Social inequalities in healthy life expectancy in Rio de Janeiro, Brazil

XVIII Congresso Mundial de Epidemiologia
Porto Alegre, 21-24 de outubro 2008

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Introduction

- Recent studies have increasingly focused on health inequality, using individual characteristics such as education, income or ethnicity, as well as group characteristics to explain social and spatial variations in health .
- Highlighting inequalities at the local level is especially important, since social and environmental conditions have been shown to be significant determinants in health status.

Introduction

- The majority of geographical health analyses have been based on mortality data, due to the accessibility of this indicator.
- However, increased longevity in developed countries has resulted in a greater emphasis on the quality of the remaining years.
- It is generally agreed that mortality indicators alone are insufficient to appropriately characterize the health state of a population.

Healthy Life Expectancy

- Different health indicators that consider morbidity, functional limitations and disabilities along with mortality have been proposed.
- A single measure of morbidity and mortality obtained by the Sullivan method - “healthy life expectancy” is the most frequently used.
- It estimates the number of years a person of a given population may expect to enjoy good health.
- Variations of this measure are established by different definitions of “healthy” based on self-perceived health, long-term illness or disability, and functional or cognitive limitations.

This paper

- **This paper describes area-based deprivation and inequalities in total life expectancy and healthy life expectancy in the Municipality of Rio de Janeiro, Brazil.**

Study Design

- As part of a project developed by the World Health Organization (WHO) aimed at assessing health system performance of member countries, the World Health Survey (WHS) was carried out in Brazil in 2003.
- In 2006, the WHS questionnaire was adapted to assess the performance of primary care, focusing on the Family Health Program. The survey was carried out in several large Brazilian cities, including Rio de Janeiro.

Study Design

- **The study design was based on four strata, each composed by the aggregation of census tracts with different socioeconomic characteristics.**
  1. **"Slum Sector" - composed of all census tracts considered to be slums (*favelas*) by the Brazilian Institute of Geography and Statistics.**
  2. **"Poor Sector" - census tracts (not considered to be slums) with mean monthly income less than or equal to US$350.00;**
  3. **"Intermediate Sector" - mean monthly income greater than US$ 350.00 and less than or equal to US$1000.00;**
  4. **"Wealthy Sector" - mean monthly income greater than US$1000.00.**

Sample Design

- The survey was carried out in 576 households, 144 in each stratum.
- The sample design had three selection stages: census tracts, households, and adult residents (18 years or older).
- In each stratum, 9 tracts were selected, with probability proportional to the number of households in the census tract.
- Within each census tract, 16 households were randomly selected.
- In the last stage, one adult (18 years or older) per household was randomly selected to participate in the survey.

Health Domains

- The definition of "healthy state" in this study was based on the approach proposed by the WHO in the International Classification of Functionality, Disability and Health (ICF).
- Two components of impairment were examined: activity limitations and deficiencies in function and body structure.
- Six health domains were considered: daily activities; mobility; self-care; pain; learning and knowledge acquisition; and vision.

Impairment score

- Each item was scored from 1 to 5 according to level of difficulty in undertaking the activity (1=none; 2=mild; 3=moderate; 4=severe; 5=extreme).
- None or mild difficulty were recoded as zero; moderate difficulty as 1; and severe or extreme as 2.
- The total impairment score was calculated from the sum of the six questions (minimum of zero and maximum of 12). A state of poor health was considered to be a score of 3 or more.

Methods

- Mean impairment scores were compared among strata.
- A multivariate logistic regression model using poor health as the response variable was fitted to examine stratum differences, adjusted for sex and age.

Methods

- Healthy life expectancies were calculated using Sullivan's method with abridged life table.
- Mortality data from the year 2006 were obtained from the Secretary of Health of the Municipality of Rio de Janeiro.
- Due to the small sample size in each five-year age group, a logistic regression model with age and sex as covariates was used to estimate the probabilities of "healthy" and "no healthy" states.

Socioeconomic Indicators by strata. Rio de Janeiro, 2006

Indicators	Strata			
	Slum	Poor	Intermediate	Rich
Complete secondary school and more	10.3	30.0	62.7	92.2
Household assets (8+)	2.6	13.5	32.5	73.4
Number of residents by household room	1.94	1.42	1.12	0.78
Number of bathrooms per household (<=1)	92.2	83.7	66.4	17.8

Life expectancy by age-group, sex and strata. Rio de Janeiro, 2006

Sex	Age	Strata			
		Slum	Poor	Intermediate	Rich
Females	0	71.6	75.6	78.0	81.4
	60	19.7	22.3	23.9	28.1
Males	0	60.9	64.0	67.1	73.7
	60	14.0	15.1	17.0	20.1

Mean impairment score by age-group, sex and strata. Rio de Janeiro, 2006

Sex	Age	Strata			
		Slum	Poor	Intermediate	Rich
Females	<60	1.31	1.17	1.06	0.37
	60+	3.39	3.56	2.17	0.5
Males	0	0.87	0.37	0.35	0.33
	60	2.06	1.83	1.22	0.56

Logistic regression model results having non healthy state as the response variable

Variable	Category	OR	95% CI	p
Sex	Male	0.361	0.214-0.611	<0.001
	Female	1.000	-	-
Age-group	18-29	0.063	0.022-0.185	<0.001
	30-39	0.266	0.136-0.520	<0.001
	40-59	0.448	0.246-0.815	<0.001
	60+	1.000	-	
Strata	Slum	4.946	2.102-11.646	<0.001
	Poor	4.010	1.686-9.539	0.002
	Intermediate	3.171	1.313-7.658	0.010
	Rich	1.000	-	-

Life expectancy (e) and healthy life expectancy (e') at age 60 by sex and strata. Rio de Janeiro, 2006

Sex	Indicator	Strata			
		Slum	Poor	Intermediate	Rich
Females	e	19.6	22.3	23.9	25.1
	e'	9.4	11.6	13.9	20.6
	lost years	10.2	10.7	10.0	4.5
	% lost	52.3	47.8	41.6	17.9
Males	e	13.9	15.1	17.0	20.1
	e'	10.2	11.5	13.7	18.7
	lost years	3.7	3.6	3.3	1.4
	% lost	27.1	23.4	19.5	7.0

Main Findings

- Life expectancy at birth varies by as much as 13 years between the wealthy and slum residents. This difference is explained, in good part, by extremely high homicide rates in Rio slums, associated with drug traffic.
- The highest scores in disability indicators occur in slum and poor areas.
- The mean impairment score among poor women aged 60 and over was higher than 3, the established limit for non healthy state.
- The wealthiest had the highest proportions of their lives spent healthy, with men and women aged 60 years and over spending 93% and 82% of their remaining life in good health.

Conclusions

- By showing that not only mortality indicators are associated with residential concentration of poverty, but that the inequality is even more striking when disability is taken into consideration, this study draws attention to the importance of relative poverty and the effects of social and material deprivation.
- It is not our objective to offer simple solutions to complex problems, but to offer input to a process of study and reflection about social determinants of health, from which effective and viable solutions may emerge.