

# Rational use of Antibiotics after Cæsarean Section in Africa: A Short Review with Recommendations

**Type:** Mini-Review

**Received:** July 28, 2023

**Published:** August 11, 2023

**Citation:**

Daniel David Otobo., et al. "Rational use of Antibiotics after Caesarean Section in Africa: A Short Review with Recommendations". PriMera Scientific Surgical Research and Practice 2.3 (2023): 12-15.

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## Introduction

The increasing global rates of caesarean section (CS) deliveries have raised concerns about the rational use of antibiotics to prevent post-operative infections. In Africa, CS is a common surgical procedure, accounting for a significant portion of the surgical workload [1]. This is even now more prevalent as CS has been seen as one of the most appropriate means for emergency deliveries in cases of obstetric emergencies presenting with hopes of fetal viability [1].

However, the appropriate use of antibiotics after CS is crucial to minimize the risk of surgical site infections (SSIs) and reduce the burden of antibiotic resistance. Nosocomial and community-based SSIs are a serious challenge in Africa too, in combination with a sad rise in antimicrobial resistance (AMR) [1]. So, a balance needs to be struck.

The aim of this short review is thus to explore the rational use of antibiotics after CS in Africa, taking into account the unique challenges and considerations in the region.

### *The Importance of Rational Antibiotic Use*

Nosocomial and community-based ease of infection is a serious consideration in the postoperative management of patients in this region. Likewise, CS deliveries carry an increased risk of complications associated with infection compared to vaginal deliveries [2]. SSIs, endometritis, and urinary tract infections are common post-operative complications that can lead to increased morbidity, healthcare costs, and antibiotic resistance [3]. To mitigate these risks, the rational use of antibiotics is essential. Rational antibiotic use involves selecting the appropriate antibiotic, optimizing the dosage regimen, and considering factors such as the patient's health status, local resistance patterns, and cost-effectiveness [4].

### *Pattern of antibiotics prophylaxis*

Currently, International guidelines provide recommendations for antibiotic prophylaxis in CS. These guidelines emphasize the importance of selecting antibiotics with appropriate spectra of activity against common pathogens, administering the antibiotics at the optimal time, and limiting the

duration of prophylaxis. However, adherence to these guidelines can vary, and it is essential to evaluate the compliance with international guidelines in different healthcare settings [4].

This variation in compliance may result in varied patients' outcome that may be positive or negative. In Nigeria, some hospitals in the federal capital give 2g single dose intravenous ceftriaxone or other potent cephalosporin intra-operatively as its sole prophylactic measure, without any other complications in the theatre, no further antibiotics are given. Whereas, while the intra-operative prophylactic ceftriaxone is given, routine intravenous antibiotics are continued for 24 hours post-operatively and then orals subsequently for 7-10 days, in Bauchi State, Nigeria. Sadly, at the moment, there are no comparative studies between these two states in Nigeria. However, a study conducted in Sudan at Elquatainah Teaching Hospital where similar practices as those of Abuja and Bauchi State were compared. Cost wise and pharmaceutically speaking, not prescribing post-CS antibiotics were found to reduce expenditure and general work load. But the medical repercussion was not examined in that study [5].

That notwithstanding, several studies have investigated the adherence to international guidelines for antibiotic prophylaxis in CS in various African countries. For example, a study conducted at Mulago National Referral Hospital in Uganda implemented a randomized clinical trial to assess the timing of antibiotic administration in CS. The study found that administering antibiotics before the skin incision significantly reduced the risk of postoperative infections. This research highlights the importance of following evidence-based guidelines to optimize patient outcomes [6].

Another study conducted in Lusaka, Zambia, examined the antibiotic prescribing patterns and prevalence of SSIs in CS deliveries. The study found that the most commonly prescribed antibiotics were the third-generation cephalosporin, ceftriaxone, and a triple combination therapy of benzylpenicillin, gentamicin, and metronidazole. The prevalence of SSIs was 6.0%, with factors such as the level of education, type of CS, and oral antibiotics post-CS influencing the risk of infection. These findings highlight the need for targeted interventions to improve antibiotic prescribing practices and reduce the prevalence of SSIs [7].

As regards targeted interventions, another study conducted at AL Ain Hospital in UAE amongst 807 women; found that there was a significantly low rate (1.4%) of SSI following CS. All women diagnosed with SSI had wound discharges within 30 days of the operation. More important, was the common denominator they identified amongst these women. That's, they all had prolonged pregnancies. This was thus now tabled as a targeted risk for SSI after CS, and as thus subsequent patients fitting this profile ought to be on longer antibiotics regimens [8].

### ***Implementing Guidelines for Rational Antibiotic Use***

Like earlier mentioned, about the variation in approach in Abuja and Bauchi state in Nigeria, there are also intra-hospital variations in antibiotics utilization in CS. A study conducted at Elquatainah Teaching Hospital in Sudan implemented a hospital guideline for the rational use of prophylactic antibiotics in ECS. The intervention involved withdrawing metronidazole dosage forms from prophylactic antibiotics according to international guidelines. The study found that this intervention significantly reduced the overuse of antibiotics and medication costs while maintaining patient safety [5].

While this approach has been found to be effective in this hospital in Sudan, there are no searchable evidences for its implementation or trial in other areas in Sudan, north Africa or in the Africa region as a whole. Similar tales can be told about many other rational approaches. Also, the study also went on to show the vital role of clinical pharmacists in the development of rationale guidelines for antibiotics in obstetrics and gynaecological clinical practice, in this case, prevention of SSIs following CS.

Furthermore, when selecting antibiotics for prophylaxis in CS, several factors need to be considered. These factors include the local epidemiology of pathogens and their antibiotic resistance patterns, the patient's individual risk factors, the surgical procedure's specific characteristics, and the available resources and infrastructure. Adapting international guidelines to the local context is crucial to ensure the effective prevention of postoperative infections.

Understanding the local epidemiology of pathogens and their antibiotic resistance patterns is essential for selecting appropriate antibiotics. Studies have shown variations in pathogen profiles and resistance patterns across different African regions. For example, a study conducted in Nigeria found that *Staphylococcus aureus* and *Escherichia coli* were the most common pathogens isolated from SSIs in CS, with high rates of resistance to commonly used antibiotics. These findings emphasize the need for local surveillance and tailored antibiotic recommendations.

However, it is worth of note that individual patient risk factors, such as obesity, diabetes, and immunosuppression, should be considered when selecting antibiotics for prophylaxis. These risk factors can increase the likelihood of postoperative infections and may require broader-spectrum antibiotics or extended prophylaxis durations. Integrating patient-specific risk stratification into antibiotic prescribing practices can help optimize outcomes and reduce unnecessary antibiotic use.

### ***Surgical Procedure Characteristics***

The type of CS procedure, whether elective or emergency, can influence the choice and duration of antibiotic prophylaxis. Elective CS procedures are considered clean surgeries with lower infection risks, while emergency CS procedures carry a higher risk due to potential contamination. Tailoring the antibiotic prophylaxis regimen based on the specific surgical procedure characteristics can help ensure adequate coverage while minimizing unnecessary antibiotic exposure.

### ***Resource Constraints and Infrastructure***

Resource constraints and infrastructure limitations pose challenges to antibiotic selection and administration in many African healthcare settings. Limited access to certain antibiotics, inadequate laboratory facilities for culture and sensitivity testing, and suboptimal healthcare infrastructure can impact the choice and availability of antibiotics. It is crucial to consider these factors when implementing guidelines for rational antibiotic use and explore strategies for optimizing antibiotic stewardship in resource-limited settings.

### ***Strategies for Optimizing Antibiotic Use***

To promote rational antibiotic use after CS in Africa, several strategies can be implemented at various levels of healthcare delivery.

#### ***Education and Training***

Education and training programs targeting healthcare professionals involved in CS deliveries can enhance their knowledge and awareness of rational antibiotic use. Providing evidence-based guidelines, conducting workshops, and promoting continuous medical education can help improve antibiotic prescribing practices and increase adherence to guidelines.

#### ***Antibiotic Stewardship Programs***

Formulating antibiotic stewardship programs specific to CS deliveries can be an effective approach to optimize antibiotic use. These programs can involve multidisciplinary teams, including clinical pharmacists, infectious disease specialists, obstetricians, and microbiologists. The programs can focus on implementing guidelines, monitoring antibiotic prescribing patterns, providing feedback to healthcare providers, and promoting appropriate antibiotic use.

#### ***Surveillance and Monitoring Systems***

Establishing surveillance and monitoring systems for SSIs and antibiotic resistance can provide valuable data for guiding antibiotic prescribing practices. These systems can help identify trends, detect outbreaks, and evaluate the effectiveness of interventions. Regular monitoring and feedback to healthcare providers can facilitate continuous improvement in rational antibiotic use.

#### ***Collaboration and Partnerships***

Collaboration and partnerships between healthcare facilities, professional organizations, and policymakers are crucial for promoting rational antibiotic use. Sharing best practices, implementing standardized protocols, and advocating for policies that support evi-

dence-based antibiotic prescribing can contribute to reducing the burden of SSIs and antibiotic resistance after CS.

## Conclusion

The rational use of antibiotics after CS in Africa is essential to mitigate the risk of postoperative infections and combat antibiotic resistance. Adhering to international guidelines, considering local epidemiology and resistance patterns, individual patient risk factors, surgical procedure characteristics, and resource limitations are key factors in optimizing antibiotic use. Implementing strategies such as education and training, antibiotic stewardship programs, surveillance systems, and collaboration can contribute to improving antibiotic prescribing practices and ultimately improving patient outcomes. By prioritizing rational antibiotic use, Africa can address the unique challenges associated with CS deliveries and pave the way for sustainable healthcare practices.

## Recommendations

- Africa faces unique challenges in the rational use of antibiotics after CS, including variations in pathogen profiles, limited resources, and infrastructure constraints. As such, Africa should conduct more internal studies and develop more locally adapted strategies.
- Adapting international guidelines to the local context is crucial for effective prevention of postoperative infections.
- Multidisciplinary collaboration and partnerships are essential for promoting evidence-based antibiotic prescribing practices.
- Education and training programs, antibiotic stewardship initiatives, and surveillance systems can contribute to optimizing antibiotic use after CS in Africa.
- Rational antibiotic use after CS plays a vital role in reducing the burden of SSIs and combatting antibiotic resistance in the region. As such, the utilization of antibiotics should not be unfairly played down in bids to rationalize its use, instead this should be evidence based and more strategic.

## References

1. Sway A., et al. "Burden of Surgical Site Infection Following Cesarean Section in Sub-Saharan Africa: A Narrative Review". *International Journal of Women's Health* 11 (2019): 309-318.
2. Gelaw KA., et al. "Surgical Site Infection and Its Associated Factors Following Cesarean Section: A Cross-Sectional Study from a Public Hospital in Ethiopia". *Patient Safety in Surgery* 11 (2017): 18.
3. Jasim HH., et al. "Incidence and Risk Factors of Surgical Site Infection among Patients Undergoing Cesarean Section". *BMC Infectious Diseases* 12.46 (2017): 113-6.
4. Azizi M., et al. "Comparing the Effectiveness of Broad-Spectrum Antibiotic Prophylaxis with Single Agent Antibiotic Prophylaxis to Prevent Post-Cesarean Section Infection". *Hormozgan Medical Journal* 20 (2017): 287-292.
5. Suliman SM, Yousef BA and Hamadelnil AA. "Impact of guidelines implementation for the rational use of prophylactic antibiotics in elective cesarean sections at Elqutainah Teaching Hospital". *J Family Med Prim Care* 9.1 (2020): 162-167.
6. Dlamini LD., et al. "Antibiotic prophylaxis for caesarean section at a Ugandan hospital: a randomised clinical trial evaluating the effect of administration time on the incidence of postoperative infections". *BMC Pregnancy Childbirth* 15 (2015): 91.
7. Kasanga M., et al. "Antibiotic Prescribing Patterns and Prevalence of Surgical Site Infections in Caesarean Section Deliveries at Two Tertiary Hospitals in Lusaka, Zambia". *Pharmacology & Pharmacy* 13 (2022): 313-330.
8. Alnajjar MS and Alashker DA. "Surgical site infections following caesarean sections at Emirati teaching hospital: Incidence and implicated factors". *Sci Rep* 10.1 (2020): 18702.