Avoidable causes of death in a low-income area in Rio de Janeiro Sate, Brazil: A ten-year longitudinal record linkage study

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Background

Record linkage methodology represents a useful tool for monitoring health outcomes in small areas.

Probabilistic linkage is based on similar variables available in the databases to be linked. These personal identifiers are used together in order to determine how likely a pair of records refers to the same individual (1).

The term “avoidable mortality” or “amenable mortality” may be attributed to the working Group on Preventable and Manageable Diseases in Harvard Medical School, USA, who introduced this concept in the 1970s to describe deaths that should not occur in the presence of effective and timely health care.

Background

The concept has evolved over the last thirty years, but in a general sense, “avoidable mortality” is used as an indicator of possible weaknesses in health care (2).

In 2007, Malta et al. (3) published a study proposing two lists of avoidable causes of death originated from a working-group organized by the Brazilian Ministry of Health, considering the available resources and technology in the Brazilian Health System (BHS), called Sistema Unico de Saúde-SUS.

These lists are based on the original list of Tobias and Jackson (4) and Ortiz (5) for classifying avoidable mortality.

The first list was built for analysis of death of children less than <5 years old and the second one, for analysis of death of individuals of five years old and above.

Purposes

To evaluate the proportion of avoidable causes of death among total deaths identified through a ten-year longitudinal record linkage study carried out in a low-income area where a major sanitation program was partially implemented.

To describe the behavior of avoidable causes of death in relation to age.

Methods

A census of 29,807 households was conducted from June to December 1997 in Parque Fluminense, a community of Duque de Caxias County (Rio de Janeiro, Brazil) in permanent privately owned housing units.

The units had a mean of 4 members and 4 rooms, including a bedroom and a bathroom;

81,6% had treated water supply and no sewer supply, but 48,0% with septic tanks connected to a pluvial net.

The average household head had 5±3 years of schooling and a monthly income which at the time of the study would be equivalent to approximately US$294, or approximately two times the Brazilian minimum wage at the time (6).

Methods

The census database (29,807 households members) was linked to the Rio de Janeiro State's mortality database (1997 to 2006, with 801,587 records), using an automatic probabilistic approach combined with an extensive clerical review.

RecLinkIII, a program which implements the probabilistic record linkage methodology (7), was used to link the databases.

Results

A total of 681 deaths were identified with 91 (13.4%) presenting an ill-defined underlying cause.

Avoidable causes accounted for 75,8% of all deaths with a defined cause and for 88.1%, 76.1% and 72.1% of deaths among adolescents and young adults, adults and the elderly, respectively (Fig.1).

External causes were predominant (79,7%) in the younger age strata: 70.2% of these were homicides and 14.8% traffic accidents (Fig.1).

The share of avoidable deaths due to non-transmissible causes rises with age, reaching 58.1% in the elderly group (Fig.1).

Results

Deaths by external causes are concentrated in adolescents and young adults; noncommunicable diseases and causes not clearly avoidable increases with age (Fig. 1);

62,4% of all deaths occurred in individuals younger than 60 years old (Table 1);

66,7% of the avoidable deaths by actions of health promotion, prevention and control of infectious diseases occurs in individuals younger than 60 years old;

91,7% of the avoidable by intersectoral actions of prevention, and attention to external causes occurs in individuals younger than 60 years old.

Conclusion

The proportion of deaths due to avoidable causes in the area of the study is high and affects the group of adolescents, young adults and adults, probably due to lacking health conditions and care and weakness of intersectoral actions.

Interviewers during field work. Duque de Caxias, RJ, Brazil, 1997

Avoidable Causes of death (Malta et al.)
1.1 Avoidable by Immunization
Tuberculosis(A15 a A19; B90)
Obstetrical tetanus (A34)
Other tetanus (A35)
Diphtheria (A36)
Whooping cough (A37)
Acute poliomyelitis (A80)
Measles (B05)
Rubella (B06)
Acute hepatitis B (B16)
Haemophilus meningitis (G00.0)
1.2 Avoidable by actions of health promotion, prevention and control of infectious diseases
Intestinal infectious diseases (A00 a A09)
HIV/aids (B20 a B24)
Viral Hepatitis (B15 a B19, exceto B16)
Syphilis, Gonococcal infection and other sexually transmitted disease (A50 a A59; A63 a A64; N70 a N735; N73.8 a N73.9; N75; N76)
Other infections (A23 a A26; A28 a A32; A38; A39; A40; A41; A46; A69.2; J020; J030; B50 a B54; G00.1 a G00.9; G01)
Rheumatic fever and rheumatic heart diseases (I00 a I09)
Respiratory infections, pneumonia and influenza (J00; J01; J02.8; J02.9; J03.8; J03.9; J04; J05; J06.0; J10 a J22)
Infections of the skin and subcutaneous tissue (L02 a L08)
Others diseases of compulsory notification: plague (A20); tularaemia (A21); anthrax (A22); leptospirosis (A27); Leprosy [Hansen's disease] (A30);
Spotted fever [tick-borne rickettsioses](A77); Rabies (A82); Dengue fever (A90); West Nile fever (A92.3); Yellow fever (A95); Haemorrhagic fever with renal syndrome (A98.5); Smallpox (B03);
Leishmaniasis (B55); Acute Chagas' disease (B57.0; B57.1); e Schistosomiasis (B65)
Urinary tract infection (N39.0)

Cont.

1.3 Avoidable by actions of health promotion, prevention, control and attention to noncommunicable diseases
Chagas' disease (B57.2)
Malignant neoplasm of lip, melanoma and other malignant neoplasms of skin (C00; C43 a C44)
Malignant neoplasm of liver (C22)
Malignant neoplasm of stomach (C16)
Malignant neoplasm of colon, rectosigmoid junction, of rectum and anus and anal canal (C18 a C21)
Malignant neoplasms of lip, oral cavity and pharynx and larynx (C01 a C06; C09; C10; C12 a C14; C32)
Malignant neoplasm of oesophagus (C15)
Malignant neoplasm of trachea and of bronchus and lung (C33; C34)
Malignant neoplasm of breast (C50)
Malignant neoplasm of cervix uteri, of corpus uteri and of uterus (C53 a C55)
Malignant neoplasm of testis (C62)
Malignant neoplasm of thyroid gland (C73)
Hodgkin's disease (C81)
Lymphoid leukaemia (C91)
Thyrotoxicosis, hypothyroidism, Iodine-deficiency-related thyroid disorders (E01 a E05)
Congenital iodine-deficiency syndrome, Congenital adrenogenital disorders associated with enzyme deficiency, Classical phenylketonuria, Disorders of galactose metabolism (E00; E25.0; E70.0; E74.2)
Diabetes (E10 a E14)
Malnutrition, Other nutritional deficiencies and Nutritional anaemias (E40 a E46; E50 a E64; D50 a D53)
Dehydration (E86)
Mental and behavioural disorders due to use of alcohol and other disordes due to alcohol (F10; I426; K292; K70)
Oesophageal varices (I85)
Epilepsy and Status epilepticus(G40; G41)
Hypertensive diseases (I10 a I13)
Ischaemic heart diseases (I20 a I25)

Cont.

Atherosclerosis (I70)
Heart failure (I50)
Cerebrovascular diseases - Hemorrhage or occlusion (I61; I630 a I635; I638; I639; I64 a I66)
Bronchitis and emphysema (J40 a J43)
Asthma (J45 a J46)
Gastric Duodenal Peptic and Gastrojejunal ulcer (K25 a K28)
Appendicitis (K35)
Lung diseases due to external agents (J60 a J70)
Hernia and Paralytic ileus and intestinal obstruction (K40 a K46; K56)
Disorders of gallbladder and biliary tract (K80 a K83)
Chronic renal failure (N18)
1.4 Avoidable by prevention, control and attention to maternal causes of death
Complications of Pregnancy, childbirth and the puerperium (O00 a O02; O03 a O26; O29 a O99)
1.5 Avoidable by intersectorial actions of prevention, and attention to external causes
Transport accidents (V01 a V89)
Accidental drowning and submersion (W65 a W74)
Exposure to smoke, fire and flames (X00 a X09)
Accidental poisoning by and exposure to noxious substances (X40 a X49)
Intentional self-harm (X60 a X84)
Assault (X85 a Y09)
Event of undetermined intent (Y10 a Y34)
Falls (W00 a W19)
Iatrogenic conditions (Y60 a Y69; Y83 a Y84)
2. Ill-defined causes
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00 a R99, except R95)
3. Other Conditions (not clearly avoidable)
All other causes

Figure 1- Proportions of avoidable and not clearly avoidable mortality by age group PAISQUA - 1997 to 2006

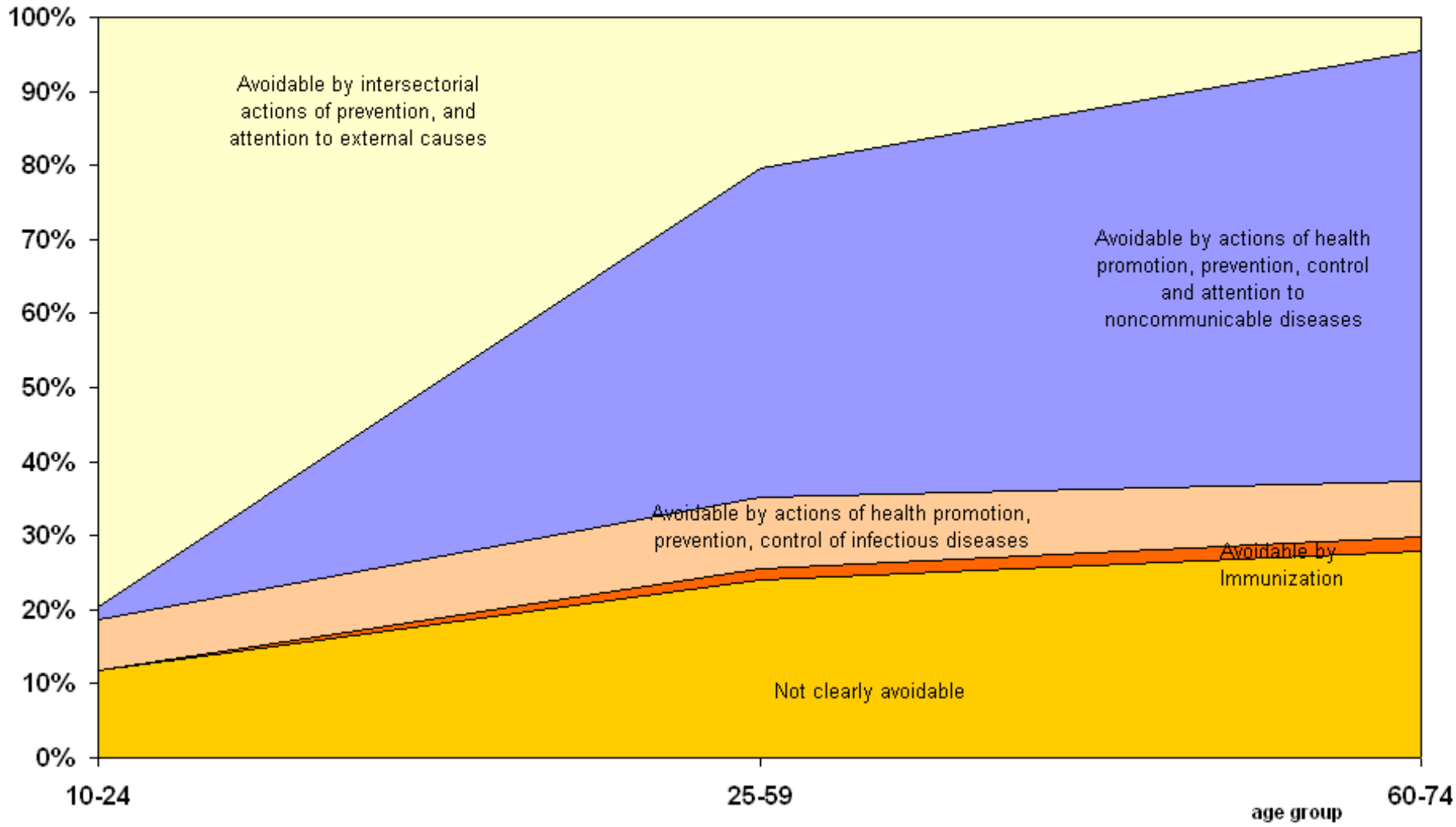

Table 1 - Cummulative percentage by age in categories of avoidable deaths

Causes of Death	10-24	25-59	60-74
Not clearly avoidable	4,9	56,6	100,0
Avoidable by Immunization	0,0	55,6	100,0
Avoidable by actions of health promotion, prevention and control of infectious diseases	7,8	66,7	100,0
Avoidable by actions of health promotion, prevention, control and attention to noncommunicable diseases	0,4	51,7	100,0
Avoidable by intersectorial actions of prevention, and attention to external causes	39,2	91,7	100,0
All causes	**10,0**	**62,4**	**100,0**

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