in Ethiopia[18,30–32] and Malaysia (63%)[33] reported a higher prevalence of quality ANC utilized by pregnant women. These discrepancies might be due to differences in the quality of ANC measurement approaches, availability of trained and approachable healthcare providers, study period, study setting, study designs, and cultures.

This study showed that difference in residence influenced the quality of ANC given to pregnant women in the study area. ANC attendees from urban areas of residence had higher odds of receiving quality care compared to those in rural areas. This finding was comparable with a study in Nigeria,[34] Nepal,[35] and Pakistan.[36] The possible reason for this could be the fact that rural areas have less transportation, and infrastructure making access to health care difficult.

This study also associated the quality of care provided to ANC attendees with monthly income. Pregnant women living with families earning a monthly income of >3000 ETB (>US$93.3) were 2.76 times more likely to receive good-quality ANC compared to those with lower incomes. Similar findings were reported by studies conducted in Ethiopia.[21,37] This is due to the reason that high household income, perhaps, increases the ability of women to cover their travel expenses and easily access ANC services.

In this study, women with higher levels of educational attainment were more likely to receive quality ANC. This finding was supported by studies conducted in Ethiopia[21,37–40] Nigeria,[34] and Nepal.[35] The possible reasons might be that women with a higher level of education need more quality care since they have a better understanding and favorable attitude toward care services and know what to expect from service providers. In addition, higher education attainment also empowers them to decide their health care service utilization.

Increased odds of the utilization of quality of care were observed among pregnant women who made four or more ANC visits at health institutions for ANC, and received information about ANC from health professionals. This finding was in line with studies done in Ethiopia[21,41] and

Table 3. Factors associated with quality of ANC among women attending general hospitals in Sidama Region, Southern Ethiopia, 1 February to 30 April 2020.

Variable	Category (n = 369)	Quality of ANC		Bivariable analysis	Multivariable analysis	
		Good N (%)	Poor N (%)	p-value	AOR	p-value
Age of women	≤25 years	110 (42.6)	148 (57.4)	0.191	1.55 (0.86–2.80)	0.141
	>25 years	42 (37.8)	69 (62.2)		1	
Education level	Primary and above	100 (52.3)	91 (47.7)	<0.001	2.68 (1.60–4.48)	<0.001
	Illiterate	52 (29.2)	126 (70.8)		1	
Place of residence	Urban	108 (58.1)	78 (41.9)	<0.001	4.32 (2.58–7.21)	<0.001
	Rural	44 (24)	139(76)		1	
Income level	>3000 ETB (>US$93.3)	112 (54.1)	95 (45.9)	<0.001	3.86 (2.28–6.51)	<0.001
	≤3000 ETB (≤US$93.3)	40 (24.7)	122 (75.3)		1	
Family size	≤4 members	130(42.5)	176 (57.5)	0.168	1.13 (0.55–2.31)	0.739
	>4 members	22 (34.9)	41 (65.1)		1	
GA at first visit	1st and 2nd trimester	50 (32.5)	104 (67.5)	0.004	1.70 (0.99–2.93)	0.054
	3rd trimester	102 (47.4)	113 (52.6)		1	
ANC visit frequency	≥4	101 (58)	73 (42)	<0.001	3.68 (2.21–6.10)	<0.001
	<4	51 (26.2)	144 (73.8)		1	
Ultrasound scanning	Yes	111 (40.4)	164 (59.6)	0.158	1.19 (0.66–2.14)	0.565
	No	41 (43.6)	53 (56.4)		1	
Source of information on importance of ANC visit	H/professionals	121 (40.3)	179 (59.7)	0.148	1.14 (0.60–2.18)	0.684
	Friends/relatives	31 (44.9)	38 (55.1)		1	
Satisfied by information	Yes	131 (42.7)	176 (57.3)	0.120	1.38 (0.69–2.74)	0.363
	No	21 (33.9)	41 (66.1)		1	
Satisfied by care	Yes	114 (42.5)	154 (57.5)	0.139	1.51 (0.85–2.68)	0.162
	No	38 (37.6)	63 (62.4)		1	

GA: gestational age; AOR: adjusted odds ratio; ANC: antenatal care; COR: crude odds ratio; ETB: Ethiopian Birr.

Nigeria.[34] The possible justification might be that repeated exposure to ANC services might enhance the familiarity of women with the services and encourage them to freely share information with healthcare providers.

Limitations of the study

This study was aimed at determining the quality of ANC and associated factors among pregnant women attending governmental hospitals. However, the study was not free from some limitations. This study was hospital-based, and therefore, it might not be possible to generalize the findings to the entire pregnant women of the region. This study also lacked qualitative aspects in assessing the perceptions of pregnant women.

Conclusion and recommendation

The proportion of women who received good-quality ANC was low in the study area. It was associated with residence area, education status, income level, and frequency of ANC visit. Sidama National Regional Health Bureau should train care providers on the focused ANC component for clients to have quality ANC service, strengthen implementation of the 2016 WHO recommendations on ANC visits, and creation of community and facility-level awareness focusing on rural women. In collaboration with responsible bodies, the bureau should also empower women to generate their own income and encourage female education. Care providers should counsel pregnant women on the importance of increasing the frequency of care visits.

Authors' contribution

Study conceptualization was done by Amelo Bolka. Data curation was done by Amelo Bolka and Assefa Filipos. Formal analysis was by Amelo Bolka and Assefa Filipos. Investigation was by Amelo Bolka and Assefa Filipos. Methodology was developed by Amelo Bolka and Assefa Filipos. Funding acquisition was by Nigussie Yohanes. Software was developed by Amelo Bolka and Assefa Filipos. Supervision was by Amelo Bolka, Assefa Filipos, and Nigussie Yohanes. Validation was done by Amelo Bolka and Assefa Filipos. Writing—original draft was by Amelo Bolka. Review and editing was by Amelo Bolka, Assefa Filipos, and Nigussie Yohanes.

Declaration of conflicting interests

Ethical approval

Ethical clearance was obtained from the Institutional Review Board of Yirgalem Hospital Medical College (IRB Number-Y/M/C/153/160/3144).

Funding

Informed consent

Written informed consent was obtained from each study participant before participation in the study after the objectives of the study were fully explained to them.

ORCID iDs

Assefa Philipos Kare https://orcid.org/0000-0002-6630-7465
Amelo Bolka Gujo https://orcid.org/0000-0002-1233-8899

Supplemental material

The supplemental data supporting this study findings will be available upon reasonable request to the corresponding author.

References

1. WHO. World health statistics of 2019, monitoring health for the sustainable development goals (Licence: CC BY-NC-SA 3.0 IGO), 2019, https://www.who.int/publications/i/item/world-health-statistics-2019-monitoring-health-for-the-sdgs-sustainable-development-goals

2. McDougall L, Campbell OMR and Graham W. Every woman, every newborn, everywhere has the right to good quality care (Executive Summary, The Lancet Maternal Health Series), 2016, https://www.thelancet.com/pb/assets/raw/Lancet/stories/series/maternal-health-2016/mathealth2016-exec-summ.pdf

3. Ashraf F, Thaver IH, Imtiaz F, et al. Quality assessment of focused antenatal care service delivery in tertiary care health facility. *J Ayub Med Coll Abbottabad* 2017; 29(2): 219–224.

4. WHO. WHO recommendations on antenatal care for a positive pregnancy experience, 2016, www.who.int/reproductivehealth/publications/maternal_perinatal_health/anc-positive-pregnancy-experience/en/

5. Girum T and Wasie A. Correlates of maternal mortality in developing countries: an ecological study in 82 countries. *Matern Health Neonatol Perinatol* 2017; 3: 19.

6. Pittrof R, Campbell OMR and Filippi VRGA. What is quality inmaternity care? An international perspective. *Acta Obstetr Gynecol Scandinav* 2002; 81: 277–283.

7. Singh L, Dubey R, Singh S, et al. Measuring quality of antenatal care: a secondary analysis of national survey data from India. *Int J Obstetr Gynaecol* 2019; 126 (Suppl. 4): 7–13.

8. EMoH. *Ethiopia-health-sector-transformation-plan of 2015-2020*. Addis Ababa, Ethiopia: EMoH, 2015.

9. Koblinsky M, Moyer CA, Calvert C, et al. Quality maternity care for every woman, everywhere: a call to action. *Lancet* 2016; 388(10057): 2307–2320.

10. Brizuela V, Leslie HH, Sharma J, et al. Measuring quality of care for all women and newborns: how do we know if we are doing it right? A review of facility assessment tools. *Lancet Glob Health* 2019; 7(5): e624–e632.

11. Arsenault C, Jordan K, Lee D, et al. Equity in antenatal care quality: an analysis of 91 National Household Surveys. *Lancet Glob Health* 2018; 6(11): e1186–e1195.

12. Raynes-Greenow C. Gaps and challenges underpinning the first analysis of global coverage of early antenatal care. *Lancet Glob Health* 2017; 5(10): e949–e950.

13. Chou VB, Walker N and Kanyangarara M. Estimating the global impact of poor quality of care on maternal and neonatal outcomes in 81 low- and middle-income countries: a modeling study. *PLoS Med* 2019; 16(12): e1002990.

14. EMoH. *Health sector transformation plan*. Addis Ababa, Ethiopia: The Federal Democratic Republic of Ethiopia Ministry of Health, 2015.

15. Tegegne TK, Chojenta C, Getachew T, et al. Antenatal care use in Ethiopia: a spatial and multilevel analysis. *BMC Pregnancy Childbirth* 2019; 19(1): 399.

16. Gebreyohannes Y, Hadis M, Abay S, et al. *Improving antenatal care service utilization in Ethiopia* (Policy Brief). Addis Ababa, Ethiopia: Ethiopian Public Health Institute, 2016.

17. CSA and ICF. *Ethiopia demographic and Health Survey*. Addis Ababa, Ethiopia; Rockville, MD: CSA; ICF, 2016.

18. Shudura E, Yoseph A and Tamiso A. Utilization and predictors of maternal health care services among women of reproductive age in Hawassa university health and demographic surveillance system site, South Ethiopia: a crosssSectional study. *Adv Public Health* 2020; 2020: 5865928.

19. Tunçalp Ö, Were WM, MacLennan C, et al. Quality of care for pregnant women and newborns—the WHO vision. *Int J Obstet Gynaecol* 2015; 122(8): 1045–1049.

20. Daniel WW. *Biostatistics: a foundation for analysis in the health sciences*. 8th ed. Hoboken, NJ: John Wiley & Sons, 2005.

21. Kassaw A, Debie A and Geberu DM. Quality of prenatal care and associated factors among pregnant women at public health facilities of Wogera District, Northwest Ethiopia. *J Pregnancy* 2020; 2020: 9592124.

22. WHO. *Standards for improving quality of maternal and newborn care in health facilities*. WHO Press, 2016, http://www.who.int

23. Gidey G, Hailu B, Nigus K, et al. Timing of first focused antenatal care booking and associated factors among pregnant mothers who attend antenatal care in Central Zone, Tigray, Ethiopia. *BMC Research Notes* 2017; 10: 608.

24. Chaurasiya SP, Pravana NK, Khanal V, et al. Factors affecting antenatal care utilization among the disadvantaged Dalit population of Nepal: a cross- sectional study. *Open Public Health J* 2019; 12: 155–163.

25. Tekelehaymanot G. Assessment of quality of antenatal care service provision and associated factor at governmental health facilities of Harar Town, Eastern Ethiopia, 2017. *J Gen Pract* 2018; 6(4): 367.

26. Fesseha G, Alemayehu M, Etana B, et al. Perceived quality of antenatal care service by pregnant women in public and private health facilities in Northern Ethiopia. *Amer J Health Res* 2014; 2(4): 146–151.

27. Emiru AA, Alene G and Debelew GT. Women's satisfaction with the quality of antenatal care services rendered at public health facilities in Northwest Ethiopia: the application of partial proportional odds model. *BMJ Open Access* 2020; 10: 1–11.

28. Ayalew TW and Nigatu AM. Focused antenatal care utilization and associated factors in Debre Tabor Town, Northwest Ethiopia, 2017. *BMC Res Notes* 2018; 11: 819.

29. Kyei NNA, Chansa C and Gabrysch S. Quality of antenatal care in Zambia: a national assessment. *BMC Preg Childbir* 2012; 12: 151.

30. Chemir F, Alemseged F and Workneh D. Satisfaction with focused antenatal care service and associated factors among pregnant women attending focused antenatal care at health centers in Jimma Town, Jimma Zone, South West Ethiopia; a facility based cross-sectional study triangulated with qualitative study. *BMC Res Notes* 2014; 7: 164.

31. Ayele DZ, Belayihun B, Teji K, et al. Factors affecting utilization of maternal health care services in Kombolcha District, Eastern Hararghe Zone, Oromia Regional State, Eastern Ethiopia. *Int Sch Res Notices* 2014: 917058.

32. Yabo AN, Gebremicheal MA and Chaka EE. Assessment of quality of antenatal care (ANC) service provision among pregnant women in Ambo Town Public Health Institution, Ambo, Ethiopia. *Amer J Nurs Sci* 2015; 4(3): 57–62.

33. Yeoh PL, Hornetz K, Shauki NIA, et al. Evaluating the quality of antenatal care and pregnancy outcomes using content and utilization assessment. *Int J Qual Health Care* 2018; 30(6): 466–471.

34. Fagbamigbe AF and Idemudia ES. Assessment of quality of antenatal care services in Nigeria: evidence from a population-based survey. *BMC Reprod Health* 2015; 12: 88.

35. Joshi C, Torvaldsen S, Hodgson R, et al. Factors associated with the use and quality of antenatal care in Nepal: a population-based study using the demographic and health survey data. *BMC Preg Childbir* 2014; 14: 94.

36. Noh J-W, Kim Y-m, Lee LJ, Akram N, et al. Factors associated with the use of antenatal care in Sindh province, Pakistan: a population-based study. *PLoS ONE* 2019; 14(4): e0213987.

37. Tesfaye G, Loxton D, Chojent C, et al. Delayed initiation of antenatal care and associated factors in Ethiopia: a systematic review and meta-analysis. *BMC Reprod Health* 2017; 14: 150.

38. Birhanu S, Demena M, Baye Y, et al. Pregnant women's satisfaction with antenatal care services and its associated factors at public health facilities in the Harari region, Eastern Ethiopia. *SAGE Open Med* 2020; 8: 1–10.

39. Berehe TT and Modibia LM. Assessment of quality of antenatal care services and its determinant factors in public health facilities of Hossana Town, Hadiya Zone, Southern Ethiopia: a longitudinal study. *Adv Publ Health* 2020; 2020: 5436324.

40. Wondimu W, Girma M and Agedew E. Antenatal care utilization and associated factors among reproductive age mother in Ari Woreda, South Omo Zone. *Reprod Syst Sex Disord* 2017; 6: 1.

41. Haile D, Habte A and Bogale B. Determinants of frequency and content of antenatal care in postnatal mothers in Arba Minch Zuria District, Southern Ethiopia. *Int J Women Health* 2020; 12: 953–964.