

The color of death: causes of death according to race in the State of Sao Paulo, 1999 to 2001

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Keywords

Mortality. Social inequity. Race/color. Correspondence analysis.

Abstract

Objective

Assuming that ethnicity might be a basis for social differentiation and that such differences might represent vulnerability to sickness, this study attempts to verify whether race or ethnic origin have an effect on mortality patterns.

Methods

The Sao Paulo State death register was examined from 1999 to 2001 in a contingency table of causes according to the 10th ICD and race or skin-color categories (White, Black, Mulatto and others). Chi-square test was used to check the association between skin-color and cause of death; residual analysis was used to elicit statistically significant excessive occurrences when each category of cause of death and skin color was combined; and correspondence analysis was used to examine overall relations among all categories considered.

Results

A total of 647,321 valid death registers were analyzed, among which 77.7% were of Whites, 5.4% of Blacks, 14.3% of Mulattoes and 2.6% of others. A significant association between skin color or race and cause of death was found. It may be observed that, although Blacks and Mulattoes present a similar death profile, on the contrary of Whites and others, which could be aggregated into a single category, the former appear in distinct positions on the multidimensional map presented. Except for mal defined causes, which characterize only the deaths of Blacks, the other causes of death within this group are common to both Blacks and Mulattoes, varying however, in intensity and as to the order in which they appear death.

Conclusions

Analysis of mortality according to race or color revealed that death has a color. There is a White death, which has, among its causes, sicknesses, which, although variable, are nothing more than sicknesses. There's a Black death, which is not caused by sicknesses but by external causes, complications in labor and delivery, mental disorders and ill- defined causes.

INTRODUCTION

Although a social group is not defined by skin-color or race relations, ethnic differences are associated with social inequities and affect people's ways of living.

In 2002, Batista,³ analyzed the results of the Re-

search on Living Conditions (PCV-98) conducted by the Fundação SEADE [State System of Data Analysis Foundation] in 1998 and found that it revealed significant differences between Black and White families in the State of Sao Paulo. While the households of the latter have two children, on the average, and the head of the household is a man, the former tend to

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Received on 28/8/2003. Reviewed on 3/3/2004. Approved on 10/5/2004.

have a larger number of children and frequently have a female head of the household. Black families tend to have less schooling and a lower family income.

This adversity, revealed by the PCV-98, with respect to the living conditions of Blacks in the State of Sao Paulo, only confirm results found in nationwide studies. In fact, Soares,⁸ in an analysis of the PNADs (Pesquisa Nacional por Amostras de Domicílios) [National Household Sample Research] 1987-98 undertaken in 2000 for the IPEA (Instituto de Pesquisas Econômicas Avançadas) [Institute for Advanced Economic Research], indicates differences among White and Black men with respect to wages and allocation in the labor market. Blacks receive lower salaries, occupy worse functions and are engaged in less qualified activities. In a similar manner, Henriques,⁵ studied the evolution of living conditions in the nineties and found that 63% of the poor population is Black and that 61.2% of the Black population is poor or indigent. Thus, he states, "*The unequivocal conclusion that presents itself is that being born Mulatto or Black increases significantly the probability of a Brazilian being poor.*"

In order to deal with adverse life situations as social components of the health-sickness process, Ayres¹ recuperates the concept of vulnerability which, like the epidemiological concept of risk, attempts to measure objectively how individual or group characteristics may imply in increased probabilities of becoming sick or in less opportunities to protect oneself against sickness. Turner et al⁹ define vulnerability as the degree to which a system is inclined to experience harm from exposure to an aggression, whether it be a commotion or a stress factor. According to these authors, the usefulness of a vulnerability analysis increases, among other factors, when it makes it easier to identify critical interactions in the human – (social) environmental system, which suggest that decision makers have opportunities to reply. Vulnerability is also a useful concept when the methodology employed allows for the analysis of a combination of quantitative and qualitative data. These two particular aspects of the concept of vulnerability guided the course of analysis in this study.

Death registers in the last few years have been aggregating information on color/race (Black, Mulatto, White, Yellow and Indigenous), based on the theoretical references mentioned above, that is, on the premise that race/skin-color is a factor of social differentiation and results in different vulnerabilities to sickness, this study intends to verify if race/skin-color affects characteristic patterns of mortality. That is, if death has a color.

METHODS

Death registers of the residents of Sao Paulo State from the year 1999 to 2001 were made available by the Centro de Informações de Saúde da Secretaria de Saúde do Estado de São Paulo (CIS-SES) [Health Information Center of the Sao Paulo State Health Department]. Data concerning basic cause of death were processed as proportional mortality according to the 10th ICD and organized in categories of race/skin-color within a contingency table. Analysis of proportional mortality was considered preferable to analysis of mortality coefficients so as to limit investigation to death registers, without having to borrow denominators from other sources of data in order to calculate coefficients. Furthermore, the intention was to focus primarily on the associations between cause of death and categories of skin-color/race. A qualitative approach was perhaps considered more appropriate for the descriptive endeavor than quantitative tests utilized to measure differences in mortality coefficients.

Registers lacking information on race/color were disregarded, as well as those in which the basic cause of death was listed under chapter VII (Eye diseases and affections of the ocular annexes – H00 a H59) or under chapter VIII (Diseases of the ear and of the mastoid process – H60 a H95) of the 10th ICD. The former because the cause/skin-color contingency was null and the latter because, the contingency, although it was discernable, was practically null given the small number of deaths due to these basic causes – 0.013% among the total number of registers analyzed. The race/skin-color categories "yellow" and "indigenous" were aggregated, forming the single category "others", which, even so, represented only 2.6% of the total number of deaths analyzed.

Analysis of the contingency table was undertaken following Pereira's suggestions.⁷ Associations between the variables "basic cause" and "skin-color/race" were evaluated by means of the χ^2 test. Associations between pairs of categories of these variables were then analyzed by means of residual analysis and, finally, the relations between all the categories of both variables were submitted to correspondence analysis.

The χ^2 test makes it possible to discern whether deaths are distributed randomly according to basic cause and skin-color/race or if there is a specific pattern determined by dependence on these variables. Residual analysis reveals the characteristic patterns displayed by each category of each variable according to excess or lack of occurrences of combinations with each category of the other variable. This study sought to characterize the categories race/skin-color according to excess oc-

currences in combinations with categories of basic causes of death: what were the most frequent and statistically significant causes of death among people of a given race/skin-color? The level of significance employed was 5%, both in associations between variables in the χ^2 test and in associations between categories of variables in residual analysis. This level of significance for excess occurrences corresponds to a residue with a positive value greater than 1.96.

Correspondence analysis is a technique of graphic representation, projected on a map, of the multidimensional relations among the categories of the variables being studied according to the χ^2 distances between them. Symmetric projection was utilized, making it possible to examine the relations between lines and columns of the contingency table simultaneously, that is, the relations between all the categories of both variables under consideration. Categories located near each other on the map are more closely associated than those which are separated by greater distances. Any category, represented by a point on the map, may be analyzed separately and characterized according to its distance with respect to the projection of points representing all the other categories on a straight line that connects its plotted point to the origin of the axis on the map. When categories of the same variable are situated near each other on a correspondence analysis map this indicates that, irrespective of their semantic content, they may be considered equivalent with respect to the distribution of masses of the total number of observations made.

In this study, the yellow and indigenous color/race categories, irrespective of their distinct ethnic significance, were aggregated under a single category "others" on the basis of a preliminary analysis which

indicated congruent projections on a correspondence analysis map. When categories of two contingent variables are projected near each other, this suggests an association between the events they represent, although there is no implication with respect to statistical significance. Statistical significance may be analyzed for pairs of categories in residual analysis, as described beforehand.

It must be kept in mind, for an adequate interpretation of the results, that correspondence analysis is essentially descriptive in nature. Consequently, no inferences may be derived with respect to cause and effect, nor can risk interpretations be implied as a corollary. The Chi-square test and residual analysis measure the distance between the observations made and those expected in a random distribution. Correspondence analysis offers information regarding the contrasts between associations among categories of contingent variables. A stronger relation between two categories in comparison to other relations does not imply that the former will have effects over the latter.

RESULTS

During the period under investigation in this study (1999 to 2001), 647,321 valid registers were obtained, being that 77.7% were Whites, 5.4% were Blacks, 14.3% were Mulattoes and 2.6% were others. The proportion of registers lacking any written observation with regard to race/skin-color decreases progressively throughout the period, going from 13.6% in 1999, to 6.8% in 2000 and to 5.1% in 2001.

The contingency between basic cause of death and race/skin-color (Table1), submitted to the χ^2 test reveals that these variables are not independent

Table 1 - Number of deaths according to categories of basic causes and color in the State of Sao Paulo, from 1999 to 2001.

Basic cause	Color				Total
	White	Black	Mulatto	Others	
Infectious diseases	21,728	2,259	5,541	689	30.217
Neoplasms	79,681	4,074	9,771	3,143	96.669
Blood diseases	1,961	125	314	71	2.471
Endocrinological and nutritional	23,548	1,759	3,601	903	29.811
Mental disorders	3,499	437	917	103	4.956
Nervous system	7,552	370	1,028	207	9.157
Circulatory system	157,227	10,637	23,510	5,475	196.849
Respiratory system	55,196	2,785	7,550	1,945	67.476
Digestive system	27,968	1,710	4,822	832	35.332
Skin	909	63	125	32	1.129
Bones	1,367	88	186	47	1.688
Genitourinary system	8,362	515	1,115	352	10.344
Pregnancy, birth	526	75	194	8	803
Perinatal causes	13,833	314	2,625	379	17.151
Congenital diseases	5,184	126	800	132	6.242
Ill-defined causes	31,692	2,728	5,418	931	40.769
External causes	62,895	6,754	25,223	1,385	96.257
Total	503,128	34,819	92,740	16,634	647.321
	χ^2 : 18296.5	DF: 48	p: 0,000		

DF: Degrees of freedom
p: Statistical significance

Table 2 - Standardized residues of the occurrences of deaths according to basic causes and skin color in the State of Sao Paulo, from 1999 to 2001.

Basic cause	Color				
	White	Black	Mulatto	Others	
Infectious diseases	-24.9	16.5	20.4	-3.3	
Neoplasms	38.1	-17.4	-40.6	14.5	
Blood diseases	2.0	-0.7	-2.3	1.0	
Endocrinological and nutritional	5.4	4.1	-11.3	5.1	
Mental disorders	-12.1	10.8	8.4	-2.2	
Nervous system	11.0	-5.7	-8.5	-1.9	
Circulatory system	27.4	0.6	-36.2	7.1	
Respiratory	26.9	-15.2	-24.6	5.4	
Digestive system	6.7	-4.6	-3.7	-2.6	
Skin	2.3	0.3	-3.1	0.6	
Bones	3.2	-0.3	-3.9	0.6	
Genitourinary system	7.7	-1.8	-10.4	5.4	
Pregnancy, birth	-8.3	5.0	8.0	-2.8	
Perinatal causes	9.3	-20.9	3.7	-3.0	
Congenital causes	10.2	-11.8	-3.4	-2.3	
Ill-defined causes	0.1	12.1	-6.2	-3.8	
External causes	-100.1	24.4	114.0	-24.0	

*Positive residues greater than 1.96, which correspond to excess of occurrences appear in bold.

($p=0,000$), that is, race/skin-color and basic cause of death are not randomly combined. Table 2 presents the residual analysis which makes it possible to characterize the deaths of each race/color according to its basic cause:

- *Whites*, deaths whose characteristic causes, in decreasing order of importance, are: neoplasm, circulatory system, respiratory system, nervous system, congenital, perinatal, genitourinary system, digestive system, endocrine and nutritional, bone, skin and blood diseases;
- *Blacks*, deaths whose characteristic causes, in decreasing order of importance, are: external causes, infectious diseases, ill-defined, mental disorders, pregnancy and birth, endocrinological and nutritional disorders;
- *Mulattoes*, deaths whose characteristic causes, in decreasing order of importance, are: external causes, infectious diseases, mental disorders, pregnancy and birth, perinatal;
- *Others*, deaths whose characteristic causes, in decreasing order of importance, are: neoplasm, circulatory system, genitourinary system, respiratory system, endocrinological and nutritional disorders.

Correspondence analysis derived two dimensions for projecting categories of variables. In conjunction, these dimensions represented 99.4% of the variations of the original Chi-square distances. The majority of the basic causes of death categories maintain small distances among themselves, as if they were more or less equivalent, suggesting that perhaps they could be united under a generic category held in common, such as death due to disease. These causes form a cloud in the

intermediary space on the right hand side of the map (see the Figure), where the categories race/skin-color 'White' and 'others' are also located. The proximity between these two categories may also indicate that, instead of two there is actually a single category of persons: non Blacks.

Outside the cloud of diseases *in general*, there are some basic causes of death that stand out due to their specificities (isolated sites). These include causes such as pregnancy and birth, mental disorders, infectious

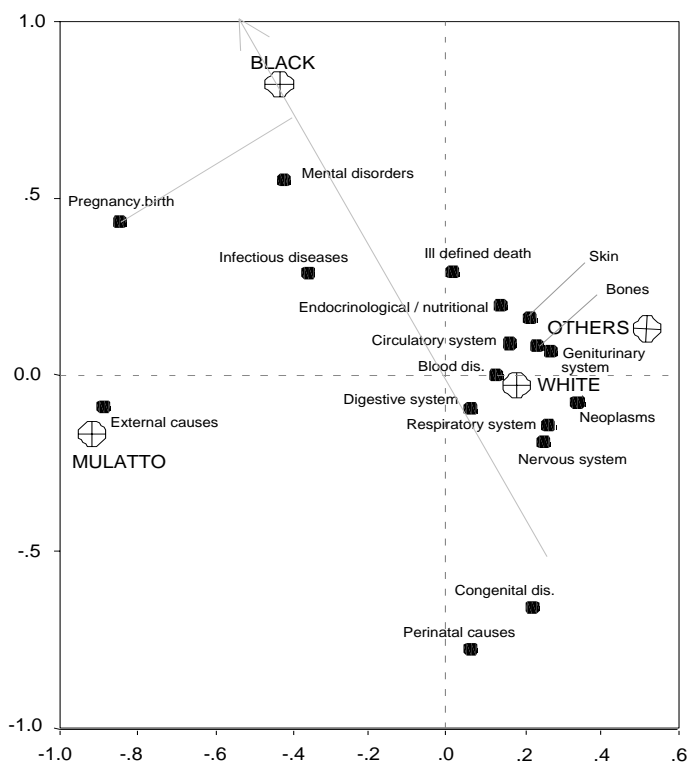


Figure - Map of the relations between the categories basic cause of death and color among the deaths registered in the State of Sao Paulo from 1999 to 2001.

diseases, ill-defined causes, endocrinological and nutritional disorders, external, congenital and perinatal causes. These would be non banal causes that cannot be united into a single category of deaths. Perhaps, they should be interpreted as the denial of the former category, indicated by the cloud of causes on the east side of the map. If the former is the category of deaths due to disease, perhaps these causes should be considered the category of deaths not due to disease. In fact pregnancy and birth, mental disorders, infectious diseases, ill-defined causes, nutritional disorders and external causes should not be causes of death. Indeed it is strange if not repugnant that these diseases or disorders should bring about death. This group of causes, with the exception of congenital diseases that are more closely associated to the White category, are more closely associated to the Black and Mulatto categories.

As to the Black and Mulatto categories, correspondence analysis aggregates important information, which is not apparent in residual analysis that examines relations between pairs of categories. Whereas Whites and Others could be united into a single category, Blacks and Mulattoes are distinct and should remain separate even though they have a similar profile. Except for ill-defined deaths that are characteristic among Blacks only, the other causes of death in this group are common among both Blacks and Mulattoes; however, they vary in the order and intensity with which they occur. This may be clearly observed both in the distinct values of standard residues and in the distinct lines of projection of the categories of skin-color/race in correspondence analysis. The line of projection used to represent Black skin-color is depicted on the map from its source to the point that characterizes Black skin-color. Pregnancy and birth is the first category of basic cause. The same exercise may be repeated imagining lines being projected towards any categories of basic causes of death or of race and skin-color. The differences between the results obtained by projecting lines to specific categories on the map and the data obtained through residual analysis should be credited to the distortions arising from the projection of an originally tetra-dimensional space (the four categories of skin-color/race) on a two-dimensional map derived from correspondence analysis. In this analysis, the space between the Black and Mulatto categories is occupied by the basic causes of death common among both of them.

DISCUSSION

Studies concerning the influence of race on the organization of society were greatly stimulated by so-

cial movements. In fact, skin-color and race became objects of investigation when they were reified by the Black Power Movement.

Paradoxically, however, the Black race and skin-color category, which represents nothing more than an expression of what is defined ontologically by ethnicity, by the inheritance of an African culture, in the present study results in distinct identities for Blacks and Mulattoes.

Perhaps this is not contradictory. Ethnicity, as suggested by the studies discussed in the introduction, is not, in and of itself, a risk factor. It is the adverse social situation of a racial/ethnic group that engenders its vulnerability. Whereas Black and White are indisputable categories of race and skin-color, Mulatto is a socially defined category. Half White and Half Black, the Mulatto recognizes himself as one or the other depending upon how his/her image is socially constructed. The identity of the Mulatto depends upon the social environment in which he lives more than on any form of cultural atavism. The distinction between Black and Mulatto is social in nature, as is the vulnerability of both categories. Therefore, if the process of health and sickness, and consequently, of death, is also a social phenomenon, it should not be a surprise that the relations between race/skin-color and death express themselves as socially defined categories, that is, death is related to race/skin-color by means of its categories of social expression; the death of Afro-Brazilian descendents expresses itself in Black and Mulatto skin-colors.

Inclusion of data on race/skin-color in the death registers in reply to demands made by the Black Power Movement created an effective opportunity to characterize empirically the theoretical concept of vulnerability as applied to this racial/ethnic group. It is surprising that, by applying adequate methodological strategies to a simple contingency table, it is possible to unravel what death according to race/skin-color signifies in the State of Sao Paulo. All causes of death are present among Whites, who are randomly visited by any fatal disease. However, this rapid glance at the causes of death should not mislead the ill-advised: death's polymorphism among Whites cannot be attributed to the greater number of deaths among Whites because the standardized residues express the distance between the observed and the expected number of deaths according to the marginal frequencies of basic cause and race/skin-color.

Blacks and Mulattoes have a similar pattern of death, but differ from each other by the order and, principally, by the intensity of how these causes of

death organize themselves. The specificity of death among Blacks has been demonstrated in several studies on mortality in the past few years. Martins & Tanaka,⁶ in 2000, identified higher rates of maternal mortality among Blacks. In 2001, Barbosa² demonstrated that the coefficients of general mortality are higher among Blacks, Cunha⁴ found greater infant mortality and Werneck¹⁰ greater HIV-Aids mortality among Blacks.

This study's major conclusion is that people's deaths differ according to their ethnic origins and that these differences may be characterized. In the State of Sao Paulo, during the period being investigated, the most ignominious deaths occurred, for the most part, among Afro-Brazilian descendents – including both Blacks and Mulattoes. It should be noted that 803 deaths due to pregnancy, birth and puerperium occurred during the study period in this State. Although these represent only 0.12% of the total number of deaths registered during this three-year period (see Table 1), it is significant that these occurrences are more concentrated among Afro-Brazilian descendents – including both Blacks and Mulattoes (see Table 2). In fact, although, in absolute terms, there are twice as many deaths due to pregnancy and birth among Whites (526 Whites and 269 Blacks), there are four times the number of Whites than Blacks among the total number of deaths registered (503,128 and 127,559 respectively).

In the present analysis of the relation between skin-color/race and cause of death, it was not possible to

characterize the social and economic condition of the deceased. It must be taken into consideration that an association between social insertion and skin-color/race on the one hand, and, on the other, between cause of death and social insertion is not improbable and that this variable would probably be a confounding factor in the associations that were found. Perhaps the characteristic of death is not color, but socioeconomic status. However, within the scope of this study, it was found that an analysis of mortality in the State of Sao Paulo according to race/skin-color, death has a color; causes of death vary according to skin-color/race.

There is a White death that is caused by disease. Different types of diseases or disorders cause death, but they are no more than that, those things which struggle against health until one day they overcome the latter and bring about an inexorable ending: death puts an end to life. Whites die of expected causes.

There is, on the other hand, a Black death which isn't due to any expected cause, be it a disease or disorder. Blacks die of misfortune. It is a senseless death, which plays with life events, such as pregnancy and birth. It is an insane form of death, which alienates ones existence in mental disorders. It is the death of a prey assaulted by infectious diseases or violence due to external causes. It is a death without a cause, for it is ill-defined. Black death doesn't bring life to an end, it undoes life, it is an insane Atropos that cuts life's thread before Clotho can weave it or Lachesis can measure it. Black death is a wretched death.

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