

Is living alone bad for your health in mid and late life? New data from Spain

David S. Reher & Miguel Requena

Introduction

In recent decades, the importance of persons living on their own has grown substantially and, at least in much of the developed world, today represents an important percentage of the elderly (35-45 percent of women and between 15 and 25 percent of all men above 65) (Reher & Requena, 2018; United Nations, 2005; Palloni, 2001). Less is known about living alone during the mature adult years, but here too percentages appear to have grown in recent years and now include 10-20 percent of people aged 50.

The implications of this residential option for the health and well-being of mature adults and the elderly are far from clear. Studies on the impact of living alone on the health of elderly people present ambiguous results (Pimouguet et al., 2015). Very little is known of the implications of solo living during the adult years, though some authors have argued that divorced middle-aged men should be considered a vulnerable social group (Murphy, 1997) and this may be linked to their relative inability to meet the physical and psychological challenges that come with life (Grundy, 2006; Möller-Leimkühler, 2003; Snow, 2008). Other than very general tidbits of knowledge such as these, based often on self-assessment from existing surveys, we know very little about the health implications of living alone in later life.

A very promising approach to assessing the health implications of living alone is to make use of death registers. The existing literature using this type of approach has yielded interesting results in which the lower death rates are found among currently married people, with higher ones among never-married, divorced or widowed people (Williams & Umberson, 2004; Bourassa et al, 2018; Berntsen and Kravdal, 2012; Sbarra et al, 2011; Burgoa et al, 1998; Hemström, 1996). A weak point of these studies, at least from the standpoint of this paper, is that marital status only reflects coresidence in a very indirect way and may be less significant than the actual type of coresidential situations where people live. There are few studies in which living alone is related specifically to the likelihood of death and on how this takes place net of the impact of marital status and other basic constraints (Iliffe et al., 1992; Hughes & Waite 2002; Kandler et al., 2007; Karicha et al. 2007; Koskinen et al. 2007; Li et al., 2009; Agrawal, 2012; Pimouguet et al., 2015; Poulain et al. 2016).

The specific goal of this paper is to address how living alone impacts the likelihood of death among mature adult and elderly persons.

Context

Some considerations regarding the potential links between coresidence and death provide a useful context for this study. Generally, we expect that mortality for people living alone will be higher than it is for people living with others, though the expected links require some explanation. In the first place, it is important to bear in mind that living alone, especially during later life, tends to be selective for those with the best initial health. Those with very bad health automatically tend to be selected out of households in which they are alone and into ones where they are with other people or, in cases of severe health depletion, into other types of institutional coresidence. In other words, all things being equal, we might expect that the likelihood of death would be lower for those on their own rather than higher, because of the a priori selection process for residential choice. The importance of this selection effect should grow with age, as the general health conditions of people tends to worsen and concerns about health grow. That said, however, there are numerous reasons why living alone could have negative implications for health but for them to be visible the effect must be stronger than the prior selection for good health. Coresidence with others, often but not always with family members, can impact health by the different pathways that are listed below.

- (a) Catastrophic events requiring immediate medical attention. In cases such as strokes, acute myocardial infarctions or falls, the time elapsed between the catastrophic event and the arrival in a specialized care

unit can spell the difference between life and death, recovery and permanent disability. Living with others should have an impact on the result of these sorts of catastrophic events and health conditions in a deep and measurable way. Our premise is that in these cases the importance of having company at home is substantial. Causes related to acute heart disease, cerebrovascular disease and falls and other domestic accidents represent this type of effect.

- (b) Health outcomes related to endocrine nutritional and metabolic diseases (including diabetes) in which the regularity of diet and medication is essential for maintaining health is another case in point. Here, the company of others should increase the likelihood that this is serious and carried out rigorously.
- (c) Finally, health outcomes related to depression should be visible. Once again, our premise is that the coresident group can have a positive effect on matters related to depression. Since death by suicide is the only measurable outcome reflecting this effect more or less directly present, the effect should be strong and closely linked to whether or not a person lives alone or with others.

For other types of chronic and degenerative illness, however, we expect the importance of others in the household may be much lower related to health outcomes. A prime example of this would be all types of tumors (cancer) because anyone with cancer is seldom living alone, especially after the initial and highly debilitating treatment for most tumors (chemotherapy, radiation therapy). In fact, contracting this dread disease would be a reason for a change in coresidential status from the very onset.

Expected results

The expected results are shown in table 1, where certain causes of death specified are used to mirror the general factors mentioned above. The importance of the posited effect is shown in the last column with positive effects shown by a plus (+), and negative by a minus (-). Cause of death data will help illustrate the mechanisms behind the existence or not of differential mortality.

More generally, we expect mortality differentials by coresidential status to be consistently higher among men living alone than among women living alone, because women have been shown to be more capable of taking care of themselves than men (Grundny, 2006). We also expect the role of age to be important for differential risk, though the exact pattern is unclear at this stage as the health-based threshold for living alone tends to change as people grow older.

Table 1: Differential mortality by cause of death and coresidence (alone/not alone)	Expected Effect
Ischemic heart disease and acute myocardial infarction, other heart disease	+++
Cerebrovascular disease, stroke	++
Causes of death related to nutritional status (endocrine and metabolic), including diabetes	++
Falls, households accidents, pathological fractures	+++
Suicide	+++
Cancer/tumors, chronic illness	-
Other	-
All causes (all mortality)	?

Data and methods

The analysis in this paper makes use of a new data set based on linked administrative registers for Spain. Deaths coming from vital registers (Movimiento Natural de la Población) have been linked to data on the same individuals present in the 2011 census, including the type of data on individual and household characteristics normally present in modern censuses (sex, age, marital status, household structure, education, migratory status, reproductive history, country of origin, and others). All original data have been provided for by the Spanish national statistical office (Instituto Nacional de Estadística) in separate files with the indispensable identifiers that allow for linking records.

The linked data set consist of a sample of around 10% of the population present in the 2011 census (i.e., population living in households). It should be noted that linked data do not include deaths of people not registered in the census —namely, those living in institutions, living abroad and those born in 2012. Taking this into account, more than 96% of the provided deaths in the potentially linkable file have been

successfully linked. The set of non-linked deaths is not affected by any relevant selectivity factor and thus there are no substantial differences between distributions of deaths (by sex, age, and marital status) in the linked data and in the set of all deaths in the vital register for 2012. After making the pertinent checks on the dataset, our analytical sample included 1,673,545 observations of men and women 50+ that were alive at the beginning of 2012. In the linked dataset 28,196 of these individuals died in 2012.

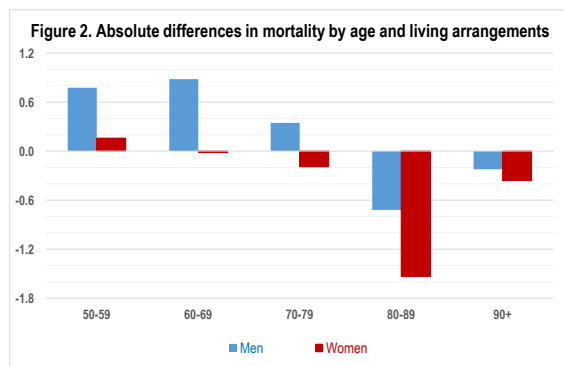
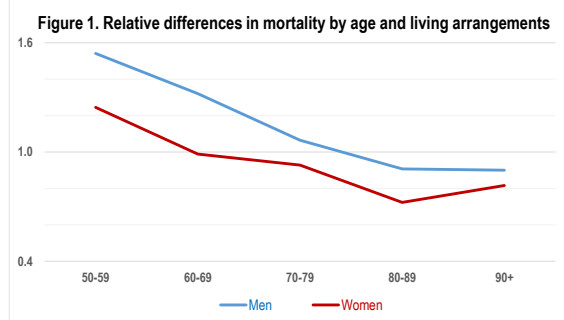
We will address our research goals applying a three-step analytical strategy. First, we calculate crude and standardized mortality rates by sex, age and coresidence (alone/not alone) to find patterns of differential mortality associated to household status. Secondly, we examine mortality differentials between coresidential statuses considering seven types of cause of death corresponding to the mechanisms involved. Finally, we estimate multivariate models for the purpose of refining the analysis and taking into account possible interactions between some of the relevant factors.

Preliminary results

Only initial results are presented in this extended abstract. Crude and standardized mortality rates and their respective ratios and differences (Table 2, Figures 1 & 2) point to a very clear mortality/coresidence pattern associated with age. While there is excess mortality among men (50-79) and among women (50-59) living alone, in later life (men over 80 and women over 70) people living with others are more likely to die than those living alone. Relative differences are striking; absolute differences seem to be small, but their cumulative effect over time suggest they can make a substantial difference in survival probabilities.

Table 2. Population, deaths and crude and standardized mortality rates

Population alive at 1/1/2012						
	50-59	60-69	70-79	80-89	90+	50+
Men Living Alone	28,500	27,056	21,788	14,392	2,139	93,875
Men Living with Others	257,667	205,158	147,704	73,286	8,472	692,287
All Men	286,167	232,214	169,492	87,678	10,611	786,162
Women Living Alone	23,735	36,658	51,797	48,584	7,531	168,305
Women Living with Others	264,364	208,771	148,044	82,080	15,819	719,078
All Women	288,099	245,429	199,841	130,664	23,350	887,383
1,673,545						
Deaths						
	50-59	60-69	70-79	80-89	90+	50+
Men Living Alone	173	333	570	905	318	2,299
Men Living with Others	1,015	1,912	3,627	5,081	1,399	13,034
All Men	1,188	2,245	4,197	5,986	1,717	15,333
Women Living Alone	53	138	595	1,749	880	3,415
Women Living with Others	474	795	1,832	4,083	2,264	9,448
All Women	527	933	2,427	5,832	3,144	12,863
Crude Rates						
	50-59	60-69	70-79	80-89	90+	50+
Men Living Alone	6.07	12.31	26.16	62.88	148.67	24.49
Men Living with Others	3.94	9.32	24.56	69.33	165.13	18.83
All Men	4.15	9.67	24.76	68.27	161.81	19.50
Women Living Alone	2.23	3.76	11.49	36.00	116.85	20.29
Women Living with Others	1.79	3.81	12.37	49.74	143.12	13.14
All Women	1.83	3.80	12.14	44.63	134.65	14.50
Standardized Rates						
	50-59	60-69	70-79	80-89	90+	50+
Men Living Alone	2.21	3.64	5.64	7.01	2.01	20.50
Men Living with Others	1.43	2.75	5.29	7.73	2.23	19.44
All Men	1.51	2.86	5.34	7.61	2.18	19.50
Women Living Alone	0.81	1.11	2.48	4.01	1.58	9.99
Women Living with Others	0.65	1.12	2.67	5.55	1.93	11.92
All Women	0.67	1.12	2.62	4.98	1.82	11.20



This double pattern associated with age points to the existence of important selection effects on the path to death along the lines outlined above. While mature men and women living alone appear to be a vulnerable group due to their poor health condition —surely worsened by a lack of family companionship and resources—, those living alone at older ages appear to have been positively selected because their better

health. When those living alone start to experience serious health problems and are no longer able to maintain their residential independence, they tend to move in with others and eventually die in this residential condition. Interestingly, women are positively selected for living alone (i.e., they survive more if live alone) at earlier ages than men and among them the effect is considerably stronger.

In accord with the framework explained above, differential mortality by large groups of causes of death and the estimation of multivariate models will help to clarify the role and relevance of these selection mechanisms.

References

- Agrawal, S (2012) Effect of living arrangement on the health status of elderly in India, *Asian Population Studies*, 8:1: 87-101.
- Berntsen, K. N. & Kravdal, Ø. (2012) The relationship between mortality and time since divorce, widowhood or remarriage in Norway. *Social Science & Medicine*, 75, 12, pp. 2267-2274.
- Bourassa, K.J., Ruiz, J.M., Sbarra, D.A. (2018) Smoking and Physical Activity Explain the Increased Mortality Risk Following Marital Separation and Divorce: Evidence from the English Longitudinal Study of Ageing. *Annals of Behavioral Medicine*, <https://doi.org/10.1093/abm/kay038>
- Burgoa, M., Regidor, E., Rodriguez, C. Gutierrez-Fisac, J.L. (1998) Mortality by cause of death and marital status in Spain. *European Journal of Public Health* 8: 37-42.
- Grundy, E. (2006) Ageing and vulnerable elderly people: European perspectives. *Ageing & Society* 26: 105-134.
- Hahn, B.A. (1993). Marital status and women's health, the effect of economic and marital acquisitions. *Journal of Marriage and the Family*, 55, 495–504.
- Hemström, Ö. (1996) Is Marriage Dissolution Linked to Differences in Mortality Risks for Men and Women? *Journal of Marriage and Family* 58(2): 366-378.
- Hughes, M.E & Waite, L.J. (2002) Health in Household Context: Living Arrangements and Health in Late Middle Age, *Journal of Health and Social Behavior* 43(1): 1–21.
- Iliffe, S, Tai, S.S., Haines, A., Gallivan, S., Goldenberg, E, Booroff, A. & Morgan, P. (1992) Are elderly people living alone an at risk group? *British Medical Journal* 305:1001-4.
- Kandler U, Meisinger C, Baumert J, Löwel H, the KORA Study Group (2007). Living alone is a risk factor for mortality in men but not women from the general population: a prospective cohort study. *BMC Public Health*. 7: 335.
- Kharicha, K., Iliffe, S., Harari, D., Swift, C., Gillmann, G., & Stuck, A.E. (2007) Health risk appraisal in older people 1: are older people living alone an 'at-risk' group? *British Journal of General Practice* 57: 271–276.
- Koskinen, S., Joutsenniemi, K., Martelin, T. & Martikainen, P. (2007) Mortality differences according to living arrangements, *International Journal of Epidemiology* 36:1255–1264.
- Li, L.W., Zhang, J., Liang, J. (2009) Health among the Oldest-Old in China: Which Living Arrangements Make a Difference? *Social Science and Medicine* 68(2): 220–227.
- Möller-Leimkühler, A. (2003) The gender gap in suicide and premature death or: why are men so vulnerable? *European Archives of Psychiatry and Clinical Neurosciences* 253: 1.
- Murphy, M. (1997). Household and family factors in morbidity and mortality. In Wunsch, G. & Hancioglu, A. (eds), *Morbidity and Mortality Data: Problems of Comparability*. Proceedings of the European Association for Population Studies and the Hacettepe Institute of Population Studies Workshop, Urgup, Turkey, 18–20 October, 1995. Hacettepe Universitesi, Nufus Etutleri Enstitüsü, Ankara, Turkey, 209–33.
- Palloni, Alberto. 2001. Living arrangements of older persons. In United Nations (Ed.), *Living arrangements of older persons: Critical issues and policy responses*. New York: Population Bulletin of the United Nations, Special Issue Nos. 42/43, pp. 54–110.
- Pimouguet, C., Rizzuto, D., Schön, P., Shakersain, B., Angleman, S., Lagergren, M., Fratiglioni, L., Xu, W. (2015) Impact of living alone on institutionalization and mortality: a population-based longitudinal study, *European Journal of Public Health* 26(1): 182–187.
- Poulain, M., Dal, L. & Herm, A. (2016) Mortality risk by living arrangements for the elderly Belgian population, *Quetelet Journal* 4(1): 29-56.
- Reher, d. & Requena, M. (2018) Living alone in later life. A global perspective, *Population and Development Review*, <https://doi.org/10.1111/padr.12149>.
- Sbarra, D.A., Law, R.W. & Portley, R.M. (2011) Divorce and Death. A Meta-Analysis and Research Agenda for Clinical, Social, and Health Psychology. *Perspective on Psychological Science* 6(5):454-74.
- Snow, RC (2008) Sex, Gender and Vulnerability, *Global Public Health* 3 Suppl 1:58-74.
- Umberson, D. (1992) Gender, marital status and the social control of health behavior. *Social Science and Medicine* 34, 907–17.
- United Nations. 2005. *Living Arrangements of Older Persons around the World*. New York: Department of Economic and Social Affairs, Population Division.
- Williams, K. & Umberson, D. (2004) Marital Status, Marital Transitions, and Health: A Gendered Life Course Perspective. *Journal of Health and Social Behavior* 45(1): 81–98.