



Secondary analysis of research on heat-stable carbetocin for preventing postpartum hemorrhage



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Background

Heat-stable carbetocin (HSC), a synthetic oxytocin analogue, is a promising option for preventing postpartum hemorrhage (PPH), a leading cause of maternal deaths, mostly in low- and middle-income countries (LMICs), with the highest burden in resource-limited settings. While oxytocin is the standard uterotonic for PPH prevention, its requirement for refrigeration poses significant challenges where cold chain infrastructure is unreliable. HSC addresses this limitation by remaining stable at room temperature for extended periods, making it particularly well-suited for low-resource environments. A large trial showed HSC is as effective as oxytocin in preventing significant blood loss, with meta-analyses suggesting it may be even more effective^{1,2}.

Since then, HSC has been gradually adopted in several countries. Data on the real-world effects of HSC from the countries that already use HSC could provide further evidence that could accelerate the uptake of this life-saving drug in other countries, supporting wider access and use globally.

This study aims to analyse secondary data from healthcare facilities in **Burkina Faso, Ethiopia, Ghana, India, Nigeria, Sierra Leone, Tanzania, and Uganda** to assess the real-world effectiveness of HSC compared to oxytocin.

Study objectives:

1. Compare the **clinical characteristics** of women having a vaginal birth or caesarean section and receiving HSC for PPH prevention with women receiving oxytocin for PPH prevention
2. Compare the **clinical outcomes** of women having a vaginal birth or caesarean section and receiving HSC for PPH prevention with women receiving oxytocin for PPH prevention

Methodology

This study analyses over 45,000 data records from 38 secondary and tertiary healthcare facilities across nine countries—Burkina Faso, Ethiopia, Ghana, India, Kenya, Nigeria, Sierra Leone, Tanzania, and Uganda—focusing on women who received uterotonic drugs, either HSC or oxytocin, to prevent PPH during vaginal or caesarean births. The primary outcome is the need for blood transfusion, with maternal death as a secondary outcome. Descriptive statistics will summarise baseline characteristics, and logistic regression with robust standard errors will compare outcomes between groups, adjusting for confounders. Each country’s dataset will be analysed independently due to contextual differences, followed by a random-effects meta-analysis to estimate the overall effect of HSC versus oxytocin and explore heterogeneity using the I² statistic and subgroup analyses..

This secondary analysis uses data from implementation research in nine LMICs (including seven featured here) on the integration of HSC and tranexamic acid (TXA) into routine care, published as part of a PPH-dedicated Special Collection³. The goal of the studies was to inform the scale-up of these WHO-recommended medicines. Data from Tanzania came from a separate comparative study of HSC versus oxytocin.

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Table 1. Country-specific comparison of **blood transfusion** rates between HSC and oxytocin

	HSC (%)	Oxytocin (%)	Crude odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Nigeria	99/529 (18.7)	166/559 (29.7)	0.55 (0.41, 0.72)	0.54 (0.39, 0.78)
Burkina Faso, Ethiopia, Ghana, Sierra Leone, Uganda	66/11,586 (0.6)	64/6,779 (0.9)	0.60 (0.43, 0.85)	0.61 (0.43, 0.87)
India	200/9,843 (2.0)	275/8,275 (3.3)	0.60 (0.50, 0.73)	-

Table 2. Country-specific comparison of **maternal death** rates between HSC and oxytocin

	HSC (%)	Oxytocin (%)	Crude odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Nigeria	1/529 (0.2)	2/559 (0.36)	0.53 (0.05, 5.83)	0.55 (0.04, 6.81)
Burkina Faso, Ethiopia, Ghana, Sierra Leone, Uganda	5/9,596 (0.05)	9/6,756 (0.1)	0.39 (0.13, 1.17)	0.34 (0.11, 1.02)
India	2/9,843 (0.02)	3/8,275 (0.04)	0.56 (0.09, 3.36)	-

Results

The preliminary findings demonstrate that across all settings, HSC consistently resulted in lower blood transfusion rates compared to oxytocin for PPH prevention, with statistically significant reductions in Nigeria, India, and the African countries combined (Table 1). Maternal deaths were rare across all study settings, with slightly lower rates observed in women who received HSC compared to oxytocin (Table 2).

Conclusion

HSC demonstrated a consistently favourable effect compared to oxytocin across diverse settings, supporting its potential as a more effective and practical option for PPH prevention, particularly in low-resource contexts. It also showed a trend toward lower maternal death rates, though further analysis with larger sample sizes is needed to confirm this finding. While these findings are preliminary, the trends observed suggest that HSC could significantly enhance the quality and reach of maternal care in settings where oxytocin’s storage requirements are a barrier. Broader adoption of HSC could strengthen maternal health systems by reducing reliance on cold-chain storage and improving access to effective uterotonics. Future efforts should focus on expanding regulatory approval, integrating HSC into national guidelines, and conducting implementation research to assess its impact at scale and across different health system contexts.

References:
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