Elective cesarean section for pregnant women with Human T-cell Lymphotropic Virus (HTLV) in the *Sistema Único de Saúde* (SUS) (Brazilian Public Health System), Brazil: when biological plausibility exceeds scientific evidence

Melania Maria Ramos Amorim [1,2,3]
https://orcid.org/0000-0003-1047-2514

Alexandre Delgado [2]
https://orcid.org/0000-0002-2311-8744

Anna Catharina Carneiro da Cunha [2]
https://orcid.org/0000-0003-1281-192X

Alex Sandro Rolland Souza [2,4,5]
https://orcid.org/0000-0001-7039-2052

João Lucas de Brito Freitas [2]
https://orcid.org/0009-0002-6748-2385

Isabela Coutinho [2]
https://orcid.org/0000-0003-4707-4069

Brena Melo [2]
https://orcid.org/0000-0002-7671-2122

Leila Katz [2,4]
https://orcid.org/0000-0001-9854-7917

[1] Programa de Pós-graduação Stricto Sensu em Saúde Integral. Instituto de Medicina Integral Prof. Fernando Figueira (IMIP). Rua dos Coelhos, 300. Boa Vista. Recife, PE, Brazil. CEP: 50.070-902. E-mail: melania.amorim@imip.org.br
[2] Programa de Pós-graduação Stricto Sensu em Saúde Integral. Instituto de Medicina Integral Prof. Fernando Figueira (IMIP). Recife, PE, Brazil.
[3] Programa de Residência Médica em Ginecologia e Obstetrícia. Universidade Federal de Campina Grande (UFCG). Campina Grande, PB, Brazil.
[4] Escola de Saúde e Ciências da Vida. Universidade Católica de Pernambuco (UNICAP). Recife, PE, Brazil.
[5] Área acadêmica de Ginecologia e Obstetrícia. Universidade Federal de Pernambuco (UFPE). Recife, PE, Brazil.

Introduction

Infection with human T-cell lymphotropic viruses (HTLV-1 and HTLV-2) has historically been neglected in Brazil, despite the country being among those with the highest absolute number of infected people in the world. In 2025, the Ministry of Health published a *Nota Técnica Conjunta* nº 6/2025 (Joint Technical Note), with the aim of guiding care for pregnant women, women in labor, and newborns in contexts of HTLV infection, responding to a legitimate demand for standardization of procedures within the *Sistema Único de Saúde* (SUS) (Brazilian Public Health System).[1]

The *Nota Técnica* (Technical Note) presents relevant advances. Among them are the reinforcement of serological screening in prenatal care, the emphasis on diagnostic confirmation before irreversible decisions, the reaffirmation of breastfeeding as the main route of vertical transmission of HTLV-1, and the recommendation to offer infant formula associated with pharmacological inhibition of lactation.[1] These measures are supported by decades of consistent evidence and represent effective strategies for preventing vertical transmission. Also commendable is the effort to integrate maternal and child care, recognize social vulnerabilities associated with HTLV, and propose care flows in SUS, contributing to reduce the invisibility of this infection.

However, alongside these advances, the *Nota Técnica* (Technical Note) adopts a broadened recommendation for elective cesarean section as the preferred mode of delivery among pregnant women with confirmed HTLV-1 or HTLV-2, regardless of clinical or obstetric factors. This recommendation contrasts with its own recognition, present

http://dx.doi.org/10.1590/1806-9304202605100458-en

in the document that evidence on the role of delivery method in vertical transmission of HTLV is limited. This dissonance between the fragility of the available evidence and the strength of the proposed recommendation raises central questions from the perspective of evidence-based medicine, health ethics, and the rational use of public resources in SUS.

This Point of View aims to critically analyze the *Nota Técnica Conjunta* nº 6/2025 (Joint Technical Note), recognizing its relevant contributions but discussing in a well-founded manner in the limits of the scientific evidence supporting the recommendation for elective cesarean section. This present text does not propose to formulate alternative normative recommendations, but rather to stimulate qualified scientific debate on the topic. It is discussed that, in the absence of randomized clinical trials - the conduct of which faces substantial ethical and practical barriers - and before the observational studies that have so far failed to demonstrate an independent protective effect of cesarean section, the recommendation for universal elective cesarean section for pregnant women with HTLV lacks robust support in the available literature. Finally, we discuss how contemporary approaches advanced observational analysis, including big data, multicenter studies, directed acyclic graphs (DAGs), and propensity score methods, may contribute in the future to elucidate this issue in a more robust manner, without exceeding the ethical and scientific limits currently imposed.

The Proposal for Elective Cesarean Section in the Technical Note

The recommendation of elective cesarean section as the preferred mode of delivery for pregnant women with HTLV-1 or HTLV-2 is one of the central axles of the *Nota Técnica* (Technical Note). By linking the indication for mode of delivery exclusively to the diagnosis of HTLV, the *Nota* (Note) proposes a change in obstetric management regardless of associated clinical or obstetric conditions. This guidance is based essentially on the biological plausibility that cesarean section could reduce the newborn's exposure to the virus during birth, even though breastfeeding is recognized as its main route of vertical transmission.[2-4]

However, by formulating this recommendation in a broad and prescriptive manner, the *Nota Técnica* (Technical Note) does not consistently address the available evidence, which remains limited and heterogeneous, with no consensus on the independent protective effect of cesarean section. In the context of the *Sistema Único de Saúde* (SUS) (Brazilian Public Health System), the indiscriminate adoption of cesarean sections for all pregnant women with HTLV implies additional costs, greater demand for healthcare resources, and women exposure to immediate and late surgical risks. In the absence of robust evidence demonstrating clinical benefit or relevant impact on public health, such recommendation is difficult to sustain from a scientific, ethical, and health standpoint, which reinforces the necessity for ongoing debate and periodic review in light of new evidence.[5-7]

Limitations of Current Evidence and Lack of Randomized Clinical Trials

The main gap in recommending cesarean section as the preferred mode of delivery for pregnant women with HTLV is the absence of randomized clinical trials (RCTs) that provide robust evidence of the benefit of this approach. Although biological plausibility suggests that cesarean section may reduce the newborn's exposure to maternal secretions contaminated with the virus, the available observational evidence does not allow us to confidently support a strong recommendation. The lack of RCTs in this area makes the scenario challenging, as observational studies, by their nature, cannot establish causality with the same confidence as randomized controlled trials.

Prates *et al*.[8] study, investigated vertical transmission of HTLV-1, exemplifies the limitations of observational evidence. In their analysis, the authors identified cesarean section as a protective factor in the bivariate analysis; however, when performing multivariate analysis, they found no statistically significant association between cesarean section and reduced transmission of HTLV-1. This finding suggests that the relationship initially observed may have been influenced by uncontrolled confounding factors, reinforcing the necessity of caution in interpreting these data.[8]

Furthermore, as this was an observational study, the data from Prates *et al*.[8] may have been influenced by uncontrolled external variables, such as sociodemographic context, maternal viral load at birth, access to healthcare, and adherence to recommended interventions, such as the use of formula instead of breastfeeding. These factors make the interpretation of the results more complex and highlight the need for studies with more robust designs to confirm or refute the available findings.

Impossibility of Conducting Randomized Clinical Trials: Ethical and Practical Considerations

Conducting RCTs on elective cesarean section for pregnant women with HTLV faces considerable practical barriers and raises substantial ethical concerns, which have been widely discussed in literature on surgical research ethics.[9,10] Cesarean section is a major surgical intervention with significant risks for both the mother and the newborn. Possible complications include infections,

injuries during surgery, anesthetic complications, prolonged post-operative recovery, and an increased risk of complications in subsequent pregnancies, such as the spectrum of placenta accreta.

This ethical concern is even more relevant when considering the context of limited resources in SUS, where a recommendation for routine cesarean sections could significantly increase hospital costs without concrete evidence of its effectiveness. The inclusion of pregnant women in clinical research also involves specific ethical considerations related to vulnerability and reproductive autonomy, which have been the subject of an increasing debate in contemporary bioethics.[10-12] Furthermore, in a public health system with a shortage of beds and specialized personnel, performing cesarean sections without clear obstetric indication places additional pressure on the health infrastructure.

Future Methodological Perspectives

Given the ethical and practical impossibility of RCTs, advanced observational approaches offer promising forms to investigate the independent effect of the delivery mode on vertical transmission of HTLV. Multicenter studies with large administrative and clinical databases, combined with methods of causal inference—such as directed acyclic graphs (DAGs) for identifying confounders, propensity score matching, and target trial emulation—can approximate, within known limits, the conditions of a controlled trial.[13-15] These strategies, already consolidated in other areas of perinatal epidemiology, could provide more reliable estimates of the effect of cesarean section on vertical transmission, supporting future revisions of current recommendations.

Current Evidence and Recommendations for Elective Cesarean Section

In view of the above, the scientific evidence currently available does not allow us to state with certainty that universal elective cesarean section confers a net benefit to pregnant women with HTLV-1 or HTLV-2. Biological plausibility, although a legitimate element in the formulation of hypotheses, does not replace empirical demonstration of efficacy and safety, especially when the proposed intervention involves known surgical risks and significant costs to the health system.

It should be noted that breastfeeding remains as the most well-documented route of vertical transmission in the literature, and that measures to suppress lactation and provide infant formula - already covered in the *Nota Técnica* (Technical Note) - representing the greatest impact on preventing vertical transmission of HTLV strategy.

Final considerations

Nota Técnica Conjunta nº 6/2025 (Joint Technical Note) represents an important advance in organizing care for pregnant women with HTLV within SUS, particularly by reinforcing serological screening, diagnostic confirmation, and the contraindication of breastfeeding as a central strategy for preventing vertical transmission. However, the recommendation for universal elective cesarean section, based predominantly on biological plausibility and limited observational evidence, deserves to be the subject of ongoing debate by the scientific community. The absence of randomized clinical trials - whose implementation faces substantial ethical and practical barriers - should not be interpreted as justification for the adoption of routine surgical interventions without demonstration of net benefit.

Until evidence is available, it is prudent that the definition of the mode of delivery in pregnant women with HTLV remain guided by individualized obstetric criteria, by a decision shared with the woman, and by the principle of proportionality between risk and benefit.[11,12] This Point of View is not intended to replace normative recommendations, but to contribute to the formulation of public policies in this area based on qualified scientific debate, combined with methodological prudence and respect for women's autonomy.

Authors' contributions

Amorim MMR: Conceptualization, writing of the original manuscript, revision, and final editing.

Cunha ACC: Conceptualization, literature review, writing of the original manuscript.

Freitas JLB: Critical review of ethical and methodological arguments, review, and editing.

Melo B: Critical review of clinical-obstetric arguments, review, and editing.

Delgado A: Critical review of epidemiological arguments, review, and editing.

Souza ASR: Critical review of public health arguments, review, and editing.

Coutinho I: Critical review and final approval of the manuscript.

Katz L: Supervision, critical review, and final approval of the manuscript.

All authors approved the final version of the manuscript and assume public responsibility for the content of the work. The text does not represent the institutional position of any of the declared affiliations.

Data availability

The entire dataset supporting the results of this study has been published in the article itself.

References

1. Ministério da Saúde (BR). Nota Técnica Conjunta nº 6/2025 – CGIST/DATHI/SVSA/MS. Dispõe sobre Orientações relacionadas à prevenção da transmissão vertical do HTLV-1/2, incluindo fluxo de testagem na gestação, no parto ou puerpério, via de nascimento e amamentação. Brasília (DF): Ministério da Saúde; 2025. [access in 2025 Dez 17]. [*Internet*]. Available from: https://www.gov.br/aids/pt-br/central-de-conteudo/notas-tecnicas/2025/nota-tecnica-conjunta-no-6-2025-cgist-dathi-svsa-ms.pdf/view
2. Hino S, Sugiyama H, Doi H, Ishimaru T, Yamabe T, Tsuji Y, *et al*. Breaking the cycle of HTLV-I transmission via carrier mothers' milk. Lancet. 1987; 330 (8551): 158-9.
3. Rosadas C, Taylor GP. Current interventions to prevent HTLV-1 mother-to-child transmission and their effectiveness: a systematic review and meta-analysis. Microorganisms. 2022; 10 (11): 2227.
4. World Health Organization (WHO). Human T-lymphotropic virus type 1: technical report. Geneva: WHO; 2021. [access in 2025 Dez 17]. [*Internet*]. Available from: https://www.who.int/publications/i/item/9789240020221
5. Barr RS, Drysdale SB, Boullier M, Lyall H, Cook L, Collins GP, *et al*. A Review of the Prevention of Mother-to-Child Transmission of Human T-Cell Lymphotrophic Virus Type 1 (HTLV-1) With a proposed Management Algorithm. Front Med (Lausanne). 2022; 9: 941647. doi: 10.3389/fmed.2022.941647.
6. ESHRE Guideline Group on Viral infection/disease; Mocanu E, Drakeley A, KupkaMS, Lara-Molina EE, Clef NL, Ombelet, *et al*. ESHRE Guideline: medically assisted reproduction in patients with a viral infection/disease. Hum Reprod Open. 2021; 2021 (4): hoab037. doi: 10.1093/hropen/hoab037
7. Royal College of Obstetricians and Gynaecologists (RCOG). Assisted vaginal birth (Green-top Guideline Nº. 26). London: RCOG; 2020. [access in 2025 Dez 17]. [*Internet*]. Available from: https://www.rcog.org.uk/guidance/browse-all-guidance/green-top-guidelines/assisted-vaginal-birth-green-top-guideline-no-26/
8. Prates G, Paiva A, Haziot ME, Fonseca LAM, Smid J, Marcusso RMN, *et al*. Could cesarean delivery help prevent mother-to-child transmission of Human T-Lynphotropic Virus Type 1? J Infect Dis. 2023; 228 (12): 1766-75. https://doi.org/10.1093/infdis/jiad219.
9. McCulloch P, Taylor I, Sasako M, Lovett B, Griffin D. Randomised trials in surgery: problems and possible solutions. BMJ. 2002; 324 (7351): 1448-51.
10. Lyerly AD, Little MO, Faden RR. The second wave: toward responsible inclusion of pregnant women in research. Int J Fem Approaches Bioeth. 2008; 1 (2): 5–22.
11. Freedman B. Equipoise and the ethics of clinical research. N Engl J Med. 1987; 317 (3): 141-5.
12. London AJ. Clinical Equipoise: Foundational Requirement or Fundamental Error? In: Bonnie Steinbock (ed.). The Oxford Handbook of Bioethics. (2009; online ed, Oxford: Academic, 2 Sept. 2009). [access in 2026 Mar 1]. Available from: https://doi.org/10.1093/oxfordhb/9780199562411.003.0025
13. Hernán MA, Robins JM. Causal inference: what if. Boca Raton (FL): Chapman & Hall/CRC; 2020.
14. Greenland S, Pearl J, Robins JM. Causal diagrams for epidemiologic research. Epidemiology. 1999; 10 (1): 37-48.
15. Austin PC. An introduction to propensity score methods for reducing the effects of confounding in observational studies. Multivariate Behav Res. 2011; 46 (3): 399-424.

Received on December 18, 2025
Final version presented on February 17, 2026
Approved on February 20, 2026

Associated Editor: Lygia Vanderlei