# Assessment of the quality of immediate postnatal care practices in three referral hospitals in Juba, South Sudan

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## ABSTRACT

**Introduction:** The immediate postnatal period, particularly the first 24 hours after childbirth, is critical for preventing maternal and neonatal morbidity and mortality. Despite global efforts to improve maternal and newborn health, postnatal care remains one of the most neglected components of healthcare in many low-resource settings, including South Sudan.

**Method:** We conducted an institution-based descriptive cross-sectional study of postnatal women across three hospitals. Participants were selected using a proportionate sampling method based on patient flow. Data collection involved a structured questionnaire administered at discharge and during follow-up visits; analysis used SPSS version 27 and included descriptive statistics, Chi-square tests, and association measures, with significance at $p < 0.05$.

**Results:** 384 postnatal women participated. Coverage of essential immediate postnatal care interventions was generally high, including maternal bleeding assessment (92.4%), uterine contraction assessment (96.9%), pulse monitoring (99.7%), newborn temperature assessment (99.5%), and newborn examination (95.3%). Early initiation of breastfeeding within one hour was reported by 61.5% of mothers, while 49.7% experienced immediate skin-to-skin contact. Significant differences between facilities were observed in maternal bleeding assessment ($p < 0.001$), counselling on postnatal visits ($p < 0.001$), umbilical cord care counselling ($p = 0.002$), newborn examinations ($p = 0.001$), and BCG vaccination counselling ($p = 0.002$). Knowledge of chlorhexidine cord care was high (89.6%), although knowledge of maternal and neonatal danger signs remained inadequate. Maternal satisfaction with respectful care differed significantly across facilities ($p < 0.001$). Neonatal infections were reported in 46.4% of newborns and varied significantly by facility.

**Conclusion:** Although immediate postnatal care coverage was generally high across the three facilities, significant variations existed in the quality of care, counselling services, maternal knowledge, and maternal and neonatal outcomes. Strengthening standardized postnatal care practices, particularly at lower-level facilities, is essential for improving maternal and newborn health outcomes in South Sudan.

**Keywords:** immediate postnatal care, maternal outcomes, neonatal outcomes, postnatal counselling, South Sudan

## Introduction

The postnatal period begins immediately after the delivery of the placenta and extends to six weeks postpartum. The first 24 hours after childbirth represent the most critical period for both mothers and newborns, as the majority of maternal and neonatal deaths occur during this time. Immediate postnatal care involves the assessment, monitoring, and management of mothers and newborns to detect complications early and promote healthy recovery.[1]

Globally, substantial progress has been made in improving maternal and newborn survival. However, postnatal care remains one of the weakest components of maternal health services, particularly in low- and middle-income countries.[2] According to the World Health Organization (WHO), less than half of women in sub-Saharan Africa receive adequate postnatal care within the first two days after childbirth.[3]

South Sudan continues to experience high maternal and neonatal mortality rates despite efforts to improve reproductive, maternal, newborn, and child health services. Limited evidence exists regarding the provision and quality of immediate postnatal care services within the country. Understanding the provision of immediate postnatal care and associated maternal and neonatal outcomes is critical for informed policy and improving service delivery.[4] The quality of immediate postnatal care is not determined solely by whether individual interventions are provided, but also by their timeliness, completeness, continuity, and the ability of health workers to communicate essential information to mothers.[5]

WHO recommendations emphasize that postnatal care should include systematic assessment of the mother and newborn, early initiation of breastfeeding, thermal care and skin-to-skin contact, identification of danger signs, counselling, and appropriate follow-up after discharge.[6,7] In settings with limited health-system resources, gaps in any of these components may delay recognition and management of maternal or neonatal complications.[8] Furthermore, differences in facility level, staffing, workload, availability of essential supplies, provider competencies, and adherence to standardized protocols may influence the quality and consistency of care.[9,10] However, there is limited facility-level evidence from South Sudan comparing the actual provision of immediate postnatal care and associated maternal and neonatal outcomes across different levels and types of health facilities. This study therefore provides important evidence on both the coverage and variation of immediate postnatal care practices in major referral facilities in Juba, helping to identify specific areas for quality improvement and standardization.

## Method

This descriptive, institution-based cross-sectional study assessed the provision and quality of immediate postnatal care among women who had recently delivered in selected health facilities in Juba, South Sudan.

The study was conducted in three major hospitals: Juba Teaching Hospital (JTH), Juba Military Referral Hospital (JMRH), and St. Kizito Hospital. The three facilities were selected because they provide essential maternity and postnatal care services and serve as important referral centres within Juba.

The study population comprised all postnatal women who delivered at the selected health facilities and returned for postnatal follow-up visits during the study period.

Women were included if they had delivered in one of the selected health facilities within the previous 24 hours or were attending an early postnatal follow-up visit within 7 days of delivery and had provided informed consent to participate. They were excluded if they were critically ill and unable to participate in the interview or declined to provide consent.

The sample size was calculated using Cochran's formula for estimating proportions in an infinite population, with parameters: 95% confidence interval, prevalence 50%, and precision 5%.[11] The calculated sample size was 384 participants.

A proportionate sampling technique was used to distribute the total sample size across the three facilities based on their average patient flow to ensure adequate representation.

The allocation was as follows: Juba Teaching Hospital 41% (157), Juba Military Referral Hospital 37.2% (143), St. Kizito Hospital 21.8% (84), making a total of 384. Participants were recruited consecutively at discharge points and during postnatal clinic visits until the required sample size was reached.

Data were collected using a structured interviewer-administered questionnaire. Interviews were conducted by trained research assistants conducted interviews at discharge and during postnatal follow-up visits.

Data were entered, cleaned, and analysed using Statistical Package for Social Sciences (SPSS) version 27. Descriptive statistics were summarized using frequencies, percentages,

means, and standard deviations. Chi-square tests were used to assess associations between health facilities and study variables. Phi coefficients were used to measure the strength of associations. Statistical significance was considered at $p < 0.05$.

Ethical approval was obtained from the University of Juba. Permission to conduct the study was obtained from the participating hospitals. We obtained written informed consent from all participants. Confidentiality was maintained using unique identification codes and secure data storage.

## Results

### Characteristics of Study Participants

384 women participated in the study. Significant differences were observed across facilities regarding maternal age ($p = 0.016$), education level ($p < 0.001$), number of antenatal care visits ($p < 0.001$), mode of delivery ($p = 0.004$), and time of discharge ($p < 0.001$) (Table 1).

### Provision of Immediate Postnatal Care

Most mothers received essential immediate postnatal care interventions. Maternal bleeding was assessed in 92.4% of mothers, blood pressure in 96.1%, uterine contractions in 96.9%, and pulse in 99.7%. Nearly half of newborns (49.7%) experienced immediate skin-to-skin contact, while 61.5% initiated breastfeeding within one hour of birth. Statistically significant differences were observed between facilities in: Maternal bleeding assessment ($p < 0.001$), counselling on postnatal visit importance ($p < 0.001$), umbilical cord care counselling ($p = 0.002$), Newborn cord examination ($p = 0.001$), general newborn examination ($p = 0.001$), BCG vaccination counselling ($p = 0.002$) - Tables 2 and 3.

**Table 1. Demographic characteristics of women giving birth at the health facilities**

| | Health Facility | | | Total | p-value |
|---|---|---|---|---|---|
| | Juba Teaching Hospital | Juba Military Referral Hospital | St Kizito Hospital | | |
| | n (%) | n (%) | n (%) | n (%) | |
| **Age group** | | | | | 0.016 |
| 18-24 years | 58 (43.6) | 53 (39.8) | 22 (16.5) | 133 (34.6) | |
| 25-29 years | 58 (35.2) | 58 (35.2) | 49 (29.7) | 165 (43) | |
| 30-40 years | 42 (48.8) | 32 (37.2) | 12 (14) | 86 (22.4) | |
| **Education level** | | | | | <0.001 |
| None | 13 (19.1) | 23 (33.8) | 32 (47.1) | 68 (17.7) | |
| Primary | 94 (51.6) | 77 (42.3) | 11 (6.0) | 182 (47.4) | |
| Secondary and above | 51 (38.1) | 43 (32.1) | 40 (29.9) | 134 (34.9) | |
| **Number of antenatal care visits during this pregnancy** | | | | | <0.001 |
| 2 visits | 27 (55.1) | 20 (40.8) | 2 (4.1) | 49 (12.8) | |
| 4 visits | 44 (35.5) | 50 (40.3) | 30 (24.2) | 124 (32.3) | |
| 6 visits | 64 (53.8) | 53 (44.5) | 2 (1.7) | 119 (31) | |
| 8 visits | 23 (25.0) | 20 (21.7) | 49 (53.3) | 92 (24) | |
| **Mode of delivery** | | | | | 0.004 |
| Spontaneous | 77 (36.5) | 74 (35.1) | 60 (28.4) | 211 (54.9) | |
| C section | 5 (41.7) | 7 (58.3) | 0 (0.0) | 12 (3.1) | |
| Assisted | 76 (47.2) | 62 (38.5) | 23 (14.3) | 161 (41.9) | |
| **Time of discharge** | | | | | <0.001 |
| <24 hours | 61 (42.7) | 52 (36.4) | 30 (21) | 143 (37.2) | |
| 24-48 hours | 75 (50.7) | 70 (47.3) | 3 (2.0) | 148 (38.5) | |
| >48 hours | 22 (23.7) | 21 (22.6) | 50 (53.8) | 93 (24.2) | |
| **Total** | **158 (41.1)** | **143 (37.2)** | **83 (21.6)** | **384 (100)** | |

**Table 2: Immediate postnatal maternal and newborn care practices across three health facilities (N = 384)**

| | Health Facility | | | | |
|---|---|---|---|---|---|
| | Juba Teaching Hospital n (%) | Juba Military Referral Hospital n (%) | St Kizito Hospital n (%) | Total n (%) | p-value |
| **1. How soon after birth was the baby placed skin-to-skin against you?** | | | | | 0.295 |
| < 1 hour | 75 (39.3) | 66 (34.6) | 50 (26.2) | 191 (49.7) | |
| 1-24 hours | 60 (42.9) | 57 (40.7) | 23 (16.4) | 140 (36.5) | |
| >24 hours | 23 (43.4) | 20 (37.7) | 10 (18.9) | 53 (13.8) | |
| **2. How soon after birth was the baby did you begin breastfeeding?** | | | | | 0.103 |
| < 1 hour | 93 (39.4) | 82 (34.7) | 61 (25.8) | 236 (61.5) | |
| 1-24 hours | 55 (42.3) | 55 (42.3) | 20 (15.4) | 130 (33.9) | |
| >24 hours | 10 (55.6) | 6 (33.3) | 2 (11.1) | 18 (4.7) | |
| **3. Did a health provider check your bleeding within the first hour of delivery?** | | | | | <0.001 |
| Yes | 145 (40.8) | 137 (38.6) | 73 (20.6) | 355 (92.4) | |
| No | 1 (9.1) | 0 (0.0) | 10 (90.9) | 11 (2.9) | |
| Don't know | 12 (66.7) | 6 (33.3) | 0 (0.0) | 18 (4.7) | |
| **5. Was the maternal body temperature checked by health worker after delivery?** | | | | | 0.132 |
| Yes | 140 (39.8) | 131 (37.2) | 81 (23.0) | 352 (91.7) | |
| No | 6 (50.0) | 6 (50.0) | 0 (0.0) | 12 (3.1) | |
| Don't know | 12 (60.0) | 6 (30.0) | 2 (10.0) | 20 (5.2) | |
| **6. Was the uterine contraction checked?** | | | | | 0.137 |
| Yes | 149 (40.1) | 140 (37.6) | 83 (22.3) | 372 (96.9) | |
| No | 1 (100.0) | 0 (0.0) | 0 (0.0) | 1 (0.3) | |
| Don't know | 8 (72.7) | 3 (27.3) | 0 (0.0) | 11 (2.9) | |
| **7. Was your pulse checked within first hour of delivery?** | | | | | 0.488 |
| Yes | 157 (41) | 143 (37.3) | 83 (21.7) | 383 (99.7) | |
| No | 1 (100) | 0 (0.0) | 0 (0.0) | 1 (0.3) | |
| **8. During your stay, did a nurse/ midwife counsel you on neonatal danger signs of illness in your baby (e.g. yellow skin, fast breathing, poor feeding)?** | | | | | 0.488 |
| Yes | 157 (41) | 143 (37.3) | 83 (21.7) | 383 (99.7) | |
| No | 1 (100) | 0 (0.0) | 0 (0.0) | 1 (0.3) | |
| **9. During your stay, did a nurse/ midwife counsel you on immediate breastfeeding: how and when to start breastfeeding your baby right after birth?** | | | | | 0.058 |
| Yes | 157 (41.5) | 138 (36.5) | 83 (22) | 378 (98.4) | |
| No | 1 (16.7) | 5 (83.3) | 0 (0.0) | 6 (1.6) | |
| **10. Was your baby's temperature taken before you were moved to the ward?** | | | | | 0.237 |
| Yes | 156 (40.8) | 143 (37.4) | 83 (21.7) | 382 (99.5) | |
| No | 2 (100) | 0 (0.0) | 0 (0.0) | 2 (0.5) | |
| **11. Did the nurse or midwife check the baby's cord for bleeding?** | | | | | 0.001 |
| Yes | 157 (42.9) | 135 (36.9) | 74 (20.2) | 366 (95.3) | |
| No | 1 (5.6) | 8 (44.4) | 9 (50.0) | 18 (4.7) | |
| **12. Was eye care provided with eye drop/ointment?** | | | | | |
| Yes | 158 (41.1) | 143 (37.2) | 83 (21.6) | 384 (100) | |
| **Total** | 158 (41.1) | 143 (37.2) | 83 (21.6) | 384 (100.0) | |

**Table 3: Assessing elements of maternal and newborn postnatal health education and counselling across three health facilities (N = 384)**

| | Health Facility | | | | |
|---|---|---|---|---|---|
| | Juba Teaching Hospital | Juba Military Referral Hospital | St Kizito Hospital | Total | p-value |
| | n (%) | n (%) | n (%) | n (%) | |
| **1. Was the maternal blood pressure checked before discharge?** | | | | | 0.304 |
| Yes | 149 (40.4) | 137 (37.1) | 83 (22.5) | 369 (96.1) | |
| No | 7 (58.3) | 5 (41.7) | 0 (0.0) | 12 (3.1) | |
| Don't know | 2 (66.7) | 1 (33.3) | 0 (0.0) | 3 (0.8) | |
| **2. During your stay, did a nurse/ midwife counsel you on maternal danger sign: signs of illness in yourself (e.g. Heavy bleeding, severe headache or fever)?** | | | | | 0.488 |
| Yes | 157 (41) | 143 (37.3) | 83 (21.7) | 383 (99.7) | |
| No | 1 (100) | 0 (0) | 0 (0.0) | 1 (0.3) | |
| **3. During your stay, did a nurse/ midwife counsel you on immediate postpartum family planning: options for spacing your next pregnancy before leaving the hospital?** | | | | | 0.488 |
| Yes | 157 (41) | 143 (37.3) | 83 (21.7) | 383 (99.7) | |
| No | 1 (100) | 0 (0.0) | 0 (0.0) | 1 (0.3) | |
| **4. During your stay, did a nurse/ midwife counsel you on self-hygiene: how to care for your body and wound (if any) to prevent infection?** | | | | | 0.488 |
| Yes | 157 (41) | 143 (37.3) | 83 (21.7) | 383 (99.7) | |
| No | 1 (100) | 0 (0.0) | 0 (0.0) | 1 (0.3) | |
| **5. During your stay, did a nurse/ midwife counsel you on postnatal visit schedule: specifically, when and where you should return for your first check-up?** | | | | | 0.488 |
| Yes | 157 (41) | 143 (37.3) | 83 (21.7) | 383 (99.7) | |
| No | 1 (100) | 0 (0.0) | 0 (0.0) | 1 (0.3) | |
| **6. During your stay, did a nurse/ midwife counsel you on importance of postnatal visits: Why it is critical for you and your baby to return for follow-up care?** | | | | | <0.001 |
| Yes | 156 (41.9) | 143 (38.4) | 73 (19.6) | 372 (96.9) | |
| No | 2 (16.7) | 0 (0.0) | 10 (83.3) | 12 (3.1) | |
| **7. During your stay, did a nurse/ midwife counsel you on care for umbilical cord cleanliness?** | | | | | 0.002 |
| Yes | 157 (43) | 134 (36.7) | 74 (20.3) | 365 (95.1) | |
| No | 1 (5.3) | 9 (47.4) | 9 (47.4) | 19 (4.9) | |
| **8. Was the baby general well-being assessed by the health worker from head to toe?** | | | | | 0.001 |
| Yes | 157 (42.9) | 135 (36.9) | 74 (20.2) | 366 (95.3) | |
| No | 1 (5.6) | 8 (44.4) | 9 (50.0) | 18 (4.7) | |
| **9. Was vaccination with BCG done for newborn or counselled on before discharge?** | | | | | 0.002 |
| Yes | 136 (39.2) | 128 (36.9) | 83 (23.9) | 347 (90.4) | |
| No | 22 (59.5) | 15 (40.5) | 0 (0.0) | 37 (9.6) | |
| **Total** | 158 (41.1) | 143 (37.2) | 83 (21.6) | 384 (100.0) | |

### Maternal knowledge

Most women (89.6%) identified chlorhexidine as the recommended substance for umbilical cord care. Knowledge of neonatal danger signs was limited, with only 54.7% identifying convulsions as a danger sign. Similarly, only 52.9% correctly identified excessive vaginal bleeding as a maternal danger sign.

Approximately one-third of respondents could not identify any maternal or neonatal danger signs (Table 4).

### Maternal and neonatal outcomes

More than half of mothers (53.4%) reported experiencing sadness, anxiety, or low mood after childbirth. Overall, 61.7% reported being very satisfied with the respect and dignity shown by healthcare providers. Financial barriers affected access to care for 64.3% of mothers. Neonatal complications included: infection (46.4%), breathing difficulties (8.6%), feeding difficulties (6.5%), significant differences in neonatal outcomes were observed across facilities ($p < 0.001$) (Table 5).

## Discussion

This study demonstrated significant differences in immediate postnatal care provision, maternal knowledge, and maternal-newborn outcomes between tertiary referral hospitals (Juba Teaching Hospital and Juba Military Referral Hospital) and the secondary-level subsidized private hospital (St. Kizito Hospital).

Although overall coverage of immediate postnatal care interventions was high, tertiary hospitals generally performed better in critical clinical assessments such as

**Table 4. Assessing knowledge of women giving birth at the health facilities**

| | Health Facility | | | | |
|---|---|---|---|---|---|
| | Juba Teaching Hospital | Juba Military Referral Hospital | St Kizito PHCC | Total | p-value |
| | n (%) | n (%) | n (%) | n (%) | |
| **What should be applied to the umbilical cord stump?** | | | | | 0.003 |
| Chlorhexidine | 140 (40.7) | 131 (38.1) | 73 (21.2) | 344 (89.6) | |
| Nothing | 4 (23.5) | 3 (17.6) | 10 (58.8) | 17 (4.4) | |
| Dry care | 4 (57.1) | 3 (42.9) | 0 (0.0) | 7 (1.8) | |
| Application of ash for cord care | 2 (100) | 0 (0.0) | 0 (0.0)) | 2 (0.5) | |
| Others | 8 (57.1) | 6 (42.9) | 0 (0.0) | 14 (3.6) | |
| **Which of these are danger signs in a newborn?** | | | | | <0.001 |
| Convulsion /fits | 41 (19.5) | 89 (42.4) | 80 (38.1) | 210 (54.7) | |
| Difficulty breathing | 16 (66.7) | 8 (33.3) | 0 (0.0) | 24 (6.3) | |
| Yellowing of skin | 4 (57.1) | 3 (42.9) | 0 (0.0) | 7 (1.8) | |
| Fever or cold to touch | 7 (53.8) | 6 (46.2) | 0 (0.0) | 13 (3.4) | |
| None | 90 (69.2) | 37 (28.5) | 3 (2.3) | 130 (33.9) | |
| **Which of these are maternal danger signs?** | | | | | <0.001 |
| Excessive vaginal bleeding | 41 (20.2) | 81 (39.9) | 81 (39.9) | 203 (52.9) | |
| Severe headache | 38 (71.7) | 15 (28.3) | 0 (0.0) | 53 (13.8) | |
| Vaginal foul-smelling | 4 (50.0) | 4 (50) | 0 (0.0) | 8 (2.1) | |
| Severe abdominal pain | 0 (0.0) | 2 (50.0) | 2 (50.0) | 4 (1.0) | |
| None | 74 (64.3) | 41 (35.7) | 0 (0.0) | 115 (29.9) | |
| **Total** | **158 (41.1)** | **143 (37.2)** | **83 (21.6)** | **384 (100.0)** | |

maternal bleeding monitoring, newborn examinations, and comprehensive postnatal counselling. This finding is consistent with evidence indicating that tertiary hospitals benefit from greater specialist capacity, stronger supervision systems, and better availability of equipment and trained personnel.[12]

Despite being a secondary-level facility, St. Kizito Hospital demonstrated strengths in selected preventive maternal and newborn care practices, particularly antenatal care attendance and BCG vaccination counselling. This pattern may reflect contextual advantages such as continuity of care, closer provider–client interactions, and community engagement that can support uptake of preventive services.[13] Nevertheless, performance was lower in several components of immediate postnatal care, including maternal bleeding assessment, counselling on postnatal follow-up and umbilical cord care, and newborn examination. These findings suggest that strengths in preventive service delivery do not necessarily translate into consistent performance across all components of immediate postnatal care. The observed gaps may reflect differences in staffing, provider training, workload, availability of clinical resources, supervision, and adherence to standard postnatal care protocols.[14,15] However, because these factors were not directly assessed in the present study, these explanations should be considered hypotheses and warrant further investigation.

Knowledge of maternal and neonatal danger signs remained suboptimal across all facilities. Despite high levels of facility-based delivery and postnatal counselling, a considerable proportion of women could not identify key warning signs requiring urgent medical attention.[16] These findings suggest that the quality and effectiveness of counselling require strengthening across all levels of care.[17] Maternal satisfaction varied significantly across facilities. Juba Teaching Hospital reported the highest levels of satisfaction with respectful maternity care, while dissatisfaction was highest among mothers delivering at St.

**Table 5. Determining maternal outcomes following immediate postnatal care giving birth at the health facilities**

| | Health Facility | | | | |
|---|---|---|---|---|---|
| | Juba Teaching Hospital | Juba Military Referral Hospital | St Kizito PHCC | Total | p-value |
| | n (%) | n (%) | n (%) | n (%) | |
| **Since the birth of your child, have you felt consistently sad, anxious, or down?** | | | | | <0.001 |
| Yes | 54 (26.3) | 79 (38.5) | 72 (35.1) | 205 (53.4) | |
| No | 104 (58.1) | 64 (35.8) | 11 (6.1) | 179 (46.6) | |
| **On a scale of 1 to 5, how satisfied are you with the respect and dignity to you by the midwives?** | | | | | <0.001 |
| Very dissatisfied | 1 (0.7) | 63 (42.9) | 83 (56.5) | 147 (38.3) | |
| Very satisfied | 157 (66.2) | 80 (33.8) | 0 (0.0) | 237 (61.7) | |
| **Did the cost of services or supplies prevent you from receiving any part of your care?** | | | | | <0.001 |
| Yes | 74 (30.0) | 92 (37.2) | 81 (32.8) | 247 (64.3) | |
| No | 84 (61.3) | 51 (37.2) | 2 (1.5) | 137 (35.7) | |
| **Has the baby experienced any of the following since birth?** | | | | | <0.001 |
| Infection | 22 (12.4) | 75 (42.1) | 81 (45.5) | 178 (46.4) | |
| Breathing issue | 23 (69.7) | 8 (24.2) | 2 (6.1) | 33 (8.6) | |
| Feeding difficulties | 14 (56.0) | 11 (44.0) | 0 (0.0) | 25 (6.5) | |
| None | 99 (66.9) | 49 (33.1) | 0 (0.0) | 148 (38.5) | |
| **Total** | **158 (41.1)** | **143 (37.2)** | **83 (21.6)** | **384 (100)** | |

Kizito Hospital. These differences may reflect variations in staffing levels, workload, expectations of care, and provider-patient interactions.[18]

Neonatal infections were more frequently reported among mothers delivering at St. Kizito Hospital and Juba Military Referral Hospital than among those delivering at Juba Teaching Hospital. Better neonatal outcomes at Juba Teaching Hospital may reflect stronger infection prevention measures, more experienced healthcare providers, and greater access to specialized neonatal services.[19,20]

Overall, the findings indicate that tertiary facilities provided more comprehensive immediate postnatal care and achieved better maternal and neonatal outcomes than the secondary-level facility. Nevertheless, St. Kizito Hospital demonstrated strengths in preventive services that can be leveraged to improve overall quality of care.[21] The findings also highlight an important distinction between coverage of individual interventions and the overall quality of postnatal care. Although several routine assessments were reported at very high levels, important preventive and supportive interventions, particularly immediate skin-to-skin contact and breastfeeding within the first hour, were substantially less common. This pattern suggests that high reported coverage of selected clinical assessments does not necessarily indicate comprehensive adherence to the full package of recommended immediate postnatal care.[22,23] WHO guidance emphasizes that maternal and newborn care should be integrated, respectful, timely, and continuous from birth through the postnatal period.[24] The differences observed between facilities therefore warrant attention not only to the availability of services but also to how consistently the complete package is delivered. Standardized checklists, routine clinical audits, supportive supervision, competency-based refresher training, and strengthened discharge counselling could help reduce variation between facilities.[25,26] In addition, the relatively high proportion of mothers reporting neonatal infections and maternal emotional symptoms underscores the importance of strengthening postnatal follow-up beyond the immediate facility stay, including early identification of maternal and newborn complications and clear referral pathways.[27,28]

## Conclusion

Immediate postnatal care services were widely provided across tertiary and secondary health facilities in Juba. However, significant differences existed in service quality, maternal knowledge, counselling practices, and maternal and neonatal outcomes.

Tertiary referral facilities generally demonstrated better performance in clinical care and maternal-newborn outcomes, while the secondary-level subsidized private facility showed strengths in preventive and community-oriented services. Strengthening postnatal care quality, counselling, infection prevention practices, and maternal education across all facility levels is essential to improve maternal and newborn health outcomes in South Sudan.

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**Limitations:** Because this study was conducted in selected health facilities in Juba, the findings may not be fully generalizable to women and newborns in rural areas or other parts of South Sudan where access to postnatal services and health-system conditions may differ. Additionally, some information was obtained through participant interviews and may therefore be affected by recall and social desirability bias.

References

1. WHO Technical Consultation on Postpartum and Postnatal Care. Geneva: World Health Organization; 2010. WHO/MPS/10.03.
2. Roder-Dewan S, Nimako K, Twum-Danso NAY, Amatya A, Langer A, Kruk M. Health system redesign for maternal and newborn survival: Rethinking care models to close the global equity gap. BMJ Glob Health. 2020 Oct 14;5(10). doi: https://doi.org/10.1136/bmjgh-2020-002539.
3. WHO recommendations on maternal and newborn care for a positive postnatal experience. World Health Organization; 2022. 242 p: 978-92-4-004598-9. Licence: CC BY-NC-SA 3.0 IGO.

4. Alier KP, Kozuki N, Mothupi M. Stakeholder Perspectives of Maternal and Newborn Health Prioritization in South Sudan [Internet]. 2024. Available from: https://www.researchsquare.com/article/rs-5001036/v1 doi: https://doi.org/10.21203/rs.3.rs-5001036/v1.

5. Galle A, Moran AC, Bonet M, Graham K, Muzigaba M, Portela A, et al. Measures to assess quality of postnatal care: A scoping review. PLOS Global Public Health. 2023 Feb 1;3(2). doi: https://doi.org/10.1371/journal.pgph.0001384

6. World Health Organization. Postnatal care for mothers and newborns: highlights from the World Health Organization 2013 guidelines. Geneva: World Health Organization; 2015. 8 p. (WHO/RHR/15.05).

7. World Health Organization. WHO recommendations on postnatal care of the mother and newborn. Geneva: World Health Organization; 2013 Oct. 62 p. ISBN: 978-92-4-150664-9.

8. Souza JP, Day LT, Rezende-Gomes AC, Zhang J, Mori R, Baguiya A, et al. A global analysis of the determinants of maternal health and transitions in maternal mortality. The Lancet Global Health. Elsevier Ltd; 2024. p. e306–16. doi: https://doi.org/10.1016/S2214-109X(23)00468-0 PubMed PMID: 38070536.

9. Malel ZJ, Wapary E, Lueth GD, Ayuel MM, Mustafa H, Gang J, et al. Feasibility of labor care guide (LCG) implementation in South Sudan, creating recommendations from evaluating the LCG use in health facilities. Study and recommendations by the Association of Gynecologists and Obstetricians of South Sudan (AGOSS). International Journal of Gynecology and Obstetrics. 2026 Jul 1;174(1):468–84. doi: https://doi.org/10.1002/ijgo.70884 PubMed PMID: 41696758.

10. Majed Saud S Alnaturi, Awadh Sihli A Alshammari, Alanoud Khashman Ali Alshammari, Shrifah Sahan Alshammari, Swayef Zhaid K Alshammari, Ridha Salamh Al Shammari, et al. Impact of Nurse Staffing Levels on Patient Safety and Quality of Care. International Journal of Computational and Experimental Science and Engineering. 2024 Aug 30;10(4). doi: https://doi.org/10.22399/ijcesen.4241.

11. Tiruneh GT, Yakob B, Ayele WM, Yigzaw M, Roro MA, Medhanyi AA, et al. Effect of community-based distribution of misoprostol on facility delivery: A scoping review. BMC Pregnancy and Childbirth. BioMed Central Ltd.; 2019. doi: https://doi.org/10.1186/s12884-019-2539-5 PubMed PMID: 31694580.

12. Wangara F, Estill J, Kipruto H, Perrin C, Ngudo J, Nuru K, et al. Bottleneck Analysis of Maternal, Newborn and Child Health Services in Underserved Areas of Kwale County, Kenya. Health Serv Insights. 2025 Jan 1;18. doi: https://doi.org/10.1177/11786329251374553.

13. Larson E, Gage AD, Mbaruku GM, Mbatia R, Haneuse S, Kruk ME. Effect of a maternal and newborn health system quality improvement project on the use of facilities for childbirth: a cluster-randomised study in rural Tanzania. Tropical Medicine and International Health. 2019 May 1;24(5):636–46. doi: https://doi.org/10.1111/tmi.13220 PubMed PMID: 30767422.

14. Ministry of Health, Reproductive and Child Health Division. Situation analysis of the national newborn health in Uganda – 2023 update report. Kampala, Uganda: Ministry of Health; 2023

15. World Health Organization. Standards for improving quality of maternal and newborn care in health facilities. Geneva: World Health Organization; 2016. 84 p. ISBN: 978-92-4-151121-6.

16. Kebede AA, Cherkos EA, Taye EB. Mother's Knowledge of Neonatal Danger Signs and Health-Seeking Practices and Associated Factors in Debretabor, Northwest Ethiopia: A Community-Based Cross-Sectional Study. Res Rep Neonatol. 2020 Sep;Volume 10:47–58. doi: https://doi.org/10.2147/rrn.s257768

17. Uwamahoro V, Semasaka JPS, Ndagijimana A, Humuza J. Perceptions and attitudes of midwives on respectful maternity care during childbirth: a qualitative study in three district hospitals of Kigali City of Rwanda. Pan African Medical Journal. 2023 Sep 1;46. doi: https://doi.org/10.11604/pamj.2023.46.110.40764 PubMed PMID: 38435405.

18. Republic of South Sudan Ministry of Health Stakeholders Engagement Plan South Sudan Health Sector Transformation Project (HSTP) (P181385). 2023.

19. Warren CE, Abuya T, Kanya L, Obare F, Njuki R, Temmerman M, et al. A cross-sectional comparison of postnatal care quality in facilities participating in a maternal health voucher program versus non-voucher facilities in Kenya. BMC Pregnancy Childbirth. 2015 Jul 24;15(1). doi: https://doi.org/10.1186/s12884-015-0588-y PubMed PMID: 26205379.

20. Flora WP, Kamau RK, James MM, Ogutu O, Karanja J, Osoti A, et al. Early perinatal mortality and characteristic of mothers delivered at Juba Teaching Hospital, South Sudan: a cross-sectional study. J Obstet Gynaecol East Cent Afr. Available https://www.researchgate.net/publication/377507395.

21. Choi A, Kim H, Provido SMP, Kim HS, Juson RJ, Lucas D, et al. Women's health facility choices for antenatal, delivery, and postnatal care in Eastern Visayas, Philippines. Front Glob Womens Health. 2025;6. doi: https://doi.org/10.3389/fgwh.2025.1575896.

22. Priyanka SS, Dasgupta DP, Abdullah AYM, Ali NB, Khatun H, Billah SM. Assessing the Quality and Coverage of Maternal Postnatal Care in Bangladesh: A Comparative Analysis of Quality Postnatal Care among Home and Facility Births. Int J Environ Res Public Health. 2024 Mar 1;21(3). doi: https://doi.org/10.3390/ijerph21030359 PubMed PMID: 38541358.

23. Kim S, Wamuti B, Opondo K, Croke K, Kruk ME. "If they were telling us to go, we will go": factors associated with effective postnatal care coverage before and after discharge – a mixed-methods study in rural western Kenya. BMJ Glob Health. 2026 Mar 1;11(3). doi: https://doi.org/10.1136/bmjgh-2024-016984.

24. World Health Organization. Standards for improving quality of maternal and newborn care in health facilities. Geneva: World Health Organization; 2016. 84 p. ISBN: 978-92-4-151121-6. Available from: Source: World Health Organization (WHO) https://share.google/MbA9VecnsYjS1Jkeq.

25. Avortri GS, Nabukalu JB, Nabyonga-Orem J. Supportive supervision to improve service delivery in low-income countries: is there a conceptual problem or a strategy problem? BMJ Glob Health. 2019 Oct;4(Suppl 9):e001151. doi: https://doi.org/10.1136/bmjgh-2018-001151.

26. Abu-Jeyyab M, Al-Jafari M, El Din Moawad MH, Alrosan S, Al Mse'adeen M. The Role of Clinical Audits in Advancing Quality and Safety in Healthcare Services: A Multiproject Analysis From a Jordanian Hospital. Cureus. 2024 Feb 23. doi: https://doi.org/10.7759/cureus.54764.

27. Pillay Y, Ngonzi J, Nguyen V, Payne BA, Komugisha C, Twinomujuni AH, et al. The epidemiology and risk factors for postnatal complications among postpartum women and newborns in southwestern Uganda: A prospective cohort study. PLOS Global Public Health. 2024 Aug 7;4(8). doi: https://doi.org/10.1371/journal.pgph.0003458.

28. Felker, A., Patel, R., Kotnis, R., Kenyon, S., & Knight, M. (2025). Saving Lives, Improving Mothers' Care: Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2021–23. National Perinatal Epidemiology Unit, University of Oxford. https://ora.ox.ac.uk/objects/uuid:5d6c56bc-17ee-49d8-8702-8f235102479b.