LUMEN ET VIRTUS

Pregnant women living with HIV and children exposed to HIV in Santa Catarina, epidemiological data from 2015 to 2021

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ABSTRACT

Vertical transmission is the transmission of an infection or disease from the mother to her fetus in the womb or newborn during childbirth. The main routes of contagion are pregnancy, childbirth and breastfeeding. To prevent transmission, all pregnant women should be investigated and monitored during the gestational period, at the time of delivery and in the puerperium. The follow-up of pregnant women in prenatal care includes the performance of several laboratory tests to identify the presence of infectious agents of vertical transmission, such as the Human Immunodeficiency Virus (HIV), guiding the treatment of the pregnant woman and avoiding infection of the fetus, also providing guidance on the possibilities of prevention. Considering the high number of HIV cases in the state of Santa Catarina, especially in the Alto Vale Itajaí region, the present study aims to present the epidemiological profile of HIV/AIDS indicators of the population of the state of Santa Catarina, specifically pregnant women and children exposed to HIV, in the period from 2015 to 2021. It is an epidemiological, retrospective, descriptive and analytical study of a historical series, also presenting information on the factors involved in vertical transmission of HIV and prevention strategies. The parameters evaluated in this study, collected from the Epidemiological Indicators Panel of the Department of Chronic Conditions Diseases and Sexually Transmitted Infections, were: number of children exposed to HIV, age of children exposed to HIV, number of HIV-infected pregnant women (GVHIV) and monitoring of these in relation to HIV viral load (CV) and CD4+ T lymphocyte count (CD4+) at the beginning of antiretroviral therapy. Although the systematization of the number of pregnant women with HIV and children exposed to the virus in the state of Santa

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Catarina shows annual differences in the period evaluated, the trend line referring to the number of GVHIV shows a small increase over the years, while the trend line for the number of children exposed to the virus reveals a slight decrease, which can be elucidated by the expansion of the health team and the improvement in surveillance in the prevention of vertical transmission of HIV that has occurred over the years. The percentage of pregnant women with HIV VC lower than 50 copies/mL showed a gradual increase in the years evaluated, while the percentage with VC greater than 50 copies/mL showed a decrease. During the period evaluated in this study, less than 50% of the GVHIV had a CD4+ count and, among these, approximately 20% had CD4+ less than 350 cells/mm³ at the beginning of antiretroviral therapy. Failure to perform CD4+ counts may be related to an increase in the number of pregnant women with a VC of less than 50 copies/mL. Thus, CD4+ counts would be performed primarily in pregnant women with VC greater than 50 copies/mL and part of them with greater depletion of this cell type. In summary, this study shows the evolution of the treatment and follow-up offered to GVHIV and, consequently, to their children. It also reinforces the importance of prevention, diagnosis, treatment and prenatal follow-up strategies.

Keywords: AIDS/HIV, Immune Response, Vertical Transmission.

INTRODUCTION

The Human Immunodeficiency Virus (HIV), belonging to the Retroviridae family, is the cause of the development of Acquired Immunodeficiency Syndrome (AIDS). HIV promotes the production of new viruses in the patient's body from the infection of CD4+ T lymphocytes (CD4+, helpers or *helpers*) and the incorporation of viral genetic material into cellular DNA. These new viruses disrupt lymphocytes, gain blood circulation and are then able to infect new cells. In this process, the depletion of these cells responsible for controlling the immune response occurs, promoting the impairment of the patient's immune system and the development of AIDS (FERREIRA et al., 2010).

HIV incubation, the time from exposure to the virus until the appearance of the first signs of the disease, can vary from 3 to 6 weeks. In addition, the symptoms of acute infection manifest themselves in the form of pseudo-flu syndrome, which is one of the main reasons why most cases are not diagnosed at this stage. In sequence. There is the asymptomatic period, which can last for years, when there is a balanced interaction between cells and the virus, without compromising the defense response. Finally, there is the period in which the immune system is compromised and acts less efficiently due to the reduction in the number of CD4+. In this period, with the failure of immunity, the appearance of opportunistic diseases and the development of AIDS occur (BRASIL, 2022).

Vertical transmission is one of the forms of transmission of the infection, which is characterized when a child is infected by an etiological agent during pregnancy through the placental barrier (intrauterine), during labor (intrapartum) and, in some cases, during breastfeeding (postpartum). When during pregnancy, it can cause major complications to the fetus, such as miscarriage or stillbirth, premature birth, and congenital diseases with impairment of fetal formation (BRASIL, 2022).

Since its identification in 1981, AIDS has become a major milestone in history, moving the scientific community to seek a way to control the epidemic and find a cure. Its rapid spread and great magnitude have made it one of the greatest infectious diseases. Not long after, in 1983, researchers Luc Montaigner, in France, and Robert Gallo, in the USA, managed to isolate HIV-1. Still in the same decade, in 1986, a second etiological agent with characteristics similar to HIV-1, called HIV-2, was identified. Although the origin of the two agents is not yet fully known, it is scientific knowledge that a large family of retroviruses present in non-human primates is related to them, presenting a similar genomic structure and the ability to infect lymphocytes through the CD4 receptor. Based on a 98% similarity between HIV-1 and Simian Immunodeficiency Virus (SIV) – which infects a species of African chimpanzee, it has been suggested that both evolved from a common origin. Due to

this similarity, added to serological studies carried out since the 50s, the African origin of HIV has been accepted by the scientific community (LOPES, G.; CUETO, M., 2024).

It was only in 1987 that the use of zidovudine (or azidothymidine – AZT), the first drug for the treatment of HIV infection, extremely expensive for the time and which had significant toxicity, began. Four years later, Brazil began the free distribution of antiretrovirals to the population through the Unified Health System (SUS) and, in 1995, a new class of antiretrovirals emerged, increasing the treatment options and chances of stabilizing the health of patients with the disease (LOPES, G.; CUETO, M., 2024).

HIV is still a global health problem, causing millions of deaths since its first outbreaks in 1977. In 2020 alone, 141,025 pregnant women living with HIV (GVHIV) were reported in Brazil (2.7 cases/thousand live births), with 29.5% of these notifications registered in the South Region. In the State of Santa Catarina, in the same year, the detection rate of GVHIV was higher than the national rate, corresponding to 5.4 cases/thousand live births. Over a ten-year period, there was a 30.3% increase in the HIV detection rate in pregnant women – part of this increase justified by the improvement in the agility of diagnosis during prenatal care (DIVE, 2021).

Early diagnosis of HIV infection is one of the most important factors in controlling transmission and offering appropriate treatment so that the patient does not progress to AIDS. For this reason, the diagnostic process follows a strict protocol established by the Ministry of Health, involving screening tests (rapid tests 1st, 2nd, 3rd and 4th generation immunoassays) and confirmatory tests (Western blot (WB), Immunoblot (IB) and indirect immunofluorescence) from the preferential collection of venous blood. These tests mostly look for antibodies against HIV produced by the patient. Tests that search for these antibodies together with circulating viral protein p24 are also available, as well as the search for viral genetic material, both of which shorten the immunological window and allow the diagnosis of infection earlier. As well as treatment, the entire diagnostic procedure is offered free of charge by SUS (BRASIL, 2018b).

The risk of mother-to-child transmission of HIV in planned pregnancies, with interventions delivered appropriately during prenatal care, childbirth, and breastfeeding, is reduced to less than 1%. However, without adequate planning and follow-up, this risk is 15% to 45% (BRASIL 2022). Thus, in order to avoid vertical transmission of HIV, pregnant women should be investigated and monitored during prenatal care, at the time of delivery and during the puerperium (BARNHART, 1996; OLIVE TREE; BABY; BRINGEL, 2022). This monitoring aims to identify the presence of infectious agents of vertical transmission, including HIV, guiding the treatment of pregnant women and providing guidance on

prevention strategies (VILHABA et al., 2021). Among the actions that aim to significantly reduce the risk of vertical transmission of HIV, the following stand out: 1) adequate prenatal care by pregnant women; 2) testing for early diagnosis; 3) in confirmed cases of infection, carry out the correct treatment with monitoring by a health professional and with adherence to consultations and treatment (BRASIL, 2022).

The risk of mother-to-child transmission of HIV is determined by maternal VC, ART use during pregnancy, and the relationship between the duration of effective ART use and delivery. The use of ART during pregnancy reduces the rate of mother-to-child transmission of HIV from approximately 30% to less than 1% when maternal VC suppression (<1,000 copies/mL) is achieved (CHAPPELL; COHN, 2014). According to data from the Ministry of Health available on the Epidemiological Indicators Panel of the Department of Chronic Conditions Diseases and Sexually Transmitted Infections, GVHIV are categorized into three groups: experienced (using ART) before pregnancy; experienced (using ART) during childbirth; and not experienced (without ART treatment) at delivery (BRASIL, 2023).

Prenatal care should be carried out in monthly consultations until the 28th week, biweekly consultations from the 28th to the 36th week, weekly consultations from the 36th week until birth. In the puerperium, the recommendation is for the first consultation until the 10th day postpartum and the second consultation between the 30th and 40th days postpartum. In each of these consultations, there is a list of exams and procedures to be requested and performed, in order to monitor and diagnose the health condition of the pregnant and postpartum women, in addition to guiding the treatment if necessary (SECRETARIA DE ESTADO DA SAÚDE, 2022). In these meetings, the pregnant woman also receives guidance on the possibilities of disease prevention, if she is susceptible to contracting it (VILHABA et al., 2021).

In Brazil, treatment with Antiretroviral Therapy (ART) for HIV is available free of charge by the SUS to every infected individual with a confirmed diagnosis. According to the Clinical Protocol and Therapeutic Guidelines for the Prevention of Vertical Transmission of HIV, Syphilis and Viral Hepatitis, the use of HIVGVIS is recommended for ART throughout the gestational period, whose choice of medication considers the autonomy of the woman, informing her about the available options and proposing an appropriate antiretroviral regimen to control the infection and reduce the HIV viral load (CV) (LOPES, G.; CUETO, M., 2024).

The choice of mode of delivery also requires attention to reduce the risk of mother-to-child transmission of HIV. GVHIV with unknown VC or >1,000 copies/mL after 34 weeks of gestation has the recommendation of elective cesarean delivery from the 38th week of

gestation, requiring the application of intravenous AZT at least three hours before the procedure and maintained until umbilical cord ligation, avoiding bleeding as much as possible and, whenever possible, keeping the amniotic membranes intact until the child is removed (pellicated delivery). GVHIV using ART and who have sustained undetectable VC have vaginal delivery as an additional option. Likewise, those with VC <1,000 copies/mL are also indicated for vaginal delivery, as long as they have no obstetric contraindication and receive intravenous AZT, and all invasive procedures during labor are also contraindicated, such as: amniotomy (artificial rupture of the ovular membranes through a sterile instrument inserted into the cervix through vaginal touch), use of forceps and vacuum-extractor (BRASIL, 2022).

ART as prophylaxis for the newborn should be started as early as possible after birth, preferably in the first four hours of life for the effectiveness of the measure. Children in the low-risk group, those whose mothers are on ART during pregnancy and have undetectable VC from the 28th week onwards and have not had failed adherence to ART, receive prophylaxis containing only AZT for 28 days. For children at high risk of exposure, the prophylactic regimen consists of three antiretrovirals: AZT, lamivudine (3TC) and raltegravir (RAL), also administered for 28 days. In addition, VC is indicated for monitoring and complete blood count of the child at the beginning and end of treatment, due to the probability of occurrence of anemia and macrocytosis, neutropenia with lymphopenia and thrombocytopenia due to the use of AZT. Follow-up should be monthly for the first six months and at least bimonthly from the 1st year of life (BARNHART et al., 1996; BRAZIL, 2023a).

Approved by the National Health Surveillance Agency (Anvisa), since December 2023, the drug Dovato started to be distributed by SUS to patients with HIV. Being a combination of two drugs, dolutegravir and lamivudine, it is indicated as a complete regimen for the treatment of HIV type 1 infection in adults and adolescents over 12 years of age weighing at least 40 kg without a history of antiretroviral treatment. The new drug will be a great help in improving patients' adherence to treatment, reducing the number of pills to be taken daily (PIMENTEL, 2024).

The Ministry of Health contraindicates the practice of breastfeeding when the postpartum woman is a carrier of HIV, as it can pose a risk of transmission of the virus. In this case, lactation inhibition is done with cabergoline and the exposed child, infected or not, will be entitled to receive infant milk formula at least until he or she is six months old, free of charge through the SUS. The Ministry of Health also contraindicates cross-breastfeeding (breastfeeding of the child by another nursing mother), mixed feeding (human

milk and infant formula) and the use of human milk with home pasteurization (BENZAKEN, 2019; BRAZIL, 2023a).

Vertical transmission of HIV involves factors that support the importance of early diagnosis of infected pregnant women and that should be associated with appropriate clinical, obstetric and multidisciplinary follow-up. The use of antiretrovirals by pregnant women in prenatal care, the duration of antiretroviral use and its intrapartum use, among others, are factors that have been negatively associated with vertical transmission of HIV. The management of these factors, in the form of preventive measures such as access to health services in the prenatal, intrapartum and postpartum periods, added to the increase in the coverage of actions to prevent horizontal and vertical transmission of HIV, can contribute to the reduction of HIV contamination (OLIVEIRA; BABY; BRINGEL, 2022).

The State of Santa Catarina is located in the South region, with 295 municipalities. It has an area of 95,737.954 km² and is bordered by Paraná, Rio Grande do Sul, the Atlantic Ocean and the Argentine province of Misiones (SANTA CATARINA, 2017). The estimated population of the state in 2022 is 7,609,601 people, with a demographic density of 79.49 inhabitants/km², an average human development index (HDI) of 0.792 and a monthly household income per capita of around R$ 2,018.00 (IBGE, 2022).

In this context, the present study evaluated the epidemiological profile of pregnant women living with HIV and children exposed to the virus in the state of Santa Catarina, from 2015 to 2021, observing the representativeness of HIV infection in these populations.

MATERIAL AND METHODS

This is an epidemiological, retrospective, descriptive and analytical study of a historical series, which addresses the epidemiological profile of HIV/AIDS indicators and clinical data of the population of the state of Santa Catarina, specifically pregnant women and children exposed to HIV, in the period from 2015 to 2021. Because this was a study with secondary, aggregated data, without identifiers and available for public access, it was not necessary to submit the research project to an Ethics Committee for Research involving Human Beings.

The population included in this study includes all cases of pregnant women and children exposed to HIV registered in the State of Santa Catarina from 2015 to 2021. Data were collected from the Epidemiological Indicators Panel of the Department of Chronic Conditions Diseases and Sexually Transmitted Infections (DCCI) (BRASIL, 2023b). The Panel uses as a data source the compulsory notifications in the Notifiable Diseases Information System (SINAN), the case records in the Laboratory Tests Control System

(SisCEL) and in the Medicines Logistics Control System (SiCLOM), the data obtained in the Mortality Information System (SIM). Population data were obtained from the demographic censuses of the Brazilian Institute of Geography and Statistics (IBGE, 2022).

The parameters evaluated in this study were: number of children exposed to HIV, age of children exposed to HIV, number of HIV-infected pregnant women (GVHIV) and monitoring of these in relation to VC and CD4+ count at the beginning of antiretroviral therapy and/or pregnancy. A child exposed to HIV is understood to be any child born to a woman living with HIV (exposed to HIV during pregnancy or childbirth), or who has been breastfed by a woman infected with HIV.

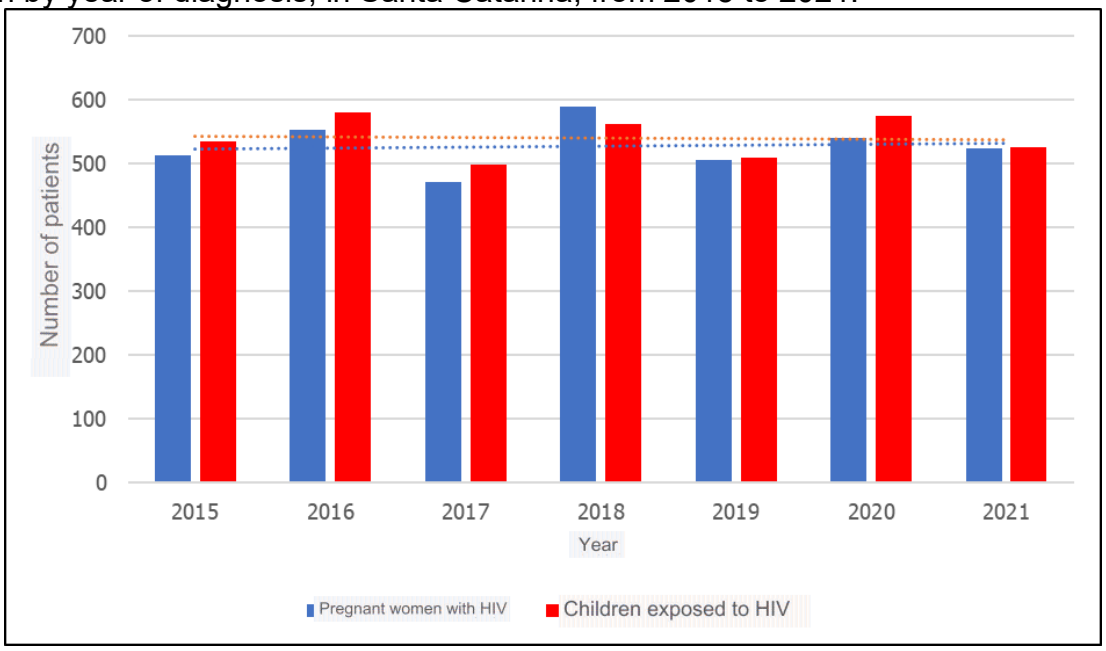
The data were tabulated and presented in graphs developed in Microsoft Excel® software, according to descriptive statistics and using percentage results and number of patients. To support the data analysis, a literature search was conducted on HIV in pregnancy and the vertical transmission of this infection, in order to improve and expand knowledge on the subject, especially with regard to the recommendations of the Ministry of Health.

RESULTS AND DISCUSSION

Monitoring by a health team throughout the pregnancy period is essential for the control of the health of GVHIV, as well as for the prevention of transmission of the virus to newborns (SECRETARIA DE ESTADO DA SAÚDE, 2022). It should be noted that the antiretroviral therapy offered to GVHIV during prenatal care is capable of providing a safer pregnancy, and can reduce vertical transmission rates to practically zero, as long as there is adherence and maintenance of treatment throughout pregnancy (BRASIL, 2022; BRAZIL, 2023a; BRAZIL, 202d; BRAZIL, 2023e).

Although the systematization of the number of GVHIV and children exposed to the virus in the State of Santa Catarina made available in the Epidemiological Indicators Panel of the Department of Chronic Diseases and Sexually Transmitted Infections shows annual differences in the period evaluated, the trend line referring to the number of GVHIV shows a small increase over the years, while the trend line for the number of children exposed to the virus practically remained unchanged, with only a slight decrease. The annual figures reveal the number of children exposed to HIV close to the number of GVHIVs, always slightly higher – except in 2018 when the number of children exposed to HIV was slightly lower than the number of GVHIVs (Figure 1).

Figure 1. Number of HIV-infected pregnant women by year of delivery and HIV-exposed children by year of diagnosis, in Santa Catarina, from 2015 to 2021.



Source: Epidemiological Indicators Panel of the Department of Chronic Conditions Diseases and Sexually Transmitted Infections (BRASIL, 2023b).

According to data from the Department of Chronic Conditions Diseases and Sexually Transmitted Infections (2020), the expansion of the health team and the improvement in prenatal services and surveillance in the prevention of vertical transmission of HIV may explain the small increase in the HIV detection rate in pregnant women. Consequently, it is expected that the number of children exposed to the virus will always remain close to that of GVHIV (Figure 1).

At the same time, the number of children effectively infected with HIV has shown a decrease in the State of Santa Catarina (BRASIL, 2023c), precisely due to the application of the Clinical Protocol and Therapeutic Guidelines for the Prevention of Vertical Transmission of HIV, Syphilis, and Viral Hepatitis (BRASIL, 2022). It is noteworthy that the early diagnosis of HIV-infected children by vertical transmission is essential for the initiation of ART, the prophylaxis of opportunistic infections, and the management of infectious complications and nutritional disorders, as the progression of the disease is faster due to immunological immaturity (TOBIN; ALDROVANDI, 2013). For this reason, the detection of VC in newborns of HIV-positive mothers is recommended in the first hours of life for the diagnosis of the infection, preferably before the first dose of prophylaxis (BRASIL, 2023a).

The risk of HIV transmission to the baby also occurs in the puerperal period, through breastfeeding in cases of pregnant women infected at the end of pregnancy or in the postpartum period, as well as by those who did not maintain adherence to antiretroviral therapy. This reinforces the importance of monitoring the postpartum woman and the baby

in the postpartum period, aiming to reinforce preventive measures (BRASIL, 2022; BRAZIL, 2023a; BRAZIL 2023d). Effective prenatal care presupposes the notification of children exposed to HIV, primarily before the newborn is 7 days old. As shown in Table 1, the absolute majority of cases of children exposed to HIV were younger than 7 days old (96.5%).

Table 1. Percentage distribution (%) of cases of exposed children according to age and year of diagnosis in Santa Catarina, 2015-2021.

AGE	Total	2015	2016	2017	2018	2019	2020	2021
Less than 7 days	96,5	95,9	95,7	97,6	95,7	96,5	97,2	96
7 to 27 days	1,7	2,6	2,1	1,4	1,8	1,4	1,4	1,3
28 to 364 days	1,4	0,9	1,9	0,6	2	1,8	0,7	1,9
More than 1 year	0,4	0,6	0,3	0,4	0,5	0,3	0,7	0,8

Source: Epidemiological Indicators Panel of the Department of Chronic Conditions Diseases and Sexually Transmitted Infections (BRASIL, 2023b).

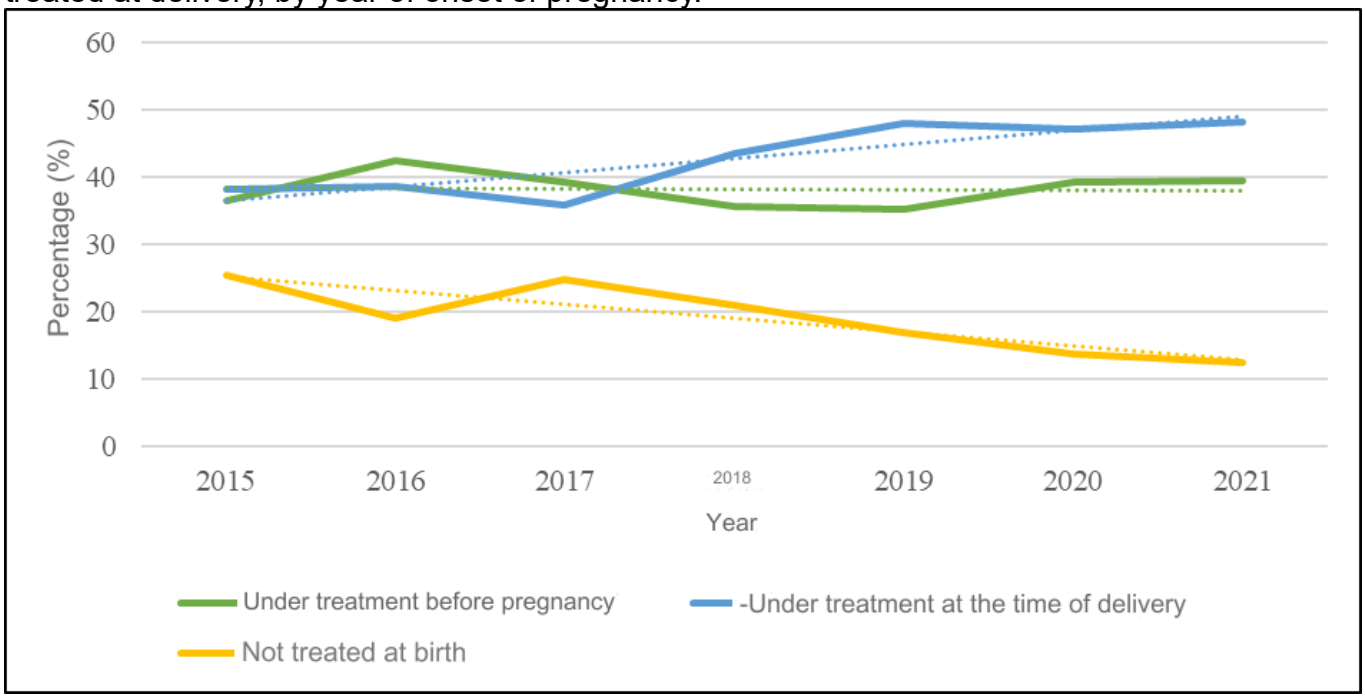
Although less frequent today, the risk of vertical transmission of HIV still exists (BRASIL, 2018a). The significant reduction in the number of cases of vertical transmission in Brazil in recent years (BRASIL, 2023c), leads health professionals to identify children exposed to HIV more frequently than children with HIV infection or AIDS (BRASIL, 2023a; BRAZIL, 2023c). In Santa Catarina, from 2015 to 2021, the number of GVHIV and children identified with exposure to the virus (Figure 1), especially in children under 7 days old (Table 1) and data from the latest Epidemiological Bulletin of HIV and ADIS, from 2023 (BRASIL, 2023c), reinforce the importance of preventive measures in the gestational, childbirth, and puerperium periods in order to prevent vertical transmission of HIV. On the other hand, carelessness with such measures can result in an increase in the number of cases of vertical transmission and the identification of children exposed to HIV, which commonly occurs in cases of women who did not maintain adherence to antiretroviral treatment or who were previously seronegative and were exposed to the virus in the postpartum period, or who were breastfed (BRASIL, 2022).

It should be noted that vertical transmission of HIV is a health problem that is being eliminated in Brazil (UNAIDS, 2014) and that its control occurs through compulsory notification. Thus, the underreporting of cases has important implications for the response to HIV/AIDS in the population of children and adolescents, as it reflects negatively on surveillance actions such as budget programming, compromising the rationalization of the system for the continuous supply of medicines, laboratory services and care, as well as on the monitoring of risk factors involved in vertical transmission of HIV and in AIDS morbidity and mortality (BRASIL, 2023a).

The laboratory approach at the beginning of the clinical-obstetric follow-up of GVHIV aims to assess the general health condition of the woman and identify the status of HIV infection, identifying the immunological (CD4+ quantification) and initial virological (VC) status, as well as the presence of comorbidities and factors that may interfere with the evolution of the pregnancy. Likewise, prenatal care also helps in the diagnosis of pregnant women who were unaware they were HIV carriers. VC is one of the most relevant factors associated with the risk of vertical transmission of HIV, it helps in the follow-up and definition of the mode of delivery (BRASIL, 2022). This is because there is a direct relationship between high VC (higher viremia) and a higher probability of contagion of the fetus and newborn, as well as between the increase in VC and the speed with which the infection progresses (BRASIL, 2022).

In the state of Santa Catarina, the percentage of GVHIV who underwent treatment at the time of delivery has been increasing, with a significant decrease over the years of GVHIV without the use of ART at the time of delivery (Figure 2). These data reveal that the diagnosis of HIV infection occurred primarily during pregnancy, or occurred during it, enabling the treatment of GVHIV and contributing to the reduction in the number of cases of HIV-infected children. This is due to greater access to the diagnosis of HIV infection (BRASIL, 2018b), as well as unrestricted access to ART treatment from the moment of diagnosis of the infection (BRASIL, 2023a; BRAZIL, 2023c; BRAZIL, 2023d).

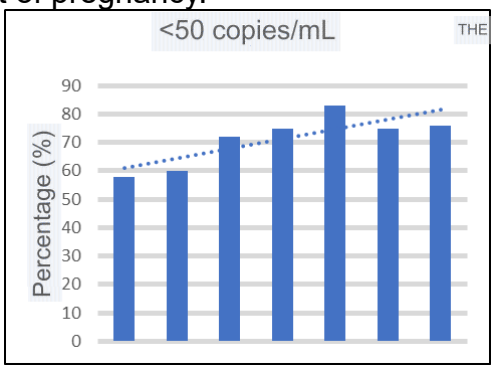
Figure 2. Distribution (%) of HIV-infected pregnant women in Santa Catarina, on treatment with antiretroviral therapy before pregnancy, on treatment at the time of delivery and not treated at delivery, by year of onset of pregnancy.

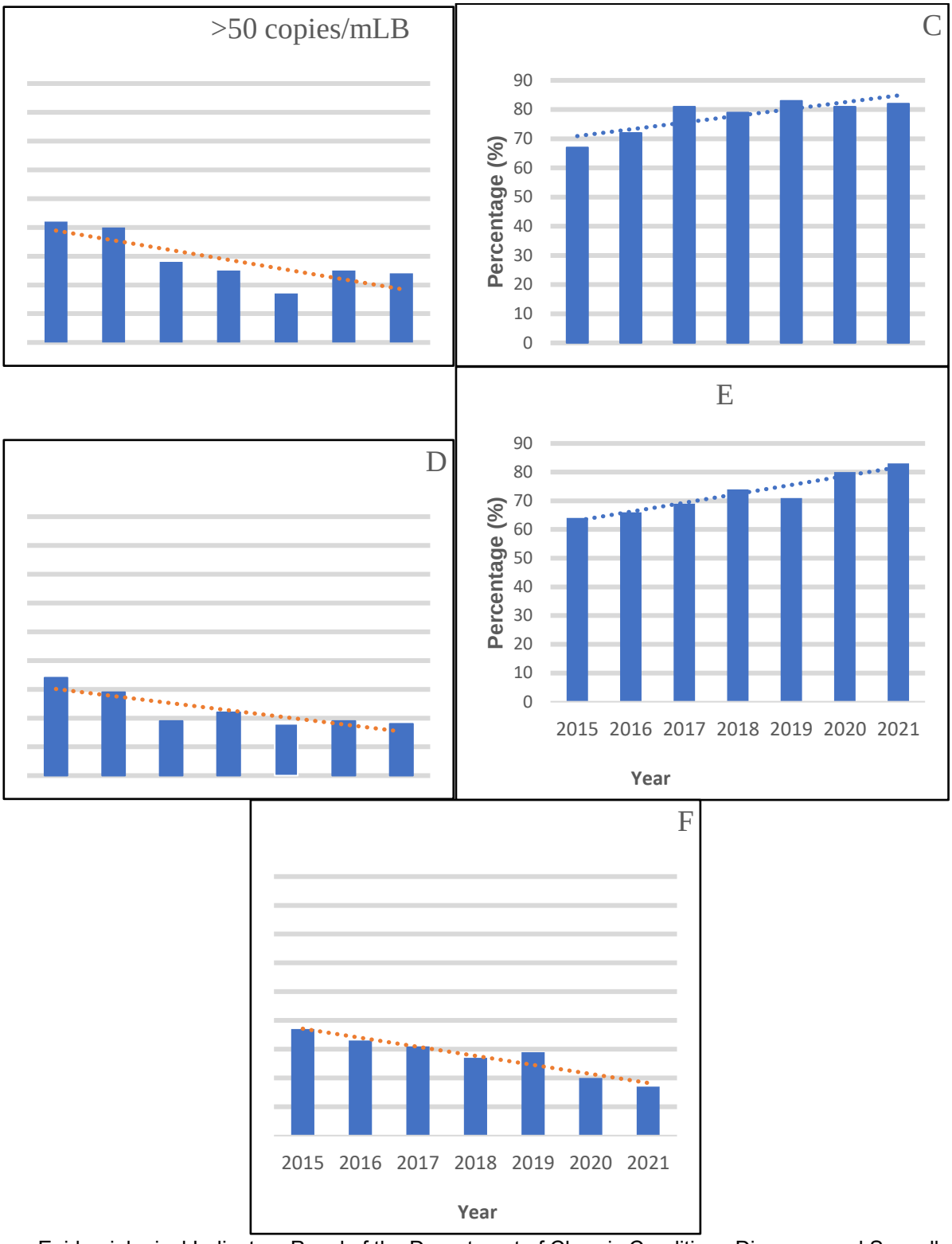


Source: Epidemiological Indicators Panel of the Department of Chronic Conditions Diseases and Sexually Transmitted Infections (BRASIL, 2023).

In the follow-up of GVHIV, at least three VC tests are recommended: at the first prenatal visit, to establish the magnitude of viremia; four weeks after the introduction or change of ART, to assess the response to treatment and at the 34th week of gestation and to indicate the mode of delivery. Requesting VC at any time is also recommended when there are doubts about adherence to ART (BRASIL, 2022). Figure 3 shows a percentage of GVHIV in the state of Santa Catarina treated with ART before pregnancy, with a VC greater than 50 copies/mL (B) slightly higher than pregnant women treated with ART at the time of delivery (D) or those without treatment (F). The lack of adherence to antiretroviral therapy of these women with HIV and the monitoring of treatment prior to pregnancy may explain this finding.

Figure 3. Distribution (%) of HIV-infected pregnant women in Santa Catarina, on antiretroviral therapy before pregnancy (A and B), at the time of delivery (C and D) and untreated (E and F), according to viral load (<50 copies/mL – A, C and E; >50 copies/mL – B, D and F), by year of onset of pregnancy.





Source: Epidemiological Indicators Panel of the Department of Chronic Conditions Diseases and Sexually Transmitted Infections (BRASIL, 2023).

According to data from the Manual for the Continuous Care of People Living with HIV/AIDS, adherence to treatment by HIV-positive pregnant women is essential for the successful prevention of vertical transmission. However, there are some factors that can hinder this adherence, such as: complexity of the therapeutic regimen; the lack of affective support (paternal or family); non-acceptance of the diagnosis, as the performance of

treatment is seen as acknowledging that HIV infection is real; presence of mental disorders; among others. Thus, there are many factors that can delay the start of ART and that need to be identified and understood by the health team, in order to define a more assertive approach for each case. To facilitate adherence to ART, this approach should help the patient to understand the disease that affects her and to understand the proposed therapy, personalized according to her needs and difficulties (BRASIL, 2023d).

Maintaining adherence to ART requires health professionals to be attentive and to carry out interventions with those patients who have irregular withdrawal of medication, since in this case the chance of effectiveness in relation to maintaining adherence is usually greater than after abandonment has occurred. Adhesion actions can be carried out through welcoming, individual or collective listening, individual care, face-to-face or virtual groups, articulation with civil society organizations and intersectoral networks (especially with social assistance services), among other ways that can be organized in the territory, according to the demands and needs of each context and each user (BRASIL, 2023d).

Figure 3 also shows the gradual increase over the years in the percentage of GVHIV presenting VC below 50 copies/mL, regardless of category, having been treated with ART before pregnancy (A), during delivery (C) or not undergoing treatment (E). As an expected consequence, proportionally there is a gradual decrease in the percentage of GVHIV with VC greater than 50 copies/mL, also unrelated to the category (Figure 3 B, D and F). This can be justified by the improvements implemented in prenatal care plans, in addition to the population's greater awareness of HIV infection and its implications. It should be noted that a VC of less than 50 copies/mL classifies the individual as a non-transmitter, which is the objective of antiretroviral therapy (BRASIL, 2022).

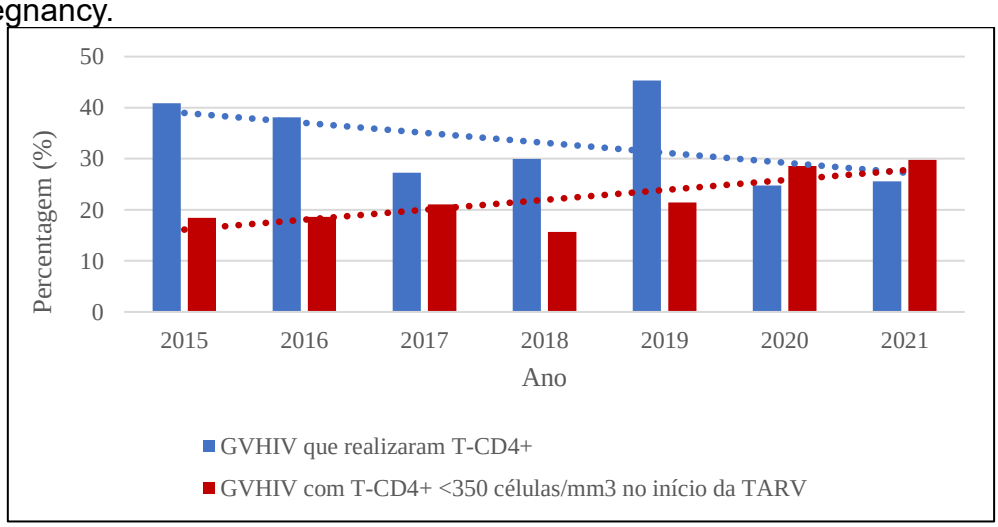
The identification of the immunological status of GVHIV by means of CD4+ counts should be performed at the first prenatal visit and at least every three months during pregnancy – for pregnant women starting treatment. For the clinical follow-up of pregnant women using ART and with undetectable VC, it is indicated that the CD4+ count together with VC be performed at the first visit and at the 34th week of gestation. Also, a minimum number of 6 (six) prenatal consultations is recommended, with the first consultation ideally carried out in the 1st trimester of pregnancy (BRASIL, 2022; BRAZIL, 2023a).

A CD4+ count within normal values indicates a better prognosis of the disease and efficacy of ART. On the other hand, a low CD4+ count is associated with an increase in VC and, therefore, signals a worse prognosis, low effectiveness of ART with the possibility of severe disease and the development of AIDS. This situation represents risks for both those involved, pregnant woman and fetus, requiring greater urgency in the initiation or

management of treatment with antiretrovirals, in order to avoid opportunistic infections and the development of AIDS (BRASIL, 2022).

Figure 4 shows the data related to the CD4+ count in GVHIV in the State of Santa Catarina, showing that the percentage of GVHIV who undergo the test has decreased over the years. In the period from 2015 to 2021, less than 50% of GVHIV had a CD4+ count, of which approximately 20% had CD4+ less than 350 cells/mm³ at the beginning of antiretroviral therapy, a condition that indicates a worse prognosis and faster progression of the disease. According to data provided by the Ministry of Health, the CD4+ T-cell count test does not need to be requested if the patient's clinical situation presents three conditions: she is using ART; is asymptomatic; and have an undetectable VC. This is because, under these conditions, the pregnant woman has effective viral suppression, which is also an indication of the proper functioning of the immune system (BRASIL, 2022). Thus, with the decrease in the number of GVHIV with VC greater than 50 copies/mL (Figure 3 B, D and F), it is expected that the number of pregnant women who needed to undergo CD4 counts will also decrease. In Santa Catarina, from December 2019 to March 2024, the Panel of Pregnant Women with HIV Viral Load revealed that, among the number of GVHIV with VC greater than 50 copies/mL, 74% had VC greater than 1,000 copies/mL, 79% were on ART, and 74% had CD4+ <350 cells/mm3 (BRASIL, 2024), confirming that a higher VC corresponds directly to a lower number of CD4+ cells.

Figure 4. Percentage (%) of pregnant women living with HIV (GVHIV) who had CD4+ and CD4+ GVHIV counts <350 cells/mm3 at the start of antiretroviral therapy (ART) in Brazil, by year of pregnancy.



Source: Epidemiological Indicators Panel of the Department of Chronic Conditions Diseases and Sexually Transmitted Infections (BRASIL, 2023).

Currently, Brazil has several strategies aimed at combating AIDS, such as national campaigns focused on the prevention of the disease. HIV Post-Exposure Prophylaxis (PEP)

is the best known in this area, aimed at people who have experienced a risk situation, such as having had unprotected sex or sharing syringes. If the risky sexual exposure has occurred less than 72 hours ago, the individual can go to a public network unit or Testing and Counseling Center (CTA), where the diagnosis of HIV infection is made from blood collection or oral fluid. Laboratory tests and rapid tests can detect antibodies against HIV in about 30 minutes. In addition, behavioral interventions are used, such as encouraging the use of condoms and counseling about HIV/AIDS and other STIs, contributing to the increase of information and knowledge about the real risk of exposure to HIV. At the same time, in order to reduce the risk of acquiring HIV infection, HIV Pre-Exposure Prophylaxis (PrEP) is offered, which consists of the use of ART. Focused on treatment, Brazil, since 1996, has offered free ART to all people living with HIV who need treatment. Currently, there is a list of 22 drugs offered, including: Darunavir, Enfuvirtide, Lamivudine, and Zidovudine (BRASIL, 2022).

At the global level, one of the most relevant strategies to combat HIV includes the Joint United Nations Programme on HIV/AIDS (UNAIDS), launched in 2014. The Program is a set of goals for confronting the HIV epidemic by 2020, known as the 90-90-90 Goals and which are part of the Paris Declaration, signed by Brazil, through which the signatory countries commit to contribute to the fight against the epidemic. The 90-90-90 targets aim to achieve that 90% of people living with HIV are diagnosed, that 90% of people diagnosed are on treatment, and that 90% of people on treatment achieve the condition of undetectable viral load (<1,000 copies/mL) (UNAIDS, 2014). The implementation of the 90-90-90 Targets was considered a successful strategy to maximize testing and expand access to ART for people living with HIV/AIDS, which led to the update of the targets for the end of the year 2025, with an increase from 90% to 95% in the three categories. In addition, people-centred approaches have also been adopted to support the achievement of the goals (UNAIDS, 2021).

CONCLUSION

The set of data obtained from the Epidemiological Indicators Panel of the Department of Chronic Conditions Diseases and Sexually Transmitted Infections and analyzed shows a slight increase in the number of GVHIV over the years, with the number of children exposed to the virus practically unchanged and notified primarily before the newborn completes 7 days. In general, there is control in vertical transmission of HIV in the State of Santa Catarina, with a significant decrease over the years of GVHIV without treatment with ART at the time of delivery due to the diagnosis of the infection prior to

pregnancy or during pregnancy. As a result, it was possible to carry out the appropriate treatment of GVHIV, which reflected in the decrease in the percentage of pregnant women with VC greater than 50 copies/mL and CD4+ less than 350 cells/mm³. These findings reinforce the success of the implementation of strategies for access to diagnosis and ART in the state and in Brazil, both for people living with HIV and for GVHIV and their newborns, directly impacting the vertical transmission of the virus.

REFERENCES

1. Barnhart, H. X., Caldwe, L. L. M. B., Thomas, P., et al. (1996). Natural history of human immunodeficency virus disease in perinatally infected children: an analysis from the Pediatric Spectrum of Disease Project. *Pediatrics, 97*, 710-716.

2. Benzaken, A. (2019). O que você precisa saber sobre o HIV e a amamentação cruzada. Disponível em: https://www.ufpb.br/saehu/contents/noticias/o-que-voce-precisa-saber-sobre-o-hiv-e-a-amamentacao-cruzada. Acesso em: 25 mar. 2023.

3. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Ações Programáticas Estratégicas. (2018a). *Política Nacional de Atenção Integral à Saúde da Criança: orientações para implementação*. Disponível em: https://portaldeboaspraticas.iff.fiocruz.br/wp-content/uploads/2018/07/Pol%C3%ADticaNacional-de-Aten%C3%A7%C3%A3o-Integral-%C3%A0-Sa%C3%BAde-daCrian%C3%A7a-PNAISC-Vers%C3%A3o-Eletr%C3%B4nica.pdf. Acesso em: 14 mar. 2024.

4. Brasil. Ministério da Saúde. Secretaria de Ciência, Tecnologia e Inovação e do Complexo Econômico-Industrial da Saúde – SECTICS. Departamento de Gestão e Incorporação de Tecnologias em Saúde – DGITS. Coordenação-Geral de Gestão de Protocolos Clínicos e Diretrizes Terapêuticas – CGPCDT. Coordenação Geral de Vigilância do HIV/AIDS e Hepatites Virais – AHV/DATHI/SVSA/MS. (2023a). *Protocolo Clínico e Diretrizes Terapêuticas Manejo da Infecção pelo HIV em Crianças e Adolescentes, Módulo 1 - Diagnóstico, manejo e acompanhamento de crianças expostas ao HIV: Relatório de Recomendação*. Disponível em: https://www.gov.br/conitec/pt-br/midias/relatorios/2023/RR_PCDTHIVCrianasmdulo1_Final.pdf. Acesso em: 14 mar. 2024.

5. Brasil. Ministério da Saúde. Secretaria de Ciência, Tecnologia, Inovação e Insumos Estratégicos em Saúde. Secretaria de Vigilância em Saúde. (2022). *Protocolo Clínico e Diretrizes Terapêuticas para Prevenção da Transmissão Vertical do HIV, Sífilis e Hepatites Virais*. 2. ed. Brasília: Ministério da Saúde. Disponível em: https://bvsms.saude.gov.br/bvs/publicacoes/protocolo_clinico_hiv_sifilis_hepatites.pdf. Acesso em: 01 dez. 2022.

6. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde e Ambiente. Departamento de HIV/AIDS, Tuberculose, Hepatites Virais e Infecções Sexualmente Transmissíveis. (2023b). *Painel de Indicadores Epidemiológicos do Departamento de Doenças de Condições Crônicas e Infecções Sexualmente Transmissíveis (DCCI)*. Disponível em: https://indicadores.aids.gov.br/index.php. Acesso em: 02 ago. 2023.

7. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde e Ambiente. Departamento de HIV/AIDS, Tuberculose, Hepatites Virais e Infecções Sexualmente Transmissíveis. (2023c). *Boletim Epidemiológico: HIV e Aids 2023*. Disponível em: https://www.gov.br/aids/pt-br/central-de-conteudo/boletins-epidemiologicos/2023/hiv-aids/boletim-epidemiologico-hiv-e-aids-2023.pdf/@@download/file. Acesso em: 14 mar. 2024.

8. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde e Ambiente. Departamento de HIV/Aids, Tuberculose, Hepatites Virais e Infecções Sexualmente Transmissíveis. (2023d). *Manual do cuidado contínuo das pessoas vivendo com HIV/Aids*. Disponível

em: https://www.gov.br/aids/pt-br/central-de-conteudo/publicacoes/2023/manual-do-cuidado-continuo-das-pessoas-vivendo-com-hivaids-atual. Acesso em: 10 mar. 2024.

9. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde e Ambiente. Portal de Boas Práticas em Saúde da Mulher, da Criança e do Adolescente. (2023e). *Principais Questões sobre HIV e Gestação*. Disponível em: https://portaldeboaspraticas.iff.fiocruz.br/atencao-mulher/principais-questoes-sobre-hiv-e-gestacao/#:~:text=O%20n%C3%BAmero%20de%20gestantes%20vivendo,HIV%20na%20gesta%C3%A7%C3%A3o%20tem%20diminu%C3%ADdo. Acesso em: 10 mar. 2024.

10. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Vigilância, Prevenção e Controle das Infecções Sexualmente Transmissíveis, do HIV/Aids e das Hepatites Virais. (2018b). *Manual Técnico para o Diagnóstico da Infecção pelo HIV em Adultos e Crianças*. 4. ed. Brasília: Ministério da Saúde. Disponível em: https://www.gov.br/aids/pt-br/centrais-de-conteudo/publicacoes/2018/manual_tecnico_hiv_27_11_2018_web.pdf/@@download/file/manual_tecnico_hiv_27_11_2018_web.pdf. Acesso em: 28 mar. 2023.

11. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de HIV/AIDS, Tuberculose, Hepatites Virais e Infecções Sexualmente Transmissíveis. (2024). *Painel de gestantes com carga viral de HIV detectável*. Disponível em: https://www.gov.br/aids/pt-br/indicadores-epidemiologicos/paineis-de-indicadores-e-dados-basicos/painel-de-gestantes-com-carga-viral-de-hiv-detectavel. Acesso em: 11 mar. 2024.

12. Chappell, C. A., & Cohn, S. E. (2014). Prevention of Perinatal Transmission of Human Immunodeficiency Virus. *Infectious Disease Clinics of North America, 28*(4), 529-547. Disponível em: http://dx.doi.org/10.1016/j.idc.2014.08.002. Acesso em: 08 mar. 2024.

13. DIVE. Gerência de IST, HIV/AIDS e Doenças Infecciosas Crônicas (GEDIC). (2022). *Barriga Verde - Informativo Epidemiológico: AIDS 2021*. Disponível em: https://www.dive.sc.gov.br/phocadownload/boletim-barriga-verde/HIV-AIDS/boletim-barriga-verde-aids-2021.pdf. Acesso em: 24 mar. 2023.

14. Ferreira, R. C. S., Riffel, A., & Sant'Ana, A. E. G. (2010). HIV: mecanismo de replicação, alvos farmacológicos e inibição por produtos derivados de plantas. *Química Nova*, 1743-1755. Disponível em: https://doi.org/10.1590/S0100-40422010000800023. Acesso em: 23 mar. 2023.

15. IBGE. (2022). *Cidades e Estados: Santa Catarina*. Disponível em: https://cidades.ibge.gov.br/brasil/sc/panorama. Acesso em: 08 ago. 2023.

16. Lopes, G., & Cueto, M. (2024). *Uma História Global e Brasileira da Aids, 1986-2021*. 1. ed. Rio de Janeiro: Editora Fiocruz.

17. Oliveira, M. J. A. F., Barros, C. R. S., & Bringel, K. (2022). Fatores associados à transmissão vertical do HIV em pacientes assistidas em um serviço de referência na Paraíba: um estudo caso-controle. *Brazilian Journal of Development, 8*(2), 12495-12514. Disponível em: https://ojs.brazilianjournals.com.br/ojs/index.php/BRJD/article/view/44242. Acesso em: 02 dez. 2022.

18. Pimentel, C. (2024). Government distributes new drug for HIV patients. *Agência Brasil*. Disponível em: https://agenciabrasil.ebc.com.br/en/saude/noticia/2024-01/government-distributes-new-drug-hiv-patients. Acesso em: 02 mai. 2024.

19. SECRETARIA DE ESTADO DA SAÚDE. Governo de Santa Catarina. Comissão Intergestores Bipartite. Deliberação 198/CIB/2021 - Retificada em 26.05.2022. Santa Catarina: 2022a. Disponível em: https://www.saude.sc.gov.br/index.php/informacoes-gerais-documentos/redes-de-atencao-a-saude-2/rede-aten-a-saude-materna-e-infantil-rede-cegonha/deliberacoes-1/20047-deliberacao-cib-198-2021-retificada-em-26-05-2022-instrumento-de-estratificacao-de-risco-gestacional/file. Acesso em: 23 abr. 2023.

20. SOUZA, M. T.; SILVA, M. D.; CARVALHO, R. Revisão integrativa: o que é e como fazer. Einstein, v. 8, p. 102-6, 2010. Disponível em: https://journal.einstein.br/wp-content/uploads/articles_xml/1679-4508-eins-S1679-45082010000100102/1679-4508-eins-S1679-45082010000100102-pt.pdf?x56956. Acesso em: 02 nov. 2022.

21. TOBIN, N. H.; ALDROVANDI, G. M. Immunology of pediatric HIV infection. Immunol Rev., v. 254, n. 1, p. 143-69, 2013. Disponível em: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3737605/pdf/nihms467859.pdf. Acesso em: 12 mar. 2024.

22. UNAIDS. United Nations Programme on HIV/AIDS. 90-90-90: uma meta ambiciosa de tratamento para contribuir para o fim da epidemia de AIDS. Geneva: Unaids, 2014. Disponível em: https://www.unaids.org/sites/default/files/media_asset/90-90-90_en.pdf. Acesso em: 10 mar. 2024.

23. UNAIDS. United Nations Programme on HIV/AIDS. Confronting inequalities: lessons for pandemic responses from 40 years of AIDS. Global AIDS Update 2021. Geneva: Unaids, 2021. Disponível em: https://www.unaids.org/sites/default/files/media_asset/2021-global-aids-update_en.pdf. Acesso em: 11 mar. 2024.

24. VILHABA, J. J. et al. Transmissão vertical do HIV e pré-natal: uma revisão de literatura. Revista Cereus, v. 13, n. 1, p. 32-39, 2021. Disponível em: http://www.ojs.unirg.edu.br/index.php/1/article/view/3313. Acesso em: 02 dez. 2022.