BMJ Open

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

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ABSTRACT

Objectives The study was aimed: (1) to describe the quality of antenatal care (ANC) at public health facilities in Northwest Ethiopia, including dimensions of the structure, process and outcome; and (2) to assess the relationship between ANC satisfaction and structure and process dimension of ANC quality.

Design Cross sectional.

Setting Healthcare facilities providing ANC services in Northwest Ethiopia.

Participants 795 pregnant women attending the antenatal clinics at 15 public health facilities and 41 health workers working for the surveyed facilities.

Outcome measures The outcome variable, women's satisfaction with ANC, was constructed from multiple satisfaction items using principal component analysis on an ordered, categorical and three-point Likert scale. The key hypothesised factors considered were structural and process aspects of care. Data were analysed using the partial proportional odds model with 95% CI.

Results The result revealed that only 30.3% of the pregnant women were highly satisfied, whereas 31.7% had a lower satisfaction level. The findings showed that process quality indicators better predicted client satisfaction. In relation to this, better scores in history taking ($aOR_1=aOR_2$; 1.81 (95% CI 1.25 to 2.60)), counselling ($aOR_1 = aOR_2$; 1.89 (95% CI 1.33 to 2.69)) and screening ($aOR_1=aOR_2$; 18.10 (95% CI 11.52 to 28.39)) were associated with achieving higher satisfaction. We also observed a significant but lower satisfaction among women in the late trimester of pregnancy ($aOR_1 = aOR_2$; 0.87 (95% CI 0.78 to 0.97)). However, we did not see any significant relationship between structural variables and client satisfaction.

Conclusions The study demonstrated that women's satisfaction with ANC was low. The contents of ANC services covered during client–provider interaction were the main factors affecting client satisfaction. This suggests that efforts are required to improve the competencies of health professionals to make them more effective while dealing with clients.

INTRODUCTION

In the past two decades, concerted global efforts have led to increased coverage of

Strengths and limitations of this study

► We tried to assess the three aspects of quality: structure, process and outcomes.
► The study has used different data collection methods including facility survey, client exit interview, provider interview and direct observation. Hence, this could increase the validity of the result and the study.
► The analysis considered the ordered nature of the outcome variable; previous studies often dichotomised satisfaction at the cost of losing information.
► However, the presence of an observer during the client–provider interaction might have biased (Hawthorne effect) the results obtained in a positive direction. In addition, this result could not be generalised to the pregnant women visiting private facilities, as the pregnant women visiting them may be different in many aspects.

maternal health services, even in poor resource settings.[1][2] Yet, improvements in health outcomes did not always follow.[2] Every year, thousands of women die from pregnancy-related complications worldwide.[3][4] The Sub-Saharan Africa countries, where Ethiopia is a part, accounted for over 86% of the global maternal deaths in 2017.[5] Maternal mortality in Ethiopia stands at 412 deaths per 100 000 live births.[6]

Fortunately, most maternal deaths are avoidable as health solutions to the causes of complications are well known.[3][7] The solution includes a strong health system that provides maternal services based on a continuum of care perspective.[3] As part of the continuum, the essence of antenatal care (ANC) serves as a platform for important healthcare activities,[3][8] including health promotion and disease prevention, screening, diagnosis and management of pregnancy-related

complications.[9 10] As such, ANC creates a unique opportunity for early detection and management of hypertension, gestational diabetes, anaemia, malaria, HIV and other health conditions which otherwise would jeopardise the health of mothers and the growing fetus.[11 12]

Evidence demonstrated that in the presence of adequately resourced healthcare services and community mobilisation, there is an opportunity to improve health service utilisation and maternal health outcomes.[2 13] In this regard, the government of Ethiopia has made significant strides towards availing health facilities closer to the community, mainly through constructing primary healthcare facilities and launching the health extension programme.[14] Establishing a voluntary-based women health development army to create awareness and increase demand for health services at the community level and waiving user charges for maternity services were also among the new endeavours that the government of Ethiopia has put in place.[15]

While expanding access to health services is an important milestone in Ethiopia, many health facilities started service provision without being adequately equipped with the necessary materials and skilled health workforce.[16] For example, despite 80% of the facilities were providing ANC, only 41% of them were in a position to provide a high-quality ANC service.[16] This has contributed to a lower rate of maternal health utilisation, including ANC services. Improving the quality of ANC services is one of the key elements the health system has to invest in to reduce maternal mortality.[1 3 4]

The term quality of care is used widely as a key performance indicator, but there is no universally agreed metrics to measure the quality of care for maternal and newborn health.[17–19] TQuality is a complex concept and described from different perspectives.[20] In the Donabedian model, quality is defined in terms of three major attributes: the structure (resources and organisational structure in healthcare setting), process (how health service is delivered) and outcome (effect of care on the status of the clients). In this model, client satisfaction was a part of the outcome variables among others.[21] Client satisfaction can be defined as a patient's evaluation of the services offered within the health system, relative to their expectations of care.[20]

In the context of maternity care, a client-centred approach is an important way of understanding the quality of services received or provided.[22] This is especially important in low/middle-income countries (LMICs) where it is recognised that women typically receive lower quality health services compared with women in developed countries.[23]

In order to identify the action points to improve the quality of care, the WHO has developed a framework using different elements from the provision of care as well as the experience of care, integral to maternal and newborn care provided in the facilities.[22] However, little attempts have been made to provide a complete picture of the quality of ANC delivered by the healthcare system in LMICs.[24 25]

A body of literature has examined the quality of ANC in Ethiopia, yet hardly was any published data that examined all the dimensions of quality simultaneously. The available studies focused largely on the availability of facility inputs[26] or service attendance,[27–29] which largely overlooked the information on the content and how care was delivered.[30] Moreover, these studies did not consider the association between client satisfaction and quality measures of the structure and process of ANC. On the other hand, although understanding pregnant women's levels of ANC service satisfaction is imperative to design an approach to meet the needs and expectations of pregnant women,[20] this notion has little been explored.

Therefore, this study was aimed to: (1) describe the quality of ANC at public health facilities including structure, process and outcome dimensions; and (2) assess the relationship between ANC satisfaction and structure and process dimension of ANC quality.

METHODS

Study design and setting

This was a cross-sectional study using a blend of methods (a facility survey, provider interview, direct observation and client exit interview). The study was conducted in five districts of West Gojjam Zone, Northwest Ethiopia from July to August 2018. At the time of the survey, the Zone had a population of 2 611 925 people with women of reproductive age (15–49) making 23.58% of the total population. The zone had 6 public hospitals, 103 health centres and 374 health posts. In addition, it had 114 private clinics and 1 private hospital. All maternal health services, including ANC services, were provided free of charge in public health facilities.[31]

Study population and sampling

The population consisted of public health facilities that provided ANC, pregnant women attending ANC clinic, maternal healthcare providers and health authorities working for the surveyed health facilities.

This study was part of a large project on the continuum of maternal healthcare that linked health facility data with a household survey. A number of sampling methods can be used to link characteristics of the sampled facilities to those of the serviced population, yet linking the sample areas(clusters) is the best approach[32] and has been considered in this study. Full details of the sampling procedure for the project have been reported elsewhere.[33 34] In brief, data from household surveys on access to maternity services were linked to health facility data in the same district. The two studies were timed in such a way that one could inform the next.

As a first step, a community-based study was conducted using a multistage sampling procedure. For this, the study area was first stratified into 13 rural districts and 2 town administrations. Then, five districts of the zone (four rural districts and one town administration) were selected by a simple random sampling method. Next,

15 kebeles (3 kebeles from each district) were selected using a simple random sampling technique. Kebele is the smallest administrative unit in the Ethiopian context. Hence, in this study, the population-based study was the basis to identify the facilities to be surveyed.

Second, the nearby public facilities at which the women sought care were identified during a house-to-house survey. Once the healthcare facilities were identified by type and location where they were found, facility survey was done across all the selected facilities. Providing basic maternity and reproductive health services (including ANC, facility delivery, postnatal care and family planning) during the last 12 months preceding the survey was the eligibility criteria to select health facilities. The health facility survey was conducted in all the 15 public health facilities: 5 primary hospitals and 10 health centres.

All the healthcare providers that were engaged in the provision of ANC in the selected facilities during the data collection period were included in the study. This approach was in accordance with recommendations by Turner and colleagues.[32]

For the satisfaction survey and clinical observation data, a sample size of 824 was calculated using the single population proportion formula based on the following assumptions: 95% confidence level; 5% margin of error, 42% service availability and readiness of public facilities for ANC in Ethiopia,[16] design effect of 2, and a 10% non-response rate. Then, the calculated sample size was allocated to each healthcare facility based on the average daily load of ANC attendees for the 2016/2017 fiscal year. From the sampled facilities, 795 women were selected using a systematic sampling procedure with probability to proportional size method.

Data collection

In this study, an attempt was made to measure all dimensions of the quality of ANC services: structure, process and outcome. For each dimension, a set of items were adapted from the WHO guidelines,[3 13] the Ethiopian demographic and health survey[35] and the list of interventions recommended by the federal ministry of health of Ethiopia.[36]

The survey comprised four main data collection methods: (1) health facility surveys; (2) provider interview; (3) direct observation of ANC consultations; and (4) exit interview with pregnant women. Structured and pretested questionnaires were used for service providers and client exit interviews, and checklists were used for facility survey and observation.

Experienced midwives who were not affiliated with the surveyed healthcare facilities collected the data. In each health facility, a team consisting of two data collectors was assigned. While one of the team members was responsible to carry out the observational study and conduct a healthcare provider interview, the other was responsible for managing the exit interview and doing the facility survey.

A facility survey of all the selected facilities was carried out to assess the availability of essential materials and staffing. For staffing, the assessment checklist was based on the national staffing standards for each type of health facility. A non-participatory observation was also made among 41 maternal health workers who were working at the ANC clinic during the time of the survey. This was aimed to evaluate whether healthcare workers conformed in interaction and conducting key ANC tests or examinations. When possible, the health workers who were observed were also interviewed, but when this was not possible, other providers of ANC service were substituted. Following her consultation, each pregnant woman was interviewed at the exit to assess the level of satisfaction on the service she received.

Variables and measurement

Structural quality was calculated at the facility level, while indices for process attributes and client satisfaction were made at individual women level.

Outcome variable

The outcome variable was ANC client satisfaction, and computed by aggregating women's responses to a series of questions regarding the ANC visit using a principal components analysis (PCA).

During the analysis, important assumptions including Bartlett's Test of Sphericity, Kaiser-Meyer-Olkin measure of sampling adequacy and communalities scores were checked. The eigenvalue>1 was used to decide the number of latent variables that we did for extracting factors. Initially, 24 variables were considered for the analysis but eventually, 12 variables were dropped as they failed to meet the assumptions of PCA. An index was computed from the original variables retained in the process. Thus, we computed a summed index from the retained items of the components that explained 68% of the total variances.

Finally, the overall satisfaction index was developed by categorising the sum of scores into a three-point Likert scale: 0%–50% as 'low satisfaction' (coded 1), 51%–79% (coded 2) as having 'moderate satisfaction' and 80%–100% (coded 3) as 'high satisfaction'.

Main explanatory variables
Structural attributes

A facility inventory checklist with 47 items was used to assess the structural attributes of the health facilities. Each item was scored '1' if the item was available and functional and a score of '0' if this was not the case. The items in each construct were then added together, with equal weights, to generate the following 5 indices: (1) an infrastructure index (7 items); (2) Health Staff index (8 variables); (3) an equipment index (10 items); (4) Index for drugs and vaccines (14 items); and (5) index for lab capacity and supplies (8 items) (online supplemental file 1). Finally, we categorised each index into three categories: poor structure quality, fair and good structure quality. Furthermore, the overall summary score was constructed

by aggregating the mean scores of all the five dimensions of care and was set as the structure index.

Process attributes

The process attributes comprised interpersonal and technical aspects of the provider–client interaction. Interpersonal aspects included, among others, issues such as greetings, maintenance of privacy and handling of client concerns. Technical aspects included observation of specific services performed, such as history taking, ANC physical examinations, counselling related to pregnancy and laboratory examinations.

A scoring system was established to calculate 5 dimensions of process attributes from 46 items: (1) interpersonal communication(6 activities), (2) history taking (12 activities); (3) clinical examination (9 activities); (4) counselling (10 activities); and (5) health screening and preventive measures(9 services; online supplemental file 2). This scoring system categorises whether an accepted standard of quality has been met or not.

All the procedures/activities provided were weighted equally and was granted '1' if the activity was observed and performed according to accepted standards of care, and a score of '0' if this was not the case. The scores of the key items for each individual client–provider interaction being observed were added up and averaged to determine a score for each dimension of care. Furthermore, the overall summary score was constructed by aggregating the mean scores of all the dimensions of care and was set as the process index. The total scores ranged between 0 and 46. Accordingly, the process of quality care was scored as follows: low quality <23, moderate quality 23 to <37, and high quality ≥37.

Other explanatory variables

Other variables included were: (1) facility type, (2) demographics, (3) socioeconomic factors, and (4) reproductive characteristics of the women.

The Cronbach's alpha was used to measure the internal consistency of a set of items for the three quality dimensions, and a reliability coefficient of 0.70 or higher was considered acceptable.[37]

Data analysis

The collected data were entered using the Epi-info V.7.0 and analysed using STATA software V.14.0. Owing to the ordinal nature of the outcome variable (low, medium and high satisfaction), a typical approach was to use the standard ordered logit.[38] Yet, the Brant test revealed that the proportional odds assumptions were not fulfilled for some independent variables (χ^2=63.4 df (16); p<0.001). We, therefore, used a generalised ordered logistic regression with auto fit (also called partial proportional odds model) for assessing the association between satisfaction and explanatory variables.

The partial proportional odds model is a hybrid of ordinal regression (same coefficients across the categories) and the default gologit (different coefficients across

categories). Hence, since the Brant test was not met, the analysis gave two ORs for an explanatory variable (low vs medium/high satisfaction (OR1) and low/medium vs high satisfaction (OR2)). Whereas for variables that did not violate the proportional odds assumption, a single OR, OR1=OR2 (OR1=2) was reported.[38]

The bivariable gologit model was used for variable inclusion in the final multivariable model. Accordingly, the independent variables to be included in the multivariable model were selected when the p value was <0.2 in the bivariable model. Before running the multivariable analysis, multicollinearity test between independent variables was done using the Variance Inflation Factor (VIF), and variables were not strongly correlated (the highest value was 2.7).

The final multivariable model was applied to define adjusted ORs, measuring the effect of different determinants on being assigned to a higher satisfaction category. Statistical significance for the final model was set at p<0.05.

Patient and public involvement

Patients/public were not involved in setting the research question or the outcome measures, and in the design and implementation of the study. Participation was voluntary based and no incentives were provided. The findings of this study will be disseminated to policy-makers and local-level service implementers.

RESULTS

General characteristics of women

Out of 824 eligible clients, 795 enrolled in the study yielding a response rate of 96.5%. The highest percentage of women were rural residents 575 (72.3%), and belonging to the age range of 20–29 years 433 (54.5%). Regarding their age, the mean and SD were 27.8 and 5.9 years, respectively. Of the total respondents, 63.4% did not attend formal education.

About one-third of the participants, 274 (34.5) were first-time visitors for ANC, and more than half of the women interviewed had their first ANC visit during their second trimester of pregnancy (table 1).

Health workers background characteristics

As can be seen in table 2, 41 health workers who worked for 15 public health facilities were included in the study. The largest number of health workers observed in any one health facility was 4 and the smallest was 1. Most of the health providers were men (61%). The median age of these health professionals was 29.0 years (range: 23–36 years) and the median year of professional experience was 3.0 years (range: 1–12 years). This is an indication that most of the providers had worked in their organisation long enough to understand and give valuable information to pregnant women (table 2).

Structural quality attributes

The analysis presented in table 3 characterises the structural and process dimensions of ANC quality. Despite there exists

Table 1 Background characteristics of antenatal care (ANC) clients interviewed in public health facilities of West Gojjam Zone, Northwest Ethiopia (N=795)

Description	Number	Per cent
Address		
Urban	220	27.7
Rural	575	72.3
Age (years)		
15–19	91	11.4
20–29	433	54.5
30–39	236	29.7
40	35	4.4
Education		
No formal education	504	63.4
Primary Education (grade 1–8)	212	26.7
Secondary education and above	79	9.9
Occupation		
Farmer	575	72.3
Employee	35	4.4
Merchant	53	6.7
Daily labourer	18	2.3
Others (*including Housewives)	114	14.3
Parity		
Nulliparous	182	22.9
Primipara 1	190	23.9
Para 2–4	321	40.4
Para 5+	102	12.8
Gestational age at time of the survey		
0–3 months	79	9.9
4–7 months	562	70.7
≥8 months	154	19.4
Number of ANC visits		
1	274	34.5
02/03/20	436	54.8
4	85	10.7
Timing of first ANC visit		
First trimester	332	41.8
Second trimester	419	52.7
Third trimester	44	5.5
Distance to HCF		
Less than 1 hour	532	66.9
Greater or equal to 1 hour	263	33.1

HCF, health care facility.

Table 2 Background characteristics of maternal health workers in public health facilities of West Gojjam Zone, Northwest Ethiopia (N=41)

Characteristics	Number	Percent
Sex of the provider		
Male	25	61
Female	16	39
Median age (range)	29.0 (23–36 years)	
Median experience (range)	3.0 (1–12 years)	
Training received on		
ANC screening	22	53.7
Counselling	21	51.2
BEmONC	27	65.9
Hypertension management	20	48.8
HIV/PMTCT	32	78
CRC	18	43.9
Personally supervised by the supervisor in the last 3 months		
Yes	15	36.6
No	26	63.4

ANC, antenatal care; BEmONC, basic emergency obstetrics and newborn care; CRC, compassionate and respectful care; PMTCT, prevention of mother-to-child transmission.

components. Nonetheless, the availability of infrastructure and general amenities was particularly deficient (59%). Some essential antenatal drugs such as magnesium sulfate, injectable antibiotics and antihypertensive drugs were not available during the time of the survey (64%) (table 3).

The availability of basic ANC items on the day of the survey varied widely by type of facility, with hospitals generally better in the number of items to provide comprehensive ANC. Some items were universally available across facility types, such as suction apparatus (81.5%) and gloves (94.1 %). However, items such as manual vacuum extractor and calcium gluconate in the health centres and insecticide-treated bed nets in hospitals were extremely deficient (online supplemental file 1). The Cronbach's alpha value of all the items measuring structural attributes of ANC quality was 0.74.

Process quality attributes
Interpersonal performance
Generally, interpersonal aspects of quality were extremely low (average score of 60%), especially concerning warm greetings and welcoming the clients (49.9%) and self-introduction of the providers (38.9%). However, this aspect was relatively better in maintaining the privacy of women during the time of consultation (ie, both visual and auditory), which was observed in 80% of the consultations.

Technical performances
The number of essential ANC services received by the surveyed women, on average, was inadequate (60%).

heterogeneity in the availability of different components, the summary scores of the facility surveys were reasonably good (70%). Laboratory consumables were more likely to be available (80%) compared with other structural

Table 3 Results of structural and process quality components of antenatal care in selected public health facilities of Northwest Ethiopia

ANC quality dimension	Subgroups	Mean quality score
Structural attributes (health facility survey)	Minimum: 0.00–Max: 1.00	
	Number of health facilities	15
	Availability of infrastructure	0.59
	Availability of essential equipment	0.77
	Availability of staff, guidelines and job aids	0.71
	Availability of drugs and vaccines	0.64
	Availability of diagnostic tests/lab supplies	0.80
	Total structural sore	0.70
Process attributes (observational studies)	Minimum: 0.00–Max: 1.00	
	Number of pregnant women	795
	Interpersonal performance	0.60
	Technical skills	0.69
	History taking	0.73
	Clinical examination	0.70
	Counselling	0.69
	Laboratory examinations and preventive measures	0.63
	Total process score	0.65

Looking in detail at the results of different dimensions, we found that some aspects of technical performance scored poorly, especially health screening (63%) and counselling (69%). However, eliciting the general history of pregnant women was rather better, 73% (table 3).

There were variations in the frequency of carrying out a clinical examination and laboratory tests. While some examinations were done regularly (eg, weighing, blood pressure measurement and abdominal palpation), other tests or activities such as haemoglobin, urinalysis and deworming were done less often. For example, only 64% of the women were checked for anaemia. Regrettably, only 2.3% of them received all essential laboratory tests and preventive medicines recommended by the Federal Ministry of Health of Ethiopia. Among all the tests and interventions, screening for asymptomatic bacteriuria (31.5%) and intervention for deworming (17.7%) were among the lowest, compared with the HIV test (93%) (online supplemental file 2). The Cronbach's alpha value of all the items measuring process attributes of ANC quality was 0.74.

Client satisfaction

The respondent's level of agreement on the various aspects of ANC service satisfaction was expressed on a scale ranging from 1 to 5. As can be seen in table 4, the mean level of satisfaction ranged from 2.54 (for the information received about breast feeding after birth) to 3.71 (for those who reported their level of satisfaction about the advice they obtained about vaginal bleeding).

Overall scores among the respondents revealed that 241 (30.3%) of the clients were highly satisfied, 302 (38.0%) were moderately satisfied and almost one-third 252 (31.7%) were unsatisfied. The mean satisfaction score was 3.11, which is approximately equivalent to neutral on the five-point Likert scale. The items were checked for reliability using Cronbach's alpha internal consistency coefficient and the overall alpha value was 0.81

Factors associated with client satisfaction

As stated earlier in the Methods section, we applied the multivariable partial proportional odds regression model to examine the determinants of the overall satisfaction of pregnant women on the antenatal healthcare service received. During the analysis, the three-scale dependent variable produced two panels: panel one (ie, low vs moderate/ high satisfaction); and panel two (low/ moderate vs high satisfaction). In each group, the lower values were recoded to '0', while the highest values were recorded to '1'. A positive coefficient (equivalent to OR >1) implied that increases in the explanatory variable led to higher levels of client satisfaction, while negative coefficient (OR <1) means that increase in the explanatory value led to less satisfaction.[38]

The Brant test of parallel lines assumption (χ2=63.4 df (16); p<0.001) revealed that women's education, number of ANC visits, distance to a health facility, and index for clinical examination were the variables that failed to meet assumption. For these variables, the coefficient estimates and ORs were intended to differ in the two panels (categories; online supplemental file 3).

After adjusting for all the covariates, significant differences in the ANC service satisfaction was observed by process quality indicators and sociodemographic factors. Residence, distance to a health facility, women's, education, number of ANC visits and gestational age appeared to be important predictors of satisfaction with ANC. Moreover, process quality indicators such as history taking, clinical examination, counselling and health screening also remained significant in the final model (p<0.05).

As women's educational status, number of ANC visits, distance to the healthcare facility and clinical examination did not satisfy the proportional odds assumption (the Brant test), $aOR_1 \neq aOR_2$ and separate interpretations at each category were therefore required for these variables. Hence, aOR1 stands for panel one (low vs moderate or high) while aOR2 was for the second panel (low/moderate vs high satisfaction).

In this regard, women with better schooling (aOR1=3.11 (95% CI 2.02 to 4.81)), and those with increased number of ANC visits (aOR1=4.16 (95% CI 1.66 to 10.23)) were significantly associated with increased odds of having moderate or high satisfactionthough no significant

Table 4 Level of satisfaction of pregnant women visiting public healthcare facilities in Northwest Ethiopia

Satisfaction							
To what extent you agree with the following statements:	Very satisfied (%)	Satisfied (%)	Indifferent (%)	Dissatisfied (%)	Very dissatisfied (%)	Mean	SD
The health workers in this facility are very friendly and approachable	6.8	57.2	34.0	2.0	0	3.69	0.626
The health staff are courteous and respectful	4.5	40.8	42.4	11.5	0.9	3.37	0.778
The treatment and/or advice I received from the health worker is optimal	3.5	28.4	49.2	11.6	5.3	3.12	0.874
The provider gives me opportunities to express the concerns I have	2.0	24.4	54.0	17.0	2.6	3.06	0.773
The provider gave me chances to ask him/her questions	1.6	21.4	48.6	23.3	5.2	2.91	0.843
I am well informed on the birth preparedness	0.5	17.6	59.5	21.1	1.3	2.95	0.675
I am informed about breast feeding after birth	–	2.1	56.1	35.0	6.8	2.54	0.654
I am told about how to recognise and proceed in case of vaginal bleeding	5.2	62.9	30.0	1.9	0.1	3.71	0.595
I am told about how to recognise and proceed in case of fever	0.6	28.7	45.0	18.4	7.3	2.97	0.887
I am told about how to recognise and proceed in case of premature uterine contractions	1.0	12.7	62.1	18.9	5.3	2.85	0.739
I am told about how to recognise and proceed in case of severe headache	0.2	24.2	66.4	9.2	–	3.15	0.566
I am told about how to recognise and proceed in case of difficulty in breathing	0.6	12.8	69.4	15.0	2.1	2.95	0.622
Average satisfaction						3.11	0.72
Overall satisfaction							
High satisfaction	241 (30.3%)						
Moderate satisfaction	302 (38.0%)						
Low satisfaction	252 (31.7%)						

1=very dissatisfied, 2=dissatisfied, 3=indifferent, 4=satisfied, 5=very satisfied.

difference was observed for the low/moderate versus high scores. However, the findings revealed that living within 60 min walking distance significantly reduced the odds of being satisfied (low vs moderate/high scores, aOR1=0.29 (95% CI 0.18 to 0.46)) though it failed to achieve statistical significance in the second category (low/moderate vs high scores).

Recieving better clinical examination of the process dimension was positively and significantly associated with the two satisfaction categories (low vs moderate/high: aOR_1=1.69 (95% CI 1.13to 2.54)), and (low/moderate vs high:aOR_2=4.09 (95%CI2.69 to 6.24)). As can be seen in table 5, the effects became much stronger when satisfaction level moved from low to high category.

However, variables that did not violate the assumption had a single beta coefficient at each of the two satisfaction categories; hence, a single aOR1=2 was reported. In this regard, client satisfaction was associated with better process scores. Better scores in history taking (aOR_1 = aOR_2; 1.81 (95% CI 1.25 to 2.60)), counselling performance (aOR_1 = aOR_2; 1.89 (95% CI 1.33 to 2.69)), and health screening and preventive measures (aOR1=2; 18.10 (95% CI 11.52 to 28.39)) were associated with achieving higher ANC satisfaction scores.

Similarly, being a rural resident was significantly associated with achieving a higher satisfaction score (aOR_1= aOR_2; 1.89 (95% CI 1.05 to 3.41)). For every 1 month increase in gestational age of a pregnancy, however, the odds of having above a particular satisfaction category was decreased by a factor of 0.87 (OR_1 = OR_2; 0.87 (95% CI 0.78 to 0.97); table 5).

DISCUSSION

In this study, we analysed a comprehensive range of structural and process-related factors and some individual characteristics associated with ANC's satisfaction. The study identified critical gaps in the quality of routine ANC and women's satisfaction with ANC was low at public health facilities. The contents of antenatal services covered during client–provider interaction were the main factors affecting their satisfaction. The study also revealed that community features (eg, residency) and individual women's characteristics including women's education, number of ANC visits and gestational age appeared to be important predictors of satisfaction. However, we get hardly any significant relationship between structural attributes and client satisfaction.

Client satisfaction with the quality of ANC services, as noted by Do *et al*, has been increasingly recognised as an important outcome for the healthcare delivery system.[39] Nonetheless, our study found that only 30% of clients had high levels of satisfaction. This proportion of satisfaction was less than the findings in Southern Ethiopia (32%), Uganda (40%) and Oman (59%).[29 40–42] This lower figure is a serious concern given that low satisfaction may adversely affect women's willingness to return and seek

care for subsequent maternal services including facility delivery and skilled postnatal care.[22]

Furthermore, our results revealed that all the dimensions of process quality including, history taking, physical examination, counselling and screening had positively significant impacts on client satisfaction. Similar findings were also reported by other studies, which indicated a positive association between clinical quality characteristics and client satisfaction.[29 43] A study conducted in India, for example, reaffirmed the importance of adequate clinical examinations in defining clients' expectations and helping to establish trust between the client and providers.[44]

It is, however, worth noting that there was no statistically significant association between client satisfaction and all the structural aspects of care, which is consistent with results obtained in previous studies.[39 45 46] This would seem to imply that the mere existence of services is not a guarantee to bring satisfaction. Contrary to our findings, however, others[43 47] showed the positive influence of structural quality indicators on client satisfaction.

The available literature on the associations between maternal education and client satisfaction reported inconclusive results. Chemir *et al* from Ethiopia reported a negative association between maternal education and service satisfaction.[48] Our study, on the contrary, showed that better educated women had a higher level of satisfaction than their counterparts did. This finding is similar to that of Rahman *et al* in Malaysia[40] who argued that educated women were more aware of the actual procedures to expect during ANC.

Rural–urban divides of residence had a significant impact on client satisfaction, as was a distance to the nearest health facility. We found a significant difference in levels of satisfaction between urban and rural residents, with the highest satisfaction achieved among rural than urban dwellers. Moreover, living within an hour walking distance to the clinic was significantly associated with lower satisfaction. The result of this study is consistent with other studies.[29 49 50] Women from rural areas, who also are supposed to live in the far distance, are more likely to have lower expectations owing to their previous experience of healthcare and lower chance of exposure to healthcare information, and therefore they tend to value service they are offered and more likely to report higher levels of satisfaction.[49]

Reproductive-related factors such as the number of antenatal visits and gestational age showed a significant association with client satisfaction. Women who made four or more antenatal visits were positively and significantly associated with the low versus moderate or high satisfactions category despite the association turned insignificant in the low or medium versus high satisfaction category. A previous study conducted in Southern Ethiopia has also reported a similar finding.[29] The positive association in this regard could be due to developing awareness through repeated visiting. The repeated ANC visits could further improve the relationship between providers and

Table 5 Multivariable partial proportional odds model showing factors affecting antenatal care (ANC) satisfaction in West Gojjam Zone, Northwest Ethiopia (n=795)

Explanatory variables	Outcome variables (panels)			
	Panel one (1 vs 2 and 3)		Panel two (1or 2 vs 3)	
	aOR 1 (95%CI)	Coefficients not varying (OR1=OR2)	aOR2 (95%CI)	Overall p value(s)
Education of women ► Attended at least primary education ► No schooling (Ref)	**3.11 (2.02 to 4.81)***		1.34 (0.97 to 1.86)	**0.001**/0.073
Number of ANC visits ► ≥4 ► <4 visits (Ref)	**4.16 (1.66 to 10.23)***		0.99 (0.51 to 1.95)	**0.002**/0.996
Walking distance to HCF ► < 1 hour ► ≥1 hour (Ref)	**0.29 (0.18 to 0.46)***		0.64 (0.39 to 1.04)	**0.001**/0.072
Clinical examination ► At least fair ► Poor (Ref)	**1.69 (1.13 to 2.54)***		**4.09 (2.69 to 6.24)***	0.011/0.001
Address (rural, urban (Ref))		**1.89 (1.05 to 3.41)***		**0.035**
Age in years ► Greater or equal to 20 ► 15–19 (Ref)		1.10 (0.80 to 1.50)		0.561
Parity ► Para 1+ ► Nulliparous (Ref)		0.80 (0.63 to 1.01)		0.065
Gestational age in months (Cont.)		**0.87 (0.78 to 0.97)***		**0.01**
Service year of providers (year) (Cont.)		0.99 (0.93 to 1.07)		0.95
Supervision received in the last 3 months ► Yes ► No (Ref)		1.34 (0.80 to 2.26)		0.264
Infrastructure ► At least fair, ► Poor (Ref)		0.78 (0.56 to 1.08)		0.138
Drug availability ► At least fair ► Poor (Ref)		0.95 (0.70 to 1.28)		0.728
Interpersonal index ► At least fair ► Poor (Ref)		1.16 (0.88 to 1.54)		0.291
History taking ► At least fair, ► Poor (Ref)		**1.81 (1.25 to 2.60)***		**0.002**
Counselling performance ► At least fair ► Poor (Ref)		**1.89 (1.33 to 2.69)***		**0.001**
Laboratory tests and preventive measures ► At least fair ► Poor (Ref)		**18.09 (11.52 to 28.39)***		**0.001**

1=low satisfaction; 2=moderate satisfaction; and 3=high satisfaction.
*Indicates <5% level of significance.
Ref, reference category.

women in a positive direction, which in turn made them feel good towards the services.[51]

Another notable finding in this study was the inverse relation between gestation age and level of satisfaction. The possible reason for this negative association could be related to the fact that the late trimester is a time when more complications can occur.[52] These complications could let expectant mothers demand extra care and support; hence, they might be dissatisfied if the service was not to their expectations.

Despite the important findings evolved in the present study, some caution needs to be taken in interpreting the results as our study could have the following limitations. First, our study assessed the satisfaction level of pregnant women who attended public facilities only; yet, the degree of satisfaction for women who attended private facilities might be rather different from our findings.

Second, the presence of an observer during the client–provider interaction could generate bias through the Hawthorne effect. Nonetheless, the data collector spent more time at each healthcare facility and observed many client consultations for each provider. In this aspect, Leonard and Masatu[53] reported that the quality of health workers' performance increased by 20% on average when being observed but that was only temporary and 10–15 observations later the behaviour of the providers became normative.

Third, social desirability bias might also be a concern in cases that women participated in the exit interviews could feel that they need to respond in a way expected of them. Yet, satisfaction was measured using a summary of the client's responses to a series of questions, which is less subjective than asking a single question. In addition, the use of interviewers who were not affiliated with the surveyed facilities might have mitigated against this.

Finally, we have been constrained by the lack of consistency in defining quality in the existing literature. Hence, the definition we used could not be refined to certain variables listed by the researchers. The unmeasured factors, however, might have influenced the client's satisfaction as well.

CONCLUSIONS

The women's satisfaction towards ANC in public facilities was suboptimal and was dependent on an interplay of factors at various levels. A significant contribution to the variation in client satisfaction was mainly attributed to factors related to the contents of the care received than did structural attributes.

Indeed, the study suggests that availing inputs may not be enough to ensure in bringing client satisfaction. Rather, providers may need further supporting mechanisms to offer ANC that clients regard as satisfactory. In so doing, facilities will increase the levels of providers' performance and client satisfaction, and improve the overall quality of care offered at public health facilities. Finally, the context of this study was an exclusively public

health facility setting. Therefore, future studies linking different health system complexities would add value to the evidence generated by our study.

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