

Assessing the quality of health facilities providing antenatal care services in Bor, South Sudan

John Thon Pandak Kuot, Shalini Ninan Cherian

Author Affiliation:

Jonglei Health Sciences Institute,
Bor, South Sudan

Correspondence:

Shalini Ninan Cherian
shalini.ninan@gmail.com

Submitted: June 2026

Accepted: July 2026

Published: August 2026

ABSTRACT

Introduction: Maternal and perinatal mortality remain a major challenge in developing countries, including South Sudan, where rates are among the highest in the world. Providing adequate antenatal care is regarded as a cornerstone of maternal and perinatal health care and is expected to have a considerable impact on achieving the Sustainable Development Goals. The objective of this study was to assess the quality of health facilities providing antenatal care services in Bor, South Sudan.

Method: Data were collected from six health facilities providing antenatal care in Bor town in June 2023. The availability of equipment for assessing pregnant women and fetuses at the facilities and the qualifications of the health care workers who provided care were assessed.

Results: Not all equipment considered necessary for antenatal care was available in every facility. Three of the six facilities had all three: a blood pressure (BP) apparatus, an examination couch or bed, and a thermometer. While all facilities had a thermometer, one had a BP apparatus and a couch, and only three had an examination couch. For foetal assessment, only one facility had an obstetric calendar, one had a tape measure for fundal height measurement, and four had Pinard's foetal stethoscope. For measuring nutritional status, only two facilities had adult mid-upper arm circumference (MUAC) tapes, weighing scales, and height measurements for calculating BMI. Of the 18 workers who provided antenatal care, 10 were not health professionals.

Conclusion: Health facilities providing antenatal care in Bor should be equipped with all necessary tools and staffed with trained health workers to improve maternal health outcomes.

Keywords: antenatal care; health facilities; skilled birth attendant; International Confederation of Midwives (ICM); South Sudan.

Citation: Kuot and Cherian. Assessing the quality of health facilities providing antenatal care services in Bor, South Sudan. South Sudan Medical Journal, 2026;19(3):190-194 © 2026 The Author (s) **License:** This is an open access article under [CC BY-NC](https://creativecommons.org/licenses/by-nc/4.0/) DOI: <https://dx.doi.org/10.4314/ssmj.v19i3.9>

Introduction

Maternal and perinatal mortality are major challenges in developing countries, including South Sudan, where the figures are among the highest in the world. The maternal mortality ratio is 1,223 per 100,000 live births, as reported by the

World Health Organization (WHO) in 2021.^[1] Recent studies indicate that South Sudan has one of the highest mortality rates globally, with early perinatal mortality reported at 122.3 per 1,000 total births in some areas and a neonatal mortality rate (NMR) of approximately 39.3 - 40.2 per 1,000 live births in 2025. High stillbirth rates (82.7 per 1,000) and maternal malnutrition contribute to these figures.^[2]

Adequate antenatal care is a cornerstone of maternal and perinatal health care and is expected to have a considerable impact on efforts to achieve the Sustainable Development Goals (SDGs). The SDG target 3.1 is to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030,^[3] and target 3.2 is ending preventable deaths of newborns and children under five years old and neonatal mortality to at least as low as 12 per 1,000 live births and under-five mortality at least as low as 25 per 1,000 live births by 2030.^[4]

The South Sudanese government introduced free maternal care in public health facilities, but access to quality antenatal care remains limited.

This research was conducted to evaluate the quality of antenatal care provided in health facilities in Bor town, in accordance with the South Sudan clinical guidelines.^[5] The guidelines follow WHO-recommended eight antenatal visits and provide guidance on nutrition, maternal and foetal assessment, prophylaxis, and hospital records.^[6]

Method

This facility-based, cross-sectional, observational study was conducted in two parts. The first part assessed the quality of antenatal care at the health facilities by examining personnel and equipment at the antenatal clinics in Bor, Jonglei State, South Sudan. The results are reported in this paper. The second part interviewed women of reproductive

age (15-49 years) attending antenatal care at these health facilities. The results will be reported in a second paper.

The research was conducted in July 2023 at six health facilities providing antenatal care: Bor State Referral Hospital; two government Primary Health Care Centres (PHCCs); two government Primary Health Care Units (PHCUs); and one faith-based private clinic (equivalent to a PHCU). Data for the first part were collected using a checklist. We assessed the equipment used at the antenatal clinics, including the nutrition status tool and examination and assessment tools, as well as the number and workload of qualified health personnel. The data were entered into Microsoft Excel, and simple calculations of averages and percentages were derived.

Permission to conduct the research was obtained from the institute's research ethics board, the heads of each facility, and the state Ministry of Health.

Results

The data in Table 1 were taken from the antenatal care registers and show the number of antenatal women who came to the six facilities in June 2023 - per month and per clinic day (antenatal clinics were held every weekday) and the type of facility. In one month, 220 pregnant women visited these facilities. Except for two facilities, the others had fewer than one client per day.

Regarding the availability of equipment for assessing mothers attending antenatal care, including blood pressure (BP) apparatus, an examination couch or bed, and a thermometer: Bor State Referral Hospital, Anyidi PHCC, and Taragok had all three assessment tools; Langbar PHCU had only a thermometer and lacked a BP apparatus or couch. Only three of the six facilities had an examination couch. See Table 2.

Table 1. Facility and workload in the health facility

Name of Facility	Type of Facility	Clients / Month	Clients / Clinic Day
Bor State Referral Hospital	Hospital	159	8
Anyidi	PHCC	36	1.8
Jalle	PHCC	10	0.5
Mathiang	PHCU	7	0.4
Langbar	PHCU	3	0.2
MCH Taragok	Private clinic	5	0.3
	Total	220	11

Table 3 lists the tools available for assessing nutritional status during pregnancy: adult mid-upper arm circumference (MUAC) tapes, weighing scales, and height measurements for calculating Body Mass Index (BMI). Only Bor State Referral Hospital and Jalle PHCC had adult MUAC tapes.

For assessing the foetus, Anyidi PHCC was the only facility with an obstetric calendar, and Jalle PHCC was the only facility with a tape measure. Mathiang PHCU and Taragok PHCU did not have a Pinard's foetal stethoscope – Table 4.

Table 2. Equipment for the assessment of the mother

Name of Facility	Type of Facility	BP Apparatus		Couch		Thermometer	
		Yes	No	Yes	No	Yes	No
Bor State Referral Hospital	Hospital	X		X		X	
Anyidi	PHCC	X		X		X	
Jalle	PHCC	X			X	X	
Mathiang	PHCU	X			X	X	
Langbar	PHCU		X		X	X	
MCH Taragok	Private clinic	X		X		X	

Table 3. Nutritional status assessment tool

Name of Facility	Type of Facility	Adult Mid-upper Arm Circumference (MUAC) Tape		Weighing Scale		Height Measuring Tool	
		Yes	No	Yes	No	Yes	No
Bor State Referral Hospital	Hospital	X		X		X	
Anyidi	PHCC		X	X			X
Jalle	PHCC	X			X		X
Mathiang	PHCU		X	X		X	
Langbar	PHCU		X		X		X
MCH Taragok	Private clinic		X	X			X

Table 4. Equipment for the assessment of the foetus

Name of Facility	Type of Facility	Obstetric Calendar		Pinard's Foetal Stethoscope		Tape Measure	
		Yes	No	Yes	No	Yes	No
Bor State Referral Hospital	Hospital		X	X			X
Anyidi	PHCC	X		X			X
Jalle	PHCC		X	X		X	
Mathiang	PHCU		X		X		X
Langbar	PHCU		X	X			X
MCH Taragok	Private clinic		X		X		X

Table 5. Number of qualified staff by facility

Name of Facility	Type of Facility	Staff		Total	Patient: Staff Ratio
		Qualified	Unqualified		
Bor State Referral Hospital	Hospital	3	1	4	8:4
Anyidi	PHCC	2	1	3	1.8:3
Jalle	PHCC	2	1	3	0.5:3
Mathiang	PHCU	0	4	4	0.4:4
Langbar	PHCU	0	2	2	0.2:2
MCH Taragok	Private clinic	1	1	2	0.3:2
		8	10	18	

Across all six health facilities, 18 staff members provided antenatal care, of whom only 8 were qualified midwives or nurses who had completed 3 years of health sciences training certified by the Ministry of Health. The staff-to-client ratio in each facility is shown in Table 5.

Discussion

The WHO published guidelines for antenatal care in 2016.^[6] These recommendations have been incorporated into the Ministry of Health's clinical care guidelines and cover nutrition, maternal and foetal assessment, prophylaxis, and hospital records.^[5]

In our study, tools for nutritional assessment were often lacking. The South Sudan clinical guidelines^[5] recommend using adult MUAC to assess the nutritional status of antenatal women and to enroll women with severe malnutrition in nutrition programmes.

Adult MUAC is a readily applicable anthropometric measure for assessing malnutrition in resource-poor settings and has been shown to correlate strongly with BMI.^[7] With acute food shortages and high rates of malnutrition, the lack of objective ways to assess nutritional status can lead to favouritism and nepotism in the distribution of nutritional assistance.

The tools for assessing the mother were suboptimal, with some facilities lacking BP apparatus. Routine testing of women for anaemia and asymptomatic bacteriuria was non-existent. Without routine investigations and the prescription of therapeutic doses of iron, the likelihood of maternal and foetal complications is high.

The only clinical test for assessing the foetus is to compare uterine height with gestational age. The other test is a routine ultrasound scan, as recommended by the 2016

WHO guidelines.^[6]

This study found limited knowledge of how to assess the foetus. Many health facilities did not use an obstetric calendar or a couch/bed to perform an abdominal examination to measure uterine height.

It is recommended that:

1. Trained skilled birth attendants, provided with the appropriate equipment and medicines, is the best strategy to improve maternal health and reduce maternal mortality, as recommended by the International Confederation of Midwives.^[8] All leaders of health facilities and leaders of NGOs and the Ministry of Health should make this one of the important strategies for improving maternal and reproductive health
2. These workers should be regularly updated on the latest antenatal care recommendations.
3. All health facilities should be provided with the necessary tools, reagents for testing, and medications for treatment and prophylaxis during the antenatal period, in accordance with the WHO antenatal care guidelines.^[6]

Conclusion

Not all facilities had all the equipment considered necessary for antenatal care. About half of the health workers providing antenatal care were qualified midwives or nurses. Health facilities providing antenatal care in Bor should be equipped with all necessary tools and staffed with trained health workers to improve maternal health outcomes.

Acknowledgment: We acknowledge the head and staff of all the facilities, the state Ministry of Health, and the ethics board for allowing this research.

Funding: None received

Conflict of interest: There was no conflict of interest in conducting this study.

References

1. World Health Organization 2023. Trends in maternal mortality 2000 to 2020: Estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/population Division. Geneva: World Health Organization 2023 <https://data.unicef.org/resources/trends-in-maternal-mortality-2000-to-2020/>.
2. Flora WP, Kamau RK, James MM et al. Early Perinatal Mortality and Characteristic of Mothers Delivered at Juba Teaching Hospital, South Sudan: A Cross-Sectional Study. *Journal of Obstetrics and Gynaecology of Eastern and Central Africa* 2020;32(1):30-35 DOI: <https://doi.org/10.59692/jogeca.v32i1.199>.
3. World Health Organisation: The global Health Observatory. Indicator Groups. SDG Target 3.1. WHO: Geneva. <https://bit.ly/4hek3sR>.
4. World Health Organisation: The Global Health Observatory. Indicator Groups. SDG Target 3.2. WHO: Geneva. <https://bit.ly/4wR0dJi>.
5. Republic of South Sudan, Ministry of Health. South Sudan Standard Treatment Guidelines SS STG. Hospitals. 2019.
6. World Health Organization 2016. World Health Organization recommendations on antenatal care for positive pregnancy experience. <https://www.who.int/publications/i/item/9789241549912>.
7. James WP, Mascie-Taylor GC, Norgan NG, Bistran BR, Shetty PS, Ferro-Luzzi A. The value of arm circumference measurements in assessing chronic energy deficiency in Third World adults. *Eur J Clin Nutr*. 1994 Dec;48(12):883-94. PMID: 7889897.
8. Nove A, Friberg I, de Bernis L et al. Potential impact of midwives in preventing and reducing maternal and neonatal mortality and stillbirths: a Lives Saved Tool modelling study, *The Lancet Global Health*, 2020; 9, e24-e32.