Deaths of despair: trends in 12 Latin American countries (2000-2014)

1. Introduction

Deaths of despair (suicides and deaths related to drug and alcohol use) have been gaining relevance in discussions about the pattern and levels of mortality after identification of the phenomenon by Case and Deaton's (2015). In a more recent study (2017), the same authors attributed the increased mortality of non-Hispanic whites aged 45-54 from the United States to despair. According to the authors, the substantial gains in life expectancy achieved throughout the twentieth century were matched by the increased mortality of middle-aged white males and females at the beginning of the 21st century.

The increase in deaths of despair was accompanied by deterioration in physical and mental health that materialized in increased morbidity (Case and Deaton, 2015). Due to the somatization process, sometimes the morbidity of despair is translated into obesity, cardiovascular diseases, mental and behavioral diseases - which suggests that morbidity and mortality of despair is, by definition, underestimated.

The stress and hopelessness faced by people as they encounter the incongruity between aspirations and achievements worsen family dysfunction, social support, and dependency conditions, which in turn drive death of despair. For example, Case and Deaton (2017) deal with the different nuances of despair - whether through suicide, alcohol and drug abuse, or opiate use-depending on individual and population characteristics (Case and Deaton, 2017). Another recent article supports these observations by showing that whites aged 45-54 in rural communities, in addition to having the greatest increases in deaths of despair due to liver disease, poisoning and suicides, also suffered higher deaths from cardiovascular disease and respiratory diseases (Stein et.al, 2017).

Regarding the relation between morbidity and mortality, there are three possible hypotheses: understanding, expansion and dynamic equilibrium. In the understanding, it is assumed that there is a fixed limit for life expectancy and with

improvements in health conditions; the morbidity curve tends to approximate the survival curve. On the other hand, with the increase in life expectancy, one expects to live longer with some kind of morbidity, expanding the distance between the morbidity and survival curve. An intermediate scenario, in which the assumption of a fixed limit of expectation is violated, would have a dynamic balance between morbidity and mortality (Gonzaga et al., 2008).

In a recently published article, Stein et.al (2017) dealt with the epidemic of despair among Americans. In the article, the authors evaluated the trends in the rates of premature mortality between 1999 and 2015, due to death, age, race and level of urbanization in the United States. From these characteristics, 48 subpopulations were constructed, of which 39 had decreased mortality rates due to HIV, cardiovascular diseases and cancers. The other nine subpopulations - with increased death rates - are non-Hispanic whites, largely in rural countries or small metropolitan areas. The increased mortality of the nine subpopulations was attributed to suicide, poisoning (including opiates), and liver disease.

Regarding the use of opiates Alexander et.al. (2017) found that the mortality rate for opioids tripled between 2000 and 2015 in the USA and are higher among the non-Hispanic white population. The gap between mortality rates by opioids between whites and blacks is in part due to the increase in the prescription of analgesic drugs, whose prescription rate in the period was higher for the white population.

In relation to suicide, Phillips (2017) shows that in the USA between 2000 and 2014 (age-weighted) suicide rates increased by 24%, with a pronounced increase between 45- 64 years. For males in this age group, the rate increased by 43% over the period and for females by 63%, although death by suicide remains much more common among males.

As explained, patterns and levels of mortality differ according to individual context and characteristics: despair deaths were generally identified among non-Hispanic whites, suicide rates are higher among males, opioid use is (rural or urban) was relevant (Stein et al, 2017). In addition, studies suggest that self-destructive health behaviors may be related to underlying social and economic factors.

There is a notable increase in the number of studies aimed at exploring deaths of despair, mainly because it represents a historical reversal of mortality decline. In scenarios where the marginal gains in life expectancy are decreasing, we observe the *retangularization* of the survival curve and compression of mortality in advanced ages, a subtle increase in mortality rates leads to the hypothesis of reversal of the health transition (Wilmoth and Horiuchi, 1999; Wilmoth, 1998).

Considering the above and knowing that between 2013 and 2014, the increase in the age group mortality of 45-54 in the USA was sufficient to compensate for the improvements in the other age groups, the relevance of studies on the historical trend and age pattern of the deaths by despair is self-determined.

As of the publication of the article "Rising Morbidity and Mortality among Non-White Hispanics in 2015 by Case and Deaton, several other articles on despair deaths in the USA have been published, however no studies have been found on the deaths of despair for America Latina (LA), although it is suspected that this is a silent epidemic.

2. Objective

The present study proposes to analyze the trend of the specific rates by sex, age and type of cause for the mortality of despair in Latin America countries for the years of 2000, 2005, 2010 and 2014 as well as to measure the potential gains in life expectancy relative to the elimination of deaths of despair.

3. Methods

3.1. Database

We used the life tables by sex and the number of deaths for each cause from World Health Organization (WHO). We analyzed twelve countries - Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, Paraguay, Peru, Venezuela and Uruguay. These countries differ significantly in terms of socioeconomic and demographic profile, as well as in terms of the political context.

We identified three major groups of causes of death of despair from the International Classification of Diseases (ICD-10): suicide (ICD10 codes: X60-84, Y87.0), accidental and intent undetermined drug overdose and alcohol poisoning (ICD10 codes: X40-45, Y10-15, Y45, Y47, Y49) and Alcoholic Liver Disease and Cirrhosis (ICD10 codes: K70, K73, K74).

3.2. Multiple decrement tables

The effect of each group of causes of death of despair of the total mortality was estimated as the hypothetical gain in mortality when the mortality rates of this particular cause are arbitrarily zero, maintaining the force of mortality from other causes-of-death constant. Note that the results obtained from the mult iple decrement tables is a counterfactual exercise and not an epidemiological forecast. Although the total elimination of a cause of death is unlikely in the current medical possibilities, this type of exercise can be useful for the prevention and management of diseases and disorders. The results of multiple decrement tables were presented in terms of percentage gains, enabling the comparing of survival variations for different levels of mortality.

4. Preliminary Results

The preliminary analysis of mortality information by reveals some points that deserve to be highlighted. First, although the level of mortality of despair varies widely among the countries analyzed, it is increasing for all countries between 2000 and 2014. Second, the gender differential assumes a relevant role, indicating that males are at greater risk of dying due to one of these three causes. Thirdly, it is important to note that the age profile of death of despair varies widely across countries. In Brazil and Colombia, the participation of different age groups is very similar, whereas, the deaths of despair are concentrated in young adults in Uruguay and Argentina. On the other hand, it focuses heavily on older adults in Mexico. Finally, it is worth mentioning that the composition of mortality of despair also differs among countries: while alcoholic liver disease and cirrhosis plays a more important role in mortality of despair in Brazil, Ecuador, El Salvador and Mexico, suicide plays a more important role in mortality out of desperation in Peru and Colombia.

5. References

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