TRENDS AND DETERMINANTS OF CAUSE OF DEATH DIVERSITY IN UGANDA: 2013 - 2021

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Description of the topic

In the past decades, there have been significant changes in the distribution of causes of death with a shift from communicable causes of death to mostly non-communicable causes of death[1]. The mortality profile by cause has long been known to be a key indicator of well-being and health. Globally, several studies have explored and documented the leading causes of death over time, however, there is scant data about the diversity of causes of death and its drivers[2, 3].

As a significant indicator of population health heterogeneity CoD diversity reflects the behavioural patterns and structural characteristics of societies[4]. On the one hand, low diversity suggests that the factors that cause mortality are more homogeneous and predictable. Conversely, a high diversity suggests significant obstacles for healthcare systems, as attempts to reduce overall mortality become increasingly complex and potentially less successful[2]. The main aim is to examine the trends, and drivers of CoD diversity using data from a Health and Demographic surveillance site in Uganda from 2013 to 2021.

Theoretical focus

The Epidemiological Transition theory highlights that CoD diversity should first increase and then decrease (i.e., follow an inverted U trajectory) when a nation's CoD profile shifts from mostly communicable deaths to mostly non-communicable deaths[5]. Furthermore, health outcomes are becoming more and more stratified within countries based on socioeconomic status[6, 7], a condition that may further contribute to the diversification of causes of death. The results presented in this study advance our knowledge of how the epidemiological transition develops in Uganda.

Data

This study used longitudinal data collected at an HDSS in Uganda, the Rakai Community Cohort Study (Rakai) in South Central Uganda (established in 1999 with an average adult population of 19843 and 1410 adult deaths as of 2021). The site collects routine data on residency status, births, education, migration, and deaths. It also collects VA data on all deaths in the population, which is administered by trained research assistants within one to two months after death. For this study, consideration was made for the period when the site started using the standardised WHO tool[8]. CoD was assigned using the InSillico VA computer algorithm which classifies CoD into 60 specific causes of death.

Research methods

Cause of death was grouped into five major categories (1) communicable diseases, (2) non-communicable diseases, (3) HIV/AIDS/TB-related, (4) maternal causes of death, and (4) injuries. Life table age-standardized cause-specific mortality rates (CSMR) per 100000 person-years (pyo) were computed to determine the leading causes of death in the regions. CoD diversity was measured using the Fractionalization index, F[9] also known as the Simpson index of diversity (widely used in ecology studies to assess the extent of biodiversity in an ecosystem). F is the likelihood that two randomly selected deaths have distinct causes. It assumes that all deaths are categorized into a list of mutually exclusive causes. Higher values of F indicate that the causes from which individuals die become increasingly diverse while lower values show that fewer causes are accounting for an increasing portion of deaths. If all individuals died from the same cause, F would equal zero. The F index is calculated using cause-specific mortality fractions from the life tables. It is expressed as:

$$F = 1 - \sum_{i=1}^{k} p_i^2$$

Where:

- p_i is the CSMF of cause i taken from the life table
- k is the number of causes of death. The Fractionalization index is.

Using the Horiuchi decomposition method[10], we will examine the contribution of each CoD to changes in CoD diversity between 2013 and 2021. Several studies have used this technique to decompose changes in life table functions like life expectancy[11-14].

Expected findings

A snapshot of results is shown. Overall, the age-standardised mortality rate per 100000 pyo for females was 349.98 in 2013 and 113.1 in 2021 while the same in males was 499.74 in 2013 and 257.79 in 2021. The leading CoD varied over the years, with HIV/AIDS/TB taking the lead in the earlier years for both males and females and later non-communicable causes of death dominated as shown in Figure 1. The calculated index of fractionalisation in 2013 was 0.67 for females and 0.32 for males, while in 2021 it was 0.93 for females and 0.79 for males. This implies a more homogenous CoD profile in males in 2013 compared to females while in 2021 it is more of a heterogenous CoD profile. Decomposition methods will show the causes of death responsible for the changes in the CoD diversity (changes in the F index).

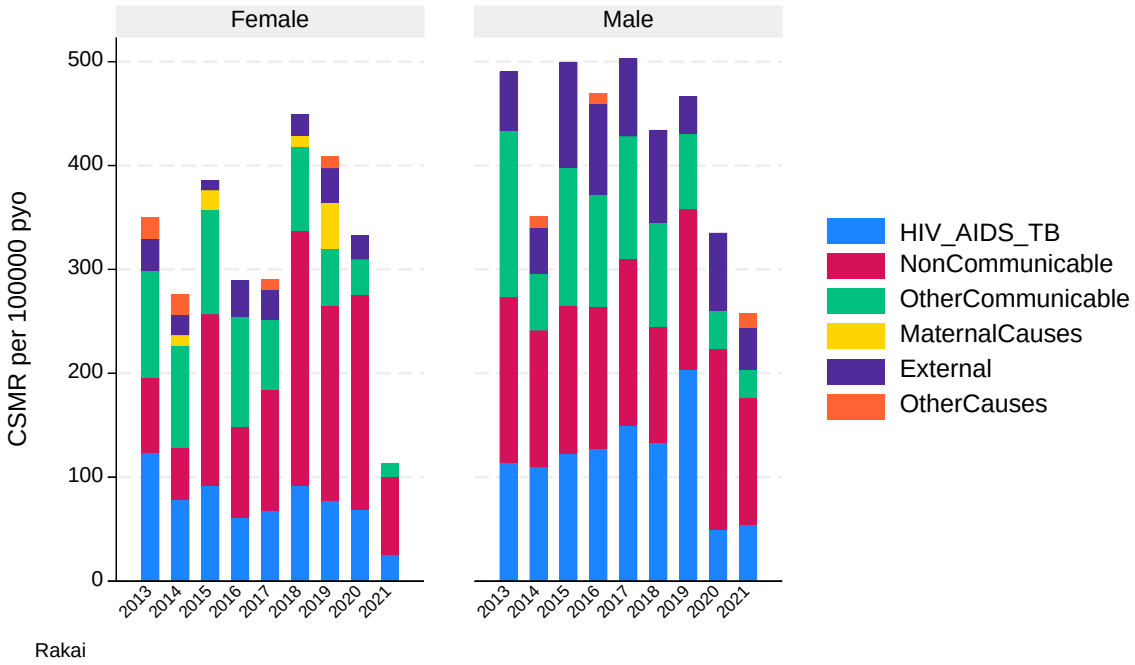

Figure 1 Causes Specific mortality rates of broad causes of death in Rakai 2013 to 2021

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