A RESEARCH ARTICLE

Quality and Experience of Antenatal Care Services in Baant Primary Health Care Center, Gezira State, Sudan: A Facility-Based Cross-Sectional Study from August to November 2023

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Abstract

Antenatal care (ANC) remains a cornerstone for reducing maternal and neonatal morbidity and mortality. Recent global strategies emphasize not only service coverage but also quality and experience of care combined with service coverage.

A facility-based cross-sectional analytic study was conducted at Baant Primary Health Care Center, Wad Medani, Gezira State, Sudan, from August to November 2023. A total of 400 women attending ANC were selected using simple random sampling. Data were collected using a structured questionnaire adapted from WHO quality assessment tools. Data were analyzed using (Statistical Package for the Social Sciences) SPSS. Chi-square test was used to assess associations. P ≤0.05 was considered statistically significant.

Among 400 participants, 68.5% were aged 20–40 years and 55% resided in urban areas. Blood pressure measurement (99.2%), abdominal examination (100%), hemoglobin testing (100%), urine testing (100%), tetanus vaccination (100%), and iron/folic acid supplementation (98.5%) showed high coverage. However, height (3.7%) and weight (3.5%) measurements were rarely documented. Ultrasound was performed in 26% of cases. Respectful treatment was reported by 96% of women. Residence was significantly associated with experience of care (p=0.050).

Core clinical ANC services were largely provided; however, gaps remain in anthropometric monitoring and counseling components. Strengthening standardized protocols and enhancing woman-centered communication are essential to improve ANC quality in Sudanese PHC settings.

1. Introduction

Maternal mortality remains one of the most critical indicators of health system performance worldwide. Despite global efforts, an estimated 287,000 maternal deaths occurred in 2020, with nearly 70% occurring in sub-Saharan Africa [1]. Although antenatal care (ANC) coverage has improved globally, reductions in maternal mortality have not paralleled increases in service utilization, highlighting persistent gaps in the quality of care [2].

Recognizing this discrepancy, the World Health Organization revised its antenatal care model in 2016 and recommended a minimum of eight contacts during pregnancy to improve maternal and neonatal outcomes and enhance women's experience of care [3]. More recent global health literature emphasizes that evaluating maternal health services should move beyond crude service coverage toward quality-adjusted coverage, which considers whether essential service components are actually delivered during ANC visits [4,5].

The WHO Quality of Care Framework defines quality across two major domains: provision of evidence-based clinical care and experience of care, which includes dignity, communication, emotional support, and respectful treatment [6]. However, evidence from several studies in low- and middle-income countries indicates that although many women attend antenatal visits, a smaller proportion receive the full recommended content of care, including anthropometric assessment, counseling, and preventive interventions [7,8].

Urban–rural disparities remain important determinants of antenatal care quality. Studies from sub-Saharan Africa have demonstrated that women living in urban areas or with higher levels of education are more likely to receive comprehensive antenatal services compared with rural residents [9,10].

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In fragile and conflict-affected settings, health system constraints often compromise service quality. Communication and counseling components of care are frequently the first to decline when health systems operate under workforce shortages or increased patient load [11,12].

Sudan is currently experiencing economic challenges and health system disruptions, which may affect maternal health service delivery. Despite historically strong antenatal service utilization in Gezira State, pressures on primary health care facilities may influence the quality of services provided [13].

Therefore, generating facility-based evidence assessing both the provision of clinical services and women's experience of care is essential for improving maternal health services in Sudan. This study aimed to evaluate the quality and experience of antenatal care services at Baant Primary Health Care Center in Wad Medani, Gezira State.

Despite the importance of antenatal care quality, facility-based studies evaluating both clinical service provision and women's experience of care remain limited in Sudan. Therefore, generating local evidence from primary health care facilities is essential to inform maternal health system improvement in the Sudanese context.

2. Methods

2.1. Study Design and Setting

A facility-based cross-sectional analytic study was conducted at Baant Health Center in Wad Medani, Gezira State, Sudan, from August to November 2023. The center serves a large urban and peri-urban population.

This study aimed to assess the quality of antenatal care services at Baant Primary Health Care Center in Wad Medani, Sudan, using the World Health Organization Quality of Care Framework. The study specifically evaluated two key domains: the provision of evidence-based clinical services and women's experience of care. In addition, the study explored potential disparities in service experience related to residence and sociodemographic characteristics within the context of a fragile health system environment.

2.2. Sample Size and Sampling

The sample size was calculated using a standard cross-sectional formula with 95% confidence level and 5% precision, resulting in 400 participants.

A simple random sampling technique was used daily. Women attending ANC were listed, assigned numbers, and 10 were randomly selected each working day until the sample size was reached.

2.3. Data Collection Tool

A structured questionnaire was developed following literature review and adapted from established ANC quality assessment tools. It included 1.Sociodemographic characteristics, 2. Obstetric history, 3. Service provision indicators, 4. Experience of care indicators.

2.4. Data Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics were used to summarize sociodemographic characteristics, service provision indicators, and experience-of-care measures.

The Chi-square test was applied to examine associations between categorical variables, particularly between sociodemographic factors and women's experience of antenatal care. The use of the Chi-square test was appropriate because the variables analyzed were categorical in nature. A p-value ≤0.05 was considered statistically significant.

This analytical approach allowed the study to identify potential inequalities in antenatal care experience across different population groups.

3. Results

Table 1. presents the sociodemographic characteristics of the study participants. The majority of women were aged between 20–40 years and more than half resided in urban areas. Educational attainment varied, with secondary and university levels representing a considerable proportion. Most participants were housewives, and the majority of husbands were employed. These characteristics provide important contextual background for interpreting ANC utilization and experience patterns.

Table 1. Sociodemographic Characteristics of Participants (N=400)

Age group	No	%
Less than 20 year	64	16
20-40 year	274	68.5
More than 40 year	62	15.5
Residence		
Urban	220	55
Rural	180	45
Level of education		
Illiterate	86	21.5
Basic	74	18.5
Secondary	123	30.8
University	111	27.8
Above university	6	1.5
Job		
House wife	294	73.5
Worker	106	26.5
Job of her husband		
Not working	29	7.2
Worker	371	92.8
Total	400	100

Table 2. summarizes the obstetric profile and current pregnancy status of participants. More than half of the respondents were currently pregnant, with most in the second and third trimesters. Multiparity was common, as a significant proportion had experienced more than one pregnancy. This profile reflects the reproductive pattern of women attending the primary health care facility.

Table 2. Obstetric and ANC Utilization Profile

Variables	Percentage %
Are you pregnant now	
Yes	225(56.3%)
No	175(43.7%)
If yes :	
The number of months of pregnancy	
1-3 months	36(16%)
4-6 months	95(42%)
7-9 month	94(44%)
Number of pregnancy	
The first	51(23.4%)
The second	41(18.8%)
The third	69(31.7%)
More	57(26.1%)

Source: Researcher from Banat health center Wad, Madani ,Gezira -Sudan 2023

Table 3. illustrates the provision of core antenatal care service components. Essential biomedical services such as blood pressure measurement, laboratory investigations, tetanus vaccination, and iron/folic acid supplementation demonstrated high coverage. However, anthropometric measurements and ultrasound utilization showed considerably lower documentation rates, indicating potential gaps in comprehensive ANC delivery.

Table 3. Provision of ANC Services (measurement)(n=400)

Measurement	Yes		No	
	N	%	N	%
Height measurement	15	3.7	385	96.3
Weight measurement	14	3.5	386	96.5
Blood pressure measurement	397	99.2	3	0.8
Abdominal examination	400	100	0	0
Hemoglobin testing	400	100	0	0
Urine testing	400	100	0	0
Tetanus vaccination	400	100	0	0
Iron/Folic acid	394	(98.5)	6	(1.5)
Ultrasound	104	(26.0)	296	(74.0)

Source: Researcher from Banat health center Wad, Madani ,Gezira -Sudan 2023

These findings indicate strong adherence to essential biomedical components of antenatal care. However, the extremely low documentation of anthropometric measurements highlights a critical gap in routine maternal assessment.

Table 4 outlines the experience-of-care indicators as reported by participants. While respectful treatment and opportunity to ask questions were highly reported, counseling-related components—including danger signs, birth preparedness, and breastfeeding education—were inconsistently delivered. The composite experience score highlights moderate adherence to person-centered antenatal care principles.

Table 4. Experience of Care Indicators

Indicator	Always %	Sometimes %	Never %
Respectful treatment	96.0	3.0	1.0
Able to ask questions	95.0	3.5	1.0
Counseling on danger signs	24.0	50.0	25.5
Birth preparedness counseling	22.5	46.3	31.2
Breastfeeding counseling	30.2	35.5	34.3

The association between place of residence and women's experience of antenatal care was examined. A higher proportion of urban residents reported a good experience of care compared to rural residents (52.3% vs. 44.4%), whereas poor experience was more common among rural women (55.6% vs. 47.7%). This difference was found to be borderline statistically significant (p = 0.050), suggesting a potential disparity in the quality of care experience between urban and rural populations, table 5. It displays all the results obtained.

Table 5. Association between Residence and Experience of Care

Residence	Good Experience n (%)	Poor Experience n (%)	Total	P-value
Urban	115 (52.3%)	105 (47.7%)	220 (55%)	0.050
Rural	80 (44.4%)	100 (55.6%)	180 (45%)	
Total	195 (48.8%)	205 (51.2%)	400 (100%)	

Composite experience score (mean "Always" responses across indicators) = 48.2%.

Residence was significantly associated with experience (χ^2=3.84; p=0.050).

The significant association between residence and experience of care suggests that geographic location may influence women's interaction with health services. Urban residents may benefit from better access to information, higher expectations regarding service quality, and improved communication with providers compared with rural residents.

The results demonstrate high levels of respectful care but reveal substantial deficiencies in counseling and health education components of antenatal services.

4. Discussion

This study demonstrated high coverage of essential biomedical antenatal care services such as blood pressure measurement, laboratory investigations, tetanus vaccination, and iron supplementation. These findings are consistent with WHO recommendations on essential antenatal care components and align with reports from facility-based studies conducted in several sub-Saharan African countries [3,7,8].

However, anthropometric monitoring was markedly deficient, with height and weight measurements documented in fewer than 5% of cases. Anthropometric assessment during pregnancy is important for identifying maternal undernutrition and potential risks such as obstructed labor [14]. Similar gaps in anthropometric monitoring have been reported in other studies across African primary health care settings [8,15].

The relatively low utilization of ultrasound services observed in this study (26%) may reflect structural barriers such as limited equipment availability, referral practices, or financial constraints within primary health care facilities. In many low-resource settings, ultrasound services are often concentrated in secondary or private facilities rather than primary health centers [16].

Although respectful treatment was widely reported by participants (96%), counseling-related components—including education on danger signs, birth preparedness, and breastfeeding—were inconsistently delivered. Effective communication and counseling during antenatal care are essential for improving maternal knowledge, health behaviors, and neonatal outcomes [11,17].

Evidence from previous research indicates that communication-related aspects of care are frequently deprioritized when health systems operate under workforce pressure or high patient loads [11,12]. This pattern has been documented particularly in fragile and conflict-affected health systems.

The moderate composite experience-of-care score observed in this study supports the growing argument that crude service coverage may overestimate the true effectiveness of maternal health services [4,18]. Increasingly, researchers recommend using quality-adjusted coverage indicators to better evaluate maternal health system performance.

The significant association between residence and experience of care identified in this study is consistent with previous research demonstrating persistent urban–rural inequalities in maternal health service quality [9]. Women living in urban areas often have greater access to information and may interact more effectively with health care providers compared with rural residents.

Overall, the findings suggest that while essential clinical screening components of antenatal care are largely maintained, important gaps remain in anthropometric monitoring and counseling services. Strengthening standardized antenatal care protocols and reinforcing person-centered maternity care principles are critical steps for improving maternal health outcomes in Sudan [6,13].

Limitations

This study has several limitations. First, the experience-of-care indicators were based on self-reported responses, which may be affected by recall bias or social desirability bias. Second, the study was conducted in a single primary health care center, which may limit the generalizability of the findings to other regions of Sudan. Third, the cross-sectional design limits the ability to establish causal relationships between variables. Finally, multivariate regression analysis was not performed, which may limit deeper exploration of predictors of antenatal care experience.

5. Conclusion

ANC clinical service provision in this PHC center was largely satisfactory regarding laboratory and clinical screening. However, substantial gaps exist in counseling, anthropometric measurements, and comprehensive experience of care.

Educational level and residence influence women's experience during ANC.

Strengthening standardized ANC protocols and reinforcing respectful, person-centered maternity care are essential to improve maternal health outcomes in Gezira State.

Policy implication Strengthening standardized antenatal care protocols, improving provider training in counseling, and ensuring routine anthropometric monitoring may improve the overall quality of antenatal care services in Sudanese primary health care facilities

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جودة وتجربة خدمات رعاية ما قبل الولادة في مركز بانت للرعاية الصحية الأولية، ولاية الجزيرة، السودان: دراسة مقطعية قائمة على المرافق الصحية من أغسطس إلى نوفمبر 2023

الخلاصة

تُعدّ رعاية ما قبل الولادة ركيزة أساسية للحدّ من اعتلالات ووفيات الأمهات والمواليد. وتؤكد الاستراتيجيات العالمية الحديثة ليس فقط على تغطية الخدمات، بل أيضًا على جودتها وتجربة مقدميها. أجريت دراسة تحليلية مقطعية قائمة على المرافق الصحية في مركز بانت للرعاية الصحية الأولية، ود مدني، ولاية الجزيرة، السودان، من أغسطس إلى نوفمبر 2023. تم اختيار 400 امرأة من المترددات على خدمات رعاية ما قبل الولادة باستخدام أسلوب العينة العشوائية البسيطة. جُمعت البيانات باستخدام استبيان مُهيكل مُقتبس من أدوات تقييم الجودة لمنظمة الصحة العالمية. وتم تحليل البيانات باستخدام برنامج SPSS (الحزمة الإحصائية للعلوم الاجتماعية). استُخدم اختبار مربع كاي لتقييم الارتباطات، واعتُبرت قيمة P ≤ 0.05 دالة إحصائيًا.

من بين 400 مشاركة، كانت 68.5% منهن تتراوح أعمارهن بين 20 و40 عامًا، و55% منهن يسكنّ في المناطق الحضرية. أظهرت قياسات ضغط الدم (99.2%)، والفحص البطني (100%)، واختبار الهيموجلوبين (100%)، وتحليل البول (100%)، والتطعيم ضد الكزاز (100%)، وتناول مكملات الحديد/حمض الفوليك (98.5%) تغطية عالية. مع ذلك، نادرًا ما تم توثيق قياسات الطول (3.7%) والوزن (3.5%). أُجري فحص الموجات فوق الصوتية في 26% من الحالات. وأفادت 96% من النساء بتلقيهن معاملة محترمة. وارتبط مكان الإقامة ارتباطًا وثيقًا بتجربة الرعاية.(p=0.050)

تم توفير خدمات رعاية ما قبل الولادة السريرية الأساسية على نطاق واسع؛ إلا أنه لا تزال هناك ثغرات في مكونات المتابعة الأنثروبومترية وتقديم المشورة. يُعد تعزيز البروتوكولات الموحدة وتحسين التواصل الذي يركز على المرأة أمرًا ضروريًا لتحسين جودة رعاية ما قبل الولادة في مراكز الرعاية الصحية الأولية السودانية.

الكلمات المفتاحية: رعاية ما قبل الولادة، جودة الرعاية، تجربة الرعاية، الرعاية الصحية الأولية، السودان.