EDITORIAL

Epidemiology as a resource for informing cancer control guidelines and policies in Peru

Epidemiología como recurso para informar las guías y políticas de control del cáncer en el Perú

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INTRODUCTION

ByAccording to the World Health Organization (WHO), the projected number of cancer cases in Peru is expected to increase from approximately 69,800 in 2020 to 93,300 by 2030 [1]. As part of the 2030 Sustainable Development Goals agenda, the United Nations has set an ambitious target of reducing non-communicable diseases, including cancer, by one-third [2]. To achieve this goal in Peru and Latin America, the Pan American Health Organization (PAHO) has suggested developing and focusing interventions at subnational levels, tailoring the specific unmet needs to reduce the cancer burden [3]. However, the lack of robust surveillance systems to monitor cancer patterns may impede the attainment of this target [4].

Although the Global Cancer Observatory reports the most commonly diagnosed cancers and the most frequent causes of cancer-related mortality for the Peruvian population [1], the incidence and mortality patterns likely differ at the subnational level [5]. Unfortunately, current surveillance systems for monitoring cancer epidemiology metrics are inadequate and insufficient to provide reliable estimates for guiding cancer control programs and policies at the province level [4]. To address this issue and meet the 2030 United Nations agenda, Peru must improve the completeness and usability of available cancer and vital registries, identify population subgroups at greater risk of developing or dying from cancer, and design tailored medical and public health interventions. This editorial aims to provide a critical overview of the limitations of cancer surveillance systems in Peru and the implications for guiding cancer control programs and policies at the province level.

Cancer surveillance limitations

Population-based cancer registries (PBCRs) systematically collect demographic and patient data, including vital status, cancer diagnosis, and tumor characteristics. This unique source of information for cancer surveillance should provide robust epidemiological metrics for monitoring cancer incidence or mortality trends in a geographically defined population [6]. High-quality PBCRs are scarce in Peru, with only two active PBCRs, the Cancer Registry of Metropolitan Lima (the capital city) and the Cancer Registry of Arequipa (a province of Peru) [4]. These limitations restrict the extent and applicability of population metrics, such as incidence or mortality rates, for evaluating health outcomes among marginalized populations at the province level.

The vital registry of the Ministry of Health of Peru (MINSA, in Spanish) collects new cancer cases and cause of death information using death certificates from the

public and private sectors at the province level. Although this data provides valuable insights into estimating the burden of cancer, significant limitations, including double counting new cancer cases, lack of completeness, and a high percentage of ill-defined or non-specific primary causes of death, hampers its utility for a high-quality estimation of health outcomes. Consequently, the WHO has classified this data source as low quality [7], restricting its use for understanding cancer patterns among population subgroups.

Cancer epidemiology in Peru

The lack of high-quality epidemiologic data in Peru hinders the development of effective health interventions to reduce cancer risk and mortality. As a result, relying on national estimates is currently the most reliable approach. This section describes the mortality rates for the overall and top five most common causes of cancer-related deaths in Peru, as compared to the WHO Americas region. The objective of this comparison is to demonstrate the utility of epidemiology as a tool for controlling cancer and highlight the challenges of conducting public health interventions.

Figure 1 depicts cancer mortality patterns in Peru and the WHO Americas region in 2019 using the Global Burden of Disease Study (GBD). Age-standardized mortality rates (ASMRs) per 100,000 persons were estimated using the World standard population. Mortality outcomes were used as ascertainment bias limits the reliability of national incidence data, as previously discussed. The GBD is publicly accessible and corrects for the lack of registry

completeness and ill-defined underlying causes of death on death certificates. The interactive web tool of the GBD (https://www.healthdata.org/gbd/2019) provides readily available mortality rates. While acknowledging that its estimates might differ from those in the WHO mortality database, this database was used for its simplicity.

According to Figure 1A, the ASMRs for all neoplasms in Peru (103.6) are lower than those in the Americas region (127.4). However, there are notable sex differences in these estimates, with Peruvian females having slightly lower rates than the Americas (102.5 vs. 110.2), and Peruvian males having significantly lower ASMRs (105 vs. 150.1). A closer examination of the top five causes of cancer mortality reveals distinct patterns for both sexes, as shown in Figure 1B for females and Figure 1C for males. Compared to the Americas region, Peruvian females have substantially higher mortality rates for cervical cancer (12.2 vs. 7.1) and stomach cancer (16.2 vs. 5.7), while Peruvian males have significantly higher mortality rates for stomach cancer (19.5 vs. 10.1).

Future directions

The distinct distribution of cancer mortality in Peru compared to the Americas region warrants further investigation (Figure 1). The current lack of robust cancer surveillance systems at the subnational level in Peru poses a challenge to researchers and healthcare providers. To address this issue, it is imperative to identify population subgroups that are at a higher risk for cancer development or mortality and who would benefit most from targeted health interventions. For instance, previous
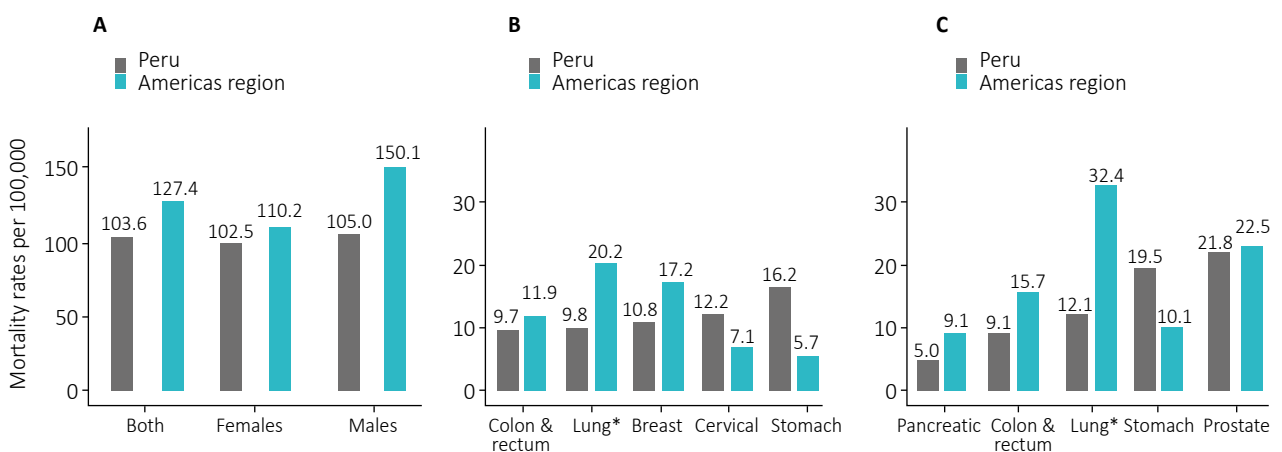

Figure 1. Age-standardized (World population) mortality rates per 100,000 persons in Peru and the Americas region. Rates for all neoplasms in the total population and by sex in 2019 **(A)**. Top five most common causes of cancer-related mortality in Peru and the corresponding average rates for the Americas region among females **(B)** and males **(C)**. *Including tracheal and bronchus cancers according to the GBD classification.

data suggest a high concentration of stomach cancer in the highlands across Latin America, yet limited efforts have been conducted to mitigate incidence or mortality risks [5]. Through descriptive epidemiology, it may be possible to identify and prioritize population subgroups in need of immediate attention, and subsequently, develop interventions to improve health outcomes and inform public health policy.

Urgent mobilization of resources is needed to improve cancer detection and patient follow-up in Peru. The unique identifier number for every Peruvian citizen is an opportunity to improve the quality of the MINSA database by linking individual-level clinical data, such as tumor characteristics or patient follow-up, with the neighborhood-level prevalence of risk factors identified through the Demographic Surveys, such as the ENDES. Identifying population subgroups at greater need has the potential to inform the development of screening and public health interventions.

CONCLUSIONS

Peru has a unique distribution of cancer epidemiology compared to the average in the Americas. The province-level distribution of these patterns is unclear. Current cancer surveillance systems are limited in their capacity to provide reliable subnational epidemiological metrics for identifying high-risk subgroups that require immediate clinical and public health interventions. To meet the 2030 Sustainable Development Goals agenda on cancer incidence and mortality, public health officials should enhance and expand existing cancer registries to understand the cancer burden in Peru and provide evidence-based recommendations to improve health outcomes at the national and sub-national levels.

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