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Cancer mortality in Itapúa—A rural province of Paraguay 2003–2012

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ABSTRACT

Background: Itapúa is a rural department in Paraguay with a population of about 500,000 and a high degree of agro-mechanization for the production of soybean and other crops. So far, only basic health care is provided. Here we analyzed the cancer mortality in this region as a first step towards epidemiological data for cancer prevention.
Methods: We calculated the age-adjusted mortality rates according to world standard (AMRWs) for the major cancer sites in both males and females between 2003 and 2012, and estimated the differences between the capital and more central districts of Itapúa *vs.* remote districts.
Results: There were about 2000 cancer deaths in the decade studied, with AMRWs for all malignancies of 90.9/100,000 in males from central *vs.* 49.1/100,000 in remote districts and 69.0/100,000 *vs.* 45.0/100,000 in women. Cancer was mentioned in 12.4% of all death certificates and outweighed mortality from certain infectious and parasitic diseases (3.6%). Cause of death was ill-defined in 19.6% of all death certificates, especially in remote regions and among the elderly. The part of cancer located in the uterus (47.8%) or cell type of neoplasm of the lymphatic or hematopoietic system (73.1%) were often not specified. The uterus (mainly the cervix) (C53–C55) was the leading cancer site in women with AMRWs of 17.2/100,000 in central and 14.0/100,000 in remote districts, followed by the breast. Lung and prostate were the leading cancer sites among men. The lung cancer mortality rate was 19.3/100,000 in the central region but 9.5/100,000 in remote districts. Although children comprised 36% of the population, only 24 death certificates listed cancer as cause of death in this decade.
Conclusions: Analysis of cancer mortality in this rural region of Paraguay, which lacks resources for diagnostics and care, revealed an already large number of cases, with higher rates in the central region than in remote districts. Lung and uterus (primarily the cervix) are common cancer sites and indicate the potential for prevention. However, the quality of the vital statistics needs to be improved. The true cancer burden is most likely underestimated, especially in remote regions and children.

1. Introduction

Cancer is projected to be a growing burden in low- and middle-income countries (LMICs) [1,2]. However, fragmented structures lacking resources for diagnostics and treatment of cancer in remote areas, and disparity due to insufficient health care for subpopulations are major challenges in LMICs, causing large differences between urban and rural regions and socio-economic groups [3]. In a comprehensive assessment of planning cancer control in Latin America and the Caribbean (LAC), Paraguay ranks among the lowest [3]. Radiotherapy and mammography are generally not available in the public health sector [4,5]. The gross national income per capita is the second lowest in South America [5].

Abbreviations: AMRW, age-adjusted mortality rate (WHO world standard); LAC, Latin America and the Caribbean; LMIC, low- and middle-income countries; LHS, cancer of the lymphatic and hematopoietic system.

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However, World Bank reports an extraordinary growth rate of the gross national product, in adjunct with recognized efforts in anti-poverty programs (http://www.worldbank.org/en/country/paraguay). The production of hydro-electric power and soybean are key economic activities. A health-care reform took place in Paraguay in 2008 and was aimed at providing basic health care. A program for cancer control is currently under development.

Cancer epidemiology is an integral part of national cancer plans to provide data for capacity building and information for preventive actions. Paraguay, with a projected population of 7 million in 2015, lacks a population-based cancer registration and, hence, reliable incidence as well as survival data [6]. Mortality data are complete but of limited quality [7]. We have selected Itapúa, a rural department in south-eastern Paraguay with a population of about 500,000, to analyze cancer mortality as a first step towards the planning and allocation of resources. A recently conducted survey in the public health sector revealed a lack of infrastructure for cancer diagnostics and treatment in this department [8]. Approximately 70% of the total area is used for farming, mainly crop (soybean, corn, rice, yerba mate, among others) and livestock production (www.itapua.gov.py). By contrast to the rural part of the department, its capital city Encarnación (about 100,000 inhabitants) is the third largest town of Paraguay. Encarnación is located some 370 km from Asunción and opposite of the Argentine city of Posadas. This present report provides information on malignant neoplasms of major sites, but identifies also limitations of the vital statistics. We further explored regional differences by comparing the capital and more central districts with the remote rural districts of Itapúa.

2. Material and methods

Annual mortality data (all causes, 2003–2012) and mid-year population data were obtained for the department of Itapúa in south-eastern Paraguay and its 30 districts from the General Directorate of Strategic Health Information. We grouped the districts into a central region (the capital of the department and the districts of the same health-service network) and more remote regions (Fig. 1). Supplemental Table S1 presents administrative information on the districts provided by the government of Itapúa. The remote region (14,072 km^2, population 313,043 in 2012) is less populated (22 inhabitants per km^2) and has fewer hospitals than the central region (3968 km^2, population 232,800 in 2012, 59 inhabitants per km^2). The distance from the most eastern part of Itapúa to the capital Encarnación is approximately 200 km.

Causes of death were retrieved from death certificates and classified at General Directorate of Strategic Health Information according to the 10th revision of the International Classification of Diseases (ICD-10). We investigated all malignant neoplasms (C00–C97), cancer of major sites, and of ill-defined sites (C76–C80). The part of the uterus where cancer was located was not specified in 119 (47.8%) death certificates (C55), 125 (50.2%) were coded as C53 (cervix uteri), and five (2%) as corpus uteri (C54). Another 50 (51.5%) death certificates were classified as C95 (leukemia, not specified) and 21 (21.6%) as C85 (non-Hodgkin lymphoma, not specified) among all 97 cases with cancer of the lymphatic and hematopoietic system (LHS). No case was coded as C96 (other and unspecified malignant neoplasm of LHS). Therefore, we analyzed the aggregated groups of cancer of the uterus (C53–C55) and LHS (C81–C96). For comparison, we further provided the number of death certificates where the cause of death was ill-defined (R00–R99) or coded as certain infectious and parasitic diseases (ICD-10 A00–B99) and external causes (V00–Y36, except medical complications).

Age-standardized mortality rates (AMRWs) were presented per 100,000 personyears with 95% confidence interval (CI) for the whole period (2003–2012) and for two consecutive 5-year periods (2003–2007; 2008–2012). We used the recently proposed age structure for the world population provided by WHO [9] stratified by gender and based on 5-year age groups up to an age of 80 and more years. We refrained from presenting annual rates due to small number of cases. For the department of Itapúa, we further calculated the cumulative mortality (0–74 years) and the median age at death from cancer and all causes by gender in this decade. Calculations were performed with SAS/STAT and SAS/IML software, version 9.4 (SAS Institute Inc., Cary, NC, USA).

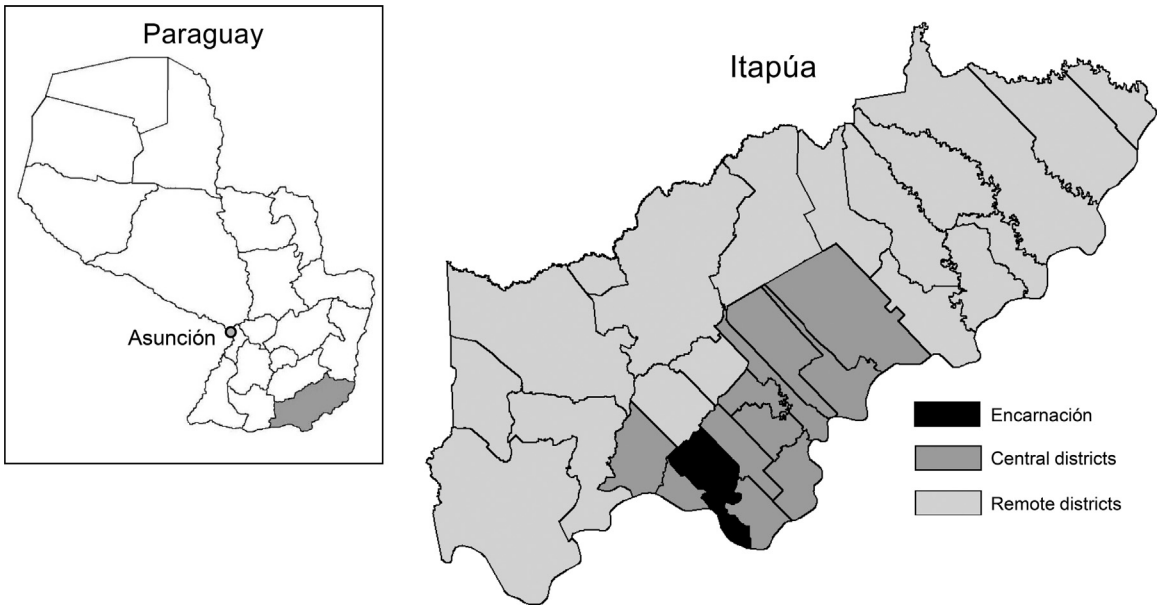

Fig. 1. Map of Itapúa, Paraguay, showing the central region (comprising Encarnación as the capital city of the department and the districts belonging to the same health-service network) and remote districts.