Socioeconomic Determinants of Mortality at Young Ages

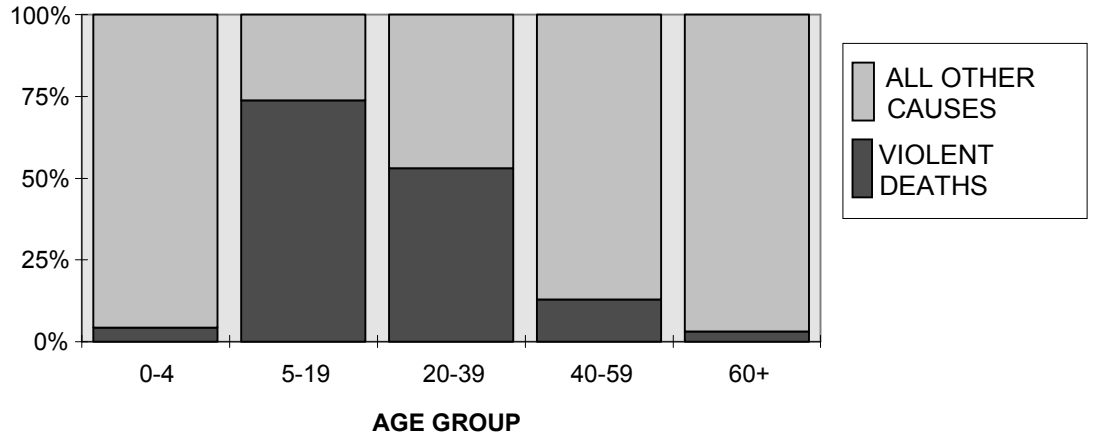
Mário Francisco Giani MONTEIRO (IMS/UERJ)
and Maria Isabel C A PARAHYBA (IBGE)

INTRODUCTION

The aim of this paper is to identify adolescents who are less able than others to survive to the age of 20 due to their financial circumstances, place of residence and family structure, in the municipality of Rio de Janeiro (Brazil).

In 75% of deaths among adolescents in Brazil, the cause is associated to homicides and accidents (Figure 1), showing an association of violence to the risk of death at ages 5 to 20.

FIGURE 1 - MORTALITY RATIO BY VIOLENT DEATHS ACCORDING TO AGE GROUP RIO DE JANEIRO - 1991



SOURCE: Brazilian System of Information on Mortality

The indirect estimates in Brazil have been applied since the pioneer work of CARVALHO & WOOD (1978) that estimated differentials of mortality by Region and family income. We used census data to estimate $_{15}q_{5}$ through indirect techniques, in order to study the association of socio-economic conditions with the risk of a premature death as consequence of suffering violence. With the Census information it is possible to compare aggregates of census tracts, such as districts and shantytowns, classified by income level and type of family, using estimates of probabilities of death for ages 15 to 19, whose mortality risk is associated to violent deaths in 75% of the cases, as shown by the graph above.

In Brazil the main source of data to study the causes of death structure is the Information System of Mortality of the Health Ministry, that collects data from the death certificates, covering the whole country.

Nevertheless, these data do not allow a correlation of violent deaths with educational level, family income, type of family, and neighbourhood. On the other hand, indirect estimations do not permit to classify mortality according to the cause of death and to ascertain if the death was violent or natural.

To overcome this obstacle we limited the age group under study to young people, from 5 to 19 years old, because the deaths of this group are caused mainly by external agents associated to violence, like homicides and accidents.

Although the 1991 Demographic Census is not a recent source of death, the IBGE (Brazilian Census Bureau) has just taken the Demographic Census of 2000, and by this method we can evaluate very soon the changes that occurred during the nineties, with a reasonable precision to compare different social groups, including small local groups, such as the dwellers of shantytown areas in different districts of Rio de Janeiro, as Copacabana, Madureira and Tijuca

2. METHODOLOGY

Sources of statistical data

For indirect estimations, the necessary information available at the 1991 Demographic Census data are: children born alive, children born alive in last 12 months, and children surviving according to Mother's age group.

Categorisation of factors

The monthly family income per capita was classified into two categories, in order to make more evident the differences determined by income:

– the lowest income level = ½ minimum wage per capita or less (1 minimum wage is approximately equivalent to 70 US Dollars)

– the highest income level = more than 2 minimum wages per capita.

Because there is an important group of social researchers that emphasises social disorganisation (Merton, 1938) as a cause of violent behaviour of their children, specially

when the family has the paternal figure absent, the family type has also been classified, for comparative purposes, into two categories

– mothers which **are** the head of family

– mothers which are **not** the head of family.

The area of dwelling was firstly divided, for the whole municipality, into two categories, so that we could have a measurement of the differential risks between "favela" (living in shantytowns) and dwellers of "normal" districts (not favela):

-- favela (a special agglomerate of census tracts, according to the Demographic Census)

-- not favela (normal agglomerate, according to the Demographic Census)

The last part is a comparison between the three districts under study: Copacabana, Tijuca and Madureira, where it has already been established that the styles of trafficking are quite different, as well as the relationships between dwellers and the police. Further research is yet needed for ascertaining the links between the drug rings of the town and the traffickers and dealers in each of these districts, as well as the impact of programs for treatment and support of heavy consumers.

Software used

On the basis of these data, with the EXCEL program, we produced tables to estimate the ratio of mortality of children ever born, for each factor of risk: family income, favela/ not-favela, and type of family. Infant and child mortality were calculated with the proceeding CEBCS (Children ever Born and Children Surviving) of the program MORTPAK, developed by the United Nations Population Division, to estimate the probabilities of death in the following age periods:

q 0 = probability of dying during the first year of life;

4q 1 = probability of dying after the first year of life and before completing 5 years;

20q 0 = probability of dying before completing 20 years of age.

These estimations allow the measurement of 15q 5 (the probability of dying between 5 and 20 years, with a gap of 15 years), for each of above mentioned categories, considered to be influential to the risk of dying early.

Mortality ratio and the Brass Method

The techniques for indirect estimations are described in BRASS & COALE (1968), and SHRYOCK & SIEGEL (1976). The mortality ratio is calculated by the difference between children ever born and children surviving (CEBCS):

$$\frac{\text{children ever born - children surviving}}{\text{children ever born}}$$

The theoretical basis for this indirect method of measuring mortality at young ages, proposed by Brass, is that such ratio of mortality approximates the risk of death (before the age x), according to the age of the mother:

- mothers from 15 to 19 years old: risk of the son's death before 1 year old (x=1)
- mothers from 20 to 24 years old: risk of the son's death before 2 years old (x=2)
- mothers from 25 to 29 years old: risk of the son's death before 3 years old (x=3)
- mothers from 30 to 34 years old: risk of the son's death before 5 years old (x=5).
- mothers from 35 to 39 years old: risk of the son's death before 10 years old (x=10)
- mothers from 40 to 44 years old: risk of the son's death before 15 years old (x=15)
- mothers from 45 to 49 years old: risk of the son's death before 19 years old (x=19)

3. RESULTS SO FAR

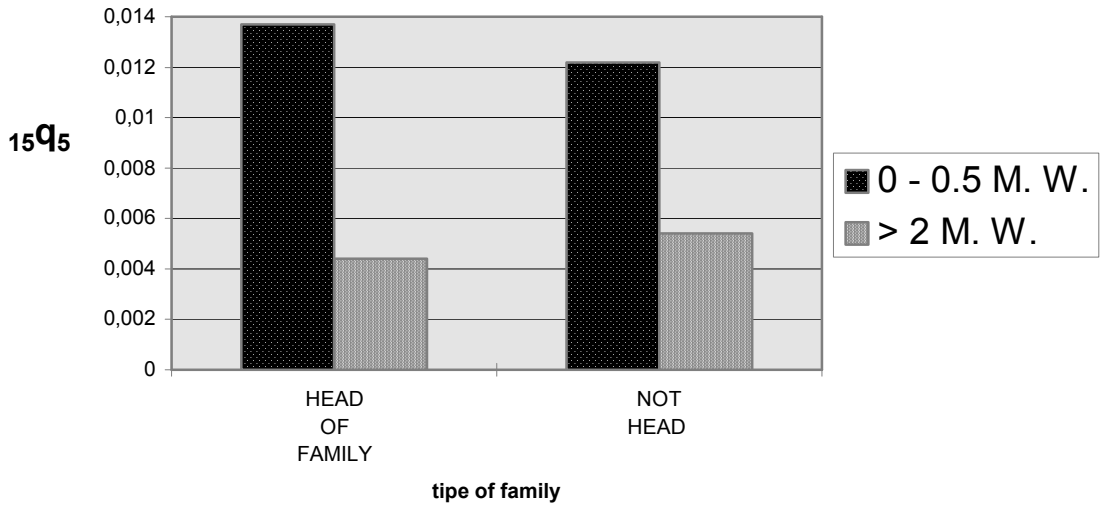
3.1 Type of family and income

We have compared the risk of dying between 5 and 20 years old when the mother was the head of family with those born from women who were not head, for the population of Rio de Janeiro.

Using the two levels of family income per capita (less or equal to 0.5 minimum wage per capita, and more than 2 minimum wages), and two categories for type of family, we observed that a major effect is due to income, in the same type of family, with a global rate of risks of approximately 3 times (0.0137 / 0.0044)

Nevertheless, there was a paradoxical effect of type of family: the probability of death between 5 and 20 years old was higher for young whose mother was the head of family (13.7/1000), compared to those whose mother was not the head of family (12.2/1000) in the lower income population, but the differential of risk was in the opposite direction for the higher income group (4,4/1000 if the mother was head of family and 5,4/1000 if she was not head).

FIGURE 2 - Probability of death between 5 and 20 years old for sons of women head and not head of family according to income



Monthly income per capita	Head of family mothers	Mothers not head of family
0 – 0.5 minimum wages	**0.0137**	**0.0122**
> 2 minimum wages	**0.0044**	**0.0054**

This suggests that there is an important difference in the structure of the family and in the risk of death when the mother is head of family in the low income population comparing to women head of family with higher income.

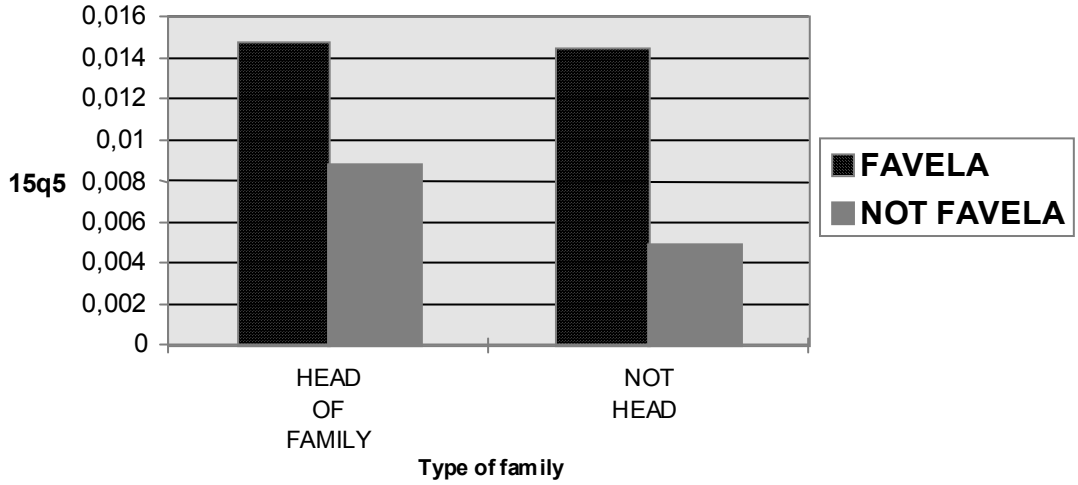
3.2 Types of families and shantytown dwellers

Shantytown dwellers live in general under a high risk of mortality for the young: for children who completed 5 years old, around 1.5 % do not reach 20 years, independent of the position of the mother in the family. This risk affects both types of family in the same way.

On the other hand, for those who do not live in favelas, that is, those who belong to the "normal agglomerates", having a mother who is head of family represents a further risk, increasing the probability of dying between 5 and 20 years old, from 4.9 to 8.8/1000, almost doubling the probability of death to those who are sons of mothers that are not head of family.

Therefore, general theories about the association between family disorganisation and risk of violent deaths in youth, or poverty and violent deaths do not function everywhere. This suggests that our theoretical choice for an interaction and complex model was right.

FIGURE 3 - Probability of death between the ages 5 and 20 for sons of women head and not head of family according to area of residence



Area of residence	Head of family mothers	Mothers not head of family
Living inside favela	**0.0148**	**0.0145**
Living outside favela	**0.0088**	**0.0049**

Source: IBGE – Sample of the 1991 Demographic Census

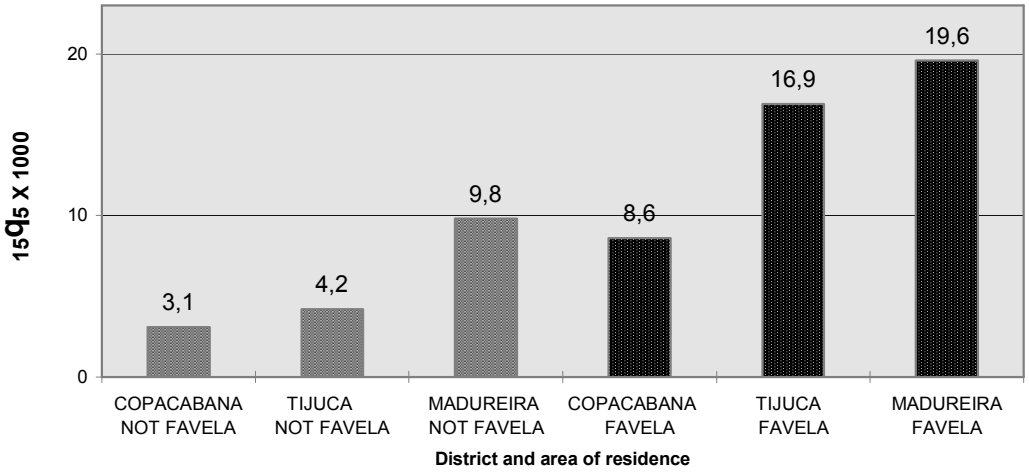
For it, one should include and articulate low family income and condition of housing, as measured by the available quantitative data, for explaining the highest rates of violent deaths in youth. Even if suffering the same insecurity than mothers who are not head, mothers head of families inside the shantytowns have twice as much probability of losing their sons between 5 and 20 years old compared to mothers head of family outside shantytowns. In their turn, mothers who belong to complete families and, therefore, are not head of family and yet live inside shantytowns have three times more probability of losing their young sons than mothers in the same family situation that live outside shantytowns.

3.3 Differentials by districts: Copacabana, Tijuca e Madureira

When we compare the three above mentioned districts of the city, it becomes clear that in Copacabana, a richest district though where there are shantytowns and poor people, the probability of dying young is smaller for those who live in the local shantytowns than for those who do not live in shantytowns, that is in regular streets and homes, in Madureira. In this district, which is poorer than Copacabana though it also has middle-class homes, policing is more scarce and worse, for policemen tend to be more

violent, more corrupted and less controlled by the press and the public opinion when human rights violations occur.

FIGURE 4 - Probability of death between 5 and 20 years old according to district and area of residence ($_{15}q_5$ x 1000)



4. DISCUSSION OF RESULTS AND FURTHER RESEARCH

According to the research already done, for the time being at the Municipality of Rio de Janeiro, we can affirm that the risk of dying young is not equally distributed within the population. On the contrary, it is bigger for the population groups submitted to unfavourable social conditions, such as low income groups, shantytown dwellers and families headed by women, to whom social and civil rights (to life and security) have been systematically menaced, making these groups more vulnerable to the risk of death.

The method used here for the indirect estimations, well known and accepted internationally, allowed a better view of the risk magnitude to which poor adolescents and children between 5 and 19 years old are submitted. Furthermore, these risks are heightened (from 12.2 to 13.7/ 1000) for the low income population when the mother is the head of the family, what many times means that the father is not present in anyway in their son's lives. Yet, this handicap of mothers head of families disappear when income is bigger than two minimum wages, what may mean either more financial or domestic help from the fathers or the mother's parents or another kind of external help, from domestic servants, that allow the mother to get part time or full time employment while their children are well cared for at home.

Amongst the poor, women who are head of family must work in order to feed their children, usually left alone at home under the care of an elder sister or brother.

Nevertheless, even families that do not dwell in shantytowns, and that live under less risks, showed that mothers who are head of family have sons with greater risk of dying young from a violent death.

The differences on the risk of dying young have come quite clear when we compared the whole population sets for Rio de Janeiro regarding the lowest income and the bigger income sets, "favela" (subnormal agglomerates) and "not favela" (normal agglomerates) dwellers, as well as families headed and not headed by women. Furthermore, comparing data from the Brazilian National Household Sample Survey and from the National System of Information on Mortality we would be able to discuss more thoroughly our own data from the indirect measures on the risk on dying young.

We must also further our knowledge on the relationships of youngsters with their families, neighbourhoods, agencies of drug abuse treatment, and policemen.

Finally, we will repeat the quantitative study based on indirect measures of the risk for dying young for other Brazilian capitals and establish trends using the Demographic Census of 2000.

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Email: monteiro@uerj.br