WHERE ARE CHILDREN WITH CANCER DYING IN BRAZIL?

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Background

Childhood cancer mortality has substantially declined worldwide. In Brazil, childhood cancer mortality has declined significantly during the last few years. During the end-of-life care process, it has become increasingly important to consider the place of death (PoD); it must meet family and patient preferences and avoid unnecessary hospitalizations and treatment morbidity. Little is known about PoD of cancer patients in Brazil.

Purpose

To describe the PoD of children who died from cancer in Brazil.

Materials and Methods

For this observational population-based study, we retrieved data from the Brazilian Mortality Information System for 1996-2014 (age of death: under 15 years; cause of death: International classification of diseases, 10th codes C00-C97 and D46). We analyzed gender; death's age; geographic region of residence (North, Northeast, Midwest, Southeast, and South); city of residence (capital; non-capital); year of death; and type of tumor. The PoD was defined as home vs. hospital (HHPoD); and the geographic place of death (GPoD) as geographic region and capital vs. non-capital. Qui-squared test was done to evaluate the associations between sociodemographic and clinical features and PoD & GPoD. Logistic regression was used to identify factors associated to death at home. Crude and adjusted odds ratio and 95% confidence intervals were obtained.

Results

Most of deaths has occurred in hospitals. There was a significant association between PoD and gender, death's age, geographic region of residence, city of residence, year of death and underlying cause of death. Home deaths occurred most frequently among patients that were from the Northeast; lived in non-capital cities; older than 4 years; and had solid tumors. In contrast, 14% of children living in the North had migrated to other regions before death, and 95% of children living in other regions died in their region of residence (Table 1).

Table 1. Sociodemographic and death characteristics of children who died from cancer, according to place of death, Brazil, 1996-2014.

	Place of Death								
	HHPoD*			GPoD**					
	Hospital	Home	pvalue	North	Northeast	Midwest	Southeast	South	pvalue
	n(%)	n(%)		n(%)	n(%)	n(%)	n(%)	n(%)	
Gender									
Male	19,350 (94.0)	1,237 (6.0)		1,696 (8.1)	5,666 (26.9)	1,809 (8.6)	8,707 (41.3)	3,154 (14.9)	
Female	15,729 (94.3)	948 (5.7)	0.185	1,281 (7.5)	4,698 (27.6)	1,447 (8.5)	7,033 (41.3)	2,547 (14.9)	0.276
Death's age (years)									
<1	2,302 (95.5)	107 (4.5)		189 (7.6)	800 (32.0)	245 (9.8)	977 (39.0)	288 (11.5)	
1--4	10,640 (95.1)	548 (4.9)		981 (8.6)	3,172 (27.8)	960 (8.4)	4,611 (40.4)	1,683 (14.7)	
5--9	10,950 (93.2)	790 (6.7)		916 (7.7)	3,162 (26.4)	1,049 (8.8)	5,015 (41.8)	1,831 (15.2)	
10--14	11,195 (93.7)	742 (6.2)	<0.001	892 (7.3)	3,238 (26.6)	1,004 (8.2)	5,138 (42.2)	1,899 (15.6)	<0.001
Geographic region of residence									
North	3,145 (93.3)	226 (6.7)		2,957 (86.1)	56 (1.6)	229 (6.7)	183 (5.3)	7 (0.2)	
Northeast	9,675 (92.6)	769 (7.4)		18 (0.2)	10,304 (96.7)	96 (0.9)	231 (2.2)	4 (0.1)	
Midwest	2,788 (93.1)	208 (6.9)	<0.001	2 (0.1)	3 (0.1)	2,886 (94.6)	130 (4.3)	28 (0.9)	<0.001
Southeast	14,269 (95.4)	694 (4.6)		0 (0)	8 (0.1)	46 (0.3)	15,135 (99.4)	32 (0.2)	
South	5,210 (94.7)	290 (5.3)		1 (0.1)	1 (0.1)	1 (0.1)	62 (1.1)	5,630 (98.8)	
City of residence									
Capital	9,526 (94.7)	532 (5.3)		1,288 (12.6)	2,716 (26.6)	1,236 (12.1)	4,199 (41.2)	749 (7.4)	
Non-capital	25,561 (93.9)	1,655 (6.1)	0.004	1,690 (6.1)	7,656 (27.4)	2,022 (7.3)	11,542 (41.4)	4,952 (17.7)	<0.001
City of death									
Capital	24,811(97.7)	584(2.3)		2,502(9.9)	8,175(32.2)	2,811(11.1)	8,977(35.3)	2,930(11.5)	
Non-capital	10,726(86.5)	1,603(13.5)	<0.001	424(3.6)	1,996(16.8)	387(3.3)	6,499(54.7)	2,573(21.7)	<0.001
Year of death									
1996-2002	12,599 (92.0)	1,098 (8.0)		880 (6.3)	3,410 (24.2)	1,203 (8.6)	6,234 (44.3)	2,340 (16.6)	
2003-2008	11,404 (94.6)	654 (5.4)		974 (7.9)	3,524 (28.6)	1,098 (8.9)	4,965 (40.3)	1,739 (14.1)	
2009-2014	11,084 (96.2)	435 (3.8)	<0.001	1,124 (9.6)	3,438 (29.4)	957 (8.2)	4,542 (38.8)	1,622 (13.8)	<0.001
Basic cause of death									
Hematological tumors	15,090 (96.9)	479 (3.1)		1,562 (9.8)	4,350 (27.3)	1,350 (8.5)	6,319 (39.7)	2,317 (14.5)	
Solid tumors	19,997 (92.1)	1,708 (7.9)	<0.001	1,416 (6.4)	6,022 (27.1)	1,908 (8.6)	9,422 (42.5)	3,384 (15.2)	<0.001

*HHPoD - Hospital and Home Place of Death; **GPoD - Geographic Place of Death

Females were less likely to die at home; comparing to infant (<1 year), those aged 5-9 and 10-14 years were more likely to die at home. Residence's geographic regions were associated with home death. Children living in capital cities had a smaller chance to die at home. Children with solid tumors were 3-times more likely to die at home, compared to children with hematologic disease. (Table 2).

Table 2. Factors associated with home deaths vs. hospital deaths in children who died from cancer, Brazil, 1996-2014.

	Crude OR (95% CI)	Adjusted OR (95% CI)	p-value
Female vs. Male	0.94 (0.86-1.02)	0.88 (0.81-0.97)	0.01
Death's age (years) (ref. <1)			
1--4	1.11 (0.89-1.37)	1.37 (1.10-1.71)	
5--9	1.55 (1.26-1.91)	2.18 (1.76-2.70)	
10--14	1.43 (1.16-1.76)	1.93 (1.56-2.39)	0.04
Geographic region (residence) (ref. SE)			
North	1.48 (1.27-1.73)	1.82 (1.55-2.13)	
Northeast	1.64 (1.47-1.82)	1.73 (1.56-1.93)	
Midwest	1.54 (1.31-1.81)	1.69 (1.44-1.99)	
South	1.15 (1.00-1.32)	1.12 (0.97-1.29)	<0.001
Capital vs. non-capital	0.86 (0.78-0.95)	0.76 (0.69-0.85)	<0.001
Year of death (ref. 1996-2002)			
2003-2008	0.65 (0.59-0.72)	0.59 (0.53-0.66)	
2009-2014	0.44 (0.39-0.50)	0.40 (0.36-0.45)	<0.001
Solid tumors vs. hematological	2.69 (2.42-2.98)	2.95 (2.65-3.27)	<0.001

SE = Southeast; * Adjustments were made by all other variables

In all regions, children that lived in capital cities most often died in capital cities. In the South and Southeast regions, children that lived in non-capital cities died most often in non-capital cities. However, in the North, Northeast, and Midwest regions, children that lived in non-capital cities often migrated to die in capital cities (Fig. 1).

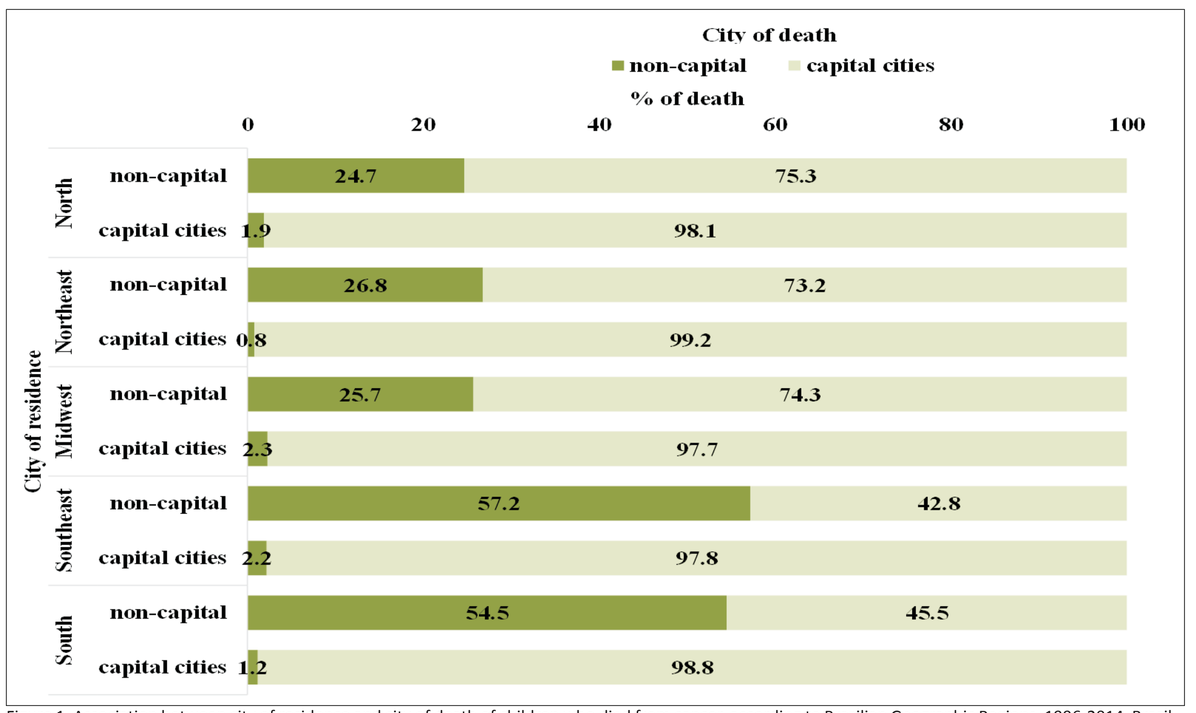

Figure 1. Association between city of residence and city of death of children who died from cancer, according to Brazilian Geographic Regions, 1996-2014, Brazil, 1996-2014.

Conclusion

The hospital was major PoD and patients from the North region tended to migrate from the place of residence to the place of death. Death at home occurred more often among children that lived in non-capital cities compared to capital cities. Children from the North, Northeast, and Midwest regions tended to migrate from non-capital cities to capital to die. There are important differences in the place of death among Brazilian regions, which may occur due to cultural attitudes towards death, religious values, socioeconomic issues, and the availability of multidisciplinary specialized teams.

Projeto Gráfico: Área de Edição e Produção de Materiais Técnico-Científicos / INCA