PROTOCOL FOR VERTICAL TRANSMISSION OF HIV THROUGH BREASTFEEDING

AUTHORS:
Marisol Isabel Sosa[1]
Paola Silvia Basta[1]
[1] Francisco Javier Muñiz Infectious Diseases Hospital, Pediatric Inpatient Unit 29

doi.org/10.55634/4.3.6

SUMMARY :

Over the decades, a significant improvement has been observed in the knowledge and recording of maternal serological status, especially since the 2010s, when the majority of mothers were aware of their HIV diagnosis and had negative serology. This reflects the progress in HIV testing and follow-up policies during pregnancy. However, during the preceding decades (1990–2009), a high proportion of mothers were unaware of their serological status or lacked adequate records, representing a significant challenge in terms of preventing mother-to-child transmission. The lack of HIV serological records for mothers highlights the importance of adequate surveillance and follow-up in these cases. This study will verify that the lack of this data in medical records was more frequent among mothers of children born before 2007. This recording deficit reflects the reality of the early years of the pandemic regarding follow-up and treatment for pregnant women with HIV, as well as the lack of a standardized system of records and diagnostic protocols during that period. This study demonstrates that mother-to-child transmission (MTCT) of HIV remains a significant risk when mothers are unaware of their serological status during breastfeeding. In the cases analyzed, many women were diagnosed as HIV-positive some time after the birth of their children, indicating that transmission may have occurred during the breastfeeding period, in a context of lack of knowledge, inadequate monitoring, or limited access to information. The study aims not only to analyze this concerning reality but also to contribute concrete proposals to reduce cases of mother-to-child transmission of HIV linked to breastfeeding. Moving towards a more informed, equitable, and responsible society is a commitment that involves the entire healthcare system, educational institutions, and, above all, every member of the community.

KEYWORDS : *HIV, breastfeeding, vertical transmission*

INTRODUCTION :

The HIV/AIDS pandemic, which began in the 1980s, was initially considered a sexually transmitted infection that predominantly affected men who have sex with men. This perception contributed to stigmatization during the early stages of the emerging pandemic. The naming of the disease, the development of diagnostic methods, the identification of the virus, and its detection in patients of both sexes—including pregnant women, children of HIV-positive mothers, infants, transfusion recipients, hemophiliacs, transplant recipients, and people at high risk—led to a clearer understanding of the virus's transmission routes.

The study of the evolution of the infection revealed that anyone, under certain circumstances, can be exposed to HIV. Since the first records, the most frequent route of transmission has been unprotected sex.

In childhood, particularly in HIV-positive children under 15, vertical transmission (VT) is the primary route of infection. In those older than 15, sexual transmission predominates, which may be accompanied by other sexually transmitted infections (STIs) that prompt medical consultation and facilitate diagnosis.

In Argentina, the healthcare system faces the challenge of diagnosing and treating pregnant women with the goal of reducing mother-to-child transmission of HIV. It is essential that healthcare professionals caring for mothers and children diagnosed with HIV/AIDS be able to identify the different stages of pregnancy, childbirth, and breastfeeding where there is a potential risk of transmission, in order to intervene promptly and prevent infection.

Extensive literature [1], and in our particular case our accumulated clinical experience, establishes that the three periods of greatest risk for vertical transmission are: pregnancy, the perinatal period, and the postnatal period, which should be considered until the end of breastfeeding. It has been determined that the probability of transmission is directly related to the maternal viral load, with the risk being considerably higher in cases of primary infection .

Vertical transmission (VT) of the virus during pregnancy, in the absence of interventions by the healthcare team, occurs in approximately 15% to 45% of cases. This percentage is influenced by the clinical context of a maternal primary infection , particularly associated with high viral loads (VL), a common characteristic of this stage of primary infection. [1][2].

In this scenario, vaginal delivery represents the greatest risk of exposure to vertical transmission, especially in pregnant women with detectable viral loads [3]. The risk of transmission exceeds 12% when the viral load (VL) is greater than 1,000 copies/ mL , and can reach up to 30% in cases where the VL exceeds 10,000 copies [19] .

Before the introduction of highly effective antiretroviral therapy (HAART), the time of greatest risk of transmission of the virus to newborns was precisely during passage through the birth canal.

Since the discovery of mother-to-child transmission (MTCT) of HIV, healthcare teams have worked tirelessly to prevent infection. It is important to note that most drug protocols, for ethical reasons, do not include pregnant women as participants. This is done to protect the pregnant woman and the child from the potential risks that a drug under investigation could pose in the short, medium, and long term. HIV treatment protocols are generally evaluated in pregnant women only after they have been approved in other study groups.

Furthermore, in research protocols, women of childbearing age are included with more controls than men of the same age. A significant milestone in this area was the ACTG-076 protocol (1994) [2][3] , which represented the first pharmacological study of antiretrovirals in pregnant women. This study demonstrated that it was possible to reduce vertical transmission to 8% by administering oral zidovudine (AZT) as monotherapy to the mother starting at week 14 of gestation, along with intravenous administration during cesarean section. Oral prophylaxis with the same drug was continued in the newborn for six weeks, supplemented by a recommendation to avoid breastfeeding [1][3].

In 1997, the Ministry of Health's HIV/AIDS Law established universal voluntary serological testing for pregnant women during their first prenatal visit, requiring their consent. It also mandates serological testing in the immediate postpartum period for those who were not tested during pregnancy. The law further stipulates that women considered high-risk should undergo quarterly serological testing. Treatment with Zidovudine (AZT) is prescribed according to protocol ACTG-076, and continued antiretroviral (ARV) therapy is recommended for mothers who had a pre-existing HIV diagnosis.

(22).

Starting in 2000 [3], combination therapies (ART) were introduced for pregnant women, including intravenous administration of zidovudine (AZT) during cesarean section and delivery. In addition, oral prophylaxis with AZT was continued for the newborn for six weeks, along with the recommendation to avoid breastfeeding. These interventions have succeeded in reducing mother-to-child transmission (MTCT) of HIV to between 2% and 5% [3].

Far from resting on their laurels, healthcare teams are constantly developing care and follow-up protocols for pregnant women, with the aim of promptly detecting those who are HIV-positive and thus preventing vertical transmission of the virus.

(4)(27)(30)(31).

Currently, HIV serological testing is recommended in each trimester of pregnancy, as well as serological monitoring of the pregnant woman's partner. These tests allow for early diagnosis and timely initiation of antiretroviral treatment, with the goal of achieving undetectable viral loads in the last trimester, specifically between weeks 34 and 36 of gestation.

According to current protocols [4], if at week 36 the pregnant woman has a viral load of less than 1,000 copies/ mL and meets adequate clinical conditions, vaginal delivery can be considered. However, if the viral load is higher, a planned cesarean section is indicated, accompanied by antiretroviral therapy (HAART) and perinatal prophylaxis with intravenous zidovudine for the mother and oral administration of the same drug for the newborn. In both scenarios, breastfeeding is contraindicated (27)(28)(29)(30)(31).

These protocols are designed to prevent vertical transmission both during pregnancy and in the perinatal period, in HIV-positive women, whether they were diagnosed before or during pregnancy or at the time of

CUADRO 2

Tasas de transmisión de la madre al hijo (TMH) evaluadas 4 a 8 semanas después del parto (reflejan la infección intrauterina, intraparto y en el postparto temprano) según la terapia antirretroviral utilizada en el periodo perinatal.

Ensayo	Tasa de TMH como %	Edad al momento de evaluación (semanas)	Medicamento(s) antirretrovirales utilizados en el periodo perinatal	Recuento medio de células CD4+ por mm^3 de plasma cerca del parto
ANRS049 + Retro-Ci (Dabis y col, 1999, Wiktor y col. 1999)	14.7	6	ZDV	545
HIVNET012 (Guay y col, 1999)	11.9	6	NVP	461
SAINT (Moodley y col, 2003)	10.7	4	NVP	405
SAINT (Moodley y col, 2003)	8.1	4	ZDV+3TC	385
Petra medium (Equipo del Estudio de Petra, 2002)	8.9	6	ZDV+3TC	475
Petra largo (Equipo del Estudio de Petra, 2002)	5.7	6	ZDV+3TC	445
ANRS1201 V1.0 (Dabis y col, 2003)	6.4	4	ZDV+NVP	370
ANRS 1201 V1.1 (Dabis y col, 2003)	4.5	4	ZDV+3TC+NVP	439

delivery (4).

Infectious disease follow-up of the mother-child dyad after birth includes the continuation or initiation of antiretroviral treatment in the mother, as well as the exclusion of infection in the newborn. For the latter, direct virological tests (RNA or DNA PCR) will be performed during the first months of life, and the diagnosis will be completed with a fourth-generation serological test (ELISA) at 18 months.

Currently, thanks to the availability of highly active antiretroviral therapy (HAART), its universal access, the implementation of protocols for the systematic testing of pregnant women, and the timely indication of treatment in HIV-positive pregnant women, the risk of mother-to-child transmission (MTCT) of HIV has been significantly reduced, reaching approximately 1%. Higher percentages are usually associated with failures in the proper implementation or adherence to these protocols.

Today, cases of children acquiring the virus through vertical transmission rarely involve mothers who received their diagnosis during pregnancy. While not impossible, it is an uncommon situation, precisely because of prenatal care and current prevention protocols.

However, in recent years, vertical transmission has been observed more frequently in children of mothers who tested seronegative during pregnancy but became infected later, during breastfeeding. This scenario highlights shortcomings in testing the sexual partners of pregnant women, as well as the initiation of new relationships during breastfeeding and the lack of maternal serological testing during that period.

Vertical transmission during breastfeeding is directly influenced by the mother's viral load (VL), her immune status, and the infant's exposure time. The longer the duration of breastfeeding, the greater the risk of transmission.

When the mother's seropositive status is known and a positive viral load is detected, the suspension of breastfeeding and its replacement with infant formulas constitutes an effective measure to avoid exposure and eventual transmission of the virus to the child [(1)].

Characteristics of vertical transmission through breastfeeding

Vertical transmission (VT) of HIV through breastfeeding (BF) represents one of the possible mechanisms of infection and exposure of children to the virus. This transmission route can occur in different contexts: when the mother knows her HIV-positive diagnosis during pregnancy, when she is unaware of her status at the time of delivery, or even when prenatal tests yielded negative results, but infection occurs during the breastfeeding period. In all these scenarios, the possibility of transmission to the infant becomes critically relevant (20) (21)(23)(24).

A woman living with HIV can transmit the virus at any time during pregnancy, childbirth, or while breastfeeding. However, thanks to established control and prevention protocols during pregnancy, the probability of this occurring is minimal today. It is uncommon for a woman, knowing her prior diagnosis, to forgo prenatal care or,

under those circumstances, choose to continue breastfeeding [5][6]. However, when this does happen, it is important to consider that the reasons behind this decision can be multiple and complex, including social, economic, psychological, and cultural factors that exert significant pressure on women in various parts of the world.

In the absence of antiretroviral prophylaxis or other effective interventions, sustained breastfeeding for two years or more in HIV-positive women can double the risk of vertical transmission, reaching up to 40% (28). Globally, it is estimated that between 5% and 20% of children born to HIV-positive mothers who do not receive highly active antiretroviral therapy (HAART) acquire the infection postnatally, with this risk being directly proportional to the duration of breastfeeding [1].

One of the less considered causes of vertical HIV transmission occurs in women who were HIV-negative during pregnancy but acquired the infection during the months or years they were breastfeeding. This context creates a prolonged period of potential risk of transmission to the infant [5][6], which often passes without follow-up protocols or testing (24).

Regarding the biological mechanisms involved, numerous studies have analyzed the immunological characteristics of breast milk, and although some factors remain under investigation, the presence of thousands of immune cells with CD4 receptors has been confirmed in both colostrum and mature milk. Direct exposure of the infant to viral particles, especially viral RNA in the presence of detectable viral loads (VL) in the mother, is associated with an increased risk of transmission.

However, it is important to note that, even with the presence of all these risk factors, vertical transmission does not always occur. This phenomenon continues to be the subject of numerous studies, many of which seek to establish correlations between viral load in breast milk and the probability of transmission, which has allowed for adjustments and updates to current protocols related to breastfeeding in HIV-positive women [35].

Furthermore, the condition of the mammary glands themselves also influences the risk of transmission. Fissures in the nipples, clinical or subclinical mastitis, and other inflammatory breast pathologies can significantly increase the possibility of transmission during breastfeeding [5].

Regarding the child's role in the context of vertical transmission through breastfeeding, it is important to highlight that infants and young children have a remarkably immature immune and digestive system during their first years of life. This condition makes them especially vulnerable to viral exposure and seroconversion during breastfeeding. The integrity of the epithelial barrier of the oral mucosa and the digestive tract can be compromised by various nutritional or infectious factors [36]. Situations such as mixed feeding, oral candidiasis [5], respiratory infections that affect and inflame the mucosa of the tonsils, pharynx, or larynx, gastrointestinal conditions, food intolerances, or chronic malnutrition—common realities in thousands of children—facilitate viral entry by compromising the body's natural barriers during breastfeeding.

There is no single pattern or clearly defined timeframe that determines HIV transmission through breast milk, as it does not occur uniformly in all exposed infants. However, it has been documented that transmission is not limited to the first months of life. Several studies have shown seroconversion through breastfeeding even after the first year of life, which extends the risk period and reinforces the need for continuous monitoring in these cases. In the present study, cases of breast milk transmission were documented after the first year of life.

Postpartum prophylaxis during breastfeeding in HIV-positive mothers and new research

As previously mentioned, until 2023, HIV detection in women

In pregnant women, testing was performed using established serological protocols (4). In the event of a positive result, the corresponding protocol was implemented according to the stage of pregnancy, with the aim of achieving an undetectable viral load (VL) by week 36, defining the delivery method (vaginal or cesarean), administering the necessary prophylaxis, and prohibiting breastfeeding.

However, recent publications compiling information from international protocols developed over the last decade (2013–2023) have reported significant progress thanks to the introduction of more tolerable highly active antiretroviral therapies (HAART) with fewer adverse effects. Several studies conducted in pregnant women with HIV—from diverse sociocultural and economic backgrounds—have shown that, in those with good treatment adherence, undetectable viral load during pregnancy, and who chose to breastfeed while maintaining that virological status, vertical transmission ranged between 1% and 5% (7)(8)(9)(10)(15)(17).

In 2016, the World Health Organization (WHO) issued specific recommendations for breastfeeding in high socioeconomic and health risk contexts. These guidelines suggested that HIV-positive mothers with good clinical follow-up and undetectable viral loads could choose to breastfeed. The implementation of this recommendation was aimed at countries with a high prevalence of HIV and limited resources, where lack of access to safe drinking water and food insecurity are prevalent. In such contexts, the risk of HIV transmission through breast milk had to be weighed against the risks of infant malnutrition, infections, and mortality associated with formula feeding (8)(11)(17)(18).

In some developed countries, following the recent publication of the aforementioned results of international protocols on breastfeeding in HIV-positive women on antiretroviral therapy, the possibility of breastfeeding by HIV-positive mothers is being considered. In Argentina, the Argentine Society of Infectious Diseases (SADI) issued new guidelines in December 2023 regarding breastfeeding by HIV-positive women. These guidelines recognize the feasibility of breastfeeding in HIV-positive mothers who have demonstrated perfect adherence to antiretroviral therapy (ART) and who maintain undetectable viral loads before, during, and after pregnancy. This practice should be carried out under close monitoring of both the mother and the child throughout the entire breastfeeding period.

In developed countries, traditional recommendations to penalize or prohibit breastfeeding in HIV-positive women have been revised. Currently, a shared decision-making approach is advocated, supporting HIV-positive mothers who choose to breastfeed, provided they maintain optimal adherence to antiretroviral treatment and undergo regular viral load monitoring (29). This approach recognizes the individuality of each case and the particular clinical context of each mother, highlighting the importance of ongoing medical support.

In this regard, recent research conducted in various international contexts has highlighted the need to evaluate pre-exposure prophylaxis (PrEP) protocols for HIV-negative pregnant or breastfeeding women at risk of infection. Among the proposed strategies, some studies suggest the use of daily oral medication, while others are evaluating the use of bimonthly injectable drugs, currently in the experimental phase (12). It is important to note that these protocols are mainly implemented in countries with high socioeconomic and health risk indices (13), where the issue of mother-to-child transmission of HIV is, in many cases, marked by strong stigmatization and social criminalization (14).

Breastfeeding and HIV in HIV-negative mothers during pregnancy

Regarding breastfeeding in these scenarios, we can affirm, based on our professional experience, that mothers with negative results for HIV during prenatal check-ups, in case the infection occurs after the birth of their last child, will generally not have new serological tests until a next pregnancy or in specific situations, such as surgical studies, donor testing, diagnosis of an acute HIV disease in the mother, partner or child, or in the worst case, due to the death of one of them (1)(5)(6).

This phenomenon is closely related to the postpartum recovery period and the resumption of maternal sexual activity. HIV transmission during breastfeeding can occur due to exposure to untested partners during pregnancy, to partners who, although tested, maintain parallel relationships, or directly to the mother's exposure to a new HIV-positive partner during the breastfeeding stage (34).

If the expectant mother has undergone prenatal care and has confirmed and documented negative serological results for HIV, it can be assumed that no further serological testing will be performed until a subsequent pregnancy, unless circumstances arise that require it. If both the mother and the child are diagnosed with HIV (other forms of transmission to the child having been ruled out), it is assumed that vertical transmission occurred during the breastfeeding period (5)(6)(25)(26).

In the early years of the HIV pandemic, breastfeeding was responsible for 15% to 20% of vertical transmission of this virus, a percentage that increased to 30% in cases of primary maternal infection , due to the high viral loads present at the time of transmission. These data are supported by numerous prestigious international studies (24)(25)(26).However, in Argentina there are few studies that analyze this specific moment of vertical transmission (20)(21)(23).

A study conducted in Zimbabwe (27)suggested that approximately 4% of HIV-negative women at the time of delivery became infected during the first year after giving birth, with the risk of transmission persisting into the second year. However, these studies, conducted in high-risk social contexts and at an early stage of the pandemic, do not specify whether the infection occurred due to untested stable partners or new partners during

breastfeeding.

Currently, there are no regulated studies or protocols addressing breastfeeding management in women who are serologically negative during pregnancy but sexually active during lactation. Although these circumstances are rare, they represent a significant risk for vertical transmission of HIV in children, as well as for the transmission of other sexually transmitted infections (STIs) [34].

Given this scenario, the question arises of how to control the risk of acquiring the infection during breastfeeding, which continues to be widely recommended by healthcare professionals due to its numerous benefits. As a healthcare team, we question whether mothers are being provided with sufficient information about the risks of HIV transmission to their children, and

inviting them to undergo serological testing during the breastfeeding period. Active interventions by healthcare teams are essential to protect both mother and child from potential infections to which they may be exposed. It is crucial to address this period of risk for vertical transmission and consider developing new prevention protocols [5][6].

This study evaluates the possibility of HIV transmission in a group of children diagnosed with HIV through vertical transmission, all of whom had been breastfed prior to their pediatric HIV diagnosis. In some of these children, the mothers were HIV-negative during pregnancy and experienced seroconversion during breastfeeding. In other cases, the children were breastfed by HIV-positive

CUADRO 1

Riesgo estimado y momento en el que ocurre la transmisión de la madre al hijo en ausencia de intervenciones (Adaptado de De Cock KM y col., 2000.)

Momento en el que ocurre la transmisión	Tasa de transmisión
Durante el embarazo	5 a 10 %
Durante el parto	10 a 15 %
Durante la lactancia	5 a 20 %
En general, sin lactancia	15 a 25 %
En general con lactancia hasta los 6 meses	20 a 35 %
En general con lactancia hasta los 18 a 24 meses	30 a 45 %

Nota: Las tasas pueden variar debido a las diferencias en las características de la población tales como recuento materno de células CD4+, carga viral de ARN y duración de la lactancia.

mothers and were diagnosed during or after breastfeeding. Additionally, one child was breastfed by an HIV-positive wet nurse. This study also includes cases where the exact duration of breastfeeding is not documented, but both the pediatric and maternal diagnoses are confirmed after breastfeeding.

STUDY OF HIV-POSITIVE CHILDREN WITH VERTICAL TRANSMISSION WHO RECEIVEDBREASTFEEDING BEFORE YOUR DIAGNOSIS

Vertical transmission after birth

Objective of the work:

The objective of this study was to determine how many patients diagnosed with vertical transmission (VT) and followed up at Pediatric Unit No. 29 of the FJ Muñiz Hospital received breastfeeding (BF) before their pediatric HIV diagnosis. This situation could be a cause of vertical transmission of the virus in this group of patients. For this study, the history of BF had to be documented in the medical records. In addition, information related to BF was recorded, such as the duration of BF, maternal HIV serology during pregnancy and/or at birth, the time elapsed from birth to the positive HIV diagnosis, and the reason for the maternal diagnosis.

Design:

This was a single-center retrospective study using data obtained from the medical records of selected patients at Pediatric Unit No. 29 of the Francisco Javier Muñiz Infectious Diseases Hospital, CABA, Argentina. Patients included in this study had to be HIV-positive due to vertical transmission and have received breast milk before their pediatric diagnosis, as well as have been followed up at Unit 29.

Materials and methods:

Selection of medical records (MR) of pediatric patients who met the study criteria and who had a history of having received breast milk before the diagnosis of HIV.

Type of study:

Retrospective, descriptive, single-center study.

Inclusion criteria:

Pediatric patients with positive serology for HIV acquired through vertical transmission, who received breastfeeding before their pediatric diagnosis.

Exclusion criteria:

HIV-positive patients without a history of breastfeeding, patients with HIV not acquired through vertical transmission, or patients without an HIV diagnosis.

RESULTS:

Data from approximately 600 patients were evaluated from 1991 to June 2023. Several medical records prior to 2000 were moved to an external repository due to space

limitations, which may have reduced the number of patients selected for this study.

The medical records that documented the history of breastfeeding yielded the following data:

Findings:

Four hundred medical records that met the inclusion criteria were examined from 1991 to 2023 of children who were HIV-positive due to vertical transmission. Of these patients:

87 patients had a history of breastfeeding (BF), of which:

- 62 patients had documented LM time (converted to months to unify the data).
- 25 patients did not have information on the time of LM received.

Difficulties in data extraction

During the data collection process, several difficulties arose related to the availability and integrity of information in medical records (MRs), especially those corresponding to the period from 1990 to the early 2000s. The main ones difficulties They were the following :

1. **Archives incomplete :**

Many patient medical records from this period were unavailable in the hospital archives due to space limitations. These records were transferred to external repositories, making it difficult to access complete records.

2. **Lack of records on breastfeeding (BF):**

Several medical records lacked information on breastfeeding. In some cases, the data was provided by family members (grandparents, close relatives) who were unaware of the patients' perinatal history, especially in the case of children who had died or orphans, who lacked complete information.

3. **Maternal disinformation:**

In some records, mothers were unaware of the serological information obtained during pregnancy or breastfeeding, or it was not adequately documented. This prevented the accurate identification of the risk of vertical transmission.

4. **Unregistered or incomplete serologies:**

There were medical records in which mothers mentioned having undergone HIV serology testing during pregnancy, but the results were not included in the medical records for various reasons. In other cases, the medical records contained only a record of a single serological test performed during some trimester of pregnancy, without specifying in which trimester the test was performed.

5. **Lack of perinatological or postnatal records:**

Many medical records lacked complete data on obstetric, postnatal, or breastfeeding history, especially for maternal and pediatric diagnoses established years after the children's birth. This makes it difficult to determine whether these children were breastfed, as this information was not recorded in the medical records.

6. **Limitations in the SISA system:**

Some breastfeeding records were not entered into the Integrated Health System (SISA), which meant that certain cases of children who could have been breastfed could not be included in this study due to the lack of formal documentation.

CONCLUSION:

These difficulties suggest that the number of children who actually received breastfeeding could be higher than reflected in this study. The lack of complete records in medical histories and the SISA system, as well as the lack of accurate documentation, prevents a more precise understanding of the impact of breastfeeding on mother-to-child transmission of HIV in this patient group.

RESULTS

Eighty-seven patients with a positive diagnosis for vertically transmitted HIV were selected, with a record of having received breast milk.

These 87 children were diagnosed months or years after their births, most of them at the same time as or later than the maternal diagnosis, as recorded in the medical record.

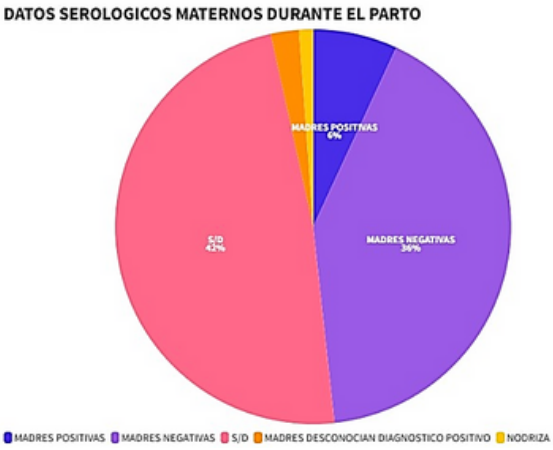
Of the 87 patients :

- 36 HC (41%) mothers reported negative pregnancy serologies
- 6 HC (7%) mothers reported positive serologies during pregnancy
- 2 HC (2%) positive mothers were diagnosed years after the birth of their children
- 43 HC (49%) no record of serological pregnancy status was found
- In one (1) patient, at the time of pediatric diagnosis, both parents had negative serologies for HIV, child breastfed by a wet nurse.

LACTATION

Of the 87 patients :

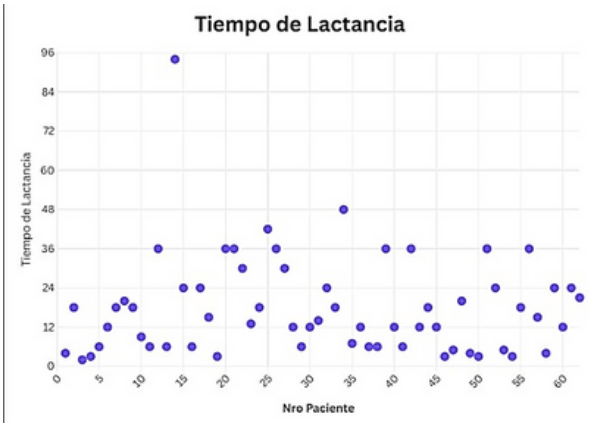
- 62 children (71%) had the duration of breastfeeding (months) recorded in the medical records
- 25 children (29%) only had the data recorded that they had received breastfeeding without specifying the time.



The average breastfeeding time was 18 months with a median of 14.5 months and a mode of 6 months, range of 92 months.

The longest duration of breastfeeding received by a child was 94 months.

The shortest duration of breastfeeding received by a child was 2 months.



Pediatric diagnosis

The average time from birth to pediatric diagnosis of HIV due to vertical transmission in these children was 4.3 years, with a median of 3 years and a mode of 2.76 years. All had a history of breast milk.

Maternal serology

Of the 87 children who received breast milk, in 36 (38%), the mothers reported being negative at the time of their children's birth.

Of the 87 patients, 42 children (48%) had no maternal serological record of pregnancy or delivery in their medical records, and the date of diagnosis for these mothers was after the birth of their HIV-positive children.

In one (1%) patient, both parents had negative HIV serology. This patient was breastfed by a nurse with positive serology; this patient did not have vertical transmission, but her infection occurred through breastfeeding and was considered relevant to this study.

Of the 87 children who were breastfed, 8 mothers who breastfed were HIV-positive at the time of their child's birth. Of these, 6 (7%) knew their carrier status during pregnancy, and 2 (2%) reported not knowing their serology and finding out years after their children's birth, during the course of a marker illness that led to their children's diagnosis.

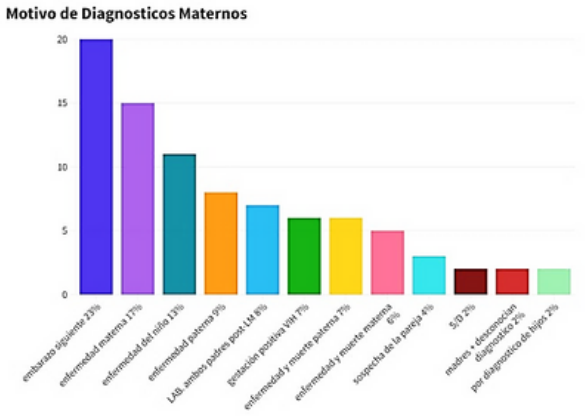
Reason for maternal diagnosis

Of the 87 children who received breast milk:

- In 20 (23%) the mothers were diagnosed during a subsequent pregnancy, with a positive diagnosis of the child prior to the current pregnancy.
    - In 13 cases, the mothers reported negative serology in the previous pregnancy and contracted HIV while breastfeeding, transmitting the virus to their children. These mothers and their children were diagnosed during a subsequent pregnancy.
    - In 7 cases, the serological data of the previous pregnancy is not recorded in the medical records.
- 11 (13%) mothers were diagnosed during the course of a child's illness.
- 15 (17%) mothers were diagnosed during the course of a maternal illness.
- 5 (6%) mothers were diagnosed during the course of an illness that culminated in maternal death
- 8 (9%) mothers were diagnosed during the course of a paternal illness
- 6 (7%) mothers were diagnosed during the course of an illness that culminated in the death of the father
- 3 (4%) mothers were diagnosed due to suspected infection of their partners
- 7 (8%) mothers were diagnosed by laboratory

- studies performed on both parents for various reasons (pre-surgical , donation, etc.).
- 2 (2%) mothers were diagnosed with the diagnosis and illness of more than one of their children
- 2 (2%) mothers no record of cause of diagnosis
- 6 (7%) mothers had positive serology during pregnancy
- 2 (2%) mothers did not learn of their positive diagnosis during pregnancy until years later

the birth of her son revealed by maternal illnesses.



Maternal serological status according to the year of the child's birth

The following shows the distribution of maternal serological status grouped by birth decade of children who received breast milk (BM):

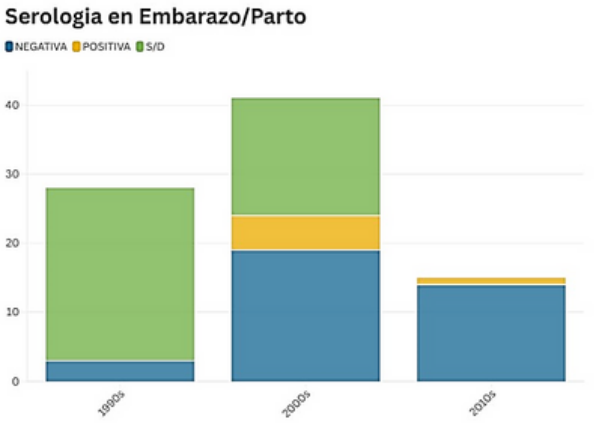
Decade 1990-1999 (28 children born in this decade who received breast milk)

- **25 mothers (89%)** have no record or are unaware of their HIV serological status during pregnancy.
- **3 mothers (11%)** reported negative HIV serology during pregnancy.

Decade 2000-2009 (44 children born in this decade who received breast milk)

- **19 mothers (43%)** reported having negative HIV serology during pregnancy.
- **18 mothers (41%)** have no record of their HIV serological status during pregnancy.
- **5 mothers (11%)** reported positive serology for HIV during pregnancy.
- **2 mothers (4%)** did not know their positive diagnosis during pregnancy, it being revealed years later due to maternal illnesses.
- In this group, **1** patient received breast milk from a wet nurse with positive serology for HIV, while both parents had negative serology for HIV.

- **Decade 2010-2020 (14 children born in this decade who received breast milk)**
- **Thirteen mothers (93%)** reported negative HIV serology during pregnancy or childbirth .**1 mother (7%)** he referred serology HIV positive during pregnancy .
- **Decade 2020-2023 (1 child received LM)**
- **1 mother (100%)** reported negative HIV serology during pregnancy.



Thanks to the implementation of standardized protocols during pregnancy and childbirth, vertical transmission of HIV in pregnant women is currently very rare. However, it is important to note that the rate of vertical HIV transmission is considerably lower in the population that undergoes regular prenatal care (30)(31)(36)(33)(34). This study does not focus on that group of patients, but rather on the exposure of infants during breastfeeding, evaluating its potential role in HIV transmission in those diagnosed after breastfeeding.

Risk factors

The findings of this study suggest that several factors significantly influence vertical transmission of HIV, particularly during the breastfeeding period. Among these , the following stand out: the next :

- **Maternal health status and type of breastfeeding: .**

The mother's clinical condition and the type of breastfeeding (exclusive, mixed, or prolonged) are determining factors in the likelihood of virus transmission to the infant. Immunological disorders or concurrent infections can increase the risk of transmission during breastfeeding.

- **Lack of knowledge of maternal serological status during breastfeeding:**

The lack of timely diagnosis of maternal infection during

breastfeeding represents a critical risk factor. In many cases, mothers test negative during pregnancy and acquire the infection later, without being retested, thus prolonging the child's exposure to the virus without any preventive intervention.

- **Lack of protection against sexually transmitted diseases (STDs) during breastfeeding:**

The limited availability or use of protection methods during this period, as well as the lack of campaigns aimed at promoting them, represent a public health problem that has not yet been resolved.

- **Lack of knowledge of the maternal partner's serological status:**

Knowing the serological status of a mother's sexual partners during the breastfeeding period is essential. Exposure to undiagnosed HIV-positive partners, whether stable or new, increases the risk of HIV acquisition by the mother and, consequently, by the infant.

- **Information and education for breastfeeding women:**

Health education about the risks of vertical transmission, prevention measures, and the importance of regular testing during breastfeeding is vital to reducing the risk of new pediatric infections.

- **Comprehensive sex education for women and men of reproductive age:**

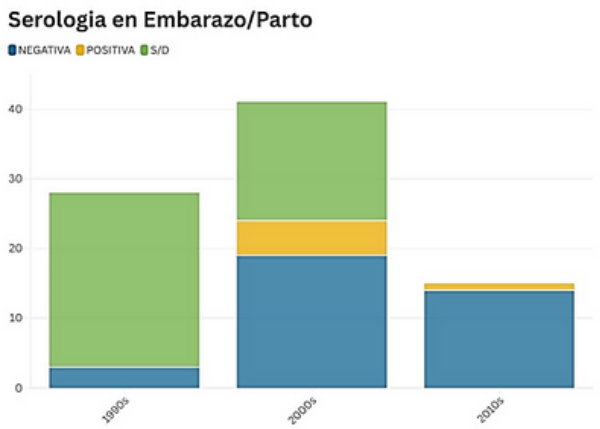
Promoting sex education, access to voluntary testing, and raising awareness about HIV and other STIs remain a priority need in public health policies, especially for sexually active people who may be involved in reproductive processes.

Similar studies in other regions of the territory

Several studies conducted in different regions of the country have shown results similar to the findings of the present work, demonstrating that breastfeeding can constitute a route of vertical transmission of HIV, especially in contexts where the mother acquires the infection after pregnancy.

These studies share the same methodological difficulties, particularly in obtaining accurate information on the serological history of the parents. The lack of complete clinical records, the lack of knowledge of the mother's diagnosis during the breastfeeding period, and the lack of serological follow-up of sexual partners are frequent limitations noted in the available studies.

A significant Argentine publication, included in the first edition of the report " Situation of Breastfeeding and HIV Transmission in Latin America " (1998) and also



documented in the CONICET registry in 2000, describes a case of late postpartum HIV transmission. In this case, the mother acquired the virus approximately 10 months after the birth of her child. The child was breastfed for 24 months and was diagnosed with HIV at 36 months of age, at the same time as his mother. It is worth noting that the child's father was HIV-positive, which is why serological testing was performed during the child's first months of life, although it was not continued thereafter.

On the other hand, a retrospective study conducted in the province of Santa Fe, which analyzed laboratory results from two maternity hospitals between 1999 and 2010, reported 12 cases of vertical transmission. In 6 of these cases, the mothers were diagnosed during breastfeeding, as were their children. The same study also documented an equivalent number of mothers who, having been infected during breastfeeding, did not transmit the infection to their children, suggesting that other factors—such as viral load, duration of exposure, and the infant's health—may influence whether or not the virus is transmitted in this context.

These national precedents reaffirm the need to strengthen clinical and serological monitoring during breastfeeding, even in mothers with negative serology during pregnancy, especially in contexts of social vulnerability or with exposure to new sexual partners.

CONCLUSIONS:

This study shows that a significant number of women were unaware of their HIV-positive status when breastfeeding their children, highlighting that the lack of knowledge of serological status during breastfeeding constitutes a relevant risk for vertical transmission (VT) of the virus.

It is important to note that, due to a lack of data, a considerable number of patients could not be included in

this analysis, although they probably meet the criteria to be included.

Of the **87 patients** who were breastfed before their pediatric HIV diagnosis due to vertical transmission, **42 mothers** reported knowing their serological status at the time of their children's birth: **36 were HIV-negative** and **6 were HIV- positive** . In the remaining cases, the lack of records prevents determining whether or not they knew their serological status. However, all the mothers breastfed and were diagnosed after their children's birth, some even several years later.

In many cases, mothers were unaware of the exact moment of their infection, as well as the serological status of their partners. Maternal diagnosis mostly occurred during a subsequent pregnancy, or as a result of their own illnesses, or following a diagnosis of their partner or child.

A significant number of mothers who reported negative serology during pregnancy also reported being infected during breastfeeding, coinciding with their children's exposure. This situation reveals a common pattern of **misinformation, lack of sex education, and limited access to preventive measures** , leading to risky behaviors by both mothers and their partners, thus facilitating transmission of the virus to children.

In light of these findings, there is an urgent need to implement **comprehensive prevention and education strategies** that extend beyond the pregnancy and childbirth period to **the postpartum period and throughout the duration of breastfeeding** . It is essential that both mothers and fathers receive education about sexually transmitted infections (STIs), the importance of serological testing, and the practice of protected sex.

This study demonstrates that breastfeeding can be a **significant risk factor for HIV transmission** , especially in mothers who acquired the infection after a negative serology test during pregnancy. The children's exposure varied over time, reinforcing the importance of **repeated serological testing during pregnancy, postpartum, and the breastfeeding period** , along with appropriate counseling and access to healthcare resources.

As can be seen, vertical transmission presents complex and often unexpected aspects. While current protocols focus on **prevention during pregnancy and childbirth**, this approach is limited if the entire family and social context in which child-rearing takes place is not considered.

Placing the entire burden of responsibility on the mother is not only unfair but also ineffective. Prevention of HIV transmission through childbirth must be approached from a perspective of shared responsibility , actively including partners and the entire childcare network. This study did not investigate the stability of the couples, but it is clear that, **regardless of the type of relationship**, responsibility for prevention must be shared.

Fatherhood doesn't begin solely with the birth of a child; the fact that **men don't carry or breastfeed does not absolve them of their responsibility in preventing mother-to-child transmission.** Women often face the pregnancy process alone, assume the care of the child, and also bear the responsibility for monitoring their own health, in many cases in highly vulnerable contexts.

For all the reasons stated above, it is essential that public health programs promote **the active inclusion of men** in prenatal care, serological testing for both partners, and **comprehensive sex education that includes the prevention of STIs, unintended pregnancies, and maternal and child health.** Equitable access to information and shared responsibility are fundamental pillars for reducing rates of mother-to-child transmission and improving public health as a whole.

RECOMMENDATIONS

1. **Strengthening public policies for serological testing during pregnancy:** It is essential to maintain and reinforce HIV screening strategies for pregnant women as a key preventive measure. This allows for the timely identification of HIV-positive mothers and the implementation of effective antiretroviral treatments that significantly reduce the risk of mother-to-child transmission (MTCT) to their children.
2. **Extending the preventive approach to the breastfeeding period:** Prevention strategies should consider not only pregnancy and childbirth, but also the breastfeeding period.

It is crucial to implement antiretroviral diagnosis and treatment during this stage, given the risk of transmission in mothers who become infected postpartum.

3. **Promote scientific research:** It is necessary to continue developing national and international research that allows a deeper understanding of the mechanisms of HIV transmission in breastfeeding, and thus optimize prevention strategies adapted to different sociocultural and health contexts.

PATIENT	F/N	LACTATION (THE)	MONTHS (THE)	DIAG CHILD	PREGNANCY SEROLOGY	DG MATERNAL	YEARS UNTIL DG CHILD
FCAPA	17/12/2005	YEAH	N/A	01/01/2009	NEGATIVE	NEGATIVOS	3,0
MRACA	2/3/2002	YEAH	4	2/11/2002	POSITIVE	1/11/1992	0,7
FLUGU	17/9/2002	YEAH	18	21/06/2005	POSITIVE	1999	2,8
FLUKA	21/9/2013	YEAH	2	04/06/2014	POSITIVE	01/03/2013	0.7
FLUIG	17/11/2001	YEAH	3	1/8/2002	POSITIVE	17/11/2001	0.7
MTOSI	25/1/2007	YEAH	6	1/7/2007	POSITIVE	2005	0.4
FMIRO	13/1/2006	YEAH	12	02/02/2016	POSITIVE	2004	10.1
MANGA	28/1/2000	YEAH	18	1/11/2002	POSITIVE	1/11/2002	2.8
FGISA	21/1/2002	YEAH	20	1/12/2004	POSITIVE	1/12/2004	2.9
FTIAC	22/9/2009	YEAH	18	5/5/2011	NEGATIVE	1/9/2010	1.6
FTARO	20/12/2000	YEAH	9	13/6/2002	NEGATIVE	1/5/2002	1.5
MNIGO	20/10/2001	YEAH	6	10/4/2002	NEGATIVE	10/4/2002	0.5
MYANI	25/2/2004	YEAH	36	1/4/2007	NEGATIVE	1/4/2007	3,1
MMACE	16/1/2005	YEAH	6	1/1/2013	NEGATIVE	4/9/2008	8,0
MALRO	2/3/2002	YEAH	94	1/1/2010	NEGATIVE	1/1/2010	7,8
FBEGA	16/6/2004	YEAH	24	19/5/2010	NEGATIVE	19/5/2010	5,9
FVASA	27/6/2005	YEAH	6	13/1/2011	NEGATIVE	13/1/2011	5.6
FXINE	24/4/2007	YEAH	24	1/11/2009	NEGATIVE	1/11/2009	2.5
FUMLE	26/8/2011	YEAH	15	28/1/2013	NEGATIVE	28/1/2013	1,4
MMAGO	26/1/2013	YEAH	3	29/7/2013	NEGATIVE	1/7/2013	0.5
FVIAC0	7/5/2009	YEAH	36	15/12/2014	NEGATIVE	15/12/2014	5.6

PATIENT	F/N	LACTATION (THE)	MONTHS (THE)	DIAG CHILD	PREGNANCY SEROLOGY	DG MATERNAL	YEARS UNTIL DG CHILD
FTHJI	14/6/2014	YEAH	36	1/6/2017	NEGATIVE	1/6/2017	3,0
MJOPE	29/8/2018	YEAH	30	1/5/2021	NEGATIVE	8/4/2021	2,7
MISRO	3/4/2020	YEAH	13	28/7/2021	NEGATIVE	1/7/2021	1,3
MMAVI	3/5/2018	YEAH	18	1/12/2022	NEGATIVE	1/1/2022	4,6
FOXCO	2/3/2017	YEAH	42	5/3/2022	NEGATIVE	5/3/2022	5,0
FGUON	5/4/2012	YEAH	36	1/11/2022	NEGATIVE	1/8/2022	10,6
MDYGO	24/9/2019	YEAH	30	1/1/2023	NEGATIVE	1/12/2022	3,3
FBRCA	27/8/2003	YEAH	12	3/11/2005	NEGATIVE	01/11/2005	2,2
MDYSA	16/1/2004	YEAH	6	1/9/2007	NEGATIVE	01/09/2007	3,6
FFLCA	6/3/2008	YEAH	12	01/01/2010	NEGATIVE	01/01/2010	1,8
FRODI	17/1/2007	YEAH	14	1/4/2014	NEGATIVE	01/04/2014	7,2
FRUGO	19/7/2012	YEAH	24	15/04/2014	NEGATIVE	01/07/2014	1,7
FALAC	13/3/2014	YEAH	18	1/1/2017	NEGATIVE (rapid test childbirth)	01/10/2016	2,8
FLUAM	14/1/2010	YEAH	48	1/9/2018	NEGATIVE	17/8/2018	17/8/2018
FMILA	21/5/1998	YEAH	7	01/01/1999	NEGATIVE	1/12/1998	0,6
MCRSA	9/4/1996	YEAH	12	1/12/2000	N/A	1/12/2000	4,6
FPRSA	21/5/1999	YEAH	6	1/12/2000	N/A	1/12/2000	1,5
MCRCA	26/2/2003	YEAH	6	01/09/2003	N/A	2003	0,5
MFEPI	13/2/1997	YEAH	36	01/04/2003	N/A	2003	6,1
MBRPO	29/6/1996	YEAH	12	01/06/1999	N/A	05/1999	2,9
FALPO	26/2/1998	YEAH	6	01/06/1999	N/A	1/5/1999	1,3

PATIENT	F/N	LACTATION (THE)	MONTHS (THE)	DIAG CHILD	PREGNANCY SEROLOGY	DG MATERNAL	YEARS UNTIL DG CHILD
FFLSA	28/2/2004	YEAH	36	15/9/2011	N/A	16/8/2008	7,6
MLETO	17/2/2005	YEAH	12	01/01/2012	NEGATIVE	2012	6,9
FAICO	14/5/2005	YEAH	18	3/11/2006	N/A	3/11/2006	1,5
FMIPO	28/10/1996	YEAH	12	13/5/1998	N/A	1/2/1998	1,5
MMAVI	16/1/1995	YEAH	3	1/1/1997	N/A	1997	2
FSTMB	22/12/1991	YEAH	5	01/08/2003	N/A	09/07/2003	11,6
FJUGE	28/10/1997	YEAH	20	1/12/2004	N/A	01/12/2004	7,1
FDEAL	29/6/2001	YEAH	4	1/12/2001	N/A	1/7/2001	0,4
FARGA	27/9/2003	YEAH	3	1/8/2004	N/A	1/5/2004	0,8
FDACA	26/6/2002	YEAH	36	01/01/2008	N/A	01/01/2005	5,5
MRULE	22/5/2002	YEAH	24	3/5/2005	N/A	3/5/2005	3,0
MDIMA	30/6/2000	YEAH	5	1/11/2000	N/A	1/11/2000	0,3
FDOGA	24/7/1994	YEAH	3	01/05/2004	N/A	01/01/2001	9,8
FMEFE	14/3/2005	YEAH	18	01/10/2006	NEGATIVE	1/9/2006	1,6
MRODA	6/2/2001	YEAH	36	18/5/2005	N/A	01/01/2004	4,3
FCASA	2/8/1999	YEAH	15	24/2/2003	N/A	25/2/2003	3,6
FJACA	27/7/2001	YEAH	4	11/12/2006	N/A	28/11/2005	5,5
FNANU	28/3/2014	YEAH	24	9/9/2019	NEGATIVE	9/2/2017	5,5
FMACA	3/3/2006	YEAH	12	2011	N/A	2009	4,0
MCRAL	19/9/2002	YEAH	24	29/6/2005	N/A	29/6/2005	2,8
FJULE	11/08/2003	YEAH	21	01/08/2004	N/A	2004	1,0

PATIENT	F/N	LACTATION (THE)	MONTHS (THE)	DIAG CHILD	PREGNANCY SEROLOGY	DG MATERNAL	YEARS UNTIL DG CHILD
FKAPO	16/10/1996	YEAH		2003	N/A	2003	7
FVIMA	28/10/2003	YEAH		21/1/2011	NEGATIVE	DECEASED s/dg	7,2
MMASA	28/8/2011	YEAH		1/8/2016	NEGATIVE	18/12/2015	4,9
FANCO	13/8/1997	YEAH		02/05/2005	NEGATIVE	01/02/2005	7,7
MMADI	21/9/1994	YEAH		1/10/2009	NEGATIVE	01/01/1999	15,0
MRORE	20/11/1997	YEAH		01/05/1998	N/A	1998	0,4
FTAMO	2/2/1998	YEAH		18/01/2001	N/A	18/01/2001	3,0
MMAGO	4/3/2002	YEAH		1/5/2005	N/A	05/2005	3,2
FIAES	19/7/2001	YEAH		15/01/2004	N/A	2003	2,5
MISTO	6/10/1999	YEAH		01/03/2005	N/A	01/01/2003	5,4
FESTO	1/3/2002	YEAH		01/04/2005	N/A	01/04/2003	3,1
MTONI	26/6/2002	YEAH		13/07/2007	N/A	01/01/2006	5,0
MDACA	8/3/1994	YEAH		1/10/2010	N/A	01/01/2001	16,6
FNACA	10/4/1996	YEAH		1/10/2010	N/A	01/01/2001	14,5
MMAAL	28/6/1999	YEAH		8/10/2008	N/A		9,3
MBRKR	15/7/1997	YEAH		15/5/2000	N/A	01/03/1999	2,8
FBROS	31/3/1998	YEAH		01/01/2002	N/A	01/01/2000	3,8
MLEGI	30/3/2005	YEAH		15/6/2008	NEGATIVE	15/6/2008	3,2
FANAZ	29/6/1998	YEAH		19/07/2003	N/A	01/01/2002	5,1
MKEIG	7/11/1999	YEAH		1/8/2002	N/A	01/11/2001	2,7
FROKA	6/6/1993	YEAH		01/01/1995	N/A	s/d	1,6

PATIENT	F/N	LACTATION (THE)	MONTHS (THE)	DIAG CHILD	PREGNANCY SEROLOGY	DG MATERNAL	YEARS UNTIL DG CHILD
MBRMA	27/12/1998	YEAH		01/08/2003	N/A	9/7/2003	4,6
MYOGA	18/3/2004	YEAH		01/01/2010	N/A	01/01/2010	5,8
FYAFR	3/5/1991	YEAH		1/10/1997	N/A	1/10/1997	6,4

4. **Develop comprehensive educational programs:** Health policies should include prevention and education programs aimed at women of childbearing age, pregnant women, and breastfeeding mothers. These programs should focus on the importance of testing, knowing one's own and one's partner's serological status, and preventing sexually transmitted infections (STIs).
5. **Proactively incorporating men into prevention strategies:** It is essential to design educational initiatives that include men as key players in preventing mother-to-child transmission of HIV and other STIs. Shared responsibility for care, serological testing, and decision-making regarding reproductive health should be a priority.
6. **Focus interventions on the couple, not just the woman:** Many prevention programs still focus exclusively on mothers. However, transmission often occurs through sexual relations with partners who are unaware of or do not disclose their HIV status. Prevention efforts should consider both partners from the beginning of pregnancy and continue throughout breastfeeding.
7. **Training of health professionals:** It is essential to train professionals from all branches of health in primary prevention, HIV and vertical transmission, providing them with theoretical and practical tools to accompany their patients in an appropriate, empathetic and up-to-date manner.
8. **Integrating health and education into preventative policies:** It is recommended that, in collaboration with the Ministry of Education, teacher training programs be developed and supervised by specialized health teams. These programs can be integrated within the framework of Comprehensive Sexuality Education (CSE), providing children and adolescents with knowledge about STI prevention, body care, consent, and reproductive health from an early age.
9. **Strengthening Comprehensive Sexuality Education (CSE) as a public health tool:** CSE, like hygiene and vaccination, should be considered an essential tool for disease prevention among young people. Strengthening it through a rights-based approach, grounded in public health and scientific evidence, will ensure more informed, responsible, and protected generations.

GENERAL CONCLUSION

This study demonstrates that mother-to-child transmission (MTCT) of HIV remains a significant risk when mothers are unaware of their HIV status during breastfeeding. In the cases analyzed, many women were diagnosed as HIV-positive some time after the birth of their children, indicating that transmission may have occurred during the breastfeeding period, in a context of lack of knowledge, inadequate monitoring, or limited access to information.

Over the past few decades, there has been remarkable progress in HIV diagnosis, prevention, and treatment protocols, especially for pregnant women. However, this study highlights significant gaps in postnatal follow-up and access to serological testing during breastfeeding. Most mothers of the children included in this study did not have records of their serological status during this period, unnecessarily exposing their children to the virus.

In this context, it is essential to rethink public health strategies, placing not only mothers but also their partners at the center of the discussion. Shared responsibility, sexual health education, and prevention must be cross-cutting themes in all public policies aimed at preventing mother-to-child transmission of HIV and other sexually transmitted infections (STIs).

This study aims not only to analyze a worrying reality but also to contribute concrete proposals to reduce cases of mother-to-child transmission of HIV linked to breastfeeding. Moving towards a more informed, equitable, and responsible society is a commitment that involves the entire healthcare system, educational institutions, and above all, every member of the community.

ACKNOWLEDGEMENTS :

To all the members of the health team who were professionally and emotionally involved throughout these 30 years, and who made possible with their commitment the care in room 29 of pediatric inpatient and follow-up of children and adolescents with HIV, and which for reasons beyond the control of this pediatric health team, in the course of this investigation ceased to be a pediatric inpatient room.
Eternal thanks to all the patients and their families who believed in us, who accompanied us and continue to accompany us.
Thanks to our families for joining us and to support us in this life choice.

REFERENCES:

1. Organización Mundial de la Salud. El VIH: transmisión del VIH a través de la lactancia. Revisión de los conocimientos actuales. Ginebra: OMS; 2004.
2. Organización Panamericana de la Salud, Organización Mundial de la Salud, UNICEF. Diecisiete países y territorios de las Américas habrían eliminado la transmisión de madre a hijo del VIH y la sífilis. Washington, DC: OPS; 2015.
3. Sopeña B. Transmisión vertical del VIH. Servicio de Medicina Interna - Unidad de Enfermedades Infecciosas, Complejo Hospitalario Xeral-Cíes de Vigo.
4. Algoritmos de diagnóstico y tratamiento de infecciones perinatales: VIH, sífilis, VHB y Chagas. (Pliego 1).
5. Organización Mundial de la Salud, Organización Panamericana de la Salud, ONUSIDA, UNICEF. Transmisión del VIH a través de la lactancia: revisión de los conocimientos actuales. Ginebra: OMS; 2004.
6. Organización Mundial de la Salud, UNICEF, ONUSIDA. VIH y alimentación infantil – Actualización. Ginebra: OMS; 2006.
7. Grupo de Trabajo sobre Tratamientos del VIH (gTt-VIH). Lactancia materna y transmisión del VIH. 2017.
8. Alcorn K. Tratamiento del VIH en el embarazo: un estudio de 7 países demuestra que la combinación de tres fármacos es superior para prevenir la infección infantil por el VIH. 25 feb 2015.
9. Grupo de Trabajo sobre Tratamientos del VIH (gTt-VIH). Cada vez más mujeres con el VIH considerarían la lactancia materna como una opción de alimentación para sus bebés. 2021.
10. Cairns G. Alimentación infantil: La mitad de las madres suizas con VIH deciden amamantar a su bebé cuando tienen la opción. 31 oct 2021.
11. Organización Mundial de la Salud, Organización Panamericana de la Salud, UNICEF. Guideline: updates on HIV and infant feeding. Ginebra: OMS; 2016.
12. Grupo de Trabajo sobre Tratamientos del VIH (gTt-VIH). Alta eficacia de cabotegravir inyectable como PrEP en mujeres cis del África subsahariana. 2021.
13. Grupo de Trabajo sobre Tratamientos del VIH (gTt-VIH). Aumenta la preocupación en África por la criminalización de las mujeres con el VIH que dan el pecho a sus bebés. 2022.
14. Grupo de Trabajo sobre Tratamientos del VIH (gTt-VIH). Aumenta la preocupación en África por la criminalización de las mujeres con el VIH que dan el pecho a sus bebés. 2022.
15. Grupo de Trabajo sobre Tratamientos del VIH (gTt-VIH). AIDS 2018: Se detectan dos casos de transmisión del VIH por lactancia de mujeres en tratamiento antirretroviral efectivo.
16. Grupo de Trabajo sobre Tratamientos del VIH (gTt-VIH). AIDS 2018: Se detectan dos casos de transmisión del VIH por lactancia de mujeres en tratamiento antirretroviral efectivo.
17. Grupo de Trabajo sobre Tratamientos del VIH (gTt-VIH). Falta de claridad en las recomendaciones sobre la lactancia materna en mujeres con el VIH y carga viral indetectable.
18. Ministerio de Salud de la Nación Argentina. Recomendaciones sobre VIH y lactancia materna. Buenos Aires: Ministerio de Salud; 2022.
19. Organización Panamericana de la Salud. Situación de la lactancia materna y la transmisión del VIH en América Latina. 1ª ed. México: OPS; 1998. p. 76-77. ISBN 968-5018-08-01.
20. Ávila M, Gazpio M, Liberatore D, Casanueva E, Camarieri G, Libonatti O, et al. Transmisión del HIV-1 a través de la leche materna en Argentina. Medicina (Buenos Aires). 2000;60:302-4.
21. Ministerio de Salud y Acción Social. Secretaría de Programas de Salud Pública. Resolución 105/97: Norma de SIDA en Perinatología. Buenos Aires: MSAS; 1997.
22. Lavarello D, López Papucci S, Acebal S, Anchart E, Calatayud S, Cadoj A, et al. Lactancia y transmisión madre-hijo del VIH en niños nacidos en las Maternidades Municipales de Rosario de 1999 a 2010. Actualizaciones en SIDA. 2012;20(76):52-62.
23. Ziegler JB, Cooper DA, Johnson RO, Gold J. Postnatal transmission of AIDSassociated retrovirus from mother to infant. Lancet. 1985 Apr 20;1(8434):896-8.
24. Davis MK. Leche humana e infección por VIH: datos epidemiológicos y de laboratorio. Adv Exp Med Biol. 1991;310:271-80. doi:10.1007/978-1-46153838-7_36. PMID:1809004.

25. Dunn DT, Newell ML, Ades AE, Peckham CS. Riesgo de transmisión del virus de la inmunodeficiencia humana tipo 1 a través de la lactancia materna. Lancet. 1992 Sep 5;340(8819):585-8.
26. Humphrey J. Comunicación personal, 2002. En: Organización Mundial de la Salud. El VIH: transmisión del VIH a través de la lactancia. Revisión de los conocimientos actuales. Ginebra: OMS; 2004.
27. Nduati R, et al. Effect of breastfeeding and formula feeding on transmission of HIV-1: a randomized clinical trial. JAMA. 2000;283(9):1167-74. / Newell ML. Mother-to-child transmission of HIV: challenges for the future. J Acquir Immune Defic Syndr Hum Retrovirol. 1998;18(3):262-7.
28. Ministerio de Salud de la Nación Argentina (MSN). Actualizaciones sobre VIH y lactancia materna. 2022.
29. Ministerio de Salud del Gobierno de la Ciudad Autónoma de Buenos Aires. Recomendaciones sobre lactancia materna y VIH. Buenos Aires: Ministerio de Salud CABA; 2022.
30. Organización Panamericana de la Salud (OPS). Lineamientos para la prevención de la transmisión maternoinfantil del VIH y la sífilis en América Latina y el Caribe. Washington, DC: OPS; 2017.
31. Organización Mundial de la Salud (OMS). Consolidated guidelines on HIV prevention, testing, treatment, service delivery and monitoring: recommendations for a public health approach. Ginebra: OMS; 2021.
32. Sociedad Argentina de Infectología (SADI). Documento de consenso sobre VIH/SIDA. Buenos Aires: SADI; 2020.
33. Sociedad Argentina de Infectología (SADI). Documento de consenso sobre VIH/SIDA. Buenos Aires: SADI; 2023
34. Sociedad Argentina de Pediatría (SAP). Recomendaciones para el manejo del VIH en pediatría. Buenos Aires: SAP; 2021.
35. De Schacht C, Mabunda N, Ferreira OC Jr, Ismael N, Calú N, Santos I, et al. High HIV incidence in the postpartum period sustains vertical transmission in settings with generalized epidemics: a cohort study in southern Mozambique. J Int AIDS Soc. 2014 Mar 5;17(1):18808.
doi:10.7448/IAS.17.1.18808. PMID:24629842; PMCID:PMC3946505.
36. Ruff y col., 1994; Van de Perre y col., 1993; Nduati y col., 1995; Lewis y col., 1998
37. Featherstone, 1997; Amerongen y col., 1991; Bomsel, 1997