INCIDENCE AND MORTALITY AMONG CHILDREN, ADOLESCENTS AND YOUNG ADULTS WITH NON-LYMPHOCYTIC LEUKEMIA IN BRAZIL: A POPULATION-BASED ANALYSIS

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BACKGROUND

The myeloid neoplasms, including acute myeloid leukemia (AML) are heterogeneous disease with varied biology. It has incidence of approximately 7 cases per million in children under 15 years old, worldwide[1-2]. Recently a study that analyzed some Brazilian Population-Based Cancer Registries (PBCR) demonstrated the differences in incidence rates of childhood leukemia in different geographical areas in Brazil [3-7]. Recently a study that analyzed some Brazilian Population-Based Cancer Registries (PBCR) demonstrated the differences in incidence rates of childhood leukemia in different geographical areas in Brazil. The objective of this study was to evaluate trends in incidence and mortality rate of non-lymphocytic leukemia (NLL) among children, adolescents and young adults (cAYA) in Brazil.

METHODS

Data on children, adolescents and young adults (aged 0-29 years) diagnosed with leucemia were obtained from the databases of 16 Population-based cancer registries (PBCRs) located in five different geographical regions of Brazil as showed in Figure 1.

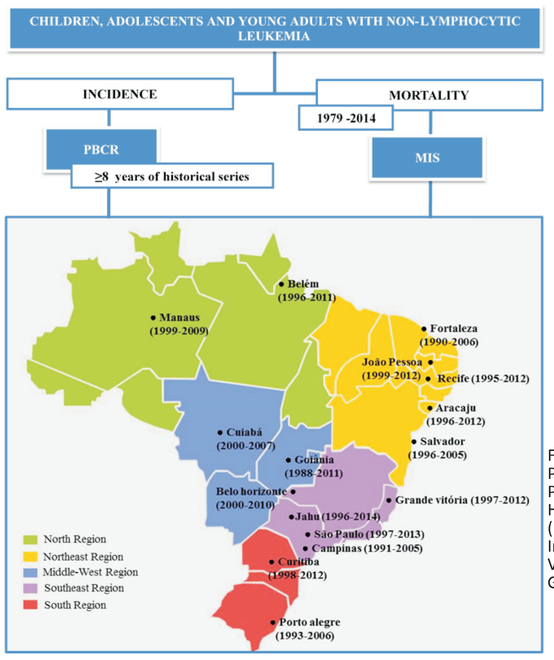

Figure 1. Illustration of the location of 16 Brazilian Population-Based Cancer Registry. Source: Population-Based Cancer Registries (PBCR); Brazilian Health Mortality Information System (MIS)/DATASUS; MS/INCA/Conprev/Divisão de Informação (www.inca.gov.br), Brazil 2017. Grande Vitória (Vitória, Cariacica, Vila Velha, Fundão, Guarapari, Serra, Viana).

STATISTICAL METHODS

Incidence data were extracted from dataset of 16 (PBCR) in Brazilian cities located in five geographical regions during the period from 1988 to 2014;

Mortality data were extracted from the databases of the Brazilian Health Mortality Information System from 1979 to 2014 for the same Brazilian cities;

Age-specific incidence (ASIR) and mortality (ASMR) rates; age-adjusted incidence (AAIR) and mortality (AAMR) rates and crude incidence and mortality rates were calculated, according PBCR cities and age groups;

Age range was stratified into five groups: younger than 1 year, 1-4 years of age, 5-9 years of age, 10-14 years of age, 15-19 years of age and 20-29 years of age;

Incidence and mortality rates were adjusted by the world population of 1960 and trends estimated from linear regression models;

To identify incidence and mortality trends a Joinpoint8 regression analyses were performed. The Annual Percent Change (APC) and Average Annual Percent Change (AAPC) were estimated.

A versão 4.5.0.1 do aplicativo Joinpoint foi utilizado (https://surveillance.cancer.gov/joinpoint);

O banco de dados será analisado por meio do pacote Statistical package for social sciences (SPSS Inc, Chicago, IL, USA), versão 18.0.

RESULTS

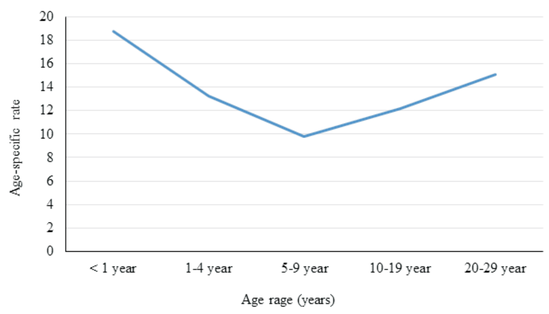

Figure 2. Median age-specific incidence rates per million of NLL in Brazilian PBCR. Source: Population-Based Cancer Registries; MP/Fundação Instituto Brasileiro de Geografia e Estatística (IBGE); MS/INCA/Conprev/Divisão de Informação (www.inca.gov.br), Brazil 2017.

Table 1. Median of cases in 16 Brazilian PBCR according to gender and leukemia subtypes

Region	PBCR (Period)	ML, N (%)	APL, N (%)	NSL, N(%)	CML, N (%)	MDS, N (%)	Total, N
North	Bélem (1996-2011)	106 (48.8)	2 (0.9)	55 (25.3)	50 (23.0)	4 (1.8)	217
	Manaus (1999-2009)	104 (59.1)	2 (1.1)	41 (23.3)	29 (16.5)	0 (0.0)	176
	Median	**54.0**	**1.0**	**24.3**	**19.8**	**0.9**	
Northeast	Aracaju (1996-2012)	29 (53,7)	1 (1.9)	8 (14.8)	12 (22.2)	4 (7.4)	54
	Fortaleza (1990-2006)	151 (65.7)	0 (0.0)	55 (23.9)	24 (10.4)	0 (0.0)	230
	João Pessoa (1999-2012)	32 (32.3)	3 (3.0)	53 (53.5)	11 (11.1)	0 (0.0)	99
	Recife (1995-2012)	115 (54.8)	5 (2.4)	51 (24.3)	37 (17.6)	2 (1.0)	210
	Salvador (1996-2005)	86 (53.1)	0 (0.0)	39 (24.1)	37 (22.8)	0 (0.0)	162
	Median	**53.7**	**1.9**	**24.1**	**17.6**	**0.0**	
Middle-West	Cuiabá (2000-2007)	17 (37.0)	1 (2.2)	20 (43.5)	8 (17.4)	0 (0.0)	46
	Goiânia (1988-2011)	119 (53.4)	4 (1.8)	49 (22.0)	34 (15.2)	17 (7.6)	223
	Median	**45.2**	**2.0**	**32.8**	**16.3**	**3.8**	
Southeast	Belo Horizonte (2000-2010)	95 (55.6)	9 (5.3)	22 (12.9)	44 (25.7)	1 (0.6)	171
	Campinas (1991-2005)	75 (77.3)	0 (0.0)	10 (10.3)	12 (12.4)	0 (0.0)	97
	Grande Vitória (1997-2012)	95 (66.0)	9 (6.3)	24 (16.7)	14 (9.7)	2 (1.4)	144
	Jahu (1996-2014)	12 (60.0)	1 (5.0)	3 (15.0)	0 (0.0)	4 (20.0)	20
	São Paulo (1997-2013)	816 (56.1)	22 (1.5)	342 (23.5)	264 (18.2)	10 (0.7)	1454
	Median	**60.0**	**5.0**	**15.0**	**12.4**	**0.7**	
South	Curitiba (1998-2012)	130 (62.8)	13 (6.3)	22 (10.6)	40 (19.3)	2 (1.0)	207
	Porto Alegre (1993-2006)	72 (54.5)	8 (6.1)	31 (23.5)	20 (15.2)	1 (0.8)	132
	Median	**58.7**	**6.2**	**17.1**	**17.3**	**0.9**	
	Brazil	**55.2**	**2.1**	**23.4**	**17.0**	**0.8**	

Note. PBCR, Population-Based Cancer Registry; N, total number of cases; ML, Myeloid leukemia; APL, Acute promyelocytic leukemia; CML, Chronic myeloid leukemia; MDS, Myelodysplastic syndromes; NSL, Nonspecific leukemia.

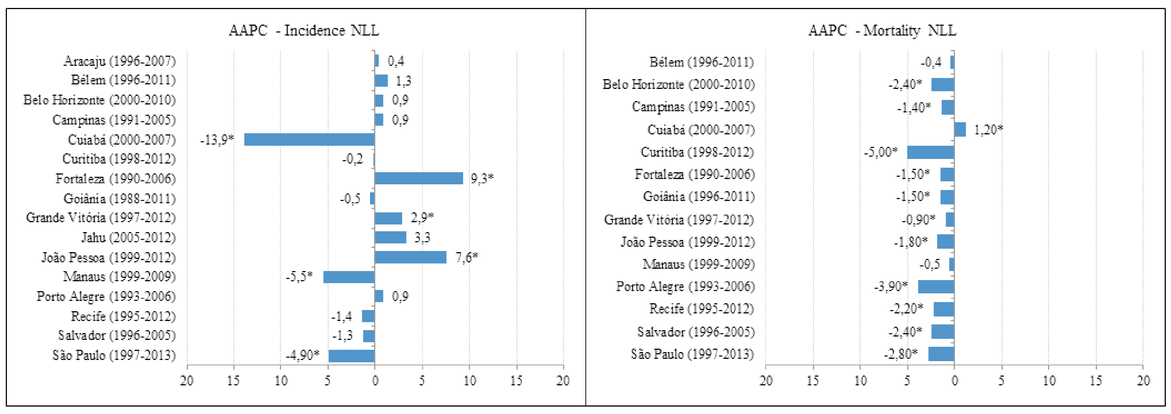

Figure 3. AAPC incidence and mortality rates of NLL in Brazilian PBCR. AAPC, Average Annual Percent Change; NLL, non-lymphocytic leukemia. *AAPC statistically significant (P-values <0.05).

Table 2. Incidence and mortality trends among children, adolescents and young adults with NLL in Brazilian PBCR

NLL	Incidence					Mortality										
	Trend 1					Trend 1			Trend 2			Trend 3				
PBCR	Year	APC	CI	AAPC	CI	Year	APC	CI	Year	APC	CI	Year	APC	CI	AAPC	CI
Aracaju (1996-2012)	1996-2007	0.4	(-4.0; 5.0)	0.4	(-4.0; 5.0)	-	-	-							-	-
Bélem (1996-2011)	1996-2011	1.3	(-0.2; 2.7)	1.3	(-0.2; 2.7)	1979-2014	-0,4	(-0.8;0.1)							-0.4	(-0.8;0.1)
Belo Horizonte (2000-2010)	2000-2010	0.9	(-1.1; 3.0)	0.9	(-1.1; 3.0)	1979-2014	-2,4*	(-2.7;-2.0)							-2.4*	(-2.7;-2.0)
Campinas (1991-2005)	1991-2005	0.9	(-0.9; 2.8)	0.9	(-0.9; 2.8)	1979-2014	-1,4*	(-2.0;-0.9)							-1.4*	(-2.0;-0.9)
Cuiabá (2000-2007)	2000-2007	-13.9*	(-20.1; -7.2)	-13.9*	(-20.1; -7.2)	1981-2013	1,2*	(0.4;2.0)							1.2*	(0.4;2,0)
Curitiba (1998-2012)	1998-2012	-0.2	(-1.5; 1.1)	-0.2	(-1.5; 1.1)	1979-2009	-1,6*	(-2.2;-1.1)	2009-2014	-23.1*	(-29.2;-16.5)				-5.0*	(-6.2;-3.8)
Fortaleza (1990-2006)	1990-2006	9.3*	(6.5; 12.2)	9.3*	(6.5; 12.2)	1979-2014	-1,5*	(-2.1;-0.9)							-1.5*	(-2.1;-0.9)
Goiânia (1988-2011)	1988-2011	-0.5	(-1.8; 0.9)	-0.5	(-1.8; 0.9)	1979-2014	-1,5*	(-1.9;-1.2)							-1.5*	(-1.9;-1.2)
Grande Vitória (1997-2012)	1997-2012	2.9*	(1.6; 4.2)	2.9*	(1.6; 4.2)	1979-2014	-0,9*	(-1.6;-0.2)							-0.9*	(-1.6;-0.2)
Jahu (1996-2014)	2005-2012	3.3	(-1.8; 8.6)	3.3	(-1.8; 8.6)	-	-	-								
João Pessoa (1999-2012)	1999-2012	7.6*	(4.1; 11.2)	7.6*	(4.1; 11.2)	1979-2005	-1,8*	(-2.7;-0.9)							-1.8*	(-2.7;-0.9)
Manaus (1999-2009)	1999-2009	-5.5*	(-7.1; -3.8)	-5.5*	(-7.1; -3.8)	1979-2014	-0,5	(-1.1;0.1)							-0.5	(-1.1;0.1)
Porto Alegre (1993-2006)	1993-2006	0.9	(-1.4; 3.2)	0.9	(-1.4; 3.2)	1979-2014	-3,9*	(-4.5;-3.4)							-3.9*	(-4.5;-3.4)
Recife (1995-2012)	1995-2012	-1.4	(-3.5; 0.7)	-1.4	(-3.5; 0.7)	1979-2005	-2,2*	(-3.1;-1.4)							-2.2*	(-3.1;-1.4)
Salvador (1996-2005)	1996-2005	-1.3	(-3.1; 0.4)	-1.3	(-3.1; 0.4)	1979-2014	-2,4*	(-2.7;-2.2)							-2.4*	(-2.7;-2.2)
São Paulo (1997-2013)	1997-2013	-4.9*	(-5.4; -4.4)	-4.9*	(-5.4; -4.4)	1979-1981	-20,5*	(-30.2;-9.5)	1981-2009	-0.3*	(-0.5;-0.1)	2009-2014	-8.7*	(-11.4;-6.0)	-2.8*	(-3.6;-2.0)

Note. NLL, non-lymphocytic leukemia; PBCR, Population-Based Cancer Registries; APC, Annual Percent Change; AAPC, Average Annual Percent Change; CI, 95% confidence interval; *APC or AAPC statistically significant (*P*-values <0.05).

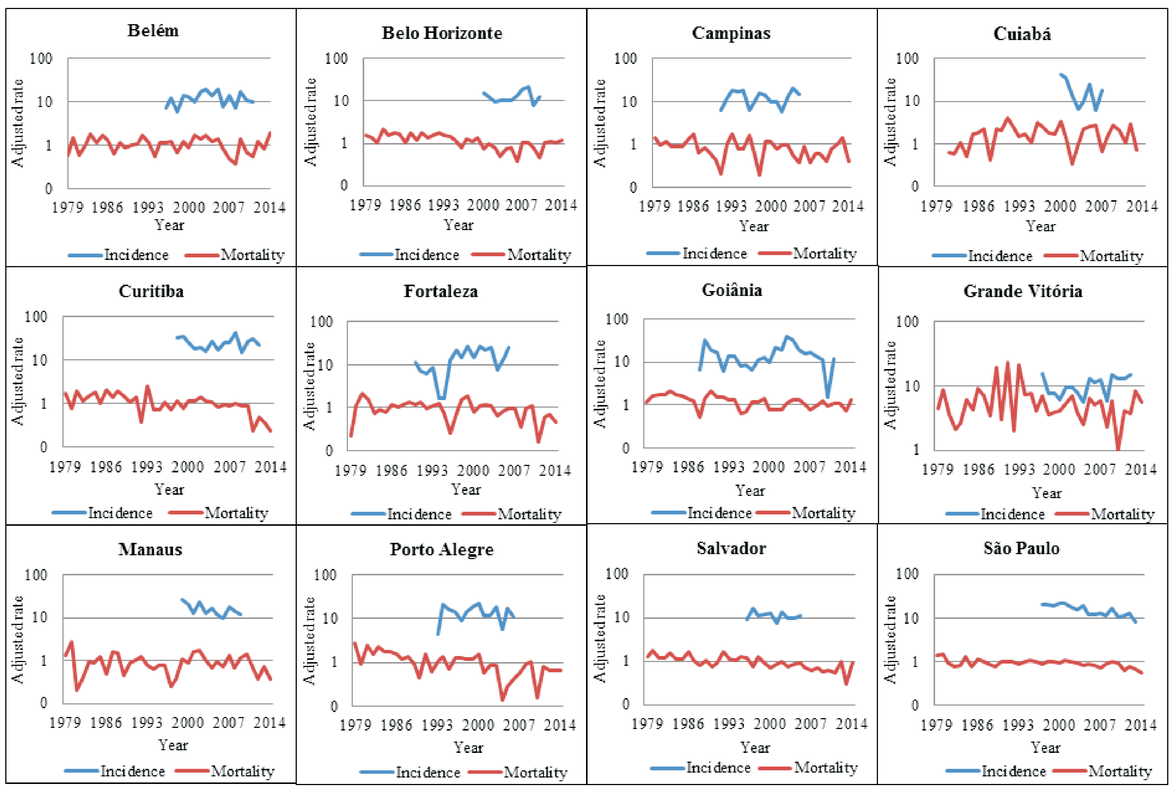

Figure 4. Historical series of distribution of the logarithm of rates incidence and mortality among NLL in Brazilian PBCR. Source: Population-Based Cancer Registries; Brazilian Health Mortality Information System (MIS)/DATASUS; MP/Fundação Instituto Brasileiro de Geografia e

CONCLUSIONS

Our data analysis demonstrated a decline of incidence rates in some cities when compared with the historical series. A substantial decrease mortality rate observed, however, could be interpreted as a clear improvement in recognition, classification and therapeutically approach of myeloid malignancies. These observations are preliminary analysis and it still need to be further explored.

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