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Rev Chil Pediatr. 2020;91(5):672-683
DOI: 10.32641/rchped.v91i5.1784

CLINICAL OVERVIEW

Prevention of vertical transmission of HIV in international migrant women: Current scenario and challenges

Prevención de la transmisión vertical de VIH en mujeres migrantes internacionales: Escenario actual y desafíos

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Received: February 10, 2020; Approved: July 15, 2020

What do we know about the subject matter of this study?

Preventing vertical transmission of HIV in pregnant migrants is both a national and international priority. Efforts of different social and health sectors have tried to contribute to solving this problem in order to meet global health goals.

What does this study contribute to what is already known?

This work contributes a comprehensive review of the challenging prevention of vertical transmission of HIV in pregnant migrants, discussing actions developed and promoting intercultural adaptations that recognize the social and cultural diversity of this population in Chile.

Abstract

Preventing vertical transmission of HIV is a challenge for all countries worldwide. The permanent construction of global societies with a variable degree of international migrant population has made it more complex. Health policies, programs, and actions for preventing vertical transmission of HIV in pregnant migrants demand an intercultural perspective, where social, cultural, and gender dimensions associated with the infection are addressed. Understanding the local reality regarding the prevention of vertical transmission in the international migrant population in Chile is essential to carry out concrete actions that favor the prevention of mother-to-child transmission of HIV. This article presents some essential concepts related to this topic. It also presents international and national information on risks of vertical transmission in pregnant migrants, the importance of the national plan for preventing vertical transmission of HIV in our country, and some ongoing efforts to adapt such plan to the reality of social and cultural diversity that pregnant migrants currently present in Chile, as a useful public health instrument with an intercultural perspective.

Keywords:
Vertical Transmission of Infectious Disease;
Migrants;
Prenatal Care;
Preventive Health Services

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How to cite this article: Rev Chil Pediatr. 2020;91(5):672-683. DOI: 10.32641/rchped.v91i5.1784

Introduction

Since 2010, the member states of the Pan American Health Organization (PAHO) have assumed various commitments to eliminate the mother-to-child transmission of the Human Immunodeficiency Virus (HIV) in the Americas.

The diverse regional agreements and actions have enabled to achieve important advances in the Region, for example, in Latin America and the Caribbean, it is estimated that the rate of mother-to-child transmission of HIV between 2010 and 2017 decreased from 17% to 12%, respectively, resulting in the prevention of approximately 30,800 HIV infections in children, due to several interventions to eliminate mother-to-child transmission[1]. However, these advances have not been consistent across the region.

In the case of Chile, there has been an exponential increase in the number of carriers of HIV in recent years[2,3]. This increase occurs more in men, even though in women the reporting of HIV infection has increased as well[4]. Along with this, the reported cases among foreigners has grown in recent years. These figures occur considering that the international migrant population accounts for around 6%-7% of the total in our country[5] and it is constantly increasing. In 2017, there were 3,291 reported cases of HIV in the public health system, where 629 (19%) were migrants[6].

The exposure of the migrant population to infectious diseases is not exclusive to Chile. According to 2018 data from the European Centre for Disease Prevention and Control, 25% of tuberculosis (TB) cases in Europe are diagnosed in individuals born in foreign countries[7]. This global, regional, and national scenario present important public health challenges in prevention, detection, and treatment, with additional efforts to avoid vertical transmission (VT) from a pregnant woman carrying HIV to her child.

Thus, regarding prevention, the management of HIV in migrant pregnant women presents significant challenges. The main ones in this area are related to the detection to diagnose the highest number of HIV-positive pregnant women, the indication of antiretroviral therapy (ART) to at least 90% of those diagnosed, and the control of the infection through an undetectable viral load of at least 90% of pregnant women on ART to achieve the elimination of VT of HIV. In this way, VT is expected to be less than 2%, which is in line with PAHO's goal. Along with this, there is an urgent need to effectively incorporate an intercultural health approach to address this problem, which will break down the administrative, linguistic, and socio-cultural barriers -including gender and socioeconomic dimensions- that currently exist with some migrant groups in the access and use of the health system for the prevention and treatment of HIV and the VT prevention to the unborn. The following is an update of the country's scenario on how this problem is addressed and pending tasks in public health and childhood.

Migration as a social determinant of health

There is an international consensus on the recognition of migration as a social determinant of health, which is a dynamic and changing process that requires special attention in population and public health. It includes dimensions such as lifestyles, conditions of the social and community environment, the socioeconomic, political, cultural, and environmental aspects in the person's lifetime before, during, and after migration[8]. In other words, the act of migration causes a turning point with potential deep and structural changes in multiple social conditions that impact health[9]. These changes can generate greater vulnerabilities and risks for the health of migrants, their families, and the communities that receive them[10].

It has been globally observed that the international migrant population tends to be relatively young (mostly of reproductive age)[9] and healthy, or at least in the first years of settlement reports fewer health problems than the local population, which is internationally known as the healthy migrant effect and has also been documented in Chile[11,12]. However, migrants can change their behavior and adopt new practices similar to the local ones (assimilation), as well as lose some of their ways of understanding reality or their customs and traditions (acculturation). Consequently, they may assume new risks to their sexual and reproductive health, be more vulnerable to alcoholism and drug use, experience dietary changes, or be forced to stay in spaces without adequate sanitary conditions, drinking water, among others[13]. They may also find limited access to basic health services, compounded by cultural and linguistic barriers they experience in host countries[10,14,15]. On the other hand, the migrant population may be at risk of diseases specific to their country of origin, requiring special care in the migrant host country, as well as protection and prevention measures for the general population[16]. Therefore, the issue of public health and international migration is of global interest and a permanent challenge.

Prenatal care in international migrants

In Chile, there are few systematic studies on the health of migrant mothers, however, some associated health risks have been described. The most frequent health problems in both migrants and non-migrants

women are obstetrical and, in our sphere, it is worrying that among the migrant ones, there is a significant proportion without health insurance[17,18]. Another characteristic of some groups of migrant pregnant women is the non-attendance at prenatal care check-ups or the late start of prenatal care which results in late detection of maternal and fetal morbidity, even though more than 80% of these pregnant women reach the recommended minimum of three or more visits during pregnancy[17]. This has been associated with the unavailability of the necessary documentation, unfamiliarity with the country's official health system, physical and financial barriers to accessing healthcare, and cultural barriers, among others[19].

In 2017, in the San Borja Arriarán Clinical Hospital, a public hospital and the main hospital of one of the Health Services of the Metropolitan Region, more than 60% of the births corresponded to foreign mothers, and in 2016, there were three maternal deaths, all of them of migrant mothers who, according to the analysis of the Audit Committee of that institution, had no or late prenatal care checkups[18]. In addition, if migrant pregnant women are compared with the Chilean ones, we can see that the first ones are at significantly higher biopsychosocial risk (50.1% vs 62.3%)[17], meaning living and working situations and conditions that can negatively affect a person's physical, psychological and/or social health and well-being[13].

International Migrant Population and HIV/AIDS

The link between migration and HIV has been addressed and studied mainly by international agencies (PAHO, IOM, WHO, among others), emphasizing that it is a complex and multi-causal relationship. Therefore, in order to develop programs and public policies aimed at this group, a more comprehensive background and adequate diagnosis of the situation is required. Throughout the migration process, in some cases people migrate with the disease from the country of origin, in other cases, the highest number of infections may occur in the country of destination and, in others, the migration route is the riskiest instance[10,20,21].

In Chile, HIV infection and TB are the infectious diseases of major concern given their high frequency in the countries of origin of some migrant groups[13]. Nationally, the number of people infected with HIV between 2010 and 2018 rose from 2,982 to 6,948, respectively. In the migrant population, between the same years, this figure increased from 41 cases to 2,580. In 2015, in this same population group, the percentage of HIV carriers was 9.19%, while in 2018 it represented 37.13%[6]. Accordingly, the epidemiological report of the Department of Infectious Diseases of the Ministry of Health of the country, as of November 28, 2017[6] showed an increase in HIV cases by 96% between 2010 and 2017. Out of the total cases detected between January and June 2018, 36% were migrants. A breakdown of this group by nationality shows that 36.4% of these cases were from Venezuela, 28.6% from Haiti, and 11.2% from Colombia. This percentage undoubtedly reflects an over-representation of migrants[2]. Table 1 shows its prevalence and incidence in the countries of origin[21]. As can be seen, many of the countries with the highest number of foreigners entering Chile have higher rates of HIV infection than our country.

The Chilean hospital discharges database provides additional data[22]. In 2015, there was a higher concentration of migrants with infectious diseases in Arica and Parinacota, Antofagasta, and the Metropolitan Region, equivalent to those with the highest density of migrants in the country (table 2). Compared with hospital discharges in Chile in 2015, a higher proportion of HIV, TB, and some infectious skin diseases have been reported in the migrant population (table 3). This information represents the entire national territory that has access to the health system, but it has selection biases since there may be groups of migrants at some risk who, due to ignorance or fear, do not have access to the health system, as well as possible errors in recording migratory status or nationality, which should continue to be reviewed and updated.

The increase in HIV incidence and mortality in Chile is not exclusively due to the international migrant population. In recent years, there has been a significant increase in HIV among Chilean youth and men who have decreased the use of condoms, the main preventive measure recognized by this group. Recent ministerial reports on communicable diseases also indicate a rise in these conditions in people with addictions, prison inmates, and street people[24]. However, given the relative over-representation of migrants with HIV concerning their population density in the country, they are undoubtedly a relevant group for public health and research. Even more so when the focus is on pregnant migrants and at-risk unborn children in circumstances where there may be fewer adaptations of VT protocols available to meet the needs of specific population groups.

Risk factors for pregnant women to acquire HIV and transmit it to their newborns

The group of young migrant women of reproductive age is a particular concern since global evidence suggests that migrant women often seek medical care in advanced stages of pregnancy, where they present higher maternal mortality compared with native wo-

Table 1. Health indicators in Chile y and other countries with relevant migrant inflows to Chile

Indicator		Chile	Argent	Bolivia	Colombia	Ecuador	Haití	Perú	Venez
Gross domestic product per capita		26905	21528	7900	15055	11864	1870	13993	10399
Infant mortality per 1.000 live births	< 1 year	7	10	35	14	16	48.2	18	12
	< 5 years	8.3	11	36.9	15.3	20.9	67	15	16.3
Maternity mortality per 100.000 live births		22	52	206	64	64	359	68	95
VIH incidence (new cases each year per 100.000 habitants)		0.28	0.13	0.10	0.12	0.12	0.77	0.09	0.21
VIH prevalence per 100 adultts		0.34	0.27	0.17	0.25	0.20	1.38	0.22	0.38

Source: Armas, Cabieses, Wolff et al. 2018. Salud y proceso migratorio. Anales de Instituto de Chile.

men[17,20,25]. This raises an alert in maternal and fetal health and especially regarding diseases that can be transmitted to the newborn (NB)[26,27] since diseases such as HIV, Hepatitis B, HTLV 1, and certain parasitic disease, for which early diagnosis and timely treatment are essential for the mother's prognosis and to prevent transmission to the newborn, often have a greater presence in their regions where they came from.

Regionally, around 670,000 women aged 15 and older were carriers of HIV infection by 2015 and about 58% of them were on ART[28,29]. Between 2010 and 2015, ART coverage among pregnant women increased from 55% to 88%, respectively, and the mother-to-child transmission rate decreased from 15% to 8% during the same period. The number of new HIV infections in children (ages 0 to 14) fell by 55% between 2010 and 2015 -from 4,700 (3,500-6,400) in 2010 to 2,100 (1,600-2,900) in 2015- and nearly 28,000 new HIV infections were prevented in the same period. Syphilis screening of pregnant women attending prenatal care in the region decreased from 74% in 2011 to 69% in 2017. The incidence rate of congenital syphilis in Latin America and the Caribbean has increased since 2010, reaching 2.1 cases per 1,000 live births and more than 28,800 reported cases in 2017[1].

In Chile, there are not always updated data on the incidence and prevalence of these infections in pregnant migrants. However, a study by the Barros Luco Health Care Complex reported a 2.4% incidence of Hepatitis B in all newborns over 12 months (July 2017 to June 2018) (n = 35 cases, of which 34 were migrants)[27]. In addition, since the 1980s, the National Immunization Program (PNI) has achieved over 90% coverage, while other Latin American countries have historically had lower or highly variable vaccine coverage, and it is very likely that part of the adult migrant population is still susceptible to vaccine-preventable infections, and therefore, a source of possible outbreaks of transmissible infections such as measles or rubella[30].

Table 2. Hospital Discharges in Chile 2015, international migrants and locals, infectious diseases chapter

	Chilean (n = 37521)		Immigrant (n = 264)	
Sex				
Male	53.9%	(20206)	60.2%	(159)
Female	46.1%	(17313)	39.8%	(105)
Age				
< 14	38.5%	(14453)	17.4%	(46)
15 - 29	12.5%	(4683)	23.9%	(63)
30 - 44	11.5%	(4309)	29.9%	(79)
45 - 64	15.7%	(5873)	16.7%	(44)
> 65	21.9%	(8203)	12.1%	(32)
Healthcare provision type				
FONASA (public)	71.9%	(26973)	42.8%	(113)
ISAPRE (private)	20.8%	(7795)	28.0%	(74)
None	1.8%	(675)	22.7%	(60)
Other	5.5%	(2078)	6.4%	(17)
Region of the country				
Tarapacá	1.7%	(628)	8.7%	(23)
Antofagasta	3.6%	(1340)	12.9%	(34)
Atacama	1.1%	(401)	0.0%	(0)
Coquimbo	2.5%	(951)	0.8%	(2)
Valparaíso	11.4%	(4296)	1.9%	(5)
Libertador B. O´Higgins	4.2%	(1564)	2.7%	(7)
Maule	5.1%	(1926)	1.1%	(3)
Bíobío	13.9%	(5197)	0.4%	(1)
La Araucanía	6.5%	(2447)	1.1%	(3)
Los Lagos	5.7%	(2141)	0.8%	(2)
Aisén del Gral. C. Ibáñez del Campo	0.8%	(298)	0.0%	(0)
Magallanes y de La Antártica Chilena	0.9%	(330)	0.0%	(0)
Metropolitana de Santiago	36.9%	(13836)	62.1%	(164)
Los Ríos	4.1%	(1546)	1.1%	(3)
Arica y Parinacota	1.3%	(502)	2.7%	(7)
Without Reporting	0.3%	(118)	0.0%	(0)

Source: own elaboration.

Table 3. Hospital Discharges in Chile 2015. international migrants and locals. infectious diseases chapter by type of condition

	Chilean (n = 37521)		Immigrant (n = 264)	
Intestinal infectious diseases	47.1%	(17666)	38.6%	(102)
Tuberculosis	3.8%	(1435)	13.6%	(36)
Bacterial zoonotic infections	0.2%	(60)	0.0%	(0)
Other bacterial infections	21.3%	(8009)	14.0%	(37)
Infections with predominant sexual transmission pattern	3.0%	(1111)	3.8%	(10)
Viral infections of the central nervous system	3.9%	(1466)	1.9%	(5)
Arthropod-borne viral fevers and viral hemorrhagic fevers	0.0%	(16)	0.8%	(2)
Viral infections characterized by lesions of the skin and mucous membranes	5.5%	(2060)	4.5%	(12)
Viral Hepatitis	2.2%	(837)	3.0%	(8)
HIV	4.5%	(1680)	14.4%	(38)
Other viral infections	4.7%	(1774)	3.8%	(10)
Diseases due to protozoa	0.3%	(107)	0.8%	(2)
Helmintiasis	2.0%	(753)	0.4%	(1)
Pediculosis, acariasis and other infestations	0.2%	(71)	0.4%	(1)

Source: own elaboration.

International evidence reports multiple factors associated with or predisposing to the VT of HIV by migrant women to their children. A search for systematic reviews carried out by the authors in PubMed (February 8, 2019) found 18 relevant articles, most of them of a clinical nature and others of more contextual or public health interest. All of them show the complex circumstances in the transmission of HIV from pregnant women to their children.

Using this evidence and the broader one of the factors associated with HIV transmission in the world's female population, we recognize several important dimensions to address. First, there are the dimensions related to *general demographic factors and the stage of the life cycle* where they are and which may be common to other non-migrant women (young age and reproductive stage seeking to get pregnant, as well as structural factors such as marital status and ethnicity)[31].

Secondly, there are those *socioeconomic factors or social vulnerability* of migrant women, such as educational, household income, and work conditions that they experience when they migrate and which may put them at risk[31,32]. This is linked with the dimensions of social and gender inequality, which have a severe impact on health when living in highly disadvantaged conditions such as poverty, or in a family or social contexts of repression such as *machismo* or gender-based abuse, especially those cases of migrant sex workers or those subjected to refuge/asylum, violence, conflict, or human trafficking, which puts them at a higher risk of acquiring diseases, including HIV[19].

Third, there are factors associated with *the host country's health system and social protection policies*, including the benefit of health coverage system for conditions such as HIV in migrant women and their unborn children. Private health systems that exclude migrants of any kind (or specific groups such as those of an irregular migration status) run the risk of delaying timely preventive and diagnostic measures, and in the long-term must pay for more urgent and severe health problems in these population groups, as has been documented by studies from other countries such as Germany[33]. The lack of a protocol for preventing VT of HIV in host countries is undoubtedly a risk factor for transmission in the unborn child.

Fourth, there are factors associated with the *migration process* and the potential contagion risks or greater VT, such as living conditions before migrating, risks associated with the migration act itself (trafficking, abuse, sexual violence, among others), and those associated with the process of initial arrival in the new country (loneliness, isolation, exclusion, poverty, and overcrowding)[34].

Finally, there are factors associated with the *disease and its specific conditions*, such as the number of sexual partners, attitudes and behaviors toward HIV, knowledge about the disease and its risks, among others[35], as well as important associated conditions such as substance use, alcohol consumption, street people, domestic violence, and sexual abuse. Table 4 shows the details of the systematic reviews analyzed for this section.

Table 4. Synthesis of international systematic reviews on vertical transmission of HIV in international migrants

Year	First author	Title	Number of articles	Objetive	Main result
2018	Omonaiye	Medication adherence in pregnant women with human immunodeficiency virus receiving antiretroviral therapy in sub-Saharan Africa: a systematic review	51	To examine the enablers and barriers of medication adherence among HIV positive pregnant women in sub-Saharan Africa	Stigma, cost of transportation, food deprivation and a woman's disclosure or non-disclosure of her HIV status to a partner, family and the community, could limit her adherence to prescribed antiretroviral drugs during pregnancy. Women who knew their HIV status before pregnancy demonstrated good adherence while women who found out their HIV infection status during pregnancy were linked with non-adherence to ART
2018	Bert	HIV screening in pregnant women: A systematic review of cost-effectiveness studies	21	To summarize evidence regarding the cost-effectiveness of mother-to-child-transmission preventive screenings, to help policy makers in choosing the optimal antenatal screening strategy	The review confirmed the cost-effectiveness not only of HIV universal antenatal screening but also of rescreening in late gestation in both developed and developing countries. Universal screening is cost-effective even in case of extremely low HIV prevalence
2018	Endalamaw	A systematic review and meta-analysis of vertical transmission route of HIV in Ethiopia	18	To provide the pooled estimation of mother-to-child transmission rate and its risk factors in Ethiopia	The estimated pooled prevalence of mother-to-child transmission of HIV was 11.4% (95% CI=9.1-13.7). The pooled adjusted odds ratio (AOR) of mother-to-child transmission of HIV for the infants from rural area was 3.8 (95% CI=1.4 to 6.3), infants delivered at home was 3.2 (95% CI=1.2 to 5.2), infant didn't take antiretroviral prophylaxis was 5.8 (95% CI=1.5 to 10.3), mother didn't take antiretroviral prophylaxis was 6.1 (95% CI=2.5 to 9.6), mothers didn't receive PMTCT intervention was 5.1 (95%CI=1.6, 8.6), and on mixed feeding was 4.3 (95% CI=1.8 to 6.7)
2017	Siemieniuk	Antiretroviral therapy for pregnant women living with HIV or hepatitis B: a systematic review and meta-analysis	10	To assess the impact of various antiretroviral/antiviral regimens in pregnant women living with HIV or hepatitis B virus (HBV)	There was no difference between several alternatives of nucleoside/nucleotide reverse transcriptase inhibitors (NRTIs) in vertical transmission of HIV
2017	Wyisonge	Vitamin A supplements for reducing mother-to-child HIV transmission	05	To summarize the effects of giving vitamin A supplements to HIV-positive women during pregnancy and after delivery	Giving vitamin A supplements to HIV-positive women during pregnancy, the immediate postpartum period, or both, probably has little or no effect on mother-to-child transmission of HIV (RR 1.07, 95% CI 0.91 to 1.26; 4428 women, 5 trials, moderate certainty evidence) and may have little or no effect on child death by two years of age (RR 1.06, 95% CI 0.92 to 1.22; 3883 women, 3 trials, low certainty evidence)
2017	Kennedy	Elective caesarean section for women living with HIV: a systematic review of risks and benefits	36	To assess maternal and perinatal outcomes comparing caesarean section (c-section) before labor and rupture of membranes [elective c-section (ECS)] with other modes of delivery for women living with HIV	Although ECS may reduce infant HIV infection, this effect was not statistically significant in the context of cART and viral suppression. As ECS poses other risks, routine ECS for all women living with HIV may not be appropriate. Risks and benefits will differ across settings, depending on underlying risks of ECS complications and vertical transmission during delivery

Table 4. Synthesis of international systematic reviews on vertical transmission of HIV in international migrants (continuation)

Year	First author	Title	Number of articles	Objetive	Main result
2017	Peng	Barriers and enablers of the prevention of mother-to-child transmission of HIV/AIDS program in China: a systematic review and policy implications	14	To identify the barriers to and enablers of the prevention of mother-to-child transmission (PMTCT) of HIV program in China	Eighteen types of barrier and nine types of supportive strategy were identified, mainly at the level of social and political issues, healthcare recipients, healthcare providers, and the healthcare system. Based on government-oriented multi-sector cooperation, enablers in China have included community-hospital-family promotion, comprehensive financial support for service recipients, free HIV testing at marriage registration, the opt-out model, and the one-to-one service model
2017	Ibekwe	Clinical outcomes of routine opt-out antenatal human immunodeficiency virus screening: a systematic review	14	To evaluate the clinical outcome of routine screening of human immunodeficiency virus in antenatal clinic settings	Irrespective of human immunodeficiency virus epidemiological scenarios, routine testing gave more women opportunity to learn their human immunodeficiency virus status and take measures for prevention of mother-to-child transmission of human immunodeficiency virus. Future studies should focus on identifying strategies to improving linkages to treatment and care for prevention of vertical transmission
2016	Zeng	Prevention of mother-to-child HIV transmission cascade in China: a systematic review and meta-analysis	113	To evaluate the programme by examining the improvements in programme coverage HIV testing and provision of antiviral drugs along the prevention of mother-to-child transmission (PMTCT) cascade	PMTCT programmes have reduced HIV mother-to-child transmission in China. Further improvements in the continuum of care remain essential in realising the full potential of the programme
2015	Tuthill	Challenges faced by health-care providers offering infant-feeding counseling to HIV-positive women in sub-Saharan Africa (sSA): a review of current research	10	To describe experiences faced by HCPs when delivering infant-feeding counseling in the context of HIV in program settings in sSA	31 challenges faced by HCPs were found. The most commonly reported were personal beliefs held by the HCPs toward infant feeding in the context of HIV, contradictory messages, staff workload, directive counseling styles, and a lack of practical strategies to offer mothers, often leading to improvised counseling approaches
2014	Remme	The cost and cost-effectiveness of gender-responsive interventions for HIV: a systematic review	11	To assess current evidence on what forms of gender-responsive intervention may enhance the effectiveness of basic HIV programmes and be cost-effective	Couple counselling for the prevention of vertical transmission; gender empowerment, community mobilization, and female condom promotion for female sex workers; expanded female condom distribution for the general population; and post-exposure HIV prophylaxis for rape survivors are cost-effective HIV interventions. Cash transfers for schoolgirls and school support for orphan girls may also be cost-effective in generalized epidemic settings
2014	McCormak	Protecting the fetus against HIV infection: a systematic review of placental transfer of antiretrovirals	103	To review studies containing data pertaining to the pharmacokinetics of placental transfer of antiretrovirals in humans, including paired cord and maternal plasma samples collected at the time of delivery as well as ex vivo placental perfusion models	Findings appear consistent with current guidelines of using two NRTIs plus an NNRTI, atazanavir/ritonavir, or lopinavir/ritonavir to maximize placental transfer as well as to optimally suppress maternal viral load. Darunavir/ritonavir and raltegravir may reasonably serve as second-line agents

Table 4. Synthesis of international systematic reviews on vertical transmission of HIV in international migrants (continuation)

Year	First author	Title	Number of articles	Objetive	Main result
2013	Gourlay	Barriers and facilitating factors to the uptake of antiretroviral drugs for prevention of mother-to-child transmission of HIV in sub-Saharan Africa: a systematic review	40	To investigate and synthesize reasons for low access, initiation and adherence to antiretroviral drugs by mothers and exposed babies for prevention of mother-to-child transmission (PMTCT) of HIV in sub-Saharan Africa	Long-standing health-systems issues (such as staffing and service accessibility) and community-level factors (particularly stigma, fear of disclosure and lack of partner support) have not changed over time and continue to plague PMTCT programmes more than 10 years after their introduction. The potential of PMTCT programmes to virtually eliminate vertical transmission of HIV will remain elusive unless these barriers are tackled
2012	Brusamento	Male involvement for increasing the effectiveness of prevention of mother-to-child HIV transmission (PMTCT) programmes	01	To evaluate the impact of interventions which aim to enhance male involvement to increase women's uptake of PMTCT interventions in developing countries	We found only one eligible study that assessed the effectiveness of male involvement in improving women's uptake of PMTCT services, which only focused on one part of the perinatal PMTCT cascade. More studies are urgently need
2011	Vitorino	Systematic review of the effectiveness and safety of assisted reproduction techniques in couples sero-discordant for human immunodeficiency virus where the man is positive	17	To evaluate the effectiveness and safety of assisted reproduction techniques (ART) in human immunodeficiency virus (HIV) serodiscordant couples	No seroconversions in women or newborns were detectable at birth or after 3 to 6 months. Cumulative evidence suggests that ART is safe and effective for avoiding horizontal and vertical transmission in HIV serodiscordant couples
2007	Arrive	Prevalence of resistance to nevirapine in mothers and children after single-dose exposure to prevent vertical transmission of HIV-1: a meta-analysis	21	To estimate the proportion of mothers and children with NVP resistance mutations detected in plasma samples 4-8 weeks postpartum after single-dose NVP use for PMTCT	Single-dose NVP is widely used for PMTCT in resource-poor settings, but the burden of viral resistance is high in both women and children. It is substantially lower in studies providing additional postpartum antiretrovirals
2007	Suksomboon	Systematic review of the efficacy of antiretroviral therapies for reducing the risk of mother-to-child transmission of HIV infection	15	To evaluate the efficacy of antiretroviral therapies in reducing the risk of mother-to-child transmission of HIV infection	Zidovudine alone or in combination with lamivudine and nevirapine monotherapy is effective for the prevention of mother-to-child transmission of HIV. They may also be beneficial in reducing the risk of infant death. Different antiretroviral regimens appear to be comparably effective in reducing HIV transmission from mothers to babies
2007	Volmink	Antiretrovirals for reducing the risk of mother-to-child transmission of HIV infection	18	To determine whether, and to what extent, antiretroviral regimens aimed at decreasing the risk of mother-to-child transmission of HIV infection achieve a clinically useful decrease in transmission risk, and what effect these interventions have on maternal and infant mortality and morbidity	The first trial began in April 1991 and assessed zidovudine (ZDV) versus placebo and since then, the type, dosage and duration of drugs to be compared has been modified in each subsequent trial. Findings are complex as studies always compare different drugs and dosages

Fuente: elaboración propia.

Preventing vertical transmission of HIV in Chile

Since, according to scientific evidence, the adequate management of pregnant women living with HIV (WLHIV) has proven to be the most cost-effective intervention to prevent the transmission of this pathology to newborns, Chilean legislation has considered the detection and timely treatment of both infections. In Chile, the first protocol for preventing VT of HIV (ACTG 076) dates from 1996[36]. The 2005 Standard for the Prevention of Vertical Transmission of HIV includes universal testing of pregnant women, a pharmacological protocol for WLHIV-positive and their children (guaranteed in GES Law), and milk formula for six months[37]. HIV detection in pregnant women is considered within the Preventive Medicine Examination of the GES Law. Since 2006, pregnant migrant women had full free prenatal care in Chile's public health care system, including HIV testing and care of the unborn child[38]. Also, the norm includes a diagnostic protocol for the NB (PCR tests at birth, at one month, and three months of age), an immunological study (CD4), and follow-up for up to 18 months, in other words, it provides comprehensive care for the mother-child pair. It is a benefit fully insured by the GES Law for all pregnant women, including immigrants.

According to the 2012 Ministerial report on VT of HIV[38], the HIV diagnosis in pregnant women and the application of the full protocol for the prevention of VT allow for reducing the transmission rate from 13% to 48% to less than 2%. Vertical transmission of HIV occurs in 35% of cases during pregnancy and approximately 65% during delivery due to exposure of the newborn to maternal blood, amniotic or cervicovaginal fluids. Breastfeeding adds risk from 14% to 29%. National data report a significant reduction in VT rates over the past five years, from 5.1% in 2014 (12/232) to 2.4% in 2018 (9/374)[39]. These improvements in preventing VT of HIV have been implemented since the 1990s through ministerial efforts[40].

The main objective of the ministerial protocol for the prevention of VT of HIV is to reduce mother-to-child transmission of HIV and syphilis in children at risk. In order to accomplish this goal, it is necessary to diagnose the highest number of pregnant women; that all WLHIV-positive receive highly effective ART; that they reach an undetectable viral load in the last four weeks of gestation or close to delivery; that the delivery route and immediate management of the NB ensure the lowest risk of VT; and to forbid breastfeeding by providing milk formula. Within this objective, the ministerial goals are (i) To reduce VT of HIV to 2% or less; and (ii) To maintain or decrease the incidence of congenital syphilis, including stillbirths, to 0.5 cases per 1,000 live births. This protocol includes considerations for the different stages involved in the VT of HIV which are pregnancy, delivery, postpartum, breastfeeding, and child care for at least 18 months. In each stage, measures are established according to the case of unawareness of the diagnosis, diagnostic suspicion, and defined diagnosis.

As the highest health authority, the Ministry of Health of Chile has addressed the need to ensure the health protection of migrants who currently live in our territory. Therefore, since 2006 to date, technical regulations and decrees have been created that have increased the scope of health coverage for this group, until its culmination with the launch of the Migrant Health Policy in 2017[41], which today is developing its Action Plan. This action plan includes goals, indicators, and specific activities relevant to the care of migrant pregnant women and children, as well as the management of notifiable diseases, of which HIV has been identified as a major marker.

In Chile, there are still no studies that allow an in-depth understanding of the risk situation of pregnant migrant WLHIV or their knowledge or practices associated with VT. Therefore, it is an important challenge to develop first-level research that seriously and systematically documents the complex relationship between international migration, pregnancy, and VT of HIV, from the perspective of public health intelligence and facing the current protocols on this subject of our country.

We recommend carrying out quantitative studies that identify and analyze patterns of prevalence, risks, and associated complications, as well as qualitative studies that allow us to approach the beliefs, experiences, and specific needs of WLHIV-positive migrants and health teams in our country. Thus, we will be able to identify the gaps existing today between what these populations need and what the health system currently provides. This is the only way that solid and evidence-based improvements can be implemented that will contribute to the effective and safe prevention of VT of HIV in every unborn child in our country, as well as adequate support, without any stigmatization or discrimination for those cases in which these women and children had entered late to the system, from an intercultural approach of protection and humanization of the care of our formal public health system[42].

National experiences in introducing to pregnant migrants the national protocol for the prevention of vertical transmission

Given the current complex context, it is important to describe some of the valuable experiences and efforts

underway in Chile to introduce or adapt the national protocol for the prevention of VT of HIV in pregnant migrants[43]. At the central level, the Ministry of Health has safeguarded and facilitated the application of vertical transmission prevention regulations to the entire beneficiary population, without exceptions of any kind[38]. For each particular case, we coordinate the monitoring via online and activate the work of local and regional committees, generating improvement actions when appropriate, as may be the case with pregnant migrants. There are training efforts for primary and secondary health care teams in migration and health, language adaptations in informational brochures, and various communes with high-migrant density have a language facilitator and intercultural mediator, especially for Haitian pregnant migrants[44]. Regarding local experiences, the case of the *Complejo Asistencial Dr. Sótero del Río* (CASR) stands out, which has carried out diverse actions to ensure adherence by Haitian mothers to the VT of HIV prevention protocol[45].

Conclusion

Chile has excellent maternal and child health indicators. This is the result of a great effort maintained for many years and has already influenced several generations of people who have created a culture of medical care during pregnancy and childhood. Chile currently faces the challenge of introducing migrant women to the formal health care system, so that they may know and value the benefits that our system offers from a human and intercultural competent perspective, which considers socioeconomic, cultural, and gender dimensions linked to the vital process they are experiencing.

From this perspective, Chile must resolve how to prevent the vertical transmission (VT) of HIV in women with different knowledge, expectations, and understanding of health/disease processes. This requires that the health system expands its particular biomedical vision, to different ways of understanding and addressing the disease. In recent years, there have been interesting efforts in this area in Chile, which deserve more attention and support. New quantitative and qualitative research focused on this topic could be crucial to approach the particular needs of migrant pregnant WLHIV-positive, as well as possible improvements and adaptations that our health system may require to reduce the gaps in the effective use of the national protocol for the prevention of VT in this population.

Conflicts of Interest

Authors declare no conflict of interest regarding the present study.

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