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HIV in Paraná: clinical-epidemiological overview, distribution, and incidence by macroregional and regional health

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ABSTRACT. Objective: to trace the clinical-epidemiological panorama, distribution, and incidence of HIV cases by macroregional and regional health of Paraná. Material and Methods: descriptive epidemiological study, carried out with data obtained by the Notifiable Diseases Information System regarding HIV/AIDS cases registered in the state of Paraná between 2018 and 2019. Data were analyzed by descriptive statistics. The study was authorized by the State Department of Health of Paraná and had a favorable opinion from the Research Ethics Committee. Results: 6,023 cases of HIV/AIDS were reported, with a prevalence of male, white, mean age of 35 years old, complete high school and college, and predominance of sexual transmission. The epidemiological characteristics corroborate the findings in the literature and are similar to the national profile. There were cases of mother-to-child vertical transmission during pregnancy and via transfusion, suggesting possibilities for effective action. East macroregional had the highest number of cases and incidence coefficient. Conclusion: the HIV/AIDS epidemic represents a multidimensional challenge for the health sector, considering its magnitude, severity, costs, and dissemination. Despite the improvement in infection prevention and health promotion strategies, the numbers of new infections per year are relevant and stable. The regionalization of information allows the individualization of epidemiological data, enabling the adoption of more effective strategies that correspond to local needs. Therefore, this study brings great contributions to local managers to direct strategies for assistance, surveillance, and control of this condition of great importance to public health.

Keywords: HIV; health profile; incidence; public health; public health surveillance; epidemiology.

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Introduction

The epidemic of infection by the human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) represents a dynamic and unstable global phenomenon, whose occurrence in different regions of the world depends, among other determinants, on individual and collective human behavior (Brito, Castilho, & Szwarcwald, 2001) and the political, managerial, and organizational dimensions of the health sector with regard to the surveillance system, diagnosis, and treatment of the aggravation (Lopes et al., 2014; Vu et al., 2020).

Since the beginning of the 1980s, HIV/AIDS infection has been a challenge for the global community, given the severity, magnitude, pandemic character, dissemination, and high costs related to prevention and treatment strategies (Castro, Scatena, Miranzi, Miranzi Neto, & Nunes, 2020). In this sense, it is noticeable that Brazil faces a multidimensional crisis in facing the epidemic, whose factors involve both global and local characteristics and phenomena arising from the interrelationship between social, economic, and political aspects (Agostini, Rocha, Melo, & Maksud, 2019).

In general, it is clear that the HIV/AIDS epidemic has been showing new trends, such as interiorization, feminization, heterosexualization, impoverishment, youthization, and aging (Rodrigues Neto et al., 2010; Silva et al., 2018; Trindade, Fernandes, Nascimento, Jabbur, & Cardoso, 2019; Knauth et al., 2020). Such transformations in the epidemiological panorama impose challenges to public policies in the sense of aiming at transforming the essentially reactive, fragmented, and episodic healthcare system so that it meets a logic of coping with chronic conditions.

In this context, HIV/AIDS remains a global health problem. It is estimated that at the end of 2019 there were 38 million people living with HIV (PLHIV), of which 68% of adults and 53% of children worldwide were on antiretroviral therapy (ART). In Latin America, it is believed that since 2010 the number of new cases of HIV/AIDS has increased by about 21%, and in 2019 approximately 120,000 people were diagnosed (Organização Pan-Americana da Saúde, 2021).

In Brazil, in 2020, 13,677 new HIV cases and 11,880 AIDS cases were diagnosed. Since 2012, there has been a decrease in the AIDS detection rate in the country, which went from 21.9 per 100,000 inhabitants in 2012 to 17.8 per 100,000 inhabitants in 2019, representing a reduction of 18.7%. Among the new HIV cases in 2020, 1,680 (12.28%) were reported in the North region, 3,134 (22.91%) in the Northeast, 4,987 (36.46%) in the Southeast, 1,369 (10%) in the Central-West and 2,507 (18.33%) in the South, of which 697 were registered in Paraná (Brasil, 2020).

Thus, it is evident that, despite the fact that more than 40 years have passed since the beginning of the epidemic, HIV infection remains a relevant and timely focus of attention at the global and national public health level, even in the face of improvement in prevention strategies, primary and secondary prevention, such as campaigns to encourage the use of condoms, early diagnosis of HIV through the Testing and Counseling Centers (CTA) and the free offer of ART in Brazil (Trindade et al., 2019).

In this logic, one can think that one of the current challenges for care and management professionals is related to the misunderstanding about the epidemiological particularities of the disease in each region, since global analyzes are incapable of effectively subsidizing local interventions (Trindade et al., 2019). Therefore, the present study aimed to trace the clinical-epidemiological, distribution and incidence of HIV cases by macroregional and regional health of Paraná between 2018 and 2019.

Material and methods

Descriptive epidemiological study carried out using a quantitative approach. Data were obtained from the Information System on Notifiable Diseases (Sistema de Informação de Agravos de Notificação [Sinan]) database made available by the Paraná State Health Department (Secretaria de Estado da Saúde do Paraná [SESA-PR]). The study was carried out during the second half of 2020, by sending data in a Microsoft Office Excel® spreadsheet by SESA-PR.

Healthcare in the state under study is organized in a decentralized manner into four macroregions health (MH) that are subdivided into 22 regionals health (RH), whose administrative headquarters are located in pole cities, which become a reference for the region in that are included, and whose organizational and operational elements that consolidate the care model are based on the health management axis.

The study population consisted of people diagnosed with HIV and/or AIDS in the state of Paraná between 2018 and 2019, whose specified aggravation/disease was "AIDS (patients aged 13 years and over)", with International Classification of Diseases - 10th revision (ICD-10) code B24 or "positive/reactive" result for the information "laboratory evidence of HIV infection". Cases in which the aggravation was suspected or investigated were discarded.

Data were collected using a specific research instrument to survey the epidemiological and clinical profile. For the epidemiological profile, the following variables were considered: sex, pregnancy and trimester of pregnancy, color/race, and education. For clinical characteristics, the selected variables were probable mode of transmission and case evolution. To calculate the distribution and incidence analysis by MH and RH in the state of Paraná, the following variables were considered: date of notification (year) and place of residence (MH and RH).

For the calculation of incidence coefficients per 100,000 inhabitants, the estimated population of individuals aged 10 years or older was considered, which encompasses the study population. In 2018, the population was 9,813,035; and in 2019, 9,883,073 individuals (Instituto Brasileiro de Geografia e Estatística [IBGE], 2021). In view of this, the estimated incidence for new HIV infections in the state of Paraná in the years 2018 and 2019 was calculated, as well as the estimates by MH and RH.

For characterization, absolute and relative frequencies were calculated. All analyzes were performed using R® software and Microsoft Office Excel® 2016. In compliance with the ethical precepts set out in Resolution No. 466/2012 and Resolution No. 510/2016 of the National Health Council, this study was authorized by SESA-PR and approved by the Standing Committee on Ethics in Research with Human Beings, under Certificate of Presentation for Ethical Consideration No. 34788720.8.0000.0104.

Results

The total number corresponding to the sum of new HIV cases in the state of Paraná between 2018 and 2019 was 6,023 notifications, of which 3,029 (50.30%) were registered in 2018 and 2,994 (49.70%) in 2019, as seen in Table 1.

Table 1. Distribution of cases of HIV infection between the years 2018 and 2019 by macroregional of health of the state of Paraná – Maringá, PR, 2020.

Macroregional	2018		2019	
	n	%	n	%
East	1,758	58.0	1,712	57.2
West	422	13.9	426	14.2
Northeast	423	14.0	394	13.2
North	426	14.1	462	15.4
Total	3,029	100.0	2,994	100.0

Source: SESA-PR.

There was a greater number of notifications in East MH, making up a percentage greater than 50.0% in relation to the total number of cases in the state in both years considered. On the other hand, Northwest MH had the lowest number of records of HIV cases, not exceeding 15.0% of the total in both 2018 and 2019% (Table 1).

As for the RH, it was observed that the 2nd RH, belonging to East MH, was the one with the highest number of new cases of HIV, corresponding, respectively, for 45.9 and 46.6% of the total cases in 2018 and 2019 among the seven RH that make up the aforementioned MH. It is also noteworthy that this RH was the one that registered the highest number of new HIV cases in the entire state (Table 2).

Table 2. Distribution of HIV infection cases between 2018 and 2019 by regional health of the state of Paraná – Maringá, PR, 2020.

Macroregional	Regional	2018		2019	
		n	%	n	%
East	1st	104	3.4	105	3.5
	2nd	1,389	45.9	1,391	46.5
	3rd	123	4.1	120	4.0
	4th	12	0.4	11	0.4
	5th	83	2.7	53	1.8
	6th	26	0.9	14	0.5
	21st	21	0.7	18	0.6
West	7th	60	2.0	61	2.0
	8th	50	1.7	48	1.6
	9th	123	4.1	113	3.8
	20th	55	1.8	86	2.9
Northeast	10th	138	4.6	154	5.1
	11th	44	1.5	46	1.5
	12th	38	1.3	37	1.2
	13th	31	1.0	41	1.4
	14th	41	1.4	12	0.4
	15th	268	8.8	290	9.7
	16th	47	1.6	71	2.4
North	17th	285	9.4	260	8.7
	18th	25	0.8	13	0.4
	19th	53	1.7	38	1.3
	22nd	13	0.4	12	0.4
Total		3,029	100.0	2,994	100.0

Source: SESA-PR.

It is noteworthy that the 4th RH, which recorded the lowest number of notifications in the state of Paraná in both years considered, 12 in 2018 and 11 in 2019, is also located in theEast MH. Still regarding the distribution by RH, it was observed that the 15th and 17th were the ones with the highest number of notifications after the 2nd, representing about 9% of the cases of the Northwest and North MH, respectively (Table 2).

When estimating the incidence coefficients of cases of HIV infection according to MH, it was observed that the East had the highest incidence coefficient in both years, while the North also had the lowest in both years. Comparing the periods analyzed, there was an increase in the incidence coefficient in the Northwest and West MH (Figure 1).

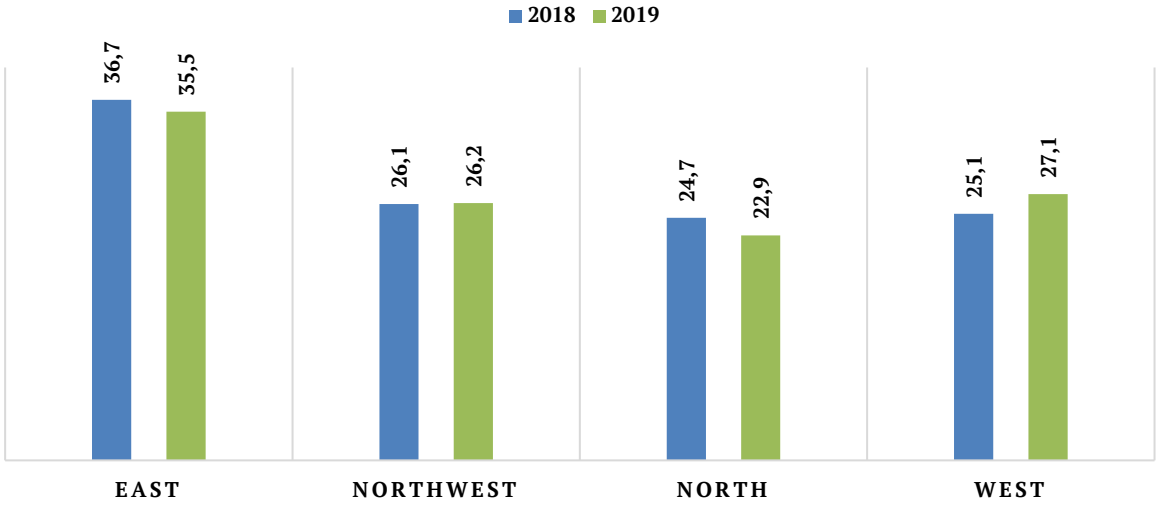

Figure 1. Incidence of HIV infection cases per 100,000 inhabitants between 2018 and 2019 by macroregional health of the state of Paraná – Maringá, PR, 2020.
Source: The authors.

Regarding the incidence coefficient by RH, the 1st, 2nd, 7th, 12th, and 17th stand out. Furthermore, it is important to note that there was an increase in the incidence coefficient from 2018 to 2019 in the 10th, 13th, 14th, 15th, 17th, 19th and 22nd RH (Figure 2).

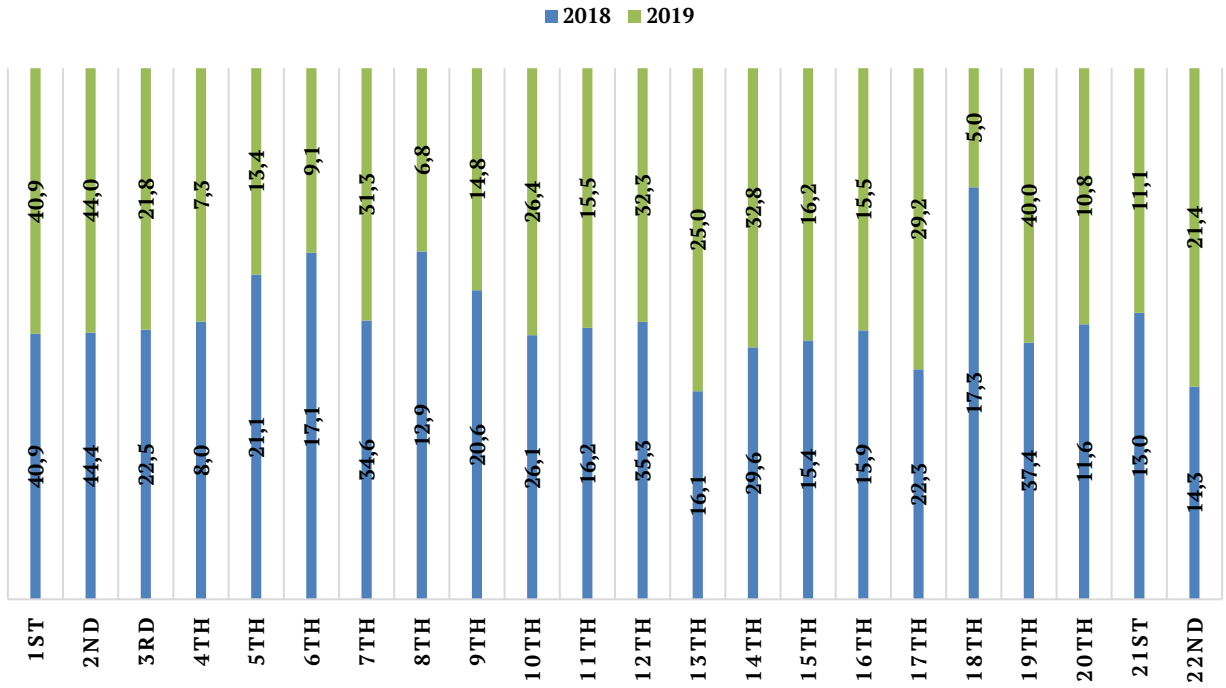

Figure 2. Incidence of HIV infection cases per 100,000 inhabitants between 2018 and 2019 by regional health of the state of Paraná – Maringá, PR, 2020.
Source: The authors.

As for the epidemiological profile of new HIV cases in Paraná in 2018 and 2019, it was observed that the average age was 34.9 years and 35.4 years, respectively, with a higher prevalence of cases in people between 20 and 50 years old. The male sex was predominant in both years analyzed, representing about 73% of the cases (Table 3).

Among women, about 4% were pregnant in both years. White color/race was predominant among the total number of cases, with 71.4% in 2018 and 66.2% in 2019. Regarding education, people with complete high school and complete higher education were the majority in both years, totaling 36.2% of HIV cases in 2018 and 38.5% in 2019 (Table 3).

Regarding the clinical profile, both in 2018 and 2019 more than 93% of cases had transmission other than vertically. It is noteworthy that there was a slight increase in cases of vertical transmission (VT) from 2018 to 2019, rising from 25 to 30 cases, respectively (Table 4).

Table 3. Epidemiological profile of new HIV cases between 2018 and 2019 in the state of Paraná – Maringá, PR, 2020.

Characteristics	2018		2019	
	n	%	n	%
Sex				
Male	2,209	73.8	2,186	73.0
Female	820	27.1	808	26.7
Pregnancy and trimester of pregnancy				
1st trimestre	31	1.0	48	1.6
2nd trimestre	29	1.0	34	1.1
3rd trimestre	23	0.8	21	0.7
Gestational age unknown	1	0.03	1	0.03
No	624	20.6	599	20.0
It does not apply	2,299	76.8	2,273	75.0
Unknown	22	0.7	18	0.6
Race/color				
White	2,157	71.4	2,000	66.2
Black	175	5.9	202	6.8
Yellow	14	0.5	27	0.9
Brown	568	19.0	645	21.6
Indigenous	10	0.3	8	0.3
Unknown	98	3.3	102	3.4
Education				
Illiterate	29	1.0	35	1.2
Incomplete 1st to 4th grade of elementary school	115	3.9	145	5.0
Complete 4th grade of elementary school	125	4.2	147	5.0
Incomplete 5th to 8th grade of elementary school	368	12.6	356	12.2
Complete secundary education	266	9.0	263	8.9
Incomplete high school	268	9.2	215	7.4
Complete high school	651	22,0	731	24.7
Incomplete higher education	213	7.3	225	7.7
Complete higher education	419	14.2	408	13.8
Unknown	500	17.2	388	13.3

Source: SESA-PR.

Table 4. Clinical profile of new HIV cases between 2018 and 2019 in the state of Paraná – Maringá, PR, 2020.

Characteristics	2018		2019	
	n	%	n	%
Probable mode of transmission				
Vertical				
Yes	25	0.8	30	1.0
It was not vertical transmission	2,866	95.7	2,821	93.1
Unknown	138	4.6	143	4.8
Sexual				
Sexual relations with men	1,684	55.6	1,645	54.9
Sexual relations with women	815	27.2	797	26.3
Sexual relations with men and women	159	5.2	156	5.2
It was not sexual transmission	5	0.2	10	0.3
Unknown	366	12.1	386	12.9
Blood				
Use of injectable drugs	67	2.2	73	2.4
Treatment/blood transfusion for hemophilia	2	0.07	1	0.03
Blood transfusion	14	0.5	19	0.6
Accident with biological material	0	0.0	0	0,0
Evolution of cases				
Alive	2,843	93.9	2,807	92.7
Death from aids	131	4.4	135	4.5
Death from other causes	35	1.2	38	1.3
Unknown	20	0.7	14	0.5

Source: SESA-PR.

Among people with a probable mode of sexual transmission, those who reported having sex only with men were the ones who recorded the highest number of new HIV cases, with 1,684 in 2018 and 1,645 in 2019, which corresponds to more than 50% of cases in the periods considered (Table 4).

As for cases of probable blood transmission, the use of injecting drugs stood out, with 67 cases in 2018 and 73 in 2019. It is important to note that there were no records of new cases of HIV due to accidents with biological material in any of the years analyzed. However, there were 36 new cases of HIV resulting from blood transfusion in the state of Paraná during the study period (Table 4).

Considering the situation/evolution of the cases, more than 92% of the total number of people with a new diagnosis of HIV were alive in the years considered, with a record of about 4.5% of deaths due to AIDS in both years, adding up 266 AIDS from deaths. Furthermore, 73 died from other causes (Table 4).

Discussion

The present study was necessary and timely as it aims to trace the clinical-epidemiological profile of HIV cases registered in Paraná between the years 2018 and 2019, as well as to analyze the distribution and incidence of these by MH and RH. Surveying these characteristics is important to support, direct and evaluate disease prevention and control actions by geographic area (D'Souza, Golub, & Gange, 2019; Castro et al., 2020).

AIDS is considered a chronic and incurable condition. However, with the implementation and free offer of ART by the Unified Health System (SUS) it was possible to evidence a reduction in mortality caused by the disease (Castro et al., 2020). In this sense, studies are needed to monitor the trend of infection and analyze the quality of care in each municipality (Davoglio, Gandin, & Mocellin, 2021).

In this research, it was shown that East MH had the highest number of new cases and incidence of HIV per 100,000 inhabitants in the state of Paraná, which may be related to the fact that large municipalities in Paraná are concentrated in this region, such as Curitiba and the metropolitan region, Paranaguá, Ponta Grossa, and others. However, in this study, the epidemiological and clinical characteristics did not differ from the other MH.

The use of geographic reference techniques plays a key role in the epidemiological surveillance of HIV infection, contributing to the planning and monitoring of the disease. Furthermore, it can support the need for decentralization of health actions and services, which tend to be concentrated in large centers, directing disease prevention and health promotion strategies with a view to fighting HIV (Limas et al., 2021).

In this way, the need to improve and improve public policies involving HIV/AIDS is noticeable, so that there are changes to meet the epidemiological and clinical particularities of each location, enabling a critical and singular look at the epidemic panorama of the disease (Silva et al., 2018) and health planning that considers the sociocultural specificities of PLHIV (Vu et al., 2020).

The epidemiological profile found in Paraná corroborates other studies, showing a predominance of males, aged between 20 and 49 years and with complete secondary and higher education (Gabriel, Barbosa, & Vianna, 2005; Trindade et al., 2019; Knauth et al., 2020; Santos et al., 2022). In addition, the profile of PLHIV in the state is similar to the national profile (Brasil, 2020), showing a population group that needs better attention with regard to health promotion and prevention actions.

It should be noted that the sociodemographic, economic, and clinical profile is directly linked to adherence to ART, generating a significant impact on this indicator (Tegegne, 2021). Thus, the need to identify the characteristics of PLHIV is reinforced in order to contribute to the implementation of more effective and assertive strategies to promote adherence to drug therapy.

Regarding the pregnancy-puerperal cycle, the occurrence of VT of the HIV was noticed. Furthermore, it was noted that mother-to-child transmission occurs even in the 3rd trimester of pregnancy, suggesting poor and/or low adherence to prenatal care performed in the state of Paraná. This occurs even with the logical assistance model *Rede Mãe Paraense* (Mother from Paraná Network) implemented in the state, which, if implemented, could contribute to the reduction of maternal and infant mortality (Paraná, 2018).

The lack of adherence to prenatal care was also demonstrated in a study carried out in the city of Goiânia, Goiás, between 2006 and 2011, in which the late start of prenatal care was evidenced, considering that the first consultation of 71.2% of pregnant women took place after the 1st trimester of pregnancy, contrary to the recommendations of the Ministry of Health (Barbosa, Marques, & Guimarães, 2018).

This information may suggest that there is a late capture of pregnant women, contrary to the model recommended by the *Rede Mãe Paranaense* (Paraná, 2018), whether due to lack of interest in adherence, difficulty in accessing the services of the Health Care Network (HCN) or difficulty in orientation and the

approach of these women by the services and/or health professionals involved in the pregnancy-puerperal cycle (Barbosa et al., 2018).

In this sense, there is a need for better implementation and/or execution of health actions focused on expanding the care model during the pregnancy-puerperal cycle within the HCN, in order to guarantee comprehensive care with VT prevention strategies, health promotion, early diagnosis in prenatal care and adherence to ART (Silva et al., 2018).

It should be noted that the mode of transmission of HIV has changed over the decades (Gabriel et al., 2005). In this study, a predominance of infection through sexual transmission was observed, especially in sexual relations with men, which may be justified by the fact that the male public lacks self-awareness regarding access to preventive and care services (Knauth et al., 2020).

Furthermore, the discussion about the modes of transmission of HIV and the severity of the clinical profile of PLHIV is of paramount importance to instigate and encourage the correct use of condoms, especially since unprotected sexual contact is currently the main form of transmission (Knauth et al., 2020). It is worth mentioning the need to review educational strategies on modes of transmission and prevention of HIV, especially with a view to orienting the population on the correct use of condoms.

On the other hand, it is also extremely important to adopt health education strategies with a view to diagnosing HIV infection and raising awareness of PLHIV for adherence to ART, given a growing trend in the number of infected people for getting involved with PLHIV who are unaware of their HIV status and who could benefit from ART (Castro et al., 2020).

Therefore, it is necessary to emphasize that the combination of biomedical methods and techniques, such as testing and ART coverage, with interventions and behavior change practices, which encompass the parallel sociocultural and behavioral factors that characterize greater risk and vulnerability to HIV, can be effective in terms of controlling the virus epidemic (Musumari et al., 2021).

Finally, it is worth noting that, despite the inclusion of pre-transfusional measures in the process of capturing and selecting donors and serological screening in blood centers corroborating the reduction in the possibility of transmission of agents via transfusion, it is known that there is no exemption from risks to receivers for several reasons (Carrazzone, Brito, & Gomes, 2004; Martins & Nóbrega, 2018). This fact was evidenced in this study, given the occurrence of this transmission route.

In view of the above, it is believed that the present study provides substantial and relevant data for the delineation of the clinical-epidemiological profile of HIV cases in Paraná and analysis of the distribution and incidence of the disease in each MH and RH in the state, making it possible to base and subsidize government authorities in directing the most unique and effective HIV prevention and control strategies for each region of the state.

As limitations for the study, one can point out the small-time frame used for the analysis of HIV cases in the state and that the use of secondary data implies the impossibility of predicting or controlling errors in filling out and/or recording notification forms. In this way, the continuing education of professionals with a focus on the correct filling and recording of relevant information becomes essential, aiming, also, at the reduction of underreporting.

Conclusion

It was possible to trace the clinical-epidemiological picture, distribution, and incidence of HIV cases in Paraná between 2018 and 2019, noting a predominance of men, white, with an average age of 35 years, complete high school/higher education and probably infected through sexual intercourse. As for incidence and distribution, MH East was the one with the highest number of cases and incidence coefficient in the period, with emphasis on the 2nd RH.

Such results have great potential to contribute to the analysis and local planning of actions and health services aimed at preventing HIV infection and managing PLHIV, in order to contribute to the quality of care, surveillance and control of this condition of great importance to public health, without disregarding the need to carry out new studies to better understand and correlate the variables found in the research.

References

Agostini, R., Rocha, F., Melo, E., & Maksud, I. (2019) A resposta brasileira à epidemia de HIV/aids em tempos de crise. *Ciência & Saúde Coletiva*, *24*(12), 4599-4604. DOI: https://doi.org/10.1590/1413-812320182412.25542019

Barbosa, B. L. F. A., Marques, A. K., & Guimarães, J. V. (2018). Gestantes HIV positivas e os fatores de risco relacionados à transmissão vertical do HIV. *Revista Enfermagem UFPE on-line*, *12*, 171-178. DOI: https://doi.org/10.5205/1981-8963-v12i01a23257p171-178-2018

Brasil. Ministério da Saúde. (2020). *Boletim epidemiológico HIV/aids – 2020*. Retrieved from http://www.aids.gov.br/pt-br/pub/2020/boletim-epidemiologico-hivaids-2020

Brito, A. M., Castilho, E. A., & Szwarcwald, C. L. (2001). Aids e infecção pelo HIV no Brasil: uma epidemia multifacetada. *Revista da Sociedade Brasileira de Medicina Tropical*, *34*(2), 207-17. DOI: https://doi.org/10.1590/S0037-86822001000200010

Carrazzone, C. F. V., Brito, A. M., & Gomes, Y. M. (2004). Importância da avaliação sorológica pré-transfusional em receptores de sangue. *Revista Brasileira de Hematologia e Hemoterapia*, *26*(2). DOI: https://doi.org/10.1590/S1516-84842004000200005

Castro, S. S., Scatena, L. M., Miranzi, A., Miranzi Neto, A., & Nunes, A. A. (2020). Tendência temporal dos casos de HIV/aids no estado de Minas Gerais, 2007 a 2016. *Epidemiologia e Serviços de Saúde*, *29*, e2018387. DOI: https://doi.org/10.5123/S1679-49742020000100016

D'Souza, C., Golub, E. T., & Gange, S. J. (2019). The changing science of HIV epidemiology in the United States. *American Journal of Epidemiology*, *188*(12), 2061-2068. DOI: https://doi.org/10.1093/aje/kwz211

Davoglio, R. S., Gandin, H., & Mocellin, L. P. (2021). Epidemia de HIV/aids em município da fronteira oeste do Rio Grande do Sul, Brasil: evolução, cascata de cuidados e letalidade. *Revista Brasileira de Epidemiologia*, *24*(suppl 1), e210018. DOI: https://doi.org/10.1590/1980-549720210018.supl.1

Gabriel, R., Barbosa, D. A., & Vianna, L. A. C. (2005). Perfil epidemiológico dos clientes com HIV/aids da unidade ambulatorial de hospital escola de grande porte – município de São Paulo. *Revista Latino-Americana de Enfermagem*, *13*(4). DOI: https://doi.org/10.1590/S0104-11692005000400008

Instituto Brasileiro de Geografia e Estatística [IBGE]. (2021). *Projeção da população do Brasil e das Unidades da Federação*. Retrieved from https://www.ibge.gov.br

Knauth, D. R., Hentges, B., Macedo, J. L., Pilecco, F. B., Teixeira, L. B., & Leal, A. F.(2020) O diagnóstico do HIV/aids em homens heterossexuais: a surpresa permanece mesmo após mais de 30 anos de epidemia. *Cadernos de Saúde Pública*, *36*(6). DOI: https://doi.org/10.1590/0102-311X00170118

Limas, F. M., Brandão, M. L., Luccas, D. S., Bossle, R. C., Khalaf, D. K., & Chaves, M. M. N. (2021). Análise espacial dos casos de HIV em adultos jovens e o acesso aos serviços públicos em um município do Paraná. *Revista O Mundo da Saúde*, *45*, 337-345. DOI: https://doi.org/10.15343/0104-7809.202145337347

Lopes, L. M., Magnabosco, G. T., Andrade, R. L. P., Ponce, M. A. S., Wysocki, A. D., Ravanholi, G. M., ... Monroe, A. A. (2014). Coordenação da assistência prestada às pessoas que vivem com HIV/aids em um município do estado de São Paulo, Brasil. *Cadernos de Saúde Pública*, *30*(11). DOI: https://doi.org/10.1590/0102-311X00091213

Martins, T. S., & Nóbrega, J. O. T. (2018). Segurança transfusional no Brasil: dos primórdios ao NAT. *Revista Brasileira de Análises Clínicas*, *50*(4), 321-326. DOI: https://doi.org/10.21877/2448-3877.201800693

Musumari, P. M., Techasrivichien, T., Srithanaviboonchai, K., Wanyenze, R. K., Matovu, J. K. B., Poudyal, H., ... Kihara, M. (2021). HIV epidemic in fishing communities in Uganda: a scoping review. *PLoS ONE*, *16*(4), e0249465. DOI: https://doi.org/10.1371/journal.pone.0249465

Organização Pan-Americana da Saúde. (2021). *HIV/aids*. Retrieved fromhttps://www.paho.org/pt/topicos/hivaids

Paraná. Secretaria Estadual de Saúde. (2018). *Linha Guia Rede Mãe Paranaense* (8a ed.). Curitiba, PR: SESA, 2018. Retrieved from https://www.saude.pr.gov.br/sites/default/arquivos_restritos-/files/documento/2020-09/LinhaGuiaMaeParanaense_2018.pdf

Rodrigues Neto, J. F., Lima, L. S., Rocha, L. F., Lima, J. S., Santana, K. R., & Silveira, M. F. (2010). Perfil de adultos infectados pelo vírus da imunodeficiência humana (HIV) em ambulatório de referência em doenças sexualmente transmissíveis no norte de Minas Gerais. *Revista Médica de Minas Gerais*, *20*, 22-29. Retrieved fromhttp://rmmg.org/artigo/detalhes/379

Santos, M. R., Lima, L. V., Silva, I. G. P., Monteiro, L. R. S., Cecilio, H. P. M., Gil, N. L. M., & Magnabosco, G. T. (2022).Perfil clínico-epidemiológico das pessoas acometidas por HIV/aids, tuberculose e hanseníase no Paraná, Brasil, 2010-2019. *Ciência, Cuidado e Saúde*, *21*, e61725. DOI: https://dx.doi.org/10.4025/ciencuidsaude.v21i0.61725

Silva, C. M., Alves, R. S., Santos, T. S., Bragagnollo, G. R., Tavares, C. M., & Santos, A. A. P. (2018) Panorama epidemiológico do HIV/aids em gestantes de um estado do Nordeste brasileiro. *Revista Brasileira de Enfermagem*, *71*(suppl 1), 568-576. DOI: https://doi.org/10.1590/0034-7167-2017-0495

Tegegne, A. S. (2021). Socio-demographic, economic and clinical predictors for HAART adherence competence in HIV-positive adults at Felege Hiwot Teaching and Specialized Hospital, North West Ethiopia. *HIV/AIDS (Auckland, N. Z.)*, *13*, 749-758. DOI: https://doi.org/10.2147/HIV.S320170

Trindade, F. F., Fernandes, G. T., Nascimento, R. H. F., Jabbur, I. F. G., & Cardoso, A. S. (2019). Perfil epidemiológico e análise de tendência do HIV/aids. *Journal Health Núcleo de Pesquisa e Extensão em Política, Planejamento, Organização e Práticas em Saúde*, *4*, 153-165. DOI: https://doi.org/10.30681/252610103394

Vu, G. T., Tran, B. X., Hoang, C. L., Hall, B. J., Phan, H. T., Ha, G. H., ... Ho, R. C. M. (2020). Global research on quality of life of patients with HIV/AIDS: is it socio-culturally addressed? *International Journal of Environmental Research and Public Health*, *17*(6). DOI: https://doi.org/10.3390/ijerph17062127