

## **Living alone and mortality: more complicated than it seems**

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Living alone is a common experience among older people in Europe. More than 25 million men and women aged 65 and older (around 32% of the total) live alone, and levels have increased markedly over the past two decades.<sup>1,2</sup> There are many reasons why people in middle and older ages live alone. For some, it may be a personal choice or preference, a wish to be independent and solitary. For others, factors that are partly beyond their control such as divorce or widowhood may have forced the transition from living with spouse or family. A third possibility is that selection effects mean that people who have physical or mental health problems have found it difficult to establish stable personal relationships, so remain alone. Whatever the reason, living alone increases the chances of social isolation and loneliness, factors that have emerged as risk factors for all-cause mortality, and cardiovascular disease in particular.<sup>3,4</sup>

Interest in the impact of living alone on the well-being, health and mortality of older people has consequently intensified. In this issue of *European Heart Journal – Quality of Care and Clinical Outcomes*, Jensen et al have examined the impact of living alone on mortality using data from The Copenhagen Male Study, a prospective cohort of employed middle-aged Danish men.<sup>5</sup> Although living alone has previously been shown to be a predictor of mortality, the evidence has often been drawn from patient populations or observations over short periods. In the current study, living arrangements were assessed when participants were aged 62.9 years on average, and they were followed up for a mean of 18 years to examine the association with all-cause and cardiovascular mortality. Living alone was shown to be an independent risk factor for both all-cause and cardiovascular mortality in this general population sample. After adjusting for baseline cardiovascular disease history, diabetes, body mass index, cardiovascular risk factors, lifestyle variables, self-rated health, mood, satisfaction with housing conditions, and other factors, living alone was associated with a 23% increased risk of all-cause mortality, and a 24% increased risk of death from cardiovascular disease. Interestingly the association varied by socioeconomic position (SEP), so that whilst living alone was not a risk factor for individuals in the highest SEP, it remained an independent factor for all other socioeconomic strata. The study also found that the results were

robust when those who had died within the first five years of follow-up were excluded, thus suggesting that the association observed between living alone and mortality could not be explained simply by reverse causality.

There are certain limitations to this interesting study that are highlighted by the authors. It was only possible to examine living alone at one time point, which did not allow transitions into or out of one-person households to be explored. This would be of interest, since it would help us to reject the potential explanation that these associations are due to the selection of those in worst health circumstances into solo households. Additionally, exploring transitions between the different states would allow the exploration of the relevance of different reasons for living alone. For example, there is evidence that smoking and physical inactivity become more common among middle aged and older people who divorce, and that these account in part for the increased mortality risk.<sup>6</sup> The study was only able to examine older men, and it would be interesting to consider where these findings are also true for older women. Across Europe, a higher proportion of older women live alone and in the oldest old (those aged 85 and older), around half of women live alone. However, the association between living alone and mortality has been found in some studies to be more toxic for older men than women.<sup>7</sup> Another important issue is that the study was based on living alone in 1985-86, and we do not know whether the findings generalise to the present day when the social context and culture has changed so much. Perhaps in the era of text and email connectivity and greater mobility, the drawbacks of living alone have been ameliorated.

The role of SEP in moderating the relationship between living alone and survival is highly intriguing. Recent research examining the association between cardiovascular disease and both general stress and stress in the workplace has suggested that adverse effects are particularly strong among individuals with lower socioeconomic positions. The combination of living alone plus chronic strain related to lower SEP may act as a double source of stress.<sup>8,9</sup> The degree to which welfare state support can protect citizens from some of the financial or social barriers of living alone could be examined by cross-national research in this area. There are large geographical variations in the

proportions of elderly people living alone across Europe, and since countries differ in their economic and social regimes, the opportunities for exploring whether there are also differing consequences for health outcomes are important.

The study by Jensen and colleagues was not able to explore the mechanisms linking living alone with a higher risk of mortality. As noted earlier, social isolation, an objective indicator of social connectivity, and loneliness, the subjective experience of lack of companionship, have both been implicated in health risk, and people who live alone are more likely to report both isolation and loneliness. If these associations are causal, two broad sets of mechanisms have been implicated. First, there appear to be direct links between isolation or loneliness and activation of systemic biological processes that increase risk of cardiovascular disease such as raised concentration of inflammatory biomarkers and disruption of adrenocortical rhythms.<sup>10</sup> A second set of potential mechanisms relate to lifestyle and other behaviours. Social isolation is associated with less physical activity, poorer diet and more smoking over periods up to 10 years in older people.<sup>11</sup> Individuals who live alone may lack encouragement to maintain healthy lifestyles, or may not have people around them to make contact with medical services when they experience potentially dangerous symptoms. Therefore, it is possible that a combination of behavioural and direct psychobiological pathways are operating.<sup>12</sup>

This research provides robust evidence about the potential adverse effects of living alone, but more nuanced work is needed to understand the processes in more detail. Repeated measurements over a number of years would make it possible to tease out the impact of sustained living alone versus the situation in which people transition from living with others to being alone. People who live alone at older ages are a heterogeneous group and differences related to marital status and other factors may be relevant.<sup>7</sup> Research which contributes to this growing body of evidence by exploring the health consequences of living alone is timely. However, to alleviate the risks of solo living it will be necessary to understand further the risks associated with living alone and whether the consequences are the same across different societies and cultures.

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