

DECLINE IN CARDIOVASCULAR DISEASE MORTALITY IN THE CITY OF S. PAULO, BRAZIL, 1970 TO 1983

Cecília Amaro de Lolio*
José Maria Pacheco de Souza*
Ruy Laurenti*

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ABSTRACT: Mortality from all causes as well as from the great groups of cardiovascular diseases for the residents of the city of S. Paulo, Brazil, of the ages-group 40-69, for the years 1970 to 1983, has been analysed by means of the specific death rates. During this period a statistically significant decline was observed (28% on the average for ischemic heart diseases and 16% for cerebrovascular diseases). The death rates for the group 40-69 years old for both sexes were age-standardized and compared with those of 27 industrialized countries. The S. Paulo standardized death rates ranked almost always very high in the comparisons.

UNITERMS: Cardiovascular diseases, mortality. Mortality trends. Death, causes. Risk.

INTRODUCTION

In the last eight years, several authors have described a decline in the mortality from cardiovascular diseases in the United States and in several other industrialized countries, for these diseases as a whole^{6,12,13,17}, and for their great groupings, such as ischemic heart diseases^{3,5} and cerebrovascular diseases¹⁵ a decline that cannot be ascribed to statistical artefacts⁶. The search for explanations for this fact is important, mainly as an attempt to discover the impact of those measures associated with a reduction of risk factors¹⁶ and of those related to better medical care. The first step suggested for this type of research consists in the surveillance of the mortality and morbidity statistics for these diseases, preferably for administrative subunits smaller than a country, such as cities⁵.

In the city of S. Paulo an increase of cardiovascular disease mortality (both as a whole and in its great groupings) was observed from 1970 to 1973^{7,8}. In S. Paulo also, the mortality from these diseases was high in 1960-1962 when an international investigation into the urban mortality of adults was conducted¹⁴. Since 1976, however, a decline of the mortality from ischemic heart diseases has been observed with a reduction of 20% in the age-standardized death rates for the period 1976-1981⁹.

The purpose of this paper is to investigate the magnitude of the mortality from all causes and the mortality from the great groups of cardiovascular diseases for the age group 40-69 in the city of S. Paulo, and to compare it with those of 27 indus-

trialized countries^{13,17}, as well as to describe its evolution for the period from 1970 to 1983.

MATERIAL AND METHODS

Data source

Deaths, from all causes as well as from the great groupings of cardiovascular diseases, for residents of the city of S. Paulo of both sexes and of all ages as well as of the age group 40-69, were taken from the microfiches of the "Fundação Sistema Estadual de Análise de Dados" (SEADE) for the years 1970 to 1983**.

The population data were taken from the censuses for 1970*** and 1980⁴. The population estimates for the years 1971-1979 were made by means of linear interpolation; for 1981-1983, the population of each age group according to sex was obtained by means of linear projection using the data of the census of 1980⁴ and the projections for 1985 by the method of the components¹.

Analysis

Specific sex, age (five-year groups) and cause of death rates were calculated; the deaths were analysed as part of a continuous trend although they were coded until 1978 according to the 8th Revision of the International Classification of Diseases (ICD-8)¹⁰ and, after 1978, according to the 9th Revision of the ICD (ICD-9)¹¹.

* Department of Epidemiology of the School of Public Health - University of S. Paulo - Av. Dr. Arnaldo, 715 - 01255 - São Paulo, SP - Brazil.

** Deaths of residents in the city of S. Paulo, according to sex and detailed cause, 1970-1983 (microfiches of SEADE - non-published data).

*** SEADE - Population enumerated in 1970 at the 8th General Census with adjustment by SEADE for July 1, 1980. Non-published data.

The great groupings of cardiovascular diseases were maintained in both Revisions with the same codes. The whole of cardiovascular diseases (390-458), the ischemic heart diseases (410-414) and the cerebrovascular diseases (430-438) were analysed. For the purpose of analysis, another grouping was formed with the name "Heart Diseases" (390-398 and 410-429) which excludes from the cardiovascular diseases those of the arteries, veins and lymphatic vessels.

Linear regression tests were performed, using the t statistics with $n - 2$ degrees of freedom², with a 5% level of significance, in order to evaluate whether the observed trend was significantly smaller than zero ($H_0 : \beta = 0$; $H_1 : \beta < 0$).

In order to permit comparison with the data from 27 industrialized countries analysed by other authors^{13,17}, the death rates for the age group 40-69 were age-standardized, using the same weights utilized by those authors, which correspond to the age distribution of the European population. The weighting system is the following:

Age Group	Weight
40 - 44	7/36
45 - 49	7/36
50 - 54	7/36
55 - 59	6/36
60 - 64	5/36
65 - 69	4/36
40 - 69	1

RESULTS

Tables 1 through 5 present, respectively, the death rates from all causes, from cardiovascular diseases, ischemic heart diseases, cerebrovascular diseases and heart diseases, for the period 1970 to 1983, according to sex and the five year age groups, as well as the general and the standardized death rates. The value of t is also presented. Figures 1 through 5 compare death rates for the age groups 40 - 69, according to sex and to the great groupings of diseases in the city of S.Paulo in 1980, with those of 27 industrialized countries.

Mortality From All Causes

The mortality from all causes increased from 1970 to 1974 for all ages and for the age group 40-69 as a whole (Table 1), when it began to decline consistently in all five year age groups and for both sexes. The decline over the whole period, taking the rates of 1970 as the bases, is statistically significant. For males, a reduction of 9.1% was observed and for females, 16.9%. The mortality from all causes is always greater for males and increases with age.

When compared with other countries (Figure 1), the all causes mortality for the age-group 40-69 in 1980 is high: in males only three countries had greater mortality and in females, Brazil ranked first.

Mortality From Cardiovascular Diseases

Cardiovascular disease mortality declined 15.1% in the group 40-69 from 1970 to 1983, and 24% for

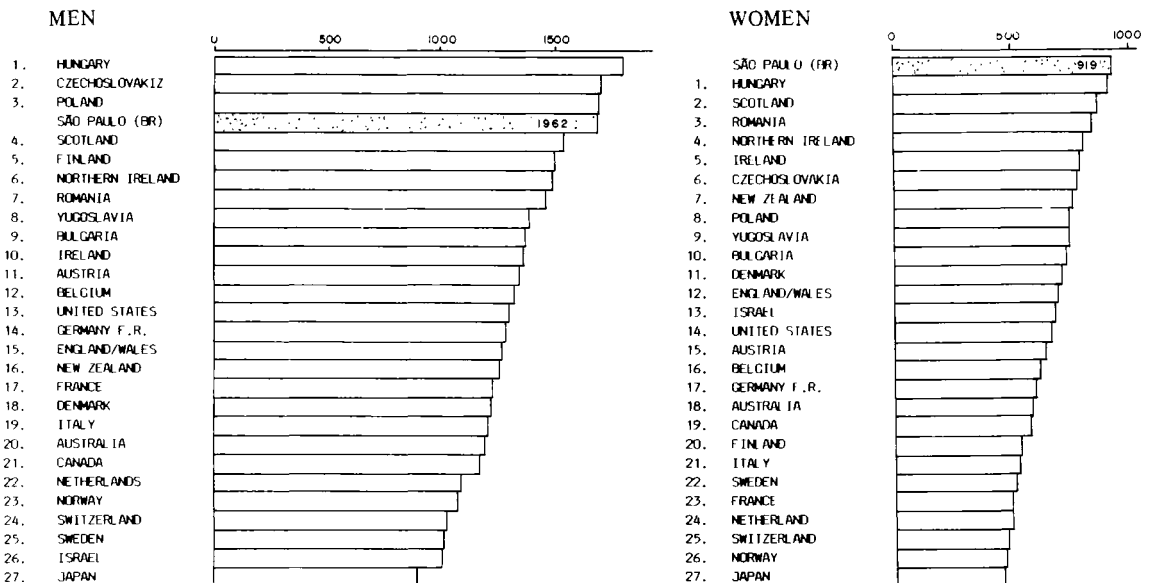


Fig. 1 - Age-standardized death rates from all causes in 1980 (rates per 100,000 population aged 40-69).

females for the same age group, in the same period (Table 2). Cardiovascular disease mortality is also always greater for males and increases with age. The observed decline is significant for all five year groups with the exception of the 45-49 group.

The comparison of mortality in the city of S. Paulo with that of other countries, shows it to be very high: it ranks between the 5th and the 6th position for males and between the 1st and 2nd for females (Figure 2).

Mortality From Ischemic Heart Diseases

Ischemic heart disease mortality is always greater for males and increases with age (Table 3). The observed decline for the age group 40-69 (21% for males and 34% for females) is significant for all five year age groups of both sexes with the exception of the females 40-44 and the males/females 45-49 years old.

In the comparison of the city of S. Paulo with other countries, ischemic heart disease occupies an intermediate position (Figure 3).

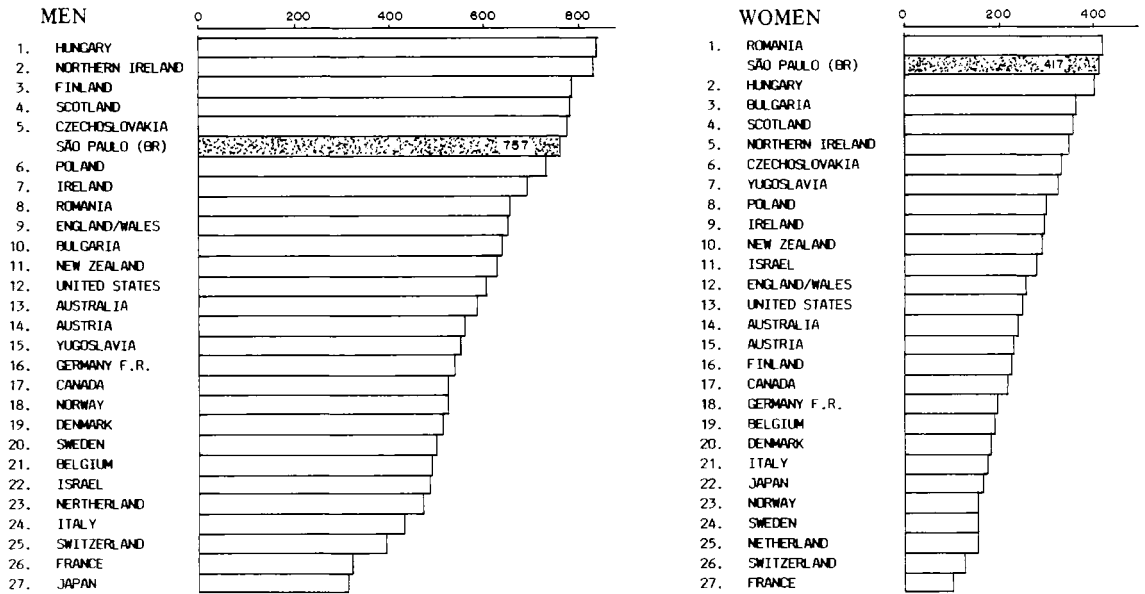


Fig. 2 - Age-standardized death rates from cardiovascular diseases in 1980 (rates per 100,000 population aged 40-69).

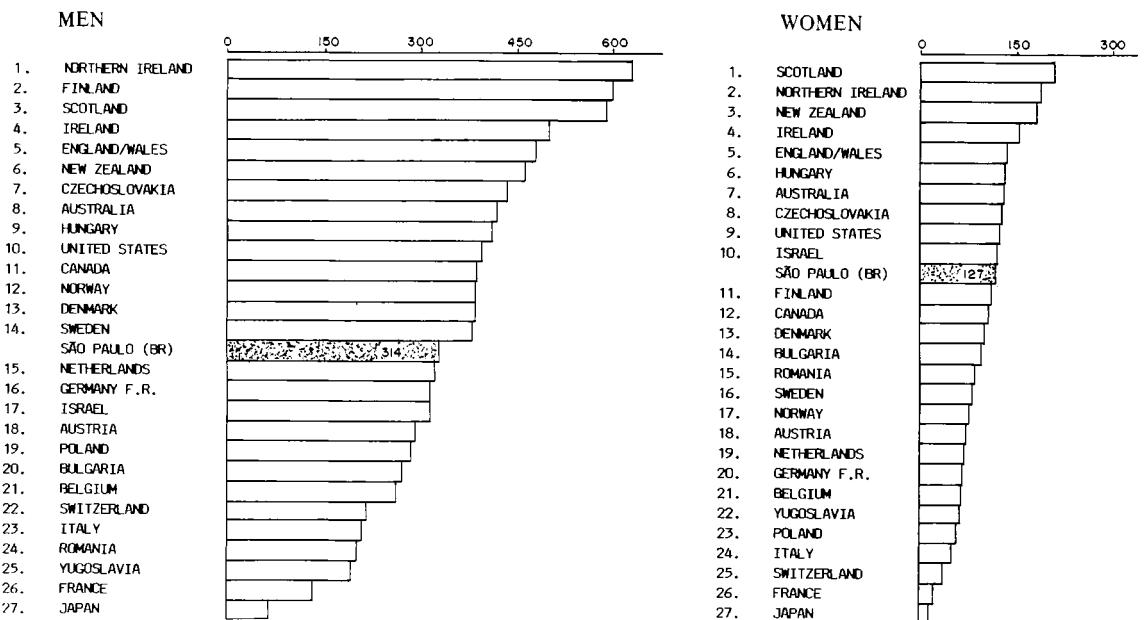


Fig. 3 - Age-standardized death rates from ischemic heart diseases in 1980 (rates per 100,000 population aged 40-69)

Mortality From Cerebrovascular Diseases

Cerebrovascular disease mortality is also always greater for males and increases with age (Table 4). The observed decline for the age groups 40-69 is 10.9% for males and 21.4% for females, during the period 1970-1983. This decline, however, is only significant for the oldest five year groups (Table 4).

In the comparison with the other countries, the high cerebrovascular mortality in the city of S. Paulo, similar to that of the European countries of higher mortality (Figure 4), can be seen.

Mortality From Heart Diseases

Heart disease mortality is always greater for males and increases with age (Table 5). The decline observed for the period 1970 to 1983 is of 17.5% for males and of 24% for females, for the age group

40-69. This decline, however, is not statistically significant for the five year groups 40-44 (females) and 45-49 (males).

In the comparison with other countries, heart disease mortality in the city of S. Paulo (1980) is situated at an intermediate level (Figure 5) for males and at a higher level for females.

Summary Of The Results

A decline of the mortality from all causes and for the great groupings of cardiovascular diseases took place for all ages as well as for the age group 40-69. This trend is statistically significant but this fact does not minimize the importance of these diseases in the city of S. Paulo because the risk of dying from these diseases in the age group 40-69 is high when compared with that of industrialized countries.

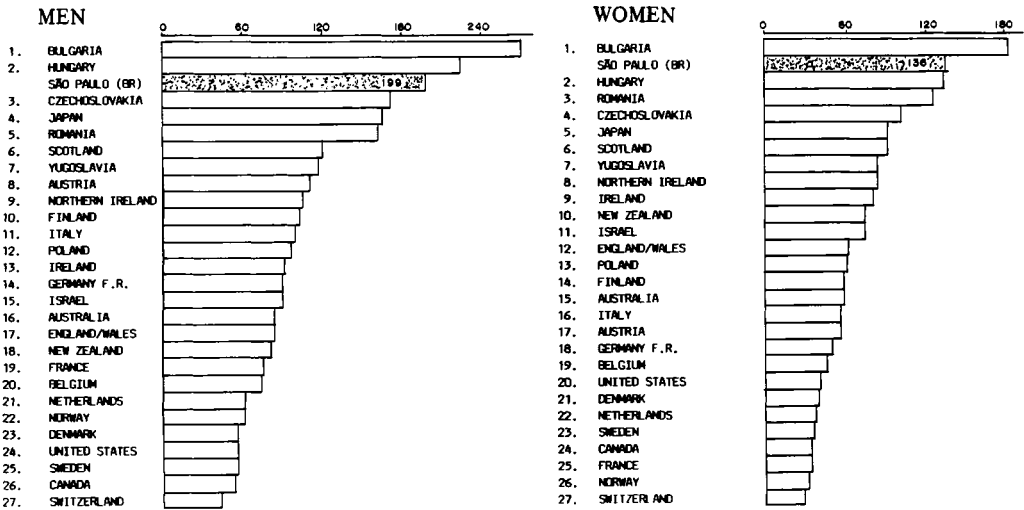


Fig. 4 - Age-standardized death rates from cerebrovascular diseases in 1980 (rates per 100,000 population aged 40-69)

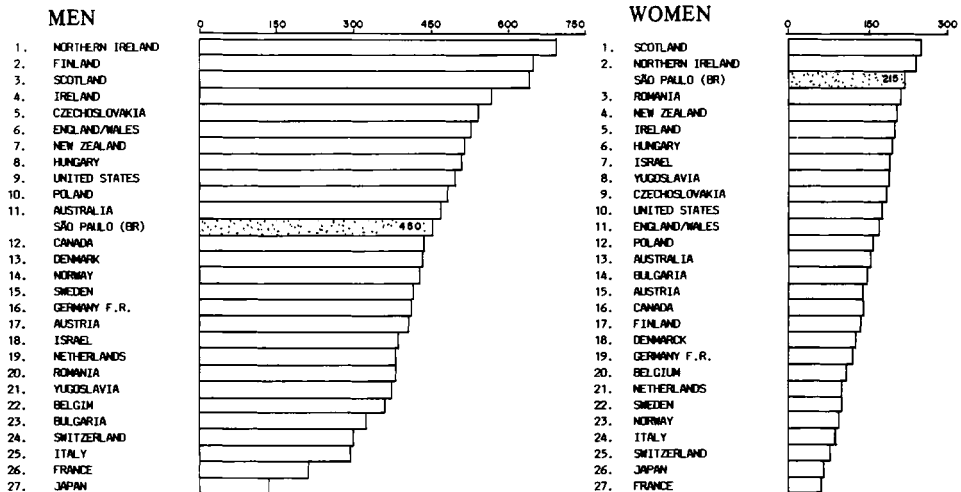


Fig. 5 - Age-standardized death rates from heart diseases in 1980 (rates per 100,000 population aged 40-69).

TABLE I
Death rates from all causes, according to sex and age, and age-standardized death rates for residents of the city of S. Paulo, Brazil, 1970 to 1983 (per 100,000 population)

Year	All ages	Age group in year																		Age-standardized 40-69	
		40-44		45-49		50-54		55-59		60-64		65-69		40-69		40-69					
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F				
1970	891.8	645.0	707.2	368.5	904.7	488.7	1392.5	746.7	2043.4	1138.1	3136.6	1740.8	4346.2	2688.0	1561.7	908.3	1843.3	1042.0			
1971	931.0	674.5	733.9	363.7	957.7	456.0	1367.3	752.7	2090.7	1161.2	3126.4	1709.0	4289.6	2647.3	1582.6	900.5	1854.1	1030.8			
1972	940.2	676.4	739.2	358.6	1021.5	527.4	1397.8	694.8	1995.4	1089.4	3068.0	1761.3	4375.8	2626.8	1595.8	901.7	1859.0	1025.4			
1973	988.6	694.7	821.2	386.5	1053.6	500.8	1470.7	710.1	2038.4	1118.3	3225.9	1837.3	4324.3	2679.6	1660.6	925.4	1918.8	1049.9			
1974	949.1	682.1	764.8	365.7	1002.7	535.6	1398.4	710.1	1910.6	1122.1	3116.7	1867.4	4147.4	2446.4	1581.7	914.4	1827.7	1031.5			
1975	903.6	655.7	671.0	360.6	979.5	530.9	1347.6	675.3	1734.6	972.6	2948.5	1738.9	4167.5	2344.3	1504.2	863.6	1744.6	968.7			
1976	882.0	647.7	639.6	330.5	980.9	553.4	1289.2	707.0	1832.7	1029.3	3063.0	1668.7	4145.6	2431.4	1511.9	876.5	1757.3	982.8			
1977	835.8	607.0	664.1	336.1	958.1	488.8	1278.8	685.5	1836.6	953.1	2845.9	1635.9	3917.6	2356.4	1474.8	840.8	1700.7	941.6			
1978	825.6	591.1	628.8	302.5	976.2	497.2	1346.1	650.8	1820.1	951.8	2700.4	1625.5	4040.9	2357.2	1476.8	827.8	1701.2	928.3			
1979	805.9	575.0	645.6	317.6	893.7	457.3	1246.2	654.2	1821.6	969.0	2799.0	1505.8	3829.7	2429.8	1440.4	820.8	1659.5	918.5			
1980	796.6	562.5	648.0	327.7	941.4	483.4	1247.9	639.3	1924.5	980.1	2733.5	1456.0	3962.5	2305.1	1471.9	812.8	1692.4	903.7			
1981	773.4	549.2	588.8	303.1	848.2	420.6	1270.3	632.5	1823.0	947.2	2603.6	1409.5	3932.6	2254.0	1412.6	779.1	1628.8	867.8			
1982	764.0	530.0	591.5	301.4	864.0	415.1	1168.3	599.4	1865.8	914.1	2640.9	1406.5	3931.0	2291.7	1402.5	771.1	1624.7	858.2			
1983	759.6	521.1	604.4	283.0	867.1	450.4	1269.2	618.7	1940.6	921.6	2665.7	1434.3	4040.4	2249.4	1456.8	780.4	1675.5	865.7			
t*	6.325**	7.528**	4.506**	6.749**	2.747*	3.807**	4.610**	8.995**	2.919**	6.749**	7.528**	5.954**	5.071**	6.749**	5.200**	9.487**	-	-	-		

* t test, period 1970-1983 (12 d.f.).

+ p ≤ 0.05 (critical t = 1.782)

** p ≤ 0.01 (critical t = 2.821)

TABLE 2
Death rates from cardiovascular diseases, according to sex and age, and age-standardized death rates for residents of the city of S. Paulo, Brazil, 1970 to 1983
(per 100,000 population)

Year	Age group in year																		Age-standardized 40-69	
	All ages		40-44		45-49		50-54		55-59		60-64		65-69		40-69		M	F		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F						
1970	270.2	229.9	192.2	116.7	313.9	174.9	567.6	331.9	916.0	557.6	1649.1	903.1	2396.9	1533.9	690.6	430.6	856.8	510.0		
1971	273.7	229.6	202.7	122.1	335.5	192.3	589.3	305.0	943.6	535.0	1627.2	868.4	2289.9	1478.4	698.5	421.6	856.9	494.5		
1972	262.1	219.7	185.8	124.6	331.9	193.6	593.1	267.2	914.1	468.1	1526.5	807.5	2231.7	1383.1	677.4	393.4	828.3	457.7		
1973	277.6	225.0	227.8	123.9	343.0	193.7	590.2	292.0	957.5	479.0	1556.3	857.7	2295.7	1413.7	706.8	408.7	856.6	474.6		
1974	262.6	225.8	203.4	121.7	353.6	185.6	553.4	306.8	902.3	551.1	1550.7	888.7	2105.0	1271.1	675.3	412.1	815.6	416.2		
1975	257.4	214.7	214.1	133.7	351.6	189.8	551.8	282.7	815.5	433.2	1421.9	836.3	2247.6	1226.2	664.6	386.4	800.4	442.5		
1976	254.9	226.3	196.6	129.5	349.1	209.3	535.0	311.1	812.5	465.7	1508.0	850.6	2159.5	1314.1	659.3	409.6	794.9	468.1		
1977	243.6	205.6	193.2	126.4	372.0	177.3	515.5	273.9	832.4	413.5	1360.4	797.1	2049.6	1220.8	640.8	374.4	765.5	427.6		
1978	245.3	210.1	187.2	108.9	353.5	198.1	571.9	277.8	866.5	426.7	1333.0	809.7	2084.4	1270.0	651.8	383.6	777.5	438.4		
1979	245.7	208.9	197.6	116.1	329.2	164.0	527.2	268.0	868.8	449.3	1371.5	771.9	2001.1	1266.6	639.9	357.9	762.6	429.4		
1980	245.4	211.7	203.2	121.6	356.4	201.5	514.3	256.9	882.3	444.6	1296.6	721.4	1988.3	1172.0	639.3	369.3	756.9	417.3		
1981	232.5	204.3	183.4	115.8	298.7	171.3	521.0	248.5	845.1	408.9	1248.7	669.4	1937.0	1163.5	610.0	348.9	724.6	394.5		
1982	229.2	196.4	172.6	91.9	312.5	158.4	474.1	235.5	781.9	397.5	1245.0	654.7	1948.0	1164.7	593.5	335.6	676.8	381.1		
1983	234.6	202.9	175.2	105.7	303.2	174.2	525.5	252.1	836.2	390.1	1248.0	651.3	1976.7	1157.7	613.5	344.5	727.5	387.6		
t*	8.563++	6.325++	2.021+	2.270+	0.933	1.380	4.406++	4.610++	3.038++	4.948++	11.952++	6.987++	8.181++	6.749++	8.563++	7.838++	-	-		

* t test, period 1970-1983 (12 d.f.).
+ p ≤ 0.05 (critical t = 1.782)
++ p ≤ 0.01 (critical t = 2.821)

TABLE 3
Death rates from ischemic heart diseases, according to sex and age, and age-standardized death rates for residents of the city of S. Paulo, Brazil, 1970 to 1983 (per 100,000 population)

Year	Age group in year																		Age-standardized 40-49	
	All ages		40-44		45-49		50-54		55-59		60-64		65-69		70-74		M	F		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
1970	113.1	74.9	82.1	24.7	136.4	45.2	287.0	98.4	402.0	194.2	779.0	344.3	1071.7	572.3	315.8	141.3	392.6	170.9		
1971	113.8	74.9	87.5	24.4	136.7	40.5	264.0	76.6	446.7	176.3	742.7	331.2	1006.2	544.4	311.9	135.0	384.3	163.4		
1972	113.6	73.5	71.6	23.7	161.7	49.8	282.4	84.0	464.8	149.1	746.2	276.0	1017.0	576.2	321.3	131.6	394.4	157.8		
1973	115.1	77.6	75.4	28.0	152.5	53.1	267.3	85.5	473.9	161.2	736.5	343.6	1048.7	551.2	321.1	141.3	394.1	168.2		
1974	110.2	79.2	77.5	22.8	145.0	44.5	245.3	91.7	400.7	165.1	708.0	353.1	989.0	479.5	299.5	135.3	366.0	160.8		
1975	114.2	77.6	89.4	28.4	153.5	51.7	266.5	82.2	391.1	148.7	690.8	314.7	1100.0	458.9	314.6	128.7	382.4	151.0		
1976	109.8	83.4	88.6	32.3	162.2	60.8	264.4	91.8	370.1	146.1	648.5	324.7	975.3	500.3	300.2	138.0	360.3	161.0		
1977	106.6	72.7	78.4	27.3	172.2	47.3	247.1	66.2	379.6	134.9	636.6	295.3	920.3	507.6	293.0	125.1	350.7	147.4		
1978	107.7	76.9	76.1	24.4	165.5	49.1	272.8	81.4	428.5	153.8	638.9	294.1	938.4	545.6	305.0	133.9	364.4	157.2		
1979	103.3	73.2	85.5	27.6	145.4	40.2	271.9	75.5	392.4	140.9	632.7	298.8	845.9	521.8	290.9	128.6	345.0	150.0		
1980	98.7	67.8	80.9	26.5	144.4	38.7	240.8	60.9	412.3	131.0	537.7	232.6	855.7	438.6	277.9	109.5	329.1	127.4		
1981	93.6	66.8	74.7	20.9	124.9	41.0	233.6	57.9	382.2	117.5	563.4	224.3	792.7	426.1	264.7	104.4	314.3	121.4		
1982	91.8	63.7	63.1	14.0	125.7	35.0	212.4	59.7	348.1	125.1	503.1	228.1	812.1	392.9	248.5	100.8	296.1	117.3		
1983	94.7	68.1	53.9	17.5	137.2	40.1	237.0	53.0	375.9	111.8	519.8	219.4	827.9	410.6	260.8	100.3	310.1	112.8		
t*	7.528**	1.874*	2.021*	1.679	0.933	1.630	3.568**	4.718**	2.582*	6.987**	13.784**	4.830**	6.325**	3.716**	6.529**	5.477**	-	-	-	

* t test, period 1970-1983 (12 d.f.).

+ p ≤ 0.05 (critical t = 1.782)

** p ≤ 0.01 (critical t = 2.821)

TABLE 4
Death rates from cerebrovascular diseases, according to sex and age, and age-standardized death rates for residents of the city of S. Paulo, Brazil, 1970 to 1983 (per 100,000 population)

Age Sex Rate	Age group in year																		Age-standardized 40-69		
	40-44		45-49		50-54		55-59		60-64		65-69		40-69		40-69		40-69				
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
1970	74.1	72.8	49.0	37.0	78.8	51.9	133.3	124.0	239.7	180.0	436.7	276.0	641.7	487.6	178.5	138.5	222.7	163.9			
1971	77.3	72.2	62.0	38.0	80.7	69.5	150.0	93.6	244.4	158.6	453.0	288.6	671.5	464.4	190.6	134.4	235.2	157.2			
1972	74.0	68.5	53.8	40.5	75.3	72.2	160.8	82.5	240.8	156.0	410.3	231.4	619.6	398.5	181.0	122.0	222.3	140.4			
1973	77.6	69.3	69.7	42.3	90.5	68.8	154.7	94.9	247.1	151.8	357.5	241.2	628.4	400.3	184.5	125.0	221.9	143.3			
1974	75.2	74.1	58.1	43.1	100.6	66.7	152.9	113.1	241.6	212.0	440.1	265.4	515.3	403.4	183.0	140.0	219.2	160.4			
1975	74.9	69.5	55.6	49.0	102.4	66.7	151.4	114.4	225.3	134.4	395.7	270.1	610.1	406.5	176.8	126.8	220.5	149.8			
1976	71.3	70.9	45.2	42.3	83.1	71.0	128.9	107.2	216.1	158.2	462.3	268.6	589.3	413.6	170.1	129.0	215.7	152.5			
1977	66.1	65.0	47.2	47.8	100.5	62.3	131.9	105.3	216.0	135.7	331.0	247.3	543.3	381.7	164.6	125.1	196.7	141.3			
1978	64.4	65.1	52.1	39.0	88.1	70.6	139.0	97.0	211.6	140.7	321.3	253.8	551.4	372.0	163.9	124.0	195.4	140.2			
1979	66.4	64.3	55.8	42.3	96.6	62.6	127.6	96.0	220.1	152.0	350.3	228.7	549.4	361.7	168.8	121.1	200.8	136.4			
1980	66.0	63.8	57.6	45.4	97.1	78.4	135.0	94.0	233.0	153.2	344.1	223.2	502.2	333.0	168.8	122.3	198.8	136.0			
1981	62.8	62.8	58.7	50.6	84.3	75.1	150.8	96.7	222.3	125.9	313.9	191.2	510.5	351.9	165.7	117.6	194.5	129.9			
1982	61.0	58.3	54.1	37.9	99.9	64.3	122.9	96.1	215.3	120.3	338.0	208.4	497.3	325.9	163.3	111.1	191.9	123.8			
1983	63.0	59.8	51.3	47.2	85.4	64.7	146.9	96.1	228.3	138.1	325.4	192.2	539.9	348.1	168.1	116.5	198.4	128.8			
t*	7.243**	6.749**	0.556	1.581	1.276	0.868	1.328	0.994	2.803**	2.372*	3.793**	4.309**	4.718**	6.749**	4.718**	4.126**	-	-	-		

* t test, period 1970-1983 (12 d.f.).

+ p ≤ 0.05 (critical t = 1.782)

** p ≤ 0.01 (critical t = 2.821)

TABLE 5
Death rates from heart diseases, according to sex and age, and age-standardized death rates for residents in the city of S. Paulo, Brazil, 1970 to 1983
(per 100,000 population)

Age Sex Rate	Age group in year																		Age-standardized																																																																																																																																																																																																																																									
	40-44						45-49						50-54						55-59						60-64						65-69						40-69																																																																																																																																																																																																																							
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F																																																																																																																																																																																																																										
1970	155.3	113.7	114.6	51.0	181.6	87.8	357.4	160.8	552.0	295.7	1014.1	468.3	1406.8	752.4	416.0	215.4	516.2	256.2	156.3	116.6	112.4	47.2	198.7	92.0	356.9	156.5	565.9	283.1	967.7	468.1	1343.0	784.4	413.3	216.5	523.6	256.9	153.7	110.7	109.3	60.5	213.7	89.7	364.0	133.6	569.6	236.0	943.9	417.1	1363.5	763.8	418.1	202.4	511.1	237.3	160.8	116.5	124.7	58.6	211.4	92.3	358.6	145.6	602.8	263.1	999.2	481.2	1384.5	792.6	433.8	218.7	528.2	256.4	153.0	115.8	120.3	54.4	207.9	88.4	337.7	153.1	564.8	264.3	945.4	500.5	1295.9	668.3	412.0	210.6	498.9	245.4	152.0	114.9	130.1	62.0	205.9	96.1	345.4	142.0	513.4	242.9	853.4	465.4	1402.0	647.5	408.1	204.2	492.4	235.4	154.0	124.4	132.2	65.9	221.0	108.8	353.2	167.8	506.3	253.2	901.2	483.7	1340.0	729.4	413.7	223.8	495.8	257.0	146.9	107.7	114.8	56.8	234.8	83.3	327.0	128.8	500.7	209.1	855.2	424.6	1257.9	683.5	396.3	192.3	473.6	222.1	148.2	112.1	106.0	50.5	220.5	89.9	351.6	129.9	561.7	225.3	836.4	432.1	1273.9	764.9	404.3	203.0	483.2	235.1	139.5	109.5	121.1	57.8	187.1	69.8	331.7	132.6	520.9	223.2	813.9	418.6	1152.0	722.1	380.7	196.0	452.3	226.2	141.5	111.7	117.0	58.9	204.5	84.9	317.5	113.2	543.8	221.9	764.8	389.9	1163.9	667.6	380.6	188.1	450.4	215.3	132.4	107.2	102.5	46.0	168.6	70.8	303.4	110.5	487.4	207.2	746.3	365.9	1105.8	650.0	352.5	175.5	419.5	201.8	131.5	103.7	90.1	34.2	170.7	66.7	276.5	106.2	460.8	212.3	715.5	348.5	1114.7	624.7	338.8	168.1	404.5	193.5	135.4	108.6	94.2	37.8	179.9	75.5	311.3	107.7	486.7	185.5	727.1	352.9	1169.8	646.5	358.4	170.0	425.9	194.7
t*	6.987**	2.270*	1.972*	1.679	1.276	2.636*	5.071**	4.830**	3.426**	6.529**	12.517**	4.406**	6.325**	3.162**	5.954**	5.200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																																																																																																																																																																																																					

* t test, period 1970-1983 (12 d.f.).

+ p ≤ 0.05 (critical t = 1.782)

** p ≤ 0.01 (critical t = 2.821)

DISCUSSION

The consistence and magnitude of the observed decline give credence to the hypothesis that it is a real one, as has been pointed out by other authors^{3,6,13,17}. We have not used the comparison rate between ICD-8 and ICD-917 in this paper, because it is about 1.0 for these diseases, and the decline was observed before the changing of Revisions, which took place in 1979.

Another point to be discussed is the subenumeration of the population at the censuses but there are no studies on this matter in Brazil for the age group under consideration. Anyway, the magnitude and the consistency of the decline could not be explained by these facts because, in general, the people in this age group are the heads of their families and the degree of subenumeration, if it exists, is very small.

There are no data available in Brazil which allow the indication of the reasons for this decline. In several other countries, there has been a reduction in the incidence of these diseases which is ascribed to a better control of risk factors¹⁶, and the impact of better medical care is debated.

The risk of dying from cardiovascular disease in the city of S. Paulo is high when compared with that of the other countries. The possible confounding bias represented by different age distributions of the populations was controlled by means of direct standardization.

Hypotheses to explain the magnitude of these rates, as well as their decline, have better conditions to be tested by means of analytical studies specially designed to evaluate the change in the prevalence of risk factors as well as their surveillance and the impact of medical care.

LOLIO, C.A. de et al. Declínio da mortalidade por doenças cardiovasculares no Município de São Paulo, Brasil, no período 1970 a 1983. *Rev. Saúde públ.*, S. Paulo, 20: 454-64, 1986.

RESUMO: Foi analisada a mortalidade por todas as causas e por grandes grupos de doenças cardiovasculares de residentes da cidade de São Paulo, SP, Brasil, nas idades de 40 a 69 anos, para os anos de 1970 a 1983, mediante os coeficientes específicos de mortalidade. No período observado houve um declínio (28% em média para as doenças isquêmicas do coração e 16% para as doenças cerebrovasculares), estatisticamente significativo. Os coeficientes de mortalidade de 40 a 69 anos, de ambos os sexos, foram ajustados por idade e comparados com os de 27 países industrializados, observando-se alto risco de morrer de doenças cardiovasculares.

UNITERMOS: Doenças cardiovasculares, mortalidade. Mortalidade, tendências. Mortes, causas. Risco.

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