Disparities in HIV continuum of care in the pediatric population: a real-life study in Brazil

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Introduction

- The care cascade frames treatment indicators that ultimately lead to viral suppression among people living with HIV (PLHIV).
- The pediatric HIV epidemic has been characterized by important gaps in several steps of the HIV continuum of care
- The aims of this study were to assess indicators of the HIV continuum of care and explore the effect of age as a potential determinant of retention in care, ART use, and viral load suppression using 2019 data adjusted for potential confounders. We also investigate changes in care indicators between 2009 and 2019 across age categories.

Methods

- Data data from the Brazilian Ministry of Health HIV program
- Criteria: all PLHIV aged ≥2 years old listed in the national HIV register who ever had laboratory data performed within the Brazilian public health system
- We used univariable and multivariable logistic regression models in the 2019 dataset to assess the effects of sex, age category, race/ethnicity and municipal-level social vulnerability index (SVI) on three pre-specified outcomes:
  - timely initiation of ART based on a CD4+ T cell count ≥350cells/mm3;
  - timely initiation of ART based on a first ART dispensation ≤30 days after the first CD4+ T cell count measurement;
  - detectable HIV viral load (>50 copies/mL)
- Time-series graphic analysis using 2009 and 2019 data to assess trends overall and across age categories:
  - ART initiation with CD4+ T cell count ≥500cells/mm3;
  - Timely initiation of ART based on a first ART dispensation ≤30 days after the first CD4+ T cell count measurement;
  - Viral load suppression (≤50 copies/mL)

Results

- We included 771,774 PLHIV under care in the Brazilian Unified Health System HIV program in 2019;
- Most (65.8%) were males; (n= 426,308); 47.1% had black/mixed race/ethnicity;
- SVI was categorized as very low in 12.3%; low in 53.5%; medium in 26.7%; high in 5.2% ; and very high in 2.3%;
- Age categories comprised: 2-4yo (n= 1,748, 0.2%), 5-8yo (n= 2,004, 0.3%), 9-11yo (n=1,675, 0.2%), 12-17yo (n= 5,166, 0.7%), 18-24yo (n=49,801, 6.5%), 25-29yo (n=79,299, 10.3%), 30-49yo (n=398,708, 51.7%), and 50+yo (n=200,640, 26%);
- Children aged 2-4 years-old had the lowest proportions of retention in care, ART use and viral suppression (Figure 1);
- 2009 – 2019: Improvements in the percentages of each indicator are noticeable in all age categories except children under 12 years old (Figure 2);
- Pediatric age categories had higher odds of detectable viral load (Table 1).

Discussion

- Indicators of the HIV continuum of care are less frequently achieved among Brazilian Children living with HIV;
- The scarcity of ART options for the pediatric population represents an important barrier for the effective achievement of the 90-90-90 goals;
- Children, adolescents, and young adults living with HIV represent a remarkable challenge in clinical care as well as in public health;

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Associations between demographic variables and timely iniation of ART and detectable viral load

	Timely initiation of ART - CD4+ T cell count ≥350/mm3		
	Frequency (%)	Univariable analysis OR (95% CI)	Multivariable analysis aOR (95% CI)
Female sex	7,770 (55.5)	1.07 (1.02 – 1.11)	1.23 (1.18 – 1.29)
Male sex	19,278 (53.9)	Reference	Reference
Age category			
2-4 years old	134 (91.8)	18.67 (10.32 – 33.74)	16.49 (7.92 – 34.3)
5-8 years old	55 (78.6)	6.18 (3.46 – 10.86)	10.48 (4.03 – 27.26)
9-11 years old	30 (62.5)	2.78 (1.55 – 5.00)	3.24 (1.54 – 6.80)
12-17 years old	488 (79)	6.27 (5.14 – 7.66)	5.93 (4.75 – 7.40)
18-24 years old	6,844 (71.4)	4.18 (3.91 – 4.58)	4.42 (4.10- 4.77)
25-29 years old	5,654 (60.9)	2.60 (2.44 – 2.77)	2.68 (2.49 – 2.88)
30-49 years old	10,569 (47.6)	1.52 (1.43 – 1.60)	1.57 (1.48 – 1.68)
50+ years old	2,677 (37.4)	Reference	Reference
Race/ethnicity			
Black/mixed	12,438 (53.2)	0.86 (0.83 – 0.9)	0.89 (0.83 – 0.95)
Native Brazilian	27 (38.6)	0.48 (0.30 – 0.77)	0.42 (0.25 – 0.71)
White/Caucasian/Asian	8,988 (56.8)	Reference	Reference
Social vulnerability index			
Very high	3,163 (59.4)	0.59 (0.53 – 0.66)	0.56 (0.49– 0.64)
High	13,176 (56.8)	0.58 (0.54 – 0.64)	0.58 (0.53 – 0.64)
Medium	7,896 (51.7)	0.73 (0.69 – 0.78)	0.72 (0.67 – 0.77)
Low	1,605 (46.2)	0.89 (0.84 – 0.95)	0.89 (0.83 – 0.95)
Very low	779 (46.4)	Reference	Reference
	Timely initiation of ART - ≤30 days after the first CD4+ T cell count measurement		
	Frequency (%)	Univariable analysis OR (95% CI)	Multivariable analysis aOR (95% CI)
Female sex	8125 (52.7)	0.84 (0.81 – 0.87)	0.98 (0.93 – 1.02)
Male sex	21,186 (57.1)	Reference	Reference
Age category			
2-4 years old	37 (18.1)	0.15 (0.10 –0.21)	0.20 (0.13 – 0.30)
5-8 years old	15 (19.7)	0.17 (0.09 – 0.29)	0.25 (0.12 – 0.50)
9-11 years old	15 (30.6)	0.30 (0.16 – 0.55)	0.41 (0.20 – 0.83)
12-17 years old	351 (56.5)	0.88 (0.74 – 1.04)	1.01 (0.83 – 1.22)
18-24 years old	5,544 (57.8)	0.92 (0.87 – 0.98)	0.92 (0.8 – 1.07)
25-29 years old	5,635 (60.6)	1.04 (0.98 – 1.11)	1.0 (0.94 – 1.07)
30-49 years old	13,399 (60.3)	1.02 (0.97 – 1.08)	0.98 (0.93 – 1.02)
50+ years old	4275 (59.7)	Reference	Reference
Race/ethnicity			
Black/mixed	14255 (58.8)	0.93 (0.89 – 0.97)	0.92 (0.88 – 0,96)
Native Brazilian	38 (50.7)	0.67 (0.42 – 1.05)	0.76 (0.0,47 –1.23)
White/Caucasian/Asian	10,105 (60.6)	Reference	Reference
Social vulnerability index			
Very high	890 (49.6)	0.61 (0.55 – 0.68)	0.74 (0.65 – 0.84)
High	1,985 (53.7)	0.72 (0.68 – 0.78)	0.82 (0.74 –0.91)
Medium	8,682 (53.8)	0.72 (0.66 – 0.78)	0.78 (0.73 – 0.84)
Low	14,008 (57.6)	0.84 (0.79 – 0.89)	0.85 (0.79 – 0.91)
Very low	3,497 (61.8)	Reference	Reference
	Detectable Viral load *		
	Frequency (%)	Univariable analysis OR (95% CI)	Multivariable analysis aOR (95% CI)
Female sex	23,390 (13.9)	1. 28(1.26 – 1.31)	1.29 (1.26 – 1.31)
Male sex	31,230 (11.2)	Reference	Reference
Age category			
2-4 years old	236 (45.0)	7.76 (6.53 – 9.22)	7.07 (5.78 - 8.66)
5-8 years old	375 (35.2)	5.16 (4.55 – 5.87)	4.76 (4.11 – 5.53)
9-11 years old	287 (29.7)	4.02 (3.50 – 4.62)	3.80 (3.23 – 4.47)
12-17 years old	649 (25.4)	3.23 (2.95 – 3.53)	2.99 (2.69 – 3.32)
18-24 years old	3,434 (16.0)	1.81 (1.74 – 1.88)	1.77 (1.69 – 1.85)
25-29 years old	4,864 (12.4)	1.35 (1.30 – 1.39)	1.35 (1.30 – 1.41)
30-49 years old	30,248 (13.1)	1.44 (1.40 – 1.47)	1.41 (1.38 – 1.31)
50+ years old	11,481 (9.5)	Reference	Reference
Race/ethnicity			
Black/mixed	23,640 (13.9)	1.36 (1.33 – 1.38)	1.30 (1.27 – 1.32)
Native Brazilian	102 (18.0)	1.85 (1.49 – 2.29)	1.68 (1.35 – 2.08)
White/Caucasian/Asian	19,562 (10.6)	Reference	Reference
Social vulnerability index			
Very high	1,684 (17.4)	1.58 (1.49 – 1.68)	1.24 (1.16 – 1.32)
High	3,344 (14.9)	1.32 (1.27 – 1.38)	1.10 (1.05 – 1.16)
Medium	15,460 (12.9)	1.11 (1.09 – 1.15)	0.95 (0.9 – 1.02)
Low	26,706 (11.4)	0.97 (0.94 – 1.0)	0.93 (0.91 – 0.96)
Very low	7,225 (11.7)	Reference	Reference

Table 1. Associations between demographic variables and timely initiation of ART (based on a CD4⁺ T cell count ≥350/mm3 or ≤30 days after the first CD4⁺ T cell count measurement) and detectable viral load using univariable and multivariable logistic regression models in the 2019 dataset.
*Viral Loas > 50 copies/mL

Care Cascade – Brazil, 2019

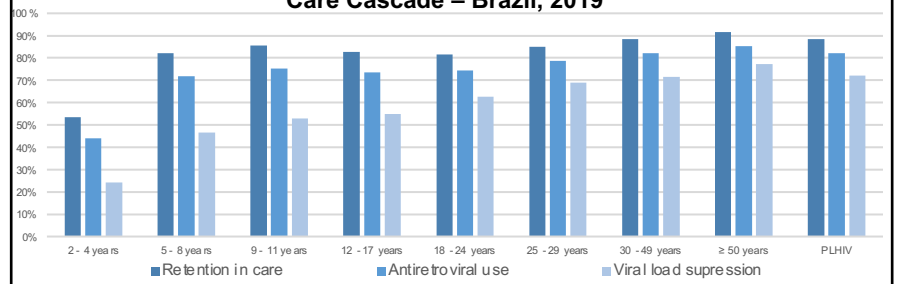

Figure 1: Retention in care, antiretroviral use and viral load suppression in people living with HIV under care in the Brazilian Unified Health System in 2019, overall and by age category (N=771,774).

Temporal trends according to age, 2009-2019

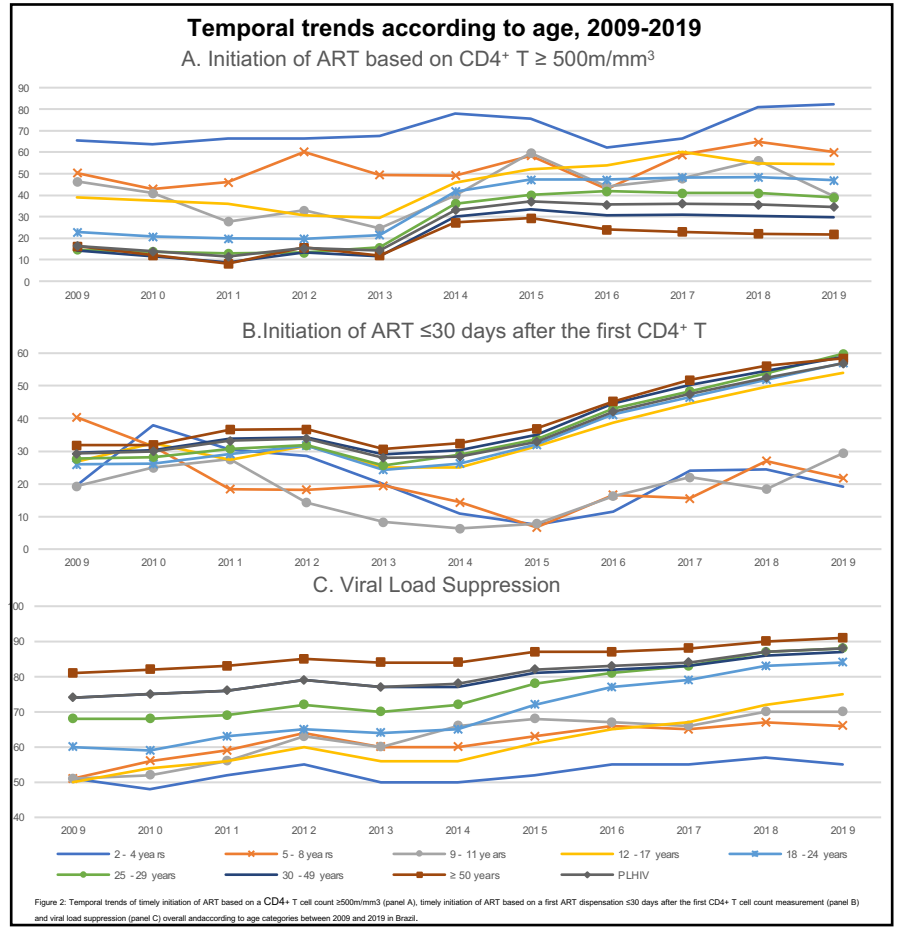

Figure 2: Temporal trends of timely initiation of ART based on a CD4+ T cell count ≥500m/mm3 (panel A), timely initiation of ART based on a first ART dispensation ≤30 days after the first CD4+ T cell count measurement (panel B) and viral load suppression (panel C) overall andaccording to age categories between 2009 and 2019 in Brazil.