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MATERNAL AND NEONATAL CONSEQUENCES OF CHLAMYDIA TRACHOMATIS INFECTION IN PREGNANCY: CLINICAL IMPLICATIONS FOR ANTENATAL CARE IN CAMEROON

Tedjieu Romeo Hervis[1]

Iradukunda Sengesho Benigne2

Nizeyimana Jean Baptiste3

1. Joint Reseacher at Lisala University and UNCR University, Department of Biomedical Sciences
2. Joint MPhil Researcher at Lisala University and UNCR University, IT Department, Film and TV Production
3. Lecturer at Lisala University, Faculty of Psychology and Education, Department of Technopedagogy

ABSTRACT

Chlamydia trachomatis infection during pregnancy is associated with a range of adverse maternal and neonatal outcomes, yet screening and treatment are not routinely provided in many low-income countries, including Cameroon. This article synthesizes the evidence on the maternal and neonatal consequences of Chlamydia trachomatis infection in pregnancy and discusses the clinical implications for antenatal care in Cameroon. Drawing on the study findings from the Mifi District Hospital in Bafoussam, which reported a seroprevalence of 54.3 percent, the article reviews the

[1] Joint Reseacher at Lisala University and UNCR University, Department of Biomedical Sciences

literature on the obstetrical complications (preterm birth, premature rupture of membranes, postpartum endometritis), neonatal complications (ophthalmia neonatorum, chlamydial pneumonia), and long-term consequences of untreated infection. The analysis reveals that Chlamydia trachomatis infection during pregnancy significantly increases the risk of preterm birth (OR 2.3, 95% CI: 1.5-3.5), premature rupture of membranes (OR 2.1, 95% CI: 1.3-3.4), and postpartum endometritis (OR 2.5, 95% CI: 1.4-4.2). Neonatal complications occur in 30-50 percent of exposed infants, with ophthalmia neonatorum presenting at 5-14 days of life and chlamydial pneumonia at 2-19 weeks. The article concludes that routine antenatal screening for Chlamydia trachomatis is essential for preventing adverse pregnancy outcomes and that treatment with azithromycin is safe and effective during pregnancy. Policy recommendations for Cameroon are provided.

Keywords: Chlamydia trachomatis, pregnancy outcomes, preterm birth, neonatal conjunctivitis, antenatal screening, Cameroon.

RÉSUMÉ (FRENCH)

L'infection à Chlamydia trachomatis pendant la grossesse est associée à une série d'issues maternelles et néonatales défavorables, mais le dépistage et le traitement ne sont pas systématiquement fournis dans de nombreux pays à faible revenu, y compris le Cameroun. Cet article synthétise les preuves sur les conséquences maternelles et néonatales de l'infection à Chlamydia trachomatis pendant la grossesse et discute des implications cliniques pour les soins prénatals au Cameroun. S'appuyant sur les résultats de l'étude menée à l'Hôpital de District de la Mifi à Bafoussam, qui a rapporté une séroprévalence de 54,3 pour cent, l'article examine la littérature sur les complications obstétricales (accouchement prématuré, rupture prématurée des membranes, endométrite post-partum), les complications néonatales (ophtalmie néonatale, pneumonie à Chlamydia) et les conséquences à long terme de l'infection non traitée. L'analyse révèle que l'infection à Chlamydia trachomatis pendant la grossesse augmente significativement le risque d'accouchement prématuré (OR 2,3, IC 95%: 1,5-3,5), de rupture prématurée des membranes (OR 2,1, IC 95%: 1,3-3,4) et d'endométrite post-partum (OR 2,5, IC 95%: 1,4-4,2). Les complications néonatales surviennent chez 30 à 50 pour cent des nourrissons exposés, avec une ophtalmie néonatale se présentant à 5-14 jours de vie et une pneumonie à Chlamydia à 2-19

semaines. L'article conclut que le dépistage prénatal systématique de Chlamydia trachomatis est essentiel pour prévenir les issues défavorables de la grossesse et que le traitement par azithromycine est sûr et efficace pendant la grossesse. Des recommandations politiques pour le Cameroun sont fournies.

Mots-clés: Chlamydia trachomatis, issues de grossesse, accouchement prématuré, conjonctivite néonatale, dépistage prénatal, Cameroun.

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Auteurs correspondant: *Tedjieuromeohervis,Iradukunda Sengesho Benigne and Nizeyimana Jean Baptiste*
Adresses électroniques: *tedjieuromeohervis@cirep.ac.cd,benigneira0@gmail.com, nizeyimana.jb@dphu.ac.cd ,*
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1. INTRODUCTION

The previous articles in this series have documented the high seroprevalence of Chlamydia trachomatis infection among pregnant women in Bafoussam, Cameroon (54.3 percent) and identified sociodemographic, behavioral, and knowledge-related determinants of infection. This article addresses the clinical consequences of infection during pregnancy and the implications for antenatal care policy and practice.

Chlamydia trachomatis infection during pregnancy is not benign; it is associated with a range of adverse maternal and neonatal outcomes that are preventable through screening and treatment (Adachi et al., 2016; Rours et al., 2012). Despite this, screening for Chlamydia trachomatis is not included in the standard antenatal care package in Cameroon, unlike screening for HIV and syphilis (Wandji, 2016). This gap in antenatal care represents a missed opportunity for prevention.

This article synthesizes the evidence on the maternal and neonatal consequences of Chlamydia trachomatis infection in pregnancy and discusses the clinical implications for antenatal care in Cameroon. The article is organized as follows. Section two reviews the maternal consequences of infection. Section three reviews the neonatal consequences. Section four discusses the evidence on screening and treatment. Section five presents policy recommendations for Cameroon. Section six concludes.

2. MATERNAL CONSEQUENCES OF CHLAMYDIA TRACHOMATIS INFECTION IN PREGNANCY

2.1 Preterm Birth

Preterm birth, defined as delivery before 37 weeks of gestation, is a leading cause of neonatal morbidity and mortality worldwide (Blencowe, Cousens, Chou, Moller, Narwal, Adler, & Lawn, 2013). Numerous studies have demonstrated that Chlamydia trachomatis infection during pregnancy increases the risk of preterm birth.

A systematic review and meta-analysis by Adachi and colleagues (2016) pooled data from 15 studies and found that Chlamydia trachomatis infection during pregnancy was associated with a significantly increased risk of preterm birth (pooled OR = 2.3, 95% CI: 1.5-3.5). The association persisted after adjustment for potential confounders, including maternal age, socioeconomic status, and other STIs (Adachi et al., 2016).

The mechanism by which Chlamydia trachomatis causes preterm birth is believed to involve ascending infection from the cervix to the decidua and fetal membranes, leading to an inflammatory response characterized by the release of cytokines and prostaglandins that trigger uterine contractions and cervical ripening (Rours et al., 2012; Brunham et al., 2015).

2.2 Premature Rupture of Membranes

Premature rupture of membranes (PROM), defined as rupture of the amniotic sac before the onset of labor, occurs in approximately 8 to 10 percent of pregnancies and is associated with increased risks of chorioamnionitis, placental abruption, umbilical cord compression, and neonatal infection (Mercer, 2003). Chlamydia trachomatis infection has been identified as a risk factor for PROM.

In a large cohort study of 2,500 pregnant women, Rours and colleagues (2012) found that women with Chlamydia trachomatis infection had a 2.1-fold increased risk of PROM compared to uninfected women (95% CI: 1.3-3.4). The association was independent of other risk factors, including smoking, alcohol use, and bacterial vaginosis (Rours et al., 2012).

2.3 Postpartum Endometritis

Postpartum endometritis is an infection of the endometrial lining of the uterus occurring after delivery, typically presenting with fever, lower abdominal pain, and purulent lochia. It affects approximately 1 to 3 percent of vaginal deliveries and up to 10 to 20 percent of cesarean deliveries (Mackeen, Packard, Ota, & Berghella, 2015).

Chlamydia trachomatis has been implicated as a cause of postpartum endometritis, particularly in women with untreated infection during pregnancy. In a study of 500 women with postpartum endometritis, 32 percent tested positive for Chlamydia trachomatis compared to 12 percent of controls (adjusted OR = 2.5, 95% CI: 1.4-4.2) (Andrews, Hauth, Cliver, & Goldenberg, 1995).

2.4 Ectopic Pregnancy and Infertility

While not directly related to pregnancy outcomes, it is important to note that Chlamydia trachomatis infection is a leading cause of tubal factor infertility and ectopic pregnancy (Brunham et al., 2015; Paavonen, 2012). The infection causes inflammation and scarring of the fallopian tubes, which can interfere with the transport of the ovum and the sperm, as well as with the passage of the fertilized egg into the uterus (Brunham et al., 2015). Women who have had Chlamydia trachomatis infection are at increased risk of subsequent ectopic pregnancy and infertility (Paavonen, 2012).

3. NEONATAL CONSEQUENCES OF CHLAMYDIA TRACHOMATIS INFECTION

3.1 Ophthalmia Neonatorum (Neonatal Conjunctivitis)

Ophthalmia neonatorum, or neonatal conjunctivitis, is inflammation of the conjunctiva occurring in the first month of life. It can be caused by chemical agents (silver nitrate), bacteria (including Chlamydia trachomatis, Neisseria gonorrhoeae, and other bacteria), or viruses (Hammerschlag, 2011).

Chlamydia trachomatis is the most common infectious cause of ophthalmia neonatorum in many settings, accounting for 30 to 50 percent of cases (Darville, 2005; Hammerschlag, 2011). The infection is acquired during vaginal delivery when the infant passes through an infected cervix. Prophylactic eye drops, typically erythromycin or tetracycline, do not reliably prevent chlamydial conjunctivitis (Darville, 2005).

The clinical presentation of chlamydial ophthalmia neonatorum is distinct from gonococcal conjunctivitis. Unlike gonococcal infection, which typically presents with profuse purulent discharge within the first 2 to 5 days of life, chlamydial conjunctivitis typically presents with mucoid discharge at 5 to 14 days of life (Hammerschlag, 2011). The diagnosis is confirmed by culture, direct fluorescent antibody testing, or nucleic acid amplification tests (NAATs).

Untreated chlamydial conjunctivitis can lead to corneal scarring and visual impairment, although this is rare (Darville, 2005). Treatment consists of systemic erythromycin or azithromycin, as topical treatment alone is insufficient to eradicate the infection (Hammerschlag, 2011).

3.2 Chlamydial Pneumonia

Chlamydia trachomatis is also a cause of pneumonia in infants, typically presenting at 2 to 19 weeks of life (Darville, 2005). The infection is acquired during vaginal delivery, and symptoms include staccato cough (a distinctive cough characterized by short, repetitive bursts), tachypnea, and wheezing. Infants with chlamydial pneumonia are typically afebrile and have normal or only slightly elevated white blood cell counts (Darville, 2005; Hammerschlag, 2011).

The diagnosis of chlamydial pneumonia is confirmed by culture, direct fluorescent antibody testing, or NAATs on nasopharyngeal specimens. Chest radiography may show hyperinflation and bilateral interstitial infiltrates (Hammerschlag, 2011). Treatment consists of systemic erythromycin or azithromycin, and most infants recover fully with appropriate treatment (Darville, 2005).

3.3 Long-Term Consequences

The long-term consequences of neonatal chlamydial infection are not well characterized, but some studies have suggested an association with reactive airway disease and asthma in later childhood (Rours et al., 2012). Further research is needed to clarify the long-term respiratory outcomes of infants infected with Chlamydia trachomatis.

4. SCREENING AND TREATMENT FOR CHLAMYDIA TRACHOMATIS IN PREGNANCY

4.1 Evidence for Screening

The high prevalence of Chlamydia trachomatis infection among pregnant women, coupled with the serious consequences of untreated infection, provides a strong rationale for routine antenatal screening. Several cost-effectiveness analyses have demonstrated that screening for Chlamydia trachomatis in pregnancy is cost-effective, even in settings with moderate prevalence (Adachi et al., 2016; World Health Organization, 2023).

The optimal approach to screening has not been established. Some guidelines recommend universal screening for all pregnant women, while others recommend risk-based screening targeting women with identified risk factors (Workowski & Bolan, 2015). Given the high prevalence observed in this study (54.3 percent), universal screening may be justified in the Cameroonian context.

4.2 Treatment During Pregnancy

Chlamydia trachomatis infection during pregnancy can be safely and effectively treated with azithromycin (1 g orally as a single dose) or amoxicillin (500 mg orally three times daily for 7 days) (Workowski & Bolan, 2015). Azithromycin is preferred due to its single-dose regimen, which improves adherence. Doxycycline, a standard treatment for non-pregnant adults, is contraindicated during pregnancy due to potential effects on fetal teeth and bone development.

Treatment of the pregnant woman should be accompanied by treatment of her sexual partner(s) to prevent reinfection (partner notification and treatment) (World Health Organization, 2023). Women who remain at risk should be retested approximately 3 months after treatment to detect reinfection (Workowski & Bolan, 2015).

4.3 Prevention of Neonatal Transmission

Screening and treatment of pregnant women is the most effective strategy for preventing neonatal Chlamydia trachomatis infection. Treating infected pregnant women reduces the risk of transmission to the infant from 50-70 percent to less than 5 percent (Darville, 2005; Hammerschlag, 2011).

Prophylactic eye drops do not reliably prevent chlamydial ophthalmia neonatorum and are not recommended for this purpose (Darville, 2005). Universal screening and treatment is the preferred approach.

5. POLICY RECOMMENDATIONS FOR CAMEROON

Based on the findings of this study and the evidence reviewed, the following policy recommendations are proposed for Cameroon:

Recommendation 1: Include screening for Chlamydia trachomatis in the standard antenatal care package. Screening should be offered to all pregnant women at their first antenatal visit, with repeat screening in the third trimester for women with ongoing risk factors.

Recommendation 2: Establish laboratory capacity for Chlamydia trachomatis testing. This requires investment in equipment, test kits, reagents, and trained personnel. Nucleic acid amplification tests (NAATs) are the preferred testing modality due to their high sensitivity and specificity.

Recommendation 3: Train health workers in the collection of specimens, interpretation of test results, and management of infected women. Training should also cover partner notification and treatment.

Recommendation 4: Ensure availability of effective treatment. Azithromycin should be available at all antenatal care facilities. Treatment should be provided free of charge to remove financial barriers.

Recommendation 5: Integrate health education about Chlamydia trachomatis into routine antenatal health promotion activities. Education should cover the asymptomatic nature of the infection, the consequences during pregnancy, the modes of transmission, and the methods of prevention.

Recommendation 6: Establish a surveillance system to monitor Chlamydia trachomatis prevalence and trends over time. This will allow evaluation of the impact of screening and treatment programs and guide resource allocation.

Recommendation 7: Conduct implementation research to identify barriers and facilitators to the integration of Chlamydia trachomatis screening into routine antenatal care in low-resource settings.

6. CONCLUSION

Chlamydia trachomatis infection during pregnancy is associated with significant adverse maternal and neonatal outcomes, including preterm birth, premature rupture of membranes, postpartum endometritis, ophthalmia neonatorum, and chlamydial pneumonia. The high seroprevalence of 54.3 percent observed among pregnant women in Bafoussam, Cameroon, underscores the urgent need for action.

Screening and treatment of Chlamydia trachomatis during pregnancy are safe, effective, and cost-effective. The implementation of routine antenatal screening in Cameroon would prevent substantial maternal and neonatal morbidity and mortality.

The policy recommendations provided in this article offer a roadmap for the integration of Chlamydia trachomatis screening into routine antenatal care in Cameroon. With political will, investment in laboratory capacity, training of health workers, and ongoing surveillance, it is possible to achieve the goal of eliminating preventable adverse pregnancy outcomes due to Chlamydia trachomatis infection.

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