Lifespans inequalities by marital status: The case of Australia from 1921 to 1981

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Short abstract

It is now well established that married people tend to live longer than their unmarried counterparts due to a mixture of *protective* and *selective* effects. Previous studies show that the mortality differences by marital status have increased over time. Differences in mortality by marital status are often studied by comparing life expectancies, but this measure conceals heterogeneity among individuals. Here we examine differences in lifespan variation and the modal age at death by marital status. These two measures refer to different aspects of mortality, namely the timing and variation of lifespans. Using data from the Australian Demographic Databank (ADDB) between 1921 and 1981, it can be shown that never- and ever-married women had a similar timing of death (mode) but had increasing differences in lifespan variation over time. Never-married men experienced both shorter and more unequal lifespans compared with ever-married men. Greater lifespan inequalities over time are thus not only observed by marital status, but also within the never-married population.

Introduction

It is now well established that married people tend to live longer than their unmarried counterparts. The advantage of married people is generally due to a mixture of *protective* and *selective* effects. The *marriage protection* effect comprises a variety of environmental, social and psychological factors that favour health. The *marriage selection* refers to the process in which marriage selects healthier people leaving higher proportions of single people with health problems. The mortality advantages of married people have been observed at all ages and tend to increase over time (Hu and Goldman 1990; Murphy et al. 2007).

Differences in mortality by marital status are generally studied by comparing life expectancy or (age-specific\standardized) death rates. Life expectancy, however, conceals heterogeneity in individual mortality. Recent studies rather suggest using the modal age at death and lifespan variation to study trends and differentials in mortality (Ouellette et al. 2012, Edwards and Tuljapurkar 2005). These two measures refer to different aspects of mortality, namely the timing and variation of lifespans. The modal age at death is the most common lifespan whereas lifespan variation summarizes heterogeneity\inequalities at the population level and uncertainty in the timing of death at the individual level. Changes in both lifespan variation and the mode drive changes in life expectancy (Bergeron-Boucher et al. 2015). These measures have mainly been used to study mortality decline over time, but they have recently been used to study differences between populations (Aburto and van Raalte 2018).

The modal age at death and lifespan variation have not been used to study mortality differentials by marital status. In this paper, we use these two measures to better understand mortality differentials by marital status over time in Australia.

Data

Data on deaths and population counts by marital status are available in the Australian Demographic Databank (ADDB) between 1921 and 1981. Data are available by single-year of age from age 0 to 100. As most people are single at young ages, we use data from age 30. Deaths and populations are classified as never-married (singles) and ever-married (married, widowed and divorced).

Methods

Separate life tables are calculated for never- and ever-married females and males. For each marital status, lifespan variation is calculated using e-dagger. E-dagger measures the variation in the age-at-death distribution in a life table and is interpreted as the average remaining life expectancy when death occurred.

Determining the mode can be challenging when the age-at-death distribution shows an irregular pattern around the mode. We thus used a P-spline method to smooth the distributions and find the mode (as suggested by Ouellette et al. 2012 and using the *MortalitySmooth* R package by Camarda (2012)).

Results

Figure 1 shows life expectancy at age 30 trends by sex and marital status. Between 1921 and 1981, differences in life expectancy by marital status increased; from 1.3 to 2.5 years for females and from 4.0 to 5.6 years for males. The difference between females and males also increased over this period; from 2.3 to 6.3 years for ever-married and from 5.0 to 9.2 years for never-married.

Figure 2 shows the modal age at death and the lifespan variation by sex and marital status. For females, the mode for never-married was around one year lower than that for ever-married from the 1950s, but the gap remained roughly constant over time. Somewhat similar timing of death by marital status was thus observed for females. However, never-married women had greater lifespan variation than ever-married women. Never-married women recorded increased variation in their age-at-death distribution from the late 1950s, while ever-married women recorded a levelling off.

Never-married men experienced both shorter and more unequal lifespans compared with ever-married men. The mode decreased for never-married men until the 1970s but stayed somewhat stable for the ever-married. Differences in lifespan variation by marital status for males decreased until World War II but increased afterwards.

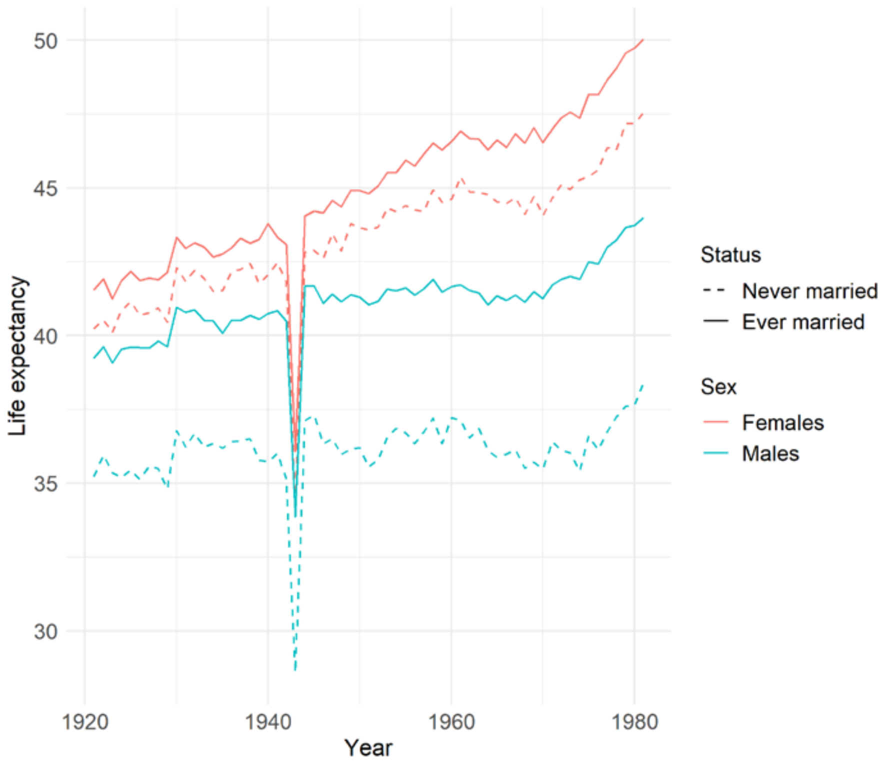

Figure 1. Life expectancy at age 30 by sex and marital status, Australia 1921-81.

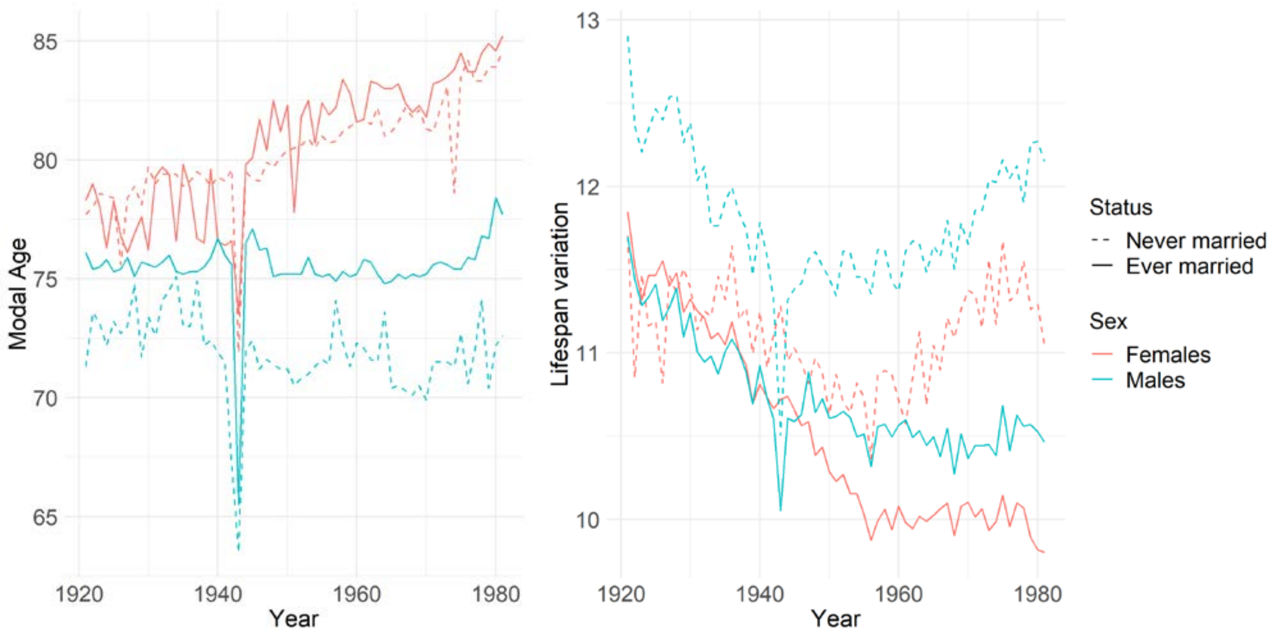

Figure 2. Modal age at death and lifespan variation by sex and marital status, Australia 1921-81.

Discussion

Never-married men and women recorded increased lifespan variation from the 1950s, while variation for ever-married men and women levelled off. Greater lifespan inequalities over time are thus not only observed by marital status, but also within the never-married group. Measures of variation in the age-at-death distribution are generally influenced by mortality at ages below the mode. Never-married individuals recorded an increased mortality at age 50-59 for females and 40-59 for males in the 1950s-60s. After the War, lung cancer and coronary heart disease mortality increased in Australia. It is possible that mortality due to these causes disproportionately affected single individuals. However, more research is needed to understand these trends.

Next steps

It is possible, using parametric mortality models, to quantify how much of the difference in life expectancy by marital status is due to difference in the mode and difference in lifespan inequality by age (Bergeron-Boucher et al. 2015). Preliminary results suggest that differences in lifespan variation drives the difference in life expectancy. A similar approach can be used to decompose the difference in e-dagger by age.

Data for married, divorced and widowed, instead of ever-married, are available in the ADDB. However, the estimation and collection of death counts for widowed and divorced have changed over time. More detailed analysis on data quality is first needed before dividing the ever-married group.

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