



## A DECADE OF RETROSPECTIVE ANALYSIS: HIV INCIDENCE AMONG ANTENATAL CLINIC ATTENDEES AND MOTHER-TO-CHILD TRANSMISSION RATES

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### ABSTRACT

**Introduction:** Because of the escalating rates of HIV infection on a global scale, it is crucial to assess the HIV-positive population. The presence of HIV in expectant mothers heightens the risk of transmitting the virus to their newborns, necessitating an evaluation. **Objective:** This current study aims to establish the frequency of HIV infections among patients seeking antenatal care at a tertiary hospital and ascertain the rate of vertical transmission among HIV-positive patients. **Material & Methods-** A comprehensive retrospective study was undertaken, encompassing all antenatal patients, including those attending the emergency outpatient department (OPD), at Pannadhay Rajkiya Mahila Chikitsalaya (PDRMC), R.N.T Medical College, Udaipur, during the period from Apr 2012 to Mar 2022. **Conclusion:** It is recommended to perform universal screening for HIV among all women attending antenatal clinics, enabling the identification of HIV-positive individuals and the initiation of appropriate HIV treatment. The prompt diagnosis and treatment of HIV-infected patients significantly decrease the risk of transmitting the virus to their infants during the perinatal period.

**KEYWORDS :** HIV/AIDS, PPTCT, HAART, ANC Mothers

### INTRODUCTION:

On a global scale, approximately 50% of individuals living with HIV and AIDS are women, with a significant portion of them in their childbearing years. Maternal HIV infection and its associated adverse outcomes in newborns represent a significant contributor to Morbidity and mortality that can be avoided or mitigated.<sup>1</sup> HIV infection can often be life-threatening and fatal, leading to further challenges such as the load of HIV positive children on humanity, arising from the loss of single or both parents to AIDS. The spread of the virus from parents to children, known as mother to child transmission (MTCT), is a major societal concern as it leads to the creation of orphans.

Consequently, this present study was carry out to evaluate the occurrence of parent-to-child spread within the premises of a tertiary care hospital, namely PDRMC affiliated with R.N.T. Medical. College, Udaipur.

In terms of virology, it's important to note that HIV is an RNA retrovirus, with two main types, HIV1 (more common) and HIV2. Virus primarily targets T-lymphocytes, which play a key role in regulating the immune response. Specifically, it attaches to the CD4 surface antigen, acting as a receptor for the virus.

### The natural history of HIV infection typically follows these stages:

- Incubation period, which can last from days to weeks.
- Acute retroviral syndrome, occurring within one week to three months, characterized by symptoms like night sweats, fever, fatigue, headache, rash, lymphadenopathy, arthralgias, pharyngitis, myalgias, & gastrointestinal issues.
- The body's immune response to HIV, taking place within one to two weeks.
- A latent period of approximately ten years.
- Acquired immunodeficiency syndrome (AIDS), which marks the most advanced stage of HIV infectivity. If the value of T cell count in CD4 < 200 cells/ L, CD4 T cells comprise less than 14 % of all lymphocytes, or the presence of specific AIDS-defining complaint.

Regarding the spread of HIV from mother to child, it can occur

through several routes:<sup>2</sup>

- Antenatally, through transplacental passage during pregnancy.
- Intranatally, when the infant is exposed to maternal blood and vaginal secretion throughout labor & delivery.
- Postnatally, which can happen through breastfeeding.

To address this, HIV testing is typically offered to pregnant females using an "opt-out approach." Additionally, treatment during pregnancy plays a critical role in avoid mother-to-child spread.<sup>3</sup>

The primary treatment regimen recommended for pregnant women infected with HIV consists of a combination of three drugs:

- Tenofovir (TDF) at a dose of 300 mg
- Lamuvidine (3TC) at a dose of 300 mg
- Efavirenz (EFV) at a dose of 600 mg

Combination is conveniently easy to get a only 1 tablet and considered as safe and sound for both pregnant & breastfeeding women. It is known for its good tolerance, requires minimal supervision, and is compatible with additional medications commonly used in clinical concern.

Prevention of Parent to Child Transmission of HIV (PPTCT) remains a critical endeavor. To eliminate new HIV infection among children reduce significantly HIV-related fatalities in pregnant women and new mothers, we must accelerate treatment access for every pregnant & breast-feeding women living with HIV.<sup>4</sup>

### The PPTCT program was initiated in India in 2002, comprising four essential components:

1. key prevention of HIV (targeting HIV-negative individuals, particularly women of childbearing age)- aimed at averting new HIV infections within this demographic.
2. Prevent unintended pregnancies (HIV +ve Not Pregnant)- preventing unintended pregnancies among women living with HIV
3. Prevention of Mother-to-Child Transmission (MTCT) for pregnant women living with HIV.
4. Delivering essential care, support, and treatment to both HIV-positive mothers and their children, as well as their

families

As part of routine antenatal care, all pregnant women are offered HIV counseling and testing, with the option to decline (opt-out).

It's important to note that MTCT is responsible for 90% of new HIV infections in children. Without antiretroviral therapy (ART), the MTCT rate ranges from 15% to 45%, but with ART, this rate can be significantly reduced to 2% to 5% in breast-feeding populations and <2% in non-breast-feeding populations.

Strategies such as avoiding breastfeeding, administering antiretroviral therapy, and ensuring appropriate delivery management have substantially decreased mother to child transmission rate, dropping from 25-30% to < 1%.

Since 2006, the World Health Organization has recommended retesting for HIV during the third trimester and throughout breastfeeding in regions with higher HIV prevalence (≥5%) to further reduce MTCT.

It's crucial to emphasize that the most critical factor in HIV transmission is a high viral load in the mother.

**District Categorization:**<sup>5</sup>

1. Category A: Districts with an ANC (Ante-natal Clinic) prevalence of more than 1% at any site within last 3 years.
2. Category B: Districts where ANC prevalence has been < 1% across all sites during the past 3 years but with more than 5% prevalence at any High-Risk Group (HRG) site (such as STD/FSW/MSM/IDU).
3. Category C: Districts with ANC prevalence < 1% across all sites during the previous 3 years and less than 5% prevalence at all HRG sites. However, these districts may have identified hot spots, including migrant, truckers, large groups of factory people, tourists, etc.
4. Category D: Districts where ANC prevalence < 1% across all sites for the past 3 years, with less than 5% prevalence at all High Risk Group sites, and unrecognized hot spots or limited HIV data available.

Udaipur falls into Category B.

**AIMS AND OBJECTIVES:**

1. To determine the prevalence of HIV infection among pregnant females attending ANC & emergency OPD.
2. To facilitate the referral of diagnosed HIV-positive patients to an ART (Antiretroviral Therapy) center for treatment, especially those identify during emergencies.
3. To assess the incidence of MTCT of HIV.

**MATERIALS AND METHODS:**

1. The study was carry out among all ANC women, together with those from the Emergency OPD, at PDRMC, affiliated with R.N.T Medical College, Udaipur, from Apr 2012 to Mar 2022.
2. Data for the study was collected from the computerized management information system (CIMS)<sup>6</sup>.

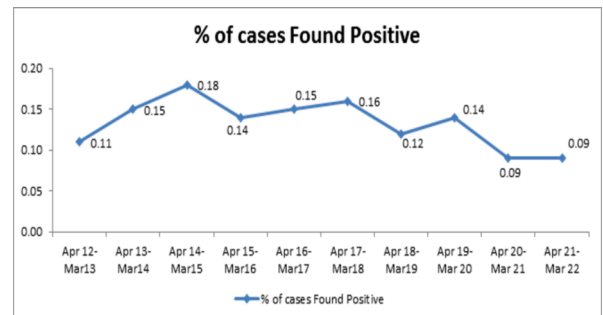
**RESULTS AND DISCUSSION**

**Table 1. Year wise Positivity rate of ANC**

| Time Duration | Total ANC | Tested for HIV | Found Positive | % of cases Found Positive |
|---------------|-----------|----------------|----------------|---------------------------|
| Apr 12-Mar13  | 25295     | 10833          | 29             | 0.11                      |
| Apr 13-Mar14  | 24174     | 16403          | 36             | 0.15                      |
| Apr 14- Mar15 | 22383     | 201789         | 40             | 0.18                      |
| Apr 15- Mar16 | 22439     | 20538          | 32             | 0.14                      |
| Apr 16- Mar17 | 21498     | 25363          | 32             | 0.15                      |
| Apr 17- Mar18 | 21244     | 21177          | 35             | 0.16                      |

|                |       |       |    |      |
|----------------|-------|-------|----|------|
| Apr 18- Mar19  | 19131 | 12032 | 23 | 0.12 |
| Apr 19- Mar 20 | 18191 | 14135 | 25 | 0.14 |
| Apr 20- Mar 21 | 16456 | 12176 | 14 | 0.09 |
| Apr 21- Mar 22 | 16400 | 15622 | 14 | 0.09 |

The table 1 provides a comprehensive overview of the year-wise ANC (Antenatal Care) testing for HIV, spanning a decade from April 2012 to March 2022. These statistics reveal the total number of pregnant women who undergo HIV testing throughout their ANC visits, highlighting the critical importance of monitoring HIV prevalence among expectant mothers. Notably, while the absolute figures of pregnant women tested for HIV fluctuate over the years, the percentage of positive cases remains relatively low. This data is invaluable for assessing the effectiveness of HIV prevention and treatment programs implemented during pregnancy. It underscores the dedication of healthcare providers and policymakers in safeguarding the health of both pregnant women and their newborns by managing and mitigating the risk of HIV transmission.



**Table 2 year wise Type of Delivery**

| Time Duration  | Delivery | Institutional Delivery | Home Delivery |
|----------------|----------|------------------------|---------------|
| Apr 12-Mar13   | 25       | 24 (96%)               | 1 (4%)        |
| Apr 13-Mar14   | 23       | 23 (100%)              | 0(0%)         |
| Apr 14- Mar15  | 38       | 37 (97.4%)             | 1 (2.6%)      |
| Apr 15- Mar16  | 32       | 32 (100%)              | 0(0%)         |
| Apr 16- Mar17  | 32       | 29 (90.6%)             | 3 (9.4%)      |
| Apr 17- Mar18  | 35       | 35(100%)               | 0(9%)         |
| Apr 18- Mar19  | 22       | 22(100%)               | 0(0%)         |
| Apr 19- Mar 20 | 18       | 18(100%)               | 0(0%)         |
| Apr 20- Mar 21 | 11       | 11(100%)               | 0(0%)         |
| Apr 21- Mar 22 | 10       | 10(100%)               | 0(0%)         |

Table 2 In this table, the data reflects the number of deliveries, the percentage of institutional deliveries, and home deliveries for each specified duration. 100% Institutional deliveries Our goal is to encourage all patients to opt for childbirth in a healthcare facility, thereby ensuring the availability of Highly Active Antiretroviral Therapy (HAART) and prophylaxis for the Prevention of Parent-to-Child Transmission (PPTCT) to newborns. It offers insights into the mode of deliveries, categorizing them into institutional deliveries and home deliveries. Notably, the majority of deliveries during this period were institutional, signifying the growing importance of healthcare facilities for ensuring safe childbirth. As seen, the percentage of institutional deliveries consistently remained high, ranging from 90.6% to 100%, showcasing a positive trend toward delivering babies in healthcare institutions. This shift is indicative of improved healthcare infrastructure and awareness, contributing to better maternal and neonatal care. Home deliveries, while present, showed a declining trend, underscoring the importance of skilled healthcare assistance during childbirth for the well-being of both mothers and their newborns.

**Table 3: Year wise Mode of Delivery**

| Time Duration | Delivery | Mode of delivery       |       |      |       |
|---------------|----------|------------------------|-------|------|-------|
|               |          | Normal or Vaginal Del. | CS    | % CS |       |
| Apr 12-Mar13  | 25       | 22                     | 86.4% | 3    | 13.6% |

|                |    |    |        |   |       |
|----------------|----|----|--------|---|-------|
| Apr 13-Mar14   | 23 | 23 | 100.0% | 0 | 0.0%  |
| Apr 14- Mar15  | 38 | 34 | 88.2%  | 4 | 11.8% |
| Apr 15- Mar16  | 32 | 30 | 93.3%  | 2 | 6.7%  |
| Apr 16- Mar17  | 32 | 26 | 76.9%  | 6 | 23.1% |
| Apr 17- Mar18  | 35 | 28 | 80%    | 7 | 20%   |
| Apr 18- Mar19  | 22 | 13 | 59.1%  | 9 | 40.9% |
| Apr 19- Mar 20 | 18 | 16 | 88.9%  | 2 | 11.1% |
| Apr 20- Mar 21 | 11 | 8  | 72.7%  | 3 | 27.3% |
| Apr 21- Mar 22 | 10 | 8  | 80%    | 2 | 20%   |

The rate of vaginal deliveries increased from 59.1 to 100%, while the rate of Caesarean sections increased from 0% to 40%. It's essential to note that Caesarean sections are performed exclusively for obstetric indications in compliance with NACO (National AIDS Control Organization) guidelines.

**Table 4. Year wise HIV Status of the Baby**

| Time Duration  | HIV Testing at 18 month | Positive at 18 month | Positive at 18 month % |
|----------------|-------------------------|----------------------|------------------------|
| Apr 12-Mar13   | 10                      | 2                    | 20                     |
| Apr 13-Mar14   | 5                       | 0                    | 0                      |
| Apr 14- Mar15  | 24                      | 1                    | 4.2                    |
| Apr 15- Mar16  | 23                      | 0                    | 0                      |
| Apr 16- Mar17  | 19                      | 0                    | 0                      |
| Apr 17- Mar18  | 26                      | 1                    | 3.8                    |
| Apr 18- Mar19  | 20                      | 2                    | 10                     |
| Apr 19- Mar 20 | 18                      | 1                    | 5.6                    |
| Apr 20- Mar 21 | 10                      | 0                    | 0                      |
| Apr 21- Mar 22 | 4                       | 0                    | 0                      |

Table no. 4 The data illustrates that the incidence of HIV in children at the age of 18 months has shown a range of 0% to 20%. Importantly, there has been a decreasing trend observed from April 2012 to March 2022. This emphasizes the need to prioritize and enhance the HIV testing rate for children at the 18-month mark. It's noteworthy that there have been reports of zero positivity among children between years 20-21 and 21-22, underlining the potential for successful prevention and intervention strategies in this age group.

**Table 5. Year wise Type of Birth and HIV testing status of Baby at 18 month of birth.**

| DURATION       | LIVE BIRTH | STILL BIRTH | BABY DEATH (BEFORE 18 MONTH) | BABY TESTED FOR HIV AT 18 MONTHS |
|----------------|------------|-------------|------------------------------|----------------------------------|
| Apr 12-Mar13   | 22         | 3           | 3                            | 10                               |
| Apr 13-Mar14   | 22         | 1           | 1                            | 5                                |
| Apr 14- Mar15  | 34         | 3           | 12                           | 24                               |
| Apr 15- Mar16  | 31         | 1           | 5                            | 23                               |
| Apr 16- Mar17  | 28         | 4           | 4                            | 19                               |
| Apr 17- Mar18  | 33         | 2           | 4                            | 26                               |
| Apr 18- Mar19  | 20         | 2           | 0                            | 20                               |
| Apr 19- Mar 20 | 17         | 1           | 1                            | 18                               |
| Apr 20- Mar 21 | 10         | 1           | 0                            | 10                               |
| Apr 21- Mar 22 | 8          | 2           | 2                            | 4                                |

Table no 5 The data presented in the table underscores an important aspect of healthcare for children. While institutional deliveries have become more prevalent, there is a concerning trend that many children do not return to health services for follow up care. Our primary objective is to address and reverse this trend by increasing the rate of follow-up visits for children. Timely and regular follow-up is crucial for monitoring the

health and development of infants and ensuring that any potential issues or concerns are promptly identified and addressed. By focusing on improving the follow-up care for children, we aim to enhance their overall health and well-being, ultimately contributing to healthier and happier futures for the youngest members of our community.

**CONCLUSION:**

The significance of universal screening for HIV among all women attending antenatal clinics cannot be overstated. This approach is instrumental in identifying HIV-infected patients promptly and initiating Highly Active Antiretroviral Therapy (HART). Timely diagnosis and treatment are key in reducing the risk of perinatal transmission of HIV, safeguarding both the mother and the child's health.

Furthermore, adhering to the WHO Guidelines of 2013, it is imperative to offer Antiretroviral (ARV) therapy to all pregnant women diagnosed with HIV, irrespective of their CD4 cell count or HIV RNA level. This approach ensures that every HIV-infected pregnant woman receives the necessary treatment for her health and that of her unborn child. It's crucial to note that ART initiation should occur at designated ART centers to guarantee the best care.

A notable concern is the unbooked pregnant women who arrive directly at the labor room. Unfortunately, many of these unbooked cases miss out on Prevention of Parent to Child Transmission (PPTCT) coverage. Addressing this gap is essential to extend the benefits of PPTCT to a broader population, furthering the cause of preventing mother-to-child transmission of HIV and promoting maternal and child health.

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