

## AIDS epidemic in the triple frontier: subsidies for professional practice

*Epidemia da aids em tríplice fronteira: subsídios para a atuação profissional*  
*La epidemia de sida en triple frontera: subvenciones para actividades profesionales*

Monica Augusta Mombelli<sup>I</sup>, Mayckel da Silva Barreto<sup>II</sup>, Guilherme Oliveira de Arruda<sup>II</sup>, Sonia Silva Marcon<sup>II</sup>

<sup>I</sup> Universidade Estadual de Maringá, Postgraduate Program in Health Sciences. Maringa-PR, Brazil.

<sup>II</sup> Universidade Estadual de Maringa, Nursing Postgraduate Program. Maringa-PR, Brazil.

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### ABSTRACT

**Objective:** to analyze the AIDS epidemic trend from 1988 to 2012, in a tri-border area. **Method:** Ecological time-series study with data from the Department of informatics from the Brazilian Unified Health System (SUS). **Results:** A total of 1427 cases of AIDS were registered, and 82.1% were aged 20-49 years and 56% in males. The relationship man/woman went from 9/1 to 1/1 and increased the number of cases among individuals with more years of education, also, people aged more than 50 years old the age group from 20 to 34 years old. The most common exposure category was heterosexual, significantly higher among women; on the other hand, drug injection use was associated with male gender. **Conclusion:** seeking to embrace the changes in the epidemiological scenario of AIDS, nursing professionals should implement intervention strategies for people identified as the most vulnerable to HIV infection.

**Descriptors:** Acquired Immune Deficiency Syndrome; Nursing; Epidemiological Profile.

### RESUMO

**Objetivo:** analisar a tendência da epidemia de aids entre 1988 a 2012, em município de tríplice fronteira. **Método:** estudo ecológico de série histórica realizado com dados do Departamento de Informática do Sistema Único de Saúde. **Resultados:** foram registrados 1427 casos de aids, sendo 82,1% na faixa etária de 20 a 49 anos e 56% no sexo masculino. A relação homem/mulher passou de 9/1 para 1/1 e aumentou o número de casos entre indivíduos com mais anos de estudo, com mais de 50 anos e com idade entre 20 e 34 anos. A categoria de exposição mais frequente foi a heterossexual, significativamente maior entre as mulheres; já o uso de drogas injetáveis associou-se ao sexo masculino. **Conclusão:** buscando abarcar as modificações no cenário epidemiológico da aids, os profissionais de enfermagem devem implementar estratégias de intervenção junto às pessoas identificadas como sendo as mais vulneráveis à infecção pelo HIV.

**Descritores:** Síndrome da Imunodeficiência Adquirida; Enfermagem; Perfil Epidemiológico.

### RESUMEN

**Objetivo:** analizar la tendencia de la epidemia de sida desde 1988 hasta 2012 en el municipio de triple frontera. **Método:** estudio ecológico de series temporales realizado con datos del Departamento de Sistema de Salud de Informática. **Resultados:** se registraron 1.427 casos de sida, y el 82,1% de 20 a 49 años y 56% en los hombres. La relación hombre/mujer fue de 09.01 a 01.01 y aumentó el número de casos entre personas con más años de escolaridad, con más de 50 años y de 20 a 34 años. La categoría de exposición más frecuente fue la heterosexual, significativamente mayor en mujeres; ya uso de drogas inyectables se asoció con sexo masculino. **Conclusión:** tratando de aprovechar los cambios en el contexto epidemiológico del sida se evidencia en este estudio, los profesionales de enfermería deben implementar estrategias de intervención para personas con características identificadas como más vulnerables a la infección.

**Palabras clave:** Síndrome de Inmunodeficiencia Adquirida; Enfermería; Perfil de Salud.

CORRESPONDING AUTHOR    Guilherme Oliveira de Arruda    E-mail: [enfgoa@gmail.com](mailto:enfgoa@gmail.com)

## INTRODUCTION

The identification, in 1981, of acquired immunodeficiency syndrome commonly known as AIDS, has become a landmark in the history of humanity<sup>(1)</sup>. Currently, the epidemic of infection by the human immunodeficiency virus (HIV) is a global phenomenon, with a pandemic, dynamic and unstable behavior which has suffered significant epidemiological changes over the years<sup>(2)</sup>. In Brazil, from the 1990s, the spatial distribution pattern of the disease was altered, characterized by the phenomena of "internalization", "feminization", "impoverishment" and "youthfulness"<sup>(3)</sup>.

Although current indicators are still alarming, preventive and treatment measures have contributed, at least in part, to maintain the epidemic stabilized in recent years, however, it is worth noting that this relative slowdown in the spread of HIV does not happen homogeneously, mainly from the standpoint of the localities and population groups most directly affected<sup>(2)</sup>.

The spread of the epidemic within the country, especially in border areas, is a reality<sup>(4)</sup> and the factors that determine it are: migratory movements motivated by the search for better living conditions or employment opportunities; product transportation activities (importation/exportation) and the intense movement caused by activities related to tourism. All these conditions are evident in the triple frontier area of Brazil-Paraguay-Argentina<sup>(3)</sup>.

It is important to note, however, that even though we know the triggers for high incidence of AIDS in border areas, much remains to be done to prevent the progression of the epidemic. In Brazil, from 1980 to 2012, 656,701 cases and 205,409 deaths from the disease were diagnosed. From the accumulated number, the southern region has the second highest percentage of notifications, with 130,942 cases (19.9%)<sup>(5)</sup>. In Parana, from the first notification in 1984, there have been 31,935 cases and 62% of them were in males. Foz do Iguaçu, despite being only the seventh most populous city in the state of Parana, is the third in the ranking of AIDS notifications. Since its first record, in 1988, there has been 1,427 cases, more than half of them (56%) in males.

Thus, when studying the evolution of AIDS, epidemic in the city of Foz do Iguaçu, in addition to the common problems of the countryside Brazilian cities, such as infrastructure, sanitation and people's access to education and health services, their great geopolitical porosity and the most common cross-border mobility, favoring human migration, should be considered. This situation influences the prevalence and incidence of AIDS in the region<sup>(3)</sup>.

Therefore, analyzing the panorama of HIV/AIDS with greater disaggregation is essential to enable the preparation of local policies, strengthening the responsibility of the cities in organizing the care network and health promotion<sup>(1)</sup>. Moreover, knowing the epidemiological features of AIDS in Foz do Iguaçu will enable managers to plan actions and strategies that are more consistent with local reality and health professionals, in particular nurses, a contextualized assistance favoring the improvement of quality of life for individuals with AIDS<sup>(5)</sup>. In addition, in a preventive perspective, from the results found

in the present study, health professionals may have a different action with the people who have identified characteristics as being more vulnerable to HIV infection.

Given the above, instigated by the need to know the evolution of AIDS epidemic in a Brazilian city of triple frontier and considering the importance of these data for the direction of public policies to guide the work of health professionals, especially nurses, regarding health promotion and prevention and rehabilitation of cases of infection, this study aimed to analyze the temporal trend of AIDS epidemic in the city of Foz do Iguaçu-PR, from 1988 to 2012.

## METHOD

Ecological time-series study with data from AIDS cases reported in the city of Foz do Iguaçu-PR, from 1988 to 2012. The year 1988 was chosen due to the first notification in the city and 2012 due to the availability of consolidated information. The city of Foz do Iguaçu is located in the extreme west of Parana, with total area of 617,701 km<sup>2</sup>; It abuts Ciudad del Este (Paraguay) and Puerto Iguazu (Argentina). It has a population of 325,137 inhabitants, with a population density of 504,0 inhabitants/km<sup>2</sup>. The main economic activities are the generation of electricity through Itaipu Binacional Hydroelectric Power Plant and tourism favored by the Iguaçu Falls.

For this study, data was collected from January to February 2012, in the database provided by the Department of Informatics of the Unified Health System - DATASUS, and refer to the absolute number of AIDS cases reported in Foz do Iguaçu, according to gender, age group, year of diagnosis and exposure category. Data were exported to Tabwin 2.7 software which were tabulated and later compiled in Microsoft Excel 2010 software for Windows®, therefore, organized into a new database.

Subsequently, the information collected was grouped into five five-year periods (1988-1992, 1993-1997, 1998-2002, 2003-2007 and 2008-2012), in order to reduce the instability of the coefficients. Incidence rates coefficients were obtained from the number of AIDS cases reported in individuals in Foz do Iguaçu, in certain periods, divided by the number of the local population, obtained by population census and intercensus estimates expressed per hundred thousand inhabitants, with demographic information provided by the Brazilian Ministry of Health, in the website [www.datasus.gov.br](http://www.datasus.gov.br).

For data analysis, we used the computer package SPSS version 15.0®. The hypothesis of homogeneity of proportions, comparing the group for gender with the other variables was tested using the chi-square test considering a 5% level of significance ( $p < 0.05$ ). We used the Yates correction when data showed absolute frequency equal to or less than 30 and Odds Ratio (OR) as a measure of association. The information collected is presented in absolute and relative frequency tables, plus the incidence rates per period, difference between coefficients and gender ratio.

Data collection was conducted in databases of public domain without identification of individuals who had their cases notified. The project that lead to this study was approved by the Permanent Research Ethics Committee on Human Beings, under the protocol number 452/2009.

## RESULTS

From the data collected there was an increase of AIDS incidence coefficient rates for both genders, from the first through the third five-year periods, but with a reduction in the fourth period. Further increasing trend was observed in the last five years. It was also found that the female/male ratio decreased from 9.6/1 (1988-1992) to approximately 1/1 (2008-2012), that is, evidence of a gradual approximation of the rates between the sexes, with less difference at end of period (Table 1).

The data presented in Table 2 show an increase in the number of cases associated with the category of heterosexual

exposure, both men and women, and the sexual transmission was the most common way for both genders. Excluding the missing information data, sexual transmission accounted for approximately 70.0% of the total cases, followed by blood transmission, accounting for 13.0% of cases. Despite the downward trend over the years, the most important way of blood contamination, for both sexes, was the use of injected drugs (UID). On the other hand, when infection was caused by blood transfusion, we noted that it was less frequent in hemophiliacs, highlighting that the first and only notified case of this category was reported in the first five-year period.

In the scenario of male epidemic, 12.0% of cases reported in the city were related to homo/bisexuals. However, the number of infected heterosexuals in the same period was higher (52.3%), which kept this as the predominant category. Concurrently, the use of injected drugs had an important role in the AIDS notifications conglomerate, with high rates until the third five-year period. However, from the beginning to the end of the period, there was a reduction of 91.8% of cases in this category.

It was also observed that although the number of AIDS cases in males was higher, the growth trend in the number of HIV-infected among women occurred rapidly and the main category of exposure was

**Table 1 -** Notified AIDS cases, incidence coefficient rate per 100,000 inhabitants, by gender, by periods, Foz do Iguacu/PR, Brazil, 1988-2012

Period	Male			Female			Dif Coef**	Gender Ratio
	n	%	Coef*	n	%	Coef		
1988 – 1992	29	3.6	6.3	3	0.5	0.6	5.7	9.6/1
1993 – 1997	106	13.2	19.7	68	10.8	12.5	7.2	1.5/1
1998 – 2002	241	30.1	37.2	177	28.2	26.7	10.5	1.3/1
2003 – 2007	197	24.6	26.7	158	25.1	20.8	5.9	1.2/1
2008 – 2012	226	28.3	32.8	222	35.3	30.7	1.9	1/1
<b>Total</b>	799	100	26.0	628	100	19.9	-	-

\*Coef: Coefficient; \*\* Diff Coef: Difference among coefficients.

**Table 2 -** Absolute and relative frequencies of AIDS cases notified by gender, exposure category, for periods, Foz do Iguacu - PR, Brazil, 1988-2012

Variables	1988 – 1992		1993 – 1997		1998 – 2002		2003 – 2007		2008 – 2012	
	Male									
Exposure Category	n	%	n	%	n	%	n	%	n	%
Homossexual	02	6.9	10	9.4	21	8.7	12	6.1	20	8.8
Bissexual	02	6.9	06	5.6	14	5.8	06	3.0	03	1.3
Heterossexual	02	6.9	49	46.2	126	52.3	112	56.8	129	57.1
UID*	22	75.8	34	32.1	53	22	18	9.1	14	6.2
Hemophilic	01	3.5	-	-	-	-	-	-	-	-
Vertical Transmission	-	-	05	4.7	11	4.5	10	5.1	01	0.4
Ignored	-	-	02	1.9	16	6.6	39	19.8	59	26.1
<b>Total</b>	29	100	106	100	241	100	197	100	226	100
Female										
Exposure category	n	%	n	%	n	%	n	%	n	%
Homossexual	-	-	-	-	-	-	-	-	-	-
Bissexual	-	-	-	-	-	-	-	-	-	-
Heterossexual	01	33.3	43	63.2	149	84.2	109	69.0	135	60.8
UID*	02	66.6	17	25	15	8.4	05	3.1	04	1.8
Hemophilic	-	-	-	-	-	-	-	-	-	-
Vertical Transmission	-	-	08	11.7	05	2.8	10	6.3	04	1.8
Ignored	-	-	-	-	08	4.5	34	21.5	79	35.6
<b>Total</b>	03	100	68	100	177	100	158	100	222	100

\*Use of Injected Drugs.

**Table 3 -** Absolute and relative frequency of AIDS notified cases by gender, age group, for periods, Foz do Iguacu-PR, 1988-2012

Variables	1988 – 1992		1993 – 1997		1998 – 2002		2003 – 2007		2008 – 2012	
	Male									
Age group	n	%	n	%	n	%	n	%	n	%
< 1 – 14	-	-	05	4.7	12	4.9	18	9.1	7	2.6
15 – 19	01	3.4	05	4.7	05	2.1	-	-	01	0.4
20 – 34	20	69.0	58	54.7	138	57.2	71	36.0	60	26.5
35 – 49	06	20.7	33	31.1	72	29.9	80	40.6	123	54.4
50 – 64	02	6.9	04	3.8	10	4.1	27	13.7	32	14.1
65 – 79	-	-	01	0.9	04	1.6	01	0.5	04	1.7
<b>Total</b>	<b>29</b>	<b>100</b>	<b>106</b>	<b>100</b>	<b>241</b>	<b>100</b>	<b>197</b>	<b>100</b>	<b>226</b>	<b>100</b>
Female										
Age group	n	%	n	%	n	%	n	%	n	%
< 1 – 14	01	33.3	08	11.8	08	4.4	16	10.1	09	4.2
15 – 19	-	-	09	13.2	12	6.8	02	1.2	07	3.1
20 – 34	01	33.3	38	55.9	110	62.1	69	43.6	91	41.0
35 – 49	01	33.3	11	16.2	41	23.1	59	37.3	90	40.5
50 – 64	-	-	02	2.9	05	2.8	10	6.3	24	10.8
65 – 79	-	-	-	-	01	0.5	02	1.2	01	0.4
<b>Total</b>	<b>03</b>	<b>100</b>	<b>68</b>	<b>100</b>	<b>177</b>	<b>100</b>	<b>158</b>	<b>100</b>	<b>222</b>	<b>100</b>

**Table 4 -** Absolute and relative frequency of AIDS notified cases by gender, years of education, for periods, Foz do Iguacu-PR, 1988-2012

Variables	1988 – 1992		1993 – 1997		1998 – 2002		2003 – 2007		2008 – 2012	
	Male									
Education*	n	%	n	%	n	%	n	%	n	%
None	-	-	04	3.8	18	7.5	05	2.5	19	8.4
From 1 to 3	16	55.2	35	33.0	80	33.2	28	14.2	43	19.0
From 4 to 7	10	34.5	44	41.5	83	34.4	89	45.2	65	28.8
From 8 to 11	01	3.4	15	14.1	34	14.1	49	24.9	41	18.1
12 or more	02	6.9	04	3.8	13	5.4	16	8.1	46	20.4
Ignored	-	-	04	3.8	13	5.4	10	5.1	12	5.3
<b>Total</b>	<b>29</b>	<b>100.0</b>	<b>106</b>	<b>100.0</b>	<b>241</b>	<b>100.0</b>	<b>197</b>	<b>100.0</b>	<b>226</b>	<b>100.0</b>
Female										
Education*	n	%	n	%	n	%	n	%	n	%
None	-	-	02	2.9	08	4.5	10	6.3	20	9.0
From 1 to 3	01	33.3	23	33.9	65	36.8	33	20.9	42	18.9
From 4 to 7	02	66.7	29	42.7	64	36.1	65	41.2	64	28.8
From 8 to 11	-	-	06	8.8	24	13.6	32	20.3	41	18.5
12 or more	-	-	02	2.9	08	4.5	08	5.0	44	19.8
Ignored	-	-	06	8.8	08	4.5	10	6.3	11	5.0
<b>Total</b>	<b>03</b>	<b>100.0</b>	<b>68</b>	<b>100.0</b>	<b>177</b>	<b>100.0</b>	<b>158</b>	<b>100.0</b>	<b>222</b>	<b>100.0</b>

\* In years of study.

being heterosexual (69, 6%). It should be noted that, for women, heterosexualization is early, presenting a reduction in the third five-year period, although there was a resumed increase in the last five-year period, while the UID category represented only 6.8% of notifications and vertical transmission 4.3% of the total cases.

In Table 3, it appears that the first AIDS notification in a child (under 14) was identified during the first five-year period and subsequently the number of cases in this age group increased, which was reduced only in the last five years, and this group accounted for 5.9% of all notifications. In turn, the age group 15-19 years remained stable, with a tendency to decrease, especially for males, accounting for 2.9% of all cases. The age group of 20 to 49 years old accounted for 82.1% of all notified cases. However, when analyzing this age group in a fragmented manner, we observed that there was a predominance of the age group 20-34 years. The age group 35-49 years old, in turn, presented rise, specially in the period from 1988 to 2012, accounting for 44% of notified cases in the age group 20-49 years. We also draw attention to the number of AIDS cases among individuals aged 50 or more years old, which increased progressively during the study period.

Regarding education, despite the higher proportion of notified cases of people with less than three years of study among women in the first five-year period, an increase was observed for both genders in the frequency of notifications for individuals with eight or more years of study (Table 4). Excluding the cases without this information, the data also revealed that, during the study period, 70.9% of men reported having less than eight years of education, compared with 72.2% of women. As for the contingent with 12 or more years of study, it was found

**Table 5** - Association between AIDS notified cases by gender and age group, category of exposure and education (in years), Foz do Iguaçu-PR, Brazil, 1988-2012

Variables	Male		Female		p value*	OR
	n	%	n	%		
<b>Age group</b>						
< 1 to 14	41	5.1	42	6.7	0.21	0.8
15 to 19	12	1.5	30	4.8	<0.001**	0.3
20 to 34	347	43.4	309	49.3	0.03	0.8
35 to 49	314	39.3	202	32.1	0.005	1.4
50 or more	85	10.6	45	7.1	0.02	1.5
<b>Exposure category</b>						
Heterosexual	418	71.4	437	86.2	<0.001	0.5
IDU	141	24.0	43	8.5	<0.001	2.9
Vertical transmission	27	4.6	27	5.3	0.44**	0.8
<b>Education</b>						
None	46	5.8	40	6.4	0.629	0.9
From 1 to 3	202	25.6	164	26.1	0.720	0.9
From 4 to 7	291	36.4	224	35.7	0.769	1.0
From 8 to 11	140	17.5	103	16.4	0.576	1.1
12 or more	81	10.1	62	9.9	0.868	1.0
Ignored	39	4.9	35	5.6	0.558	0.9
<b>Period</b>						
1988-1992	29	3.6	3	0.5	<0.001**	7.8
1993-1997	106	13.2	68	10.8	0.16	1.3
1992-2002	241	30.1	177	28.2	0.41	1.1
2003-2007	197	24.6	158	25.1	0.82	1.0
2008-2012	226	28.3	222	35.3	0.004	0.7

\*Teste de Qui-quadrado. \*\*Correção de Yates.

that the proportions of men and women are very close, corresponding to 10.7% and 10.5% respectively.

Statistically significant difference was observed in the proportion of AIDS notified cases in the age groups 15-19 years ( $p < 0.001$ ) and 20-34 years ( $p = 0.03$ ) more frequently in females, and 35-49 years ( $p = 0.005$ ) and 50 or older ( $p = 0.02$ ), more frequently in males (Table 5). The exposure category showed a significant difference between the sexes, and for heterosexuals ( $p < 0.001$ ), there was a significantly higher percentage for females, while for UIDs ( $p < 0.001$ ) the percentage was significantly higher for males, rising up to three times the odds (OR = 2.9) for exposure to HIV.

Regarding education, there was no significant difference between the sexes, since the proportions were practically balanced in different categories. Regarding the five-year periods, it was found that the frequency of notified cases was significantly higher among men in the first five-year period, they were approximately eight times more likely (OR = 7.8) to be exposed to HIV. However, at the end of the period, the frequency was significantly higher among women, and the male individual subjected to protection in this period (OR = 0.7).

## DISCUSSION

Ecological time-series studies about the dynamics of the AIDS epidemic are considered relevant for both diagnosis trend as for the development, implementation and evaluation of preventive strategies sensitive to contextual peculiarities. From our analysis, it was possible to observe that the epidemic in the city Foz do Iguaçu experienced profound changes over the years, as observed in several locations in Brazil.

Thus, it can be assumed that the spread of HIV in Brazil is characterized as a multifaceted epidemic, which has no single epidemiological profile throughout the Brazilian territory, but a mosaic of regional sub-epidemics. They are motivated, among other factors, by social and geo-economic inequalities<sup>(2)</sup>, conditions that bring with them new challenges to public health policies and collective action of civil society<sup>(4)</sup>.

The incidence rate of AIDS in Foz do Iguaçu is higher than in other city districts of the same population size or even larger. This is likely to be related to the fact that the city is located in a tri-border region, close to other urban centers and easily accessible by air and land. The movement of people across the border with Paraguay, the *Friendship Bridge*, is very

intense and free. Many merchants circulate in this area, as well as stooge (people who carry other people's belongings for crossing the bridge), tourists, truck drivers and sex workers, which favors the spread of the epidemic in the city<sup>(6)</sup>.

In this perspective, a study on the AIDS epidemic in the regions of borders of Brazil from 1990 to 2003, identified 7,973 cases being 648 in the Amazon region, 1,579 in the Midwest and 5,746 in the extreme south. The subregions with the highest AIDS incidence rates in each area were located in the triple border between Brazil and other countries in South America. In the South region, we highlight the sub-region *Vales Sulinos-Sudoeste do Parana*, with 1684 cases in the triple frontier Paraguay-Argentina-Brazil<sup>(3)</sup>.

Similarly, in a survey about the AIDS epidemic in the Brazilian border, higher rates than the national (1.38 per 10,000 inhabitants) were found between 1997 and 1999 in the cities of Uruguaiana (RS) (2.79 per 10,000 inhabitants) and Foz do Iguaçu (PR) (1.95 per 10,000 inhabitants)<sup>(6)</sup>.

However, it is noteworthy that, regardless of location, in the early years AIDS affected mainly men in the Brazilian context, being characterized as an epidemic according to occidental standards, that is, basically restricted to men who had sex with men, UIDs, hemophiliacs and politransfused<sup>(7)</sup>, profile that can be observed at the beginning of the period covered in this study.

In general, and as shown in other studies<sup>(3,6)</sup>, the results of this research also identified the transition from epidemiological profile, determined mainly by the feminization and heterosexual processes of the disease. Nevertheless, it should be noted that the impoverishment process of the epidemic, which has been identified in other studies<sup>(8-9)</sup>, was not observed in this, since from the first notification in Foz do Iguaçu, were already reported cases in individuals with lower level of education. Moreover, at the end of the study period, we identified an increase in notified cases of men and women with higher education.

It has been noted that the relationship between AIDS and poverty is complex and, in some contexts, populations with higher socioeconomic status have higher HIV prevalence, even in regions with low social indicators, such as sub-Saharan Africa<sup>(1)</sup>. Thus, the findings may be showing that AIDS epidemic in Brazil occurs predominantly in contexts that have a higher degree of human development. In turn, the "impoverishment" is not related to classic indicators of poverty, but social differences and distinctive areas of poverty in urban centers and border regions.

With regard to the expansion of HIV/AIDS among women, in addition to highlighting significant association, the results of this study showed agreement with other studies in different parts of the country and the world, in which the feminization process has also been identified<sup>(4,10)</sup>. This phenomenon can be observed worldwide, progressively, since today women account for about 50% of cases worldwide and 30% of cases in Latin America<sup>(7)</sup>. In other words, during the last five years, the number of women infected by HIV/AIDS has shown significant growth, including Brazil, where the sex ratio has decreased gradually by setting the progressive process of feminization of the epidemic<sup>(6)</sup>.

The stereotype of the woman mother-wife-woman, detached from the profile linked to risk behaviors, served as a protective factor against HIV, for a specified period, however, it did not prevent the spread of the virus in the female population<sup>(11)</sup>. Moreover, linked to the dissemination process, the susceptibility of the lower woman survival emerges, even after ten years of HIV infection diagnosis or AIDS, with lower chances of living when compared to men, as revealed by a study conducted in countryside city of the southern of Brazil<sup>(12)</sup>.

As structural determinants of this new epidemiological trend are the discourse of feminine nature, the myths of motherhood, passivity, the discourse of romantic love and also the greater biological vulnerability of women to HIV infection. Added to this, there is gender inequality and the low availability of prevention methods controlled by them<sup>(11)</sup>. In Foz do Iguaçu, there is the aggravating factor of sex tourism and the large number of sex workers who, in most cases, are subjected to the requirements of their clients, from all parts of Brazil and the world, with regard to the non-use of preservatives<sup>(13)</sup>.

The feminization of the AIDS epidemic is also related to the fact that, currently, heterosexual intercourse is the most important mode of transmission. In Brazil and in the world, the incidence of cases among heterosexuals was the one that showed the greatest increase and triggered a decisive way the spread of the epidemic among women<sup>(10)</sup>. Among the notified cases of AIDS, heterosexual orientation is prevalent in both men and women.

A study conducted on the AIDS epidemic in the borders regions of Brazil, from 1990 to 2003 showed that the epidemiological pattern of incidence of AIDS in the city borders areas showed higher frequency via sexual transmission. The heterosexual transmission category was the most frequent, since from the 7,973 reported cases, 4,605 (57.7%) were related to this category<sup>(3)</sup>.

One of the consequences of heterosexualization and the subsequent feminization of the epidemic is the increase of AIDS cases in children through mother to child transmission, which can occur during pregnancy, delivery and through breastfeeding. It is estimated, in Brazil, a prevalence of 0.42% of HIV infection in pregnant women, which corresponds to 12,470 newborns exposed to the virus each year<sup>(7)</sup>. Although the universal and compulsory notification of HIV infected pregnant women and exposed children is provided by Ordinance No. 993/2000 of the Brazilian Ministry of Health, what is observed is that known prevention measures and agreed on the ordinances and routines are not always fully complied.

A study conducted in a city in southern Brazil found low coverage of HIV testing during pregnancy; late onset or absence of the introduction of Anti Retro Viral Therapy (ART) for mothers; lack of completion assurance of delivery by elective cesarean; and breastfeeding. In the seven cases investigated retrospectively, it was revealed that all mothers had access to prenatal care, and five of them went for more than six visits and six performed routine examinations. However, two of them were not tested for HIV and five were not counseled about the disease<sup>(14)</sup>.

The free and universal access to antiretroviral drugs and HIV testing in Brazil are responsible for the significant reduction in morbidity and mortality from AIDS and vertical

transmission, however, it is important to reflect on the quality of care provided to women during the prenatal, delivery and postpartum, with reference to some aspects such as: the time of diagnosis of infection in the mother, the number of visits and the institution of antiretroviral therapy in a timely manner<sup>(14)</sup>. Thus, not only spaces and intervention strategies must be rethought, but also reflection on the inter-subjective contexts in which vulnerability to HIV is effective.

Another characteristic of the current epidemic found in the study that corroborates the results of other studies is the youthfulness process, that is, the epidemic is hitting young people particularly in the reproductive phase. Worldwide, one in 20 adolescents contracts some kind of sexually transmitted disease every year. Estimates show that, every day, more than seven thousand young people are infected with HIV, a total of 2.6 million per year, which represents half of all reported cases. An estimated 10 million adolescents are living with HIV and approximately 80% of the transmissions are due to unprotected sexual practices<sup>(15)</sup>.

Among the triggers of the spread of AIDS in the age group of the youngest are: the feeling of invulnerability, the intense sexual activity associated with variability in partners, embarrassed to use preservatives, not understanding or adapting the prevention information received and ignorance of what AIDS can pose in their lives<sup>(15)</sup>. These aspects can and should be worked out by health professionals, especially nurses, in their educational approach with adolescents.

According to the data from this study, it is also important to pay close attention to the epidemic in males who are aged 50 to 79 years, which has been growing systematically. Sexuality in later life, whether in family or social space, is still surrounded by taboos<sup>(16)</sup>. It is interesting to observe, for this age group, there was significant association for men that can be attributed to factors related to sexuality, such as low notion of risk, practice of sex without the use of preservatives and treating impotence to facilitate better sexual performance. It is also possible that with increased life expectancy, especially in an active way, sexuality could be more promoted among the elderly<sup>(17)</sup>. However, the impact of the introduction of HAART has increased the prevalence of AIDS infected aged individuals<sup>(18)</sup>. All this information reiterates that the issue of age is very important when we think about the spread of AIDS and its implications for society as a whole.

In other words, the average expectation of life of the population increased significantly, but there seems to have been accompanied by discussions and plans aimed at dealing with the issue of exercise of sexuality of adults over 50 years, in the current context of the AIDS epidemic.

Regarding the findings related to education, it is important to note that while other studies have shown a higher prevalence of AIDS cases among people with lower levels of education<sup>(7,9)</sup>, when conducting an ecological time-series study, it is clear that the notification of AIDS cases among people with more years of education has increased, even without significant difference between genders. It is also noteworthy that, in a survey conducted by the Department of Health of Sao Paulo, based on CRT data from 2011, about 83% of people

who sought free public testing for HIV attended eight years or more of study, which indicates a link between education and interest in early diagnosis of HIV tests<sup>(19)</sup>.

Therefore, existing social inequalities in different regions of Brazil are confirmed, not only related to income and education distribution patterns, but also the patterns of access to health services and other policies of social and community promotion. It is noteworthy, therefore, the importance of identifying specific aspects of the AIDS epidemic in each location, according to different variables, in a time frame perspective, as shown by this study.

Regarding the limitations, it is plausible to suppose that the use of secondary data does not allow control of possible flaws in the registration process and, therefore, the presented results may not accurately represent the reality studied. Still, it is believed that our objective has been achieved, especially considering that the data is official and required by the health services. Furthermore, it emphasizes the importance of studies developed from this data for epidemiological purposes and for the improvement of the record in the information system, by health professionals. We reiterate that this study advances towards providing such data, in a historical context, on HIV infection in the triple frontier.

## CONCLUSION

The results of the study showed that AIDS epidemic in the city of Foz do Iguacu presented transformations over the years 1988-2012, which led to the reconfiguration of a new epidemiological situation with a profile marked mainly by heterosexualization and feminization of the disease, besides the increase of notifications among individuals with more years of education. It is believed that the knowledge of the peculiarities of this context, different from other places, because it is a triple frontier region, makes it possible to (re)think the implementation of public policies that ensure equitable access for men and women to prevention, care and treatment worthy in all public spheres. This significant change in the epidemiological profile imposes great challenges, for which particular and diverse answers are required.

The results show important aspects such as the increasing prevalence among adolescents and among people over 50 years, and women in heterosexual relationships, which points to a perspective of differentiated assessment of health professionals and especially nursing. The taboo linked to preservative use needs to be addressed in order to define this practice as essential protection from the beginning of sexual life. Adults and the elderly also should not stop using preservatives, even when they feel confident in a stable relationship with the partner.

It is hoped that these results presented can serve as a stimulus and subsidies the forms of activity that are closer to reality of this group. The quantification of AIDS information is a challenge, since the epidemic is able to adapt and change quickly as a result of social, economic and cultural characteristics. In addition, the peculiarity of Foz do Iguacu as a border city should be taken into account, as it can contribute to AIDS expansion velocity.

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