Editorial

The impact of unemployment on cancer mortality, and how to avoid it

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Health authorities should warn that unemployment can damage our health. Unemployed individuals have fewer financial resources to comply with their basic needs; they can have reduced access to healthcare. Psychological malaise and stress may also derive from unemployment and engage individuals in poor behaviors that are well-known risk factors for diseases, injuries and death.

Specifically referring to cancer mortality, its relation with unemployment was initially assessed at the individual level. During the 1990s, two reviews of the literature (1,2) gathered studies assessing the higher risk that unemployed individuals had of dying from cancer. Cancer mortality may associate with factors that contribute to the risk of incidence, which would explain, in part, why cancer mortality ranked higher among the unemployed. However, the reduced access to effective healthcare may be an even more important factor to explain the association of unemployment with mortality due to chronic diseases.

In addition to affecting the health of individuals, unemployment can also be detrimental to the health of communities. During economic downturns, the increase in unemployment rates can impact on population health indices of cities and countries. Performing an ecological study is the strategy that allows assessing data focused on communities, rather than on individuals. Associations fitted at the community level are in part influenced by individual factors and effects. Such evidence allows some inferences at the individual level, which are not exempt from the risk of ecological fallacy. However, the most important feature of ecological studies is to assess directly contextual determinants of population rates and community health (3).

Following this analytical perspective, more recent studies put into question the area-level association between unemployment and cancer mortality. My research team furthered this hypothesis during the 2000s, by gathering international data of individuals clustered into countries or inner-city neighborhoods. This strategy paid off, and we could report the ecological association of unemployment and cancer mortality in Brazil and Europe, both in assessments at the small-area and at the country level (4-7). Analogous results were reported in the US, using a county-level database (8). This type of study is relevant to instruct health policy and planning. Health systems are more willing to interventions and programs that are shown to be able to improve population health indices.

In spite of their importance, these previous studies were limited by the fact that they had only assessed cross-sectional and panel data. They lacked a longitudinal assessment on what happens to cancer death rates when economic downturns and increases in unemployment rates occur. We move forward into causality when we elicit the chronological organization of associated factors, because, of course, causes must precede their effects. When we were doing these studies, however, this gap in knowledge was yet to be fulfilled.

It was then; it is not anymore! This very big step was done by Maruthappu *et al.*, who assessed country-level data originally gathered by the World Bank on socioeconomic information, and the World Health Organization on mortality (9).

They scrutinized a total of 75 high- and middle-income countries, encompassing more than 2 billion people, from 1990 to 2009, and showed that a rise of 1% in unemployment was associated with statistically significant increases in all-cancer mortality during the 5 subsequent

years. This finding is unlikely to have been confounded by insufficient control for relevant covariates, because authors adjusted their analysis for population size, age distribution, and country-specific differences in healthcare infrastructure.

When it came to assess mortality by type of cancer, analogous results were found for treatable (prostate, breast and colorectal) cancers; whereas untreatable (lung and pancreatic) cancers have not suffered increases in mortality after unemployment rises. These contrasting results suggest that the reduced access to healthcare, which follows economical downturns and unemployment rises, is an important reason for the increase in cancer mortality.

Aiming to confirm this hypothesis, authors compared countries with and without universal health coverage. This comparison elicited that universal health coverage had a protective effect and removed the impact of unemployment on cancer mortality. This is very good news indeed! If the association between rises in unemployment and increases in cancer mortality is mediated by the reduced access to healthcare during economical downturns, then universal health systems can fulfill this need by providing increased access to healthcare when other sources of funding hospital and medical care become more scarce.

Authors also assessed longitudinally the public expenditure on healthcare, showing that increases in this measurement, as a proportion of gross domestic product, were associated with reductions in all-cancer mortality during the 5 subsequent years. In addition, an analogous result was observed for mortality by treatable cancers, though not for untreatable cancers, whose mortality has not decreased after rises in investment in health. This conclusion is in line with the finding that an enlarged access to healthcare is of foremost importance to avoid the prejudicial effect of unemployment rises in cancer mortality.

I began saying that health authorities should warn that unemployment can damage our health. After reading the study by Maruthappu *et al*., I would add that health authorities should also advertize that public expenditure on healthcare and universal health coverage are antidotes to the impact of unemployment on cancer mortality. This is indeed a valuable knowledge, which deserves to be translated into health policy and planning.

Highlights

Classifying types of cancer

Cancer types, as referred to the anatomical location of the tumor, were classified into two classes in the study by Maruthappu *et al*. Lung and pancreatic cancer, whose 5-year survival rates are lower than 10%, were considered untreatable; whereas prostate, breast and colorectal cancer, whose survival rates exceed 50%, were considered treatable. The differentiation between treatable and untreatable cancers and the premise that access to healthcare is more difficult during economical downturns, contributed to explain how unemployment and public expenditure on healthcare impact on cancer mortality. This endowed strategy is highlighted as a methodological hint for further studies on health policies and cancer mortality.

Defining universal health coverage

Universal health coverage is a complex concept, and it is difficult to determine which countries effectively achieved this condition. However, a clear-cut definition was demanded to fit the regression models. Maruthappu *et al*. defined it to countries that met three criteria: (I) legislation mandating universal health coverage; (II) healthcare insurance covering more than 90% of the population; and (III) skilled birth attendance accessible to more than 90% of the population.

These criteria are sensitive and comprehensive. The first one entails specificity. No health system is universal by chance; it is necessary to stipulate this aim as mandatory. The second one refers to amplitude; to be effectively universal; the health system must provide access to an overwhelming proportion of population. And the third criterion involves the quality of services that are expected to be offered by a functioning healthcare system.

Researchers interested in cross-country comparisons of health systems should pay close attention to this concept and how it was defined in this study.

Using health information systems

Maruthappu *et al*. used databases originally gathered by the World Bank and the World Health Organization. They have also assessed subsidiary information provided by the United Nations Development Programme. All these databases demanded an enormous effort to be gathered; conducting studies that use health information systems is a way to make this huge investment compensate.

However, using this type of information requires some attention to its imperfections. Authors excluded countries

with incomplete (less than 90%) civil registration of causes of death; they have also excluded information related to very old people (85 or more years old), whose causes of death are less extensively determined in many countries. Additionally, authors fitted regression models as adjusted for population size, age distribution, and country-specific differences in healthcare infrastructure. They have also controlled their analysis for other possible differences between countries, by using a scheme of fixed effects for regression analysis.

These cautions are also highlighted as methodological hints for future studies that use health information gathered in broad international databases.

What was already known on this subject

(I) Unemployment was associated with cancer mortality at the individual level. During the 1990s, reviews of the literature concluded that unemployed individuals had a higher risk of dying from cancer than their employed counterparts;

(II) Unemployment was also associated with cancer mortality at the community level. During the subsequent period, several studies assessed this association in terms of population rates at different geographic scales: the inner-city small areas, comparisons across countries.

What Maruthappu *et al.* added

(I) The longitudinal assessment of data related to high- and middle-income countries allowed to assert that increases in unemployment rates were associated with rises in cancer mortality, a finding that is unlikely to have been confounded by uncontrolled differences between countries;

(II) The comparison between untreatable (lung and pancreatic) and treatable (prostate, breast and colorectal) types of cancer revealed that the rise in mortality that followed the increase of unemployment was only seen for treatable cancers, which reinforces the role that access to healthcare has in explaining this association;

(III) Universal health coverage protected against the prejudicial effect of unemployment rises in cancer mortality;

(IV) In contrast to unemployment, rises in public expenditure in healthcare were associated with reductions in cancer mortality, with an analogous difference between treatable and untreatable cancers.

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Footnote

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