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Uncovering gender inequalities in morbidity onset

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Abstract (250 words)

In the last decades, global health progress has been driven by impressive reductions in mortality rates which let to reach unprecedented population longevity records all over the world. Less successful, though, have been the attempts to reduce disease incidence, activity limitations and disability rates. As a result of continuing improvements in survival, delayed mortality selection has shifted the health disparities from early to later life, which translates into growing health inequalities among an older heterogeneous population. This work aims at documenting the population health registers in Catalonia by analyzing health trends for men and women to fully understand how/when the comorbidity patterns varies/starts by sex.

In this article we are using the health registers for the population in Catalonia, Spain (with a population size of 7.5 million individuals). Data comes from the Public Data Analysis for Health Research and Innovation Program” (PADRIS) and in particular we are working with a sample over 1.5 million individuals. We are following these individuals over time since the year 2005 and this offers a unique opportunity to observe the health trajectories of individuals and measure the evolution of *true* comorbidity patterns with unprecedented detail.

Health trajectories allow the identification of gendered health patterns, confirming the gendered health-survival paradox. Our findings will be useful for scholars worldwide investigating contemporary health dynamics as well as to guide the development of public policies aimed at reducing avoidable health inequalities. It will provide a comprehensive map of the disease burden in Catalonia (Spain), identifying factors contributing to shorter life expectancy as well as life lived in good health.

Keywords: health inequalities, morbidity and aging

Extended abstract (2 to 4 pages).

Introduction

People live longer and living a healthy life is considered one of the main challenge of societies worldwide. Accompanying a worldwide sociodemographic change, statistical data show an increase in the life expectancy of the most aged segment of the population (European Commission, 2020). Indeed, due to low birth rates, advancements in medical and pharmaceutical technology, health care, nutrition, and sanitation have resulted in lower death rates worldwide lower birth rates worldwide (Jones and Rose, 2005). Therefore, in the last decades, global health progress has been driven by impressive reductions in mortality rates for a wide range of causes of death, which have gradually led to the attainment of unprecedented longevity records in populations all over the world (Oeppen and Vaupel 2002, Riley 2015). Less successful, though, have been the attempts to reduce disease incidence and disability rates (Abbafati et al 2020).

Nowadays, interventions to improve population health would be more efficient focusing on the health disorders that debilitate rather than kill. Mortality is no longer the main culprit, but rather morbidity and, more specifically, the increasing co-morbidity (i.e., different diseases or health conditions affecting the same individuals) that naturally comes with age. One of the key issues of concern in ageing societies is whether the extra years of life ensuing from increasing survivorship are lived in “good” or in “less-than-good” health. Depending on the relative speed at which mortality and morbidity decline, the number of years individuals are expected to live in different health states can differ dramatically – an issue that has enormous implications for the sustainability of the health and pension systems (Christensen et al 2009; Murray et al 2015; Rechel et al 2013). The so-called “compression vs. expansion of morbidity” debate, which tries to elucidate whether morbidity retreats to older ages at higher or lower speed than mortality does (Fries 1980, Gruenberg 1977, Manton 1982), has been raging for a long time. So far, the evidence supporting the different hypotheses is mixed, as results are very often contingent on the chosen morbidity indicator, which might vary across space and time. Be that as it may, there is widespread consensus that mortality-based indicators alone (like ‘life expectancy’ – or LE for short) are increasingly falling short of fully capturing the complexities of current populations’ health. In sum, our contemporary ageing society is becoming increasingly complex and heterogeneous and our societies present global social, economic, and health challenges.

As a result of continuing improvements in survival, delayed mortality selection has shifted the health disparities from early to later life, which translates into growing health inequalities (Permanyer and Scholl 2019) among an older heterogeneous population, not only in mortality but, most importantly, in morbidity.

To explore such heterogeneity, it is necessary to assess whether the health inequalities that emerge over the life course are affected by factors like individual characteristics (e.g., age and sex), socio-economic position (e.g., educational attainment, type of job), geographical location (e.g., urban/rural) or other contextual variables. In particular, this work aims at documenting the population health registers in Catalonia by analyzing health trends for men and women.

Data

In the field of epidemiology, there is a long tradition of analysing databases that collect the health history of larger or smaller samples of patients. However, it is only recently that such databases have become representative of the population as a whole, and thus have been used in the analysis of population health. In this sense, Northern European countries were pioneers in the treatment and use of the registry data available in the different public institutions for academic purposes. Access to this type of information seems to be the cause or consequence of a greater interest on the part of demography in understanding the heterogeneity of the health of populations beyond mortality. It is in this context that the Public Data Analysis for Health Research and Innovation Program (PADRIS) database was born. This database comprehensively collects the diagnosis history of a large number of diseases as well as mortality for a representative sample of the entire population of Catalonia from 2005 onwards. The information on diagnoses is collected by the primary health care professionals of the Catalan Health Service (CatSalut) using the e-CAP programme. Primary care services are fully covered by public funding. The Catalan Health Service (CatSalut) assigns all citizens to a primary care team (composed of, at least, a practitioner and a nurse) based on where they live. The most relevant particularity of the PADRIS database is that an exhaustive follow-up is carried out for a cohort of people as of 1 January 2005. Therefore, unlike other similar databases that aim to characterise the comorbidity profile of the population year by year, in this case a follow-up is carried out for a specific cohort over 15 years (between 2005 and 2019). This implies that no new individuals are incorporated into the sample for observation, be they births or immigrants arriving after 2004. Another specificity of PADRIS is that the health history is linked with mortality registers, which permits to consider another dimension of population health as mortality.

Here, we are using the health registers for the population in Catalonia, Spain (with a population size of 7.5 million individuals) through the “Public Data Analysis for Health Research and Innovation Program” (PADRIS). The large number of cases included in the registers and their longitudinal nature offers a unique opportunity to observe the health trajectories of individuals and measure the evolution of *true* comorbidity patterns with unprecedented detail. From this dataset, we will obtain key demographic (sex, age, age at first diagnostic, age at subsequent diagnostics) and health characteristics (chronic conditions, health disorders).

At the moment we are working with a sample of 1,553,485 individuals (the study cohort in 2005, representing 20% of the entire population), with 781,655 women and 771,830 men. This sample is representative of the Catalan population as a whole on 1 January 2005 according to age, sex, territorial distribution (i.e. health region) and nationality. The fact of carrying out a follow-up for a cohort makes it possible to describe longitudinally the evolution of comorbidity profiles without the possible bias caused by possible structural changes in the population. This implies that the reference population throughout the observation period remains unchanged, thus avoiding problems of left truncation in the analysis. In accordance with the Spanish regulations on observational studies, this retrospective study conducted using anonymised data did not require informed consent to be obtained from the patients.

Analytical Strategy

We employ sequence analysis techniques for the period 2005 to 2019. Doing so, we are able to reconstruct all individual trajectories of comorbidity for Catalan men and women.

We identify the first diagnosis of the different diseases collected in the major groups of the ICD-10 classification in order to observe the accumulation of different diseases. Following the approach used in other recent papers (Harrison et al 2014, Head et al 2021), to analyze comorbidity trajectories we reconstruct the accumulation of different diseases (0; 1-2 diseases; 3-4 diseases; 5+ diseases). Mortality has also been included as one of the admissible health states.

Although we first apply this method for descriptive purposes, we will be able to identify different clusters of comorbidity trajectories as well as calculate an indicator of dissimilarity corresponding to various individual trajectories.

Preliminary Results

Sequence analysis

We present information on cumulative diagnostic diseases among 4 groups (no disease; 1-2 diseases; 3-4 diseases; 5+ diseases) and death. The group with no disease, healthy people, could have been diagnosed before the year 2005 or it could also be people that use private services (around 25% combine public and private care, a choice that is more common in young age groups and that decreases as age increase).

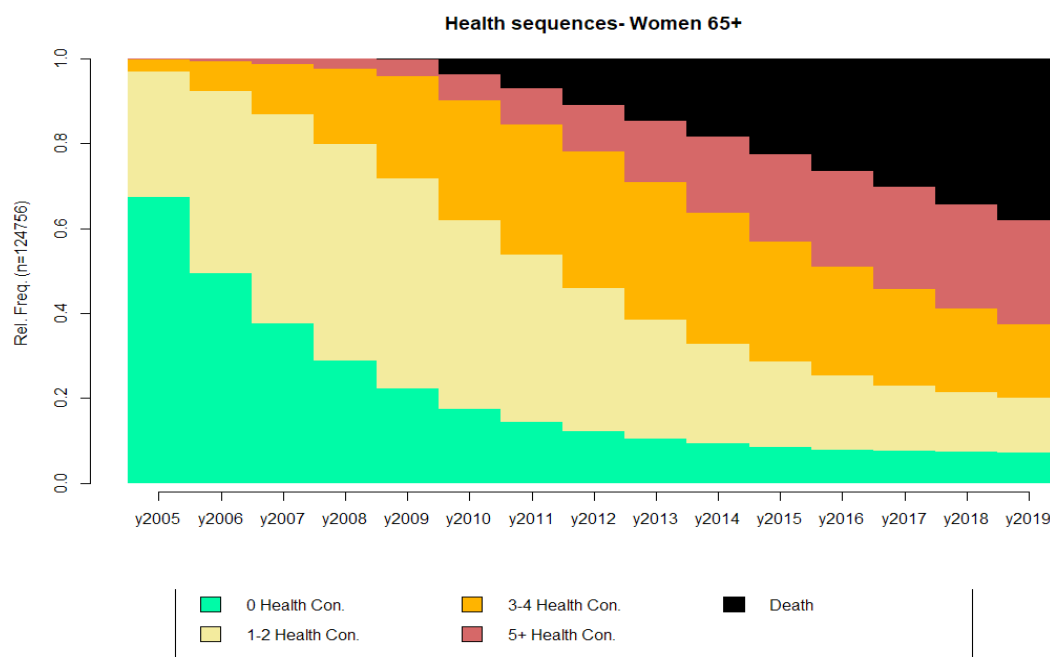
At this point, we show the results of the sequence analysis selecting women 65 years of age and older (Figure 1), 124,756 Catalan women. Results for men are not included for a matter of space, but we detect the higher mortality for them compared to female across cohorts. Figure 1 present the co-morbidity patterns for Catalan women aged 65-plus since 2005 up to 2019 and we see how, at this age, healthy individuals represents close to 70% of the population but as individuals aged unhealthy patterns are increasing.

The expected results from this research will be useful for scholars worldwide investigating contemporary health dynamics. It will provide a comprehensive map of the disease burden in Catalonia (Spain), identifying factors contributing to shorter life expectancy as well as life lived in good health. Our findings will be useful to guide the development of public policies aimed at reducing avoidable health inequalities in the territory, by socio-economic class & gender, as well as promoting territorial & social cohesion.

Future analysis

This analysis is the starting point of the whole LongHealth project that will explore, enrich and complement this present work, the population health trends for men and women in Catalonia, using additional sociodemographic population subgroups: (i) socio-economic status (level of education), (ii) mortality risks and prevalence at death; and (iii) geographic location.

Figure 1. Sequence analysis. Women aged 65-plus



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