The health and wellbeing of older women living alone in the UK: is living alone a risk factor for poorer health?

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Declarations

Ethics approval

This study was approved by the College of Nursing Midwifery and Healthcare Research Ethics Panel at University of West London, Ref. No. UWL/REC/CNMH-00495.

Authors contributions

Study design: HK CF & PF, data analysis: CF, HK & LU, manuscript preparation: CF, PF, HK and LU.

Conflict of interest

Not applicable

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Abstract

Older women are more likely to live alone in later life in the UK; however, relatively little is known as to how this has an association with poorer health. This paper attempts to fill this research gap, assessing if living alone is a risk factor for poorer health in later life. The Household Panel Survey data, wave 8 were used which was collected during 2017 in the United Kingdom. Women's household types were divided into three types: living alone, living with a partner and living with others (not a partner). Seven health and wellbeing outcome variables were used. Descriptive analysis and regression analyses examined the role of living alone in predicting health and wellbeing, controlling for demographic and socioeconomic (SES) factors.

Results showed significant differences between the household types. However, living alone was not found to be a risk factor for poorer health once SES variables were included in the regression models. While there were differences in the health and wellbeing of the three household composition types, these differences were not found to be significant once demographic and socioeconomic variables were accounted for. Future UK policy should aim to reduce inequalities in SES throughout the life course to improve health and wellbeing in later life. Future research directions include a more detailed examination of the determinants of health of this population.

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Keywords: Older women; Living alone; Lone dwelling; Health and wellbeing; Household composition.

Introduction

The phenomenon of global ageing indicates that understanding the determinants of health and wellbeing in later life is more important than ever. Social support has been shown to be an important determinant of health and wellbeing (see for example, Pinquart and Sorensen 2001; Forsman, Herberts, Nyqvist, Wahlbeck, Schierenbeck 2013; Pimouguet et al. 2016), with particular acknowledgement of the role of loneliness in shaping health outcomes (Bergland and Engedal, 2011; De Jong Gierveld, Keating and Fast 2015; Teguo et al. 2016; Saito, Murata, Aida, & Kondo, 2017; Zali, Farhadi, Soleimanifar, Allamah and Janani, 2017).

Household composition is one way of considering social support in that it has been used as an objective measure to assess support immediately on hand. Some studies have used it as a measure of social isolation although there are problems inherent with this (Smith and Victor, 2018). Those living alone in later life have been highlighted as a potentially vulnerable group in earlier research, indicating further investigation is warranted (Kharicha, Iliffe, Harari, Swift, Gillman and Stuck 2017; Banks, Haynes, and Hill 2009). Living alone is an increasing phenomenon globally across the life course (Chandler, Williams, Maconachie and Collett 2003; Klinenberg 2014; Office for National Statistics 2015; Snell 2017). Living alone cannot be said to lead inevitably to poorer social support or reduced feelings of wellbeing but it has implications for the level of social, emotional, and practical support immediately on hand. It has also been linked with poorer health behaviours (Kim, Kim and Kwon 2020). Consistent with global trends, women are more likely to live alone in later life in the UK, primarily as a result of longer life expectancies (Office for National Statistics 2019). In addition to being at higher risk of living alone, women have also been shown to have a different experience of later life to that of men. The gendered experience of later life has been partially attributed to

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the social and politico-economical position of women which can lead to an accumulation of financial and social inequalities in later life (Dwyer, Gray and Renwick 2000; Hosseinpoor, *et al.* 2019; Yang, Hagedorn, Zhu and Chen 2020). Existing evidence suggests that a better understanding is required of the health and wellbeing of older women living alone (Hughes and Waite 2002; Khan, Hafford-Letchfield and Lambert 2018; Weissman and Russell 2018). This paper presents analysis which aims to increase understanding of the health and wellbeing of older women living alone in comparison with their cohabiting counterparts, by examining the role of household composition in predicting health and wellbeing outcomes.

In the UK, women are more likely to live alone than in other countries (Khan, Hafford-Letchfield and Lambert 2018), and living alone has been shown to be associated with higher risk of poorer health outcomes (Kharicha, Iliffe, Harari, Swift, Gillman and Stuck 2007). More widely, those living alone had poorer health outcomes when compared to those living with family (Sok and Yun 2011) and have been shown to be at higher risk of mortality (Teguo *et al.* 2016), institutionalization (Pimouguet *et al.* 2016), poorer physical health outcomes (Qu and Weston 2003; Sarkar, Shekhar and Mondal 2012; Moncatar *et al.* 2019), reduced independence (Saito *et al.* 2017), higher risk of falls (Berland and Engedal 2011), unmet care needs (Dunatchik, Icardi and Blake 2019) and lower mood, self-esteem and life satisfaction (Chou, Ho and Chi 2006; Kim and Sok 2013). Those living alone have also been shown to have reduced access to medical examinations and variations in pharmaceutical use (Cermakova *et al.* 2017). In addition to increased likelihood of living alone, women are also more likely to be affected by social factors (Gaymu and Springer 2012; Sun *et al.* 2017) and by an accumulation of social and financial inequalities throughout their life course (Estes, Biggs and Phillipson 2003; Nolan, Whelan, McGuiness and Maitre 2019).

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There are some inconsistencies which highlight the importance of individual life course trajectories and cultural variations. Some studies have shown no difference in disability or mortality for women living alone (Nilsson, Lund and Avlund 2007; Fujino and Matsuda 2009). Once adjusted for age and falls history, women living alone and those with family showed no difference in levels of loneliness (Zali, Farhadi, Soleimanifar, Allamah and Janani 2017). Women living alone in later life have been shown to enjoy their independence and freedom although this may not extend to more physically dependent or financially insecure populations (Cheng 2006).

Evidence indicates that it is not enough to compare those living alone with those cohabiting. Differences have also been indicated between those living with partners and those living with children, other family members or friends (Hank and Wagner 2013; Kim and Fredrikssen-Goldsen 2014; Shim *et al.* 2020). It is also important to consider reverse causality when considering the link between cohabitation and health outcomes; particularly in Western societies, older adults may only move in with relatives once they cannot manage living alone (Michael *et al.* 2001).

What is clear from the existing literature is that women who live alone are a potentially vulnerable population, the health and wellbeing of which is not fully understood. Certain determinants of health have been established and supported in more general literature such as SES, but further research is needed to examine the differences in health and wellbeing outcomes between those living in differing household types. This paper addresses this research gap by increasing understanding of the health and wellbeing for older women living alone in comparison with those who cohabit.

The aims of the research were:

To understand the differences in health and wellbeing of older women by household composition.

To determine which factors can moderate the effect of household composition on health and wellbeing in older women.

Hypotheses:

Those living alone will have poorer health than those who live with their partners.

The effect of household composition on health and wellbeing will be moderated by SES.

Methodology

Data were used from 'Understanding Society' or the United Kingdom Household Longitudinal Study (UKHLS). This is an initiative funded predominantly by the Economic and Social Research Council, with scientific leadership by the Institute for Social and Economic Research, University of Essex. It is the largest longitudinal study of its kind in the UK and collects data from approximately 40,000 households. Wave 8 was used for this study which includes data collected during 2017. Data include a wide range of social, economic and health factors and are representative of all ages, ethnicities and socioeconomic backgrounds. A detailed description of the sampling and collection of data are available elsewhere (Knies 2018).

Data from Wave 8 of the UK HLS were used for this study, being the most recent at the time of analysis. This includes data from the main survey sample plus three other components: the Ethnic Minority Boost Sample, the former British Household Panel Survey Sample

and the Immigrant and Ethnic Minority Boost Sample. Women over the age of 65 were selected, resulting in a subsample of 4279. Variables were therefore chosen from those available in this wave based on evidence in the existing literature. Weighting was applied to the dataset as per recommendations (Lynn and Kaminska 2009).

Ethical issues

The data were obtained from the UK Data Service in 2018. All participants consent to provide information to the survey and all data were anonymised prior to receipt by the authors. The data were kept securely during and after analysis as per the UK Data Service guidelines.

Rationale for independent variables

As the main aim of the study was to examine the health and wellbeing of older women living alone, a key variable was household composition. This was created as a proxy categorical variable using the data available. The three categories differentiated between living alone, living with a partner (either with or without others) or living with others (not including a partner) as indicated by previous studies (Gaymu and Springer 2012). 'Living with a partner' included co-habiting couples, married couples, and civil partnerships. Those living alone were identified using the variable 'h_hhsize' which numerated the number of people residing in a household. Those who responded that they were living with others most commonly stated they were living with children or grandchildren but also included those living with their parents, siblings, other relatives, tenants, or other non-relatives.

Based on previous findings, demographic variables were chosen to include in the modelling to control for the effects of known determinants of health and wellbeing. Demographic variables included highest level of education, measures of economic status (in the form of

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income and home ownership) and age, all of which have a good evidence base as predictors of health (Martikainen *et al.* 2008; Marmot *et al.* 2012; Rahman *et al.* 2016; Foster *et al.* 2018). Education was dichotomised as up to school level or above school level to simplify regressions. The individual monthly net income was used to represent SES and the log of this was used to reduce the effect of outliers. 'Region' is used by UKHLS to denote which UK country, and area (urban versus rural) were also included to look for geographical variations.

Ethnicity affects many aspects of life and while it has been shown to affect SES, access to support and health in later life, it has been omitted from similar studies (Higgs, Hyde, Arber and Blane 2005; Koehn *et al.* 2013; Khan, Hafford-Letchfield and Lambert 2018). This is especially important given the intersection of financial, social and ethnic inequalities faced by women from ethnic minorities in later life (Minkler 1996). Given the small number of ethnic minorities in the study compared to white ethnicities, reflective of the UK population, a proxy variable was created which dichotomises ethnicity into white and non-white in order to improve analyses as per previous studies (Toma et al. 2015).

Marital status was used to acknowledge the multiplicity of ways in which women come to live alone in later life, and to attempt to consider lone dwelling within a life course perspective (Gaymu *et al.* 2006; Alamino and Ayuso 2019; Rahman *et al.* 2016). The categories were simplified to equalise marriage and civil partnership e.g. putting widows and surviving civil partners in one category to simplify analysis.

Rationale for dependent variables

Variables which measure health and wellbeing were chosen to reflect the holistic nature of the concepts. They are divided into those representing health and those representing wellbeing.

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Wellbeing outcome variables

Wellbeing is acknowledged to be a difficult phenomenon to measure and some debate exists as to the different aspects encompassed by the term. Hedonic wellbeing refers to those facets which consider a sense of happiness, pleasure, or enjoyment: a subjective, affect-based measure of wellbeing. Eudaemonic wellbeing refers to a sense of satisfaction with life: this tends to be more related to a subjective assessment of life overall, rather than a happiness per se. Different aspects of wellbeing are acknowledged in the study by the choice of variables.

The General Health Questionnaire (GHQ) is a standardised assessment often used in clinical settings as a measure of mental distress, scored 0-36, a higher score indicates higher levels of distress. In a research context it has been used, with the score reversed, to represent subjective wellbeing (Goldberg 1972; Ocean *et al*. 2018, Clark *et al*. 2019). Life satisfaction is asked as a question in the survey with seven possible responses ranging from 'completely dissatisfied' to 'completely satisfied'. This was dichotomised into 'satisfied' (including the three satisfied responses) and 'not satisfied' (incorporating the other four responses) to simplify regressions as per previous studies (Helvick et *al*. 2007).

Health outcome variables

The variable 'presence of a long-term illness or disability' provided a simple dichotomous health outcome of yes/no. To illustrate more sensitive variations, SF-12 scores were also used.

The SF-12 is a standardised outcome measure regularly used in clinical and research settings. An abbreviated form of the SF-36, it is quicker to administer and has been shown to be valid and reliable. Similar studies have used the SF-12 to good effect (Burdine *et al*. 2000; Jakobsson 2007; Tang *et al*. 2017). The score provided two variables, a mental health score (MCS) and a physical health score (PCS) which gives a scale measurement of health and functioning.

Self-rated health can be a useful indicator of overall health and has been shown to be a good predictor of mortality (DeSalvo *et al*. 2006). In this study this was taken from an ordinal variable of self-rated health which was originally derived from a question asking participants to rate their health in one of five categories (Excellent to Poor). This has been dichotomised into 'Good' and 'Poor' health based on the distribution of responses in order to simplify analysis. 'Good' health consists of the 'Excellent' through to 'Good' responses while 'Poor' consists of the remaining responses.

Finally, from a service-provider and commissioning perspective, frequency of service use is often a useful indicator of health and wellbeing and is directly related to the costs of worsening health and wellbeing (Kharicha, Iliffe, Harari, Swift, Gillman and Stuck 2007). Within this data, a χ^2 test between general practitioner (GP) visits and outpatient hospital or clinic appointments showed a high level of association between the two (Spearman's rho .441, $p < .001$) and therefore it was felt appropriate to use number of GP visits in order to represent health service use generally. This was dichotomised to 'low' (0-5 visits a year) and 'high' (6+ times a year) use to simplify regression analysis.

Descriptive analysis

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Analyses were undertaken using IBM SPSS 24. Initial descriptive analysis explored the patterns and trends of the chosen variables, comparing the outcomes of older women living alone with the other groups. Initial frequencies described the population and explored the variations between the sub-groups. χ^2 tests and analyses of variance (ANOVA) were carried out for the qualitative and quantitative variables respectively. These were tested for associations between demographic variables and household composition, and then between household composition and health and wellbeing outcomes.

Regression modelling

Explanatory analysis was carried out using linear and binary logistic regression modelling, depending on the level of measurement of the dependent (health or wellbeing) variable. GHQ and SF-12 allowed for linear regressions, the variables which had been dichotomised (good/bad health, service use, presence of a long-term illness, life satisfaction) were analysed using binary logistic regressions. These models allowed for analysis of the relationship between household composition and health or wellbeing, while examining the contribution of demographic variables including age, socioeconomic status, employment and education.

The demographic variables were added individually to the regression modelling, starting with household composition, to allow for examination of the effect of each one to the model.

Results

Descriptive statistics and tests of association

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The demographics of the sample are shown in Table 1. Results are shown for both for the total sample and stratified by household composition. This table summarises the tests of association between household composition and the selected independent variables. Those living alone were older on average and the most common reason for living alone appears to be widowhood. They were less likely to own their own property and more likely to live in urban areas when compared to cohabiting counterparts. Those living alone made up 43.3 per cent of the sample, those living with partners 50.6 per cent and those living with others 6.2 percent.

Table 1: Measurement of selected variables and their descriptive statistical analysis by household composition

Variables	Measurement / Categories	Total sample N 4279		Living Alone		Living with partner		Living with other (not partner)		Test
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	F value
Age	(years)	74.84	7.40	77.57	8.04	72.29	5.65	76.47	8.05	293.34***
Income	(GBP per month)	1188.23	981.15	1411.79	994.70	976.85	823.31	1374.59	1541.75	108.31***
Log of income		7.55	0.608	7.14	0.46	7.85	0.52	7.92	0.49	1177.58***
		N	%	N	%	N	%	N	%	χ^2
Marital Status										0.700^a***
	Married	2183	51.0	10	0.6	2162	100	12	4.6	
	Divorced	517	12.1	458	24.7	0	0	59	22.6	
	Widowed	1358	31.8	1187	64.1	0	0	167	64.0	
	Single/Never Married	219	5.1	196	10.6	0	0	23	8.8	
Housing Tenure										0.183^a***
	Own Outright	3059	72.3	1158	62.9	1756	82.5	145	56.0	
	Mortgaged	196	4.6	73	4.0	101	4.7	22	8.5	
	Social Rent	744	17.8	115	6.2	77	3.6	20	7.7	
	Private Rent	212	5.0	484	26.3	188	8.8	72	27.8	
	Other	18	0.4	12	0.7	6	0.3	0	0	
Education										75.61***
	Degree (or equivalent)	1038	24.3	437	23.6	560	26.0	40	15.4	
	A Level (or equivalent)	355	8.3	131	7.1	205	9.5	19	7.3	
	GCSE (or equivalent)	747	17.5	281	15.2	434	20.1	31	12.0	
	None	1421	33.2	319	17.3	340	15.8	46	17.8	
	Other	705	16.5	680	36.8	616	28.6	123	47.5	
UK Region										4.05**
	England	3596	84	1531	82.7	1845	85.3	216	82.8	
	Wales	227	5.3	109	5.9	105	4.9	12	4.6	
	Scotland	350	8.2	163	8.8	164	7.6	24	9.2	
	Northern Ireland	106	2.5	49	2.6	48	2.2	9	3.4	

	N	%	N	%	N	%	N	%	Statistic
Area									26.14***
Urban	3020	70.6	1375	74.2	1448	67.0	192	73.6	
Rural	1258	29.4	477	25.8	712	33.0	69	26.4	
Ethnicity									0.052[a]**
White	4189	97.9	1819	98.2	2118	98.2	248	95.4	
Mixed	11	0.3	5	0.3	4	0.2	1	0.2	
Asian	41	1.0	11	0.6	24	1.1	6	1.0	
Black	24	0.6	14	0.8	6	0.3	5	0.6	
Other	13	0.3	4	0.2	9	0.4	0	0.3	
Employment Status									0.069[a]***
Employment (Paid)	308	7.2	103	5.6	186	8.6	19	7.3	
Unemployed	31	0.7	12	0.6	13	0.6	5	1.9	
Retired	3895	91.0	1730	93.4	1930	89.3	230	88.5	
Unpaid Occupation	32	0.7	4	0.2	25	1.2	3	1.2	
Other	13	0.3	3	0.2	7	0.3	3	1.2	

Statistical significance: *** $p < .001$, ** $p < .01$ * $p < .05$

[a] Cramer's V used as frequencies in some cells >5.

Table 2 presents the descriptive statistics of the health and wellbeing outcomes of the total sample and stratified by household composition. Six out of seven of the health and wellbeing outcomes (the exception being service use as represented by GP visits), were significantly different between household composition groups. The SF-12 PCS, subjective health, presence of a long-term illness or disability and life satisfaction were all significant at the $p <$ .001 level. SF-12 MCS was significant at $p = .003$ and GHQ at $p = .002$. This indicates that the health of older women varied significantly depending upon the household type in which they resided. Those living with their partners consistently demonstrated better outcomes on average which is unsurprising given their lower average age and is consistent with existing evidence (Gaymu and Springer, 2012). What was more surprising was that those 'living with others' scored the poorest across the outcomes despite not having the oldest age on average; they were however, a relatively small proportion of the overall sample perhaps reflective of the UK context. Those living alone demonstrated poorer health and wellbeing than the sample average and those living with their partners. The number of visits to a GP in one year did not vary significantly by household composition.

Table 2: Measurement of dependent variables (Health and wellbeing outcome) and their descriptive statistics by household composition.

Dependent variables	Measurement of variable	Total Sample		Living Alone		Living with partner		Living with other (not partner)		Significance
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	F - test
SF-12 MCS	0-100	51.05	9.72	50.89	10.04	51.44	9.24	49.03	11.06	5.96**
SF-12 PCS	0-100	41.60	13.13	39.37	13.49	43.96	12.37	37.40	13.20	72.70***
GHQ	0-36	25.10	4.989	24.96	5.20	25.31	4.77	24.23	5.19	6.18**
	Categories	N	%	N	%	N	%	N	%	χ^2-test
Visits to GP										
None		598	14.0	253	13.7	310	14.4	34	13.1	12.94
One-Two		1518	35.6	634	34.4	805	37.3	76	29.2	
Three-Five		1245	29.2	559	30.3	601	27.6	84	32.4	
Six-Ten		528	12.4	224	12.2	262	12.1	41	15.8	
More than ten		375	8.8	172	9.3	179	8.3	25	9.6	
Long term illness										
Yes		2496	58.5	1190	64.3	1110	51.5	193	74.8	97.79***
No		1774	41.5	660	35.7	1046	48.5	65	25.2	
General Health										
Good		2724	66.7	1091	62.8	1501	71.5	128	51.8	58.76***
Poor		1363	33.3	647	37.2	597	28.5	119	48.2	
Life Satisfaction										
Completely dissatisfied		85	2.1	29	1.7	43	2.0	14	5.7	73.93***
Mostly dissatisfied		155	3.8	69	4.0	70	3.3	16	6.5	
Somewhat dissatisfied		220	5.4	104	6.0	91	4.3	24	9.7	
Neither sat nor diss		330	8.1	140	8.1	162	7.7	28	11.3	
Somewhat satisfied		543	13.3	261	15.0	239	11.4	42	17.0	
Mostly satisfied		1892	46.3	791	45.6	1005	47.9	93	37.7	
Completely satisfied		861	21.1	341	19.7	490	23.3	30	12.1	

Statistical significance: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Regression Analyses

The results of the regressions are presented in Tables 3 and 4. The final models for the regression of household composition, age, income, education, employment, homeownership, marital status, rural/urban location and UK region are shown. Once controlling for demographic and socioeconomic factors, living with others remained a significant predictor of poorer mental health as represented by the SF-12 MCS and of lower life satisfaction when compared with the reference group, those living with partners (β -4.327 (2.100) and Odds Ratio (OR) 0.315 (0.119, 0.833) respectively). Living alone was no longer significant once other factors were added to the model. Other variables found to be statistically significant were: income (in the case of presence of a long-term health condition, self-reported health and life satisfaction), education (in the case of SF-12 MCS and PCS, health service use and self-reported health), homeownership (in the case of all health and wellbeing outcomes except presence of a long-term health condition), employment (in all outcomes except SF-12 MCS), UK region (in the case of Wales for health service use and self-reported health, Scotland for SF-12 MCS and Northern Ireland for SF-12 PCS) and rural versus urban area (in the case of SF-12 MCS, self-reported health and life satisfaction).

Table 3: Results from linear regressions predicting SF-12 MCS, SF-12 PCS & GHQ scores with standardized coefficient β and standard errors in th parentheses

Variables & categories	SF-12 Mental Component Score	SF 12 Physical Component Scores	GHQ Score (reversed)
Household composition (ref: living with partners)			
Living alone	-0.114 (2.124)	0.072 (2.706)	-0.100 (1.054)
Living with others	-0.106* (2.100)	-0.005 (2.675)	-0.080 (1.046)
Age (ref: 65-74)			
75-84	0.014 (0.356)	-0.134*** (0.454)	-0.015 (0.182)
85 +	-0.012 (0.537)	-0.211*** (0.684)	-0.022 (0.276)
Income (log)	0.029 (0.336)	-0.013 (0.428)	-0.012 (0.171)
Level of education (ref: up to A-level)			
Degree level and above	0.037* (0.378)	0.083*** (0.481)	0.014 (0.193)
Employed (ref: unemployed)	0.038* (0.576)	0.088*** (0.733)	0.051** (0.294)
Homeownership (ref: non-homeowner)	0.108*** (0.380)	0.177*** (0.485)	0.107*** (0.195)
Marital status (ref: married)			
Single/never married	0.058 (2.190)	-0.066 (2.791)	0.055 (1.091)
Divorced or separated	0.063 (2.127)	-0.087 (2.710)	0.016 (1.058)
Widowed	0.142 (2.104)	-0.115 (2.680)	0.106 (1.045)
UK region (ref: England)			
Wales	-0.011 (0.698)	-0.022 (0.889)	-0.010 (0.359)
Scotland	0.041** (0.557)	-0.012 (0.709)	0.039* (0.283)
Northern Ireland	-0.011 (1.049)	-0.033* (1.336)	0.000 (0.536)
Rural area (ref: urban)	0.055** (0.338)	0.026 (0.430)	0.011 (0.173)
Ethnicity (ref: white)	-0.001 (1.131)	-0.010 (1.441)	0.019 (0.576)
N	3992	3992	4021
Adjusted R²	.025	.135	.020

Statistical significance: *** p < 0.001, ** p < 0.01, * p < 0.05

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Table 4: Results of logistic regressions (odds ratios and 95% confidence intervals) predicting service use, long-term condition, self-reported health and life satisfaction

Variables / Categories	Health service use (high/low)	Presence of a long-term health condition or disability (yes/no)	Self-reported health (good/poor)	Life satisfaction (satisfied Vs not satisfied)
Household composition (ref: living with partner)				
Living Alone	0.277 (0.055, 1.397)	1.659 (0.661, 4.156)	1.163 (0.436, 3.105)	0.812 (0.300, 2.196)
Living with Others	0.344 (0.069, 1.721)	0.825 (0.332, 2.051)	0.675 (0.256, 1.780)	0.315* (0.119, 0.833)
Age (ref:65-74)				
75-84	1.185 (0.996, 1.410)	0.703*** (0.605, 0.816)	0.721*** (0.614, 0.846)	0.991 (0.820, 1.197)
Age 85 +	1.130 (0.875, 1.459)	0.547*** (0.433, 0.688)	0.629*** (0.497, 0.796)	0.915 (0.692, 1.211)
Income (log)	0.929 (0.782, 1.102)	1.209** (1.049, 1.393)	1.184* (1.011, 1.387)	1.438*** (1.195, 1.730)
Education (reference is degree level)				
'A' level or equivalent	0.959 (0.691, 1.330)	0.939 (0.729, 1.210)	0.710* (0.533, 0.945)	0.844 (0.613, 1.162)
GCSE or equivalent	1.029 (0.798, 1.328)	1.047 (0.857, 1.279)	0.794* (0.630, 1.000)	1.085 (0.830, 1.417)
Other	1.236 (0.960, 1.593)	0.820 (0.664, 1.011)	0.741* (0.586, 0.938)	1.138 (0.864, 1.501)
None	1.322* (1.054, 1.657)	0.834 (0.690, 1.008)	0.589*** (0.478, 0.725)	0.918 (0.722, 1.168)
Home tenure (reference is own outright)				
Mortgaged	1.327 (0.922, 1.909)	0.656 (0.253, 1.704)	0.713 (0.505, 1.005)	0.419*** (0.298, 0.588)
Social rent	1.471*** (1.200, 1.804)	0.586 (0.217, 1.602)	0.408*** (0.338, 0.492)	0.678*** (0.545, 0.843)
Private rent	1.721*** (1.251, 2.367)	0.408 (0.155, 1.073)	0.455*** (0.337, 0.615)	0.569*** (0.408, 0.795)
Other	1.337 (0.442, 4.042)	0.573 (0.212, 1.547)	1.875 (0.571, 6.160)	0.960 (0.272, 3.383)

	Model 1	Model 2	Model 3	Model 4
Marital status (ref: married)				
Single/never married	3.255 (0.633, 16.740)	0.616 (0.240, 1.582)	0.679 (0.248, 1.859)	1.186 (0.426, 3.299)
Divorced or separated	3.088 (0.612, 15.592)	0.485 (0.193, 1.219)	0.859 (0.322, 2.294)	1.301 (0.483, 3.504)
Widowed	3.054 (0.610, 15.294)	0.518 (0.203, 1.288)	0.959 (0.363, 2.535)	1.6659 (0.622, 4.423)
Employment status (ref: in paid work)				
Unemployed	4.535*** (2.000, 10.284)	0.121 (0.040, 0.370)	0.092*** (0.036, 0.237)	0.231*** (0.102, 0.524)
Retired	2.031*** (1.379, 2.993)	0.502 (0.389, 0.650) ***	0.362*** (0.251, 0.523)	1.045 (0.757, 1.443)
Unpaid work	1.877 (0.718, 4.910)	0.413 (0.188, 0.904) ***	0.180*** (0.075, 0.432)	1.593 (0.466, 5.448)
Other employment	2.939 (0.767, 11.255)	1.649 (0.448, 6.075) **	0.607 (0.130, 2.826)	0.793 (0.187, 3.370)
UK country (ref: England)				
Wales	1.462* (1.070, 1.997)	0.847 (0.634, 1.131)	0.696* (0.512, 0.946)	0.987 (0.683, 1.425)
Scotland	1.125 (0.856, 1.479)	1.088 (0.862, 1.374)	0.886 (0.690, 1.138)	1.121 (0.829, 1.515)
Northern Ireland	1.401 (0.889, 2.207)	1.311 (0.866, 1.983)	0.716 (0.450, 1.139)	1.095 (0.621, 1.930)
Ethnicity (ref: white)	1.220 (0.726, 2.050)	1.155 (0.727, 1.835)	0.981 (0.576, 1.669)	1.430 (0.736, 2.779)
Rural area (ref: urban)	0.950 (0.801, 1.127)	1.047 (0.908, 1.207)	1.309*** (1.117, 1.534)	1.302** (1.080, 1.570)
N	4267	4271	4052	4051
X² (model)	96.516***	290.131***	393.802***	135.893***
Cox and Snell R²	.023	.067	.093	.033
Nagelkerke R²	.035	.090	.130	.053

Statistical significance: *** p < 0.001, ** p < 0.01, * p < 0.05

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Discussion

Confirmation of known determinants of health and wellbeing

The results presented above are consistent with existing evidence in confirming the importance of demographic and socio-economic factors in determining health and wellbeing outcomes. Namely: age, income, home ownership and education were all found to be predictors of health and wellbeing in later life to varying degrees. These findings therefore indicate the reliability of the analysis and the more novel findings. They also serve to underline the importance of reducing health inequities to improve health and wellbeing in later life.

Variations between household composition groups

The tests of association confirmed significant differences between the health and wellbeing outcomes of the different household composition groups. With the exception of service use as represented by GP visits, the health and wellbeing outcomes were significantly better on average for those living with their partners followed by those living alone and with those living with others having the poorest health and wellbeing as represented by the selected variables. The findings that those living with partners have the better health and wellbeing outcomes was unsurprising: not only did they have a lower average age but also the literature has consistently indicated similar results in other developed countries (Bergland and Engedal, 2011; Gaymu and Springer, 2012; Lukashek *et al*., 2017). Given the literature which points to the vulnerability of those who live alone (Kharicha, Iliffe, Harari, Swift, Gillman and Stuck, 2007) and their higher average age, it is surprising to find that those who live with others scored lower. One explanation for this could be that those living alone are more likely to do so because they are in better health and can therefore manage to live alone. Living alone also results in individuals taking on the main role in activities such as housework or home finances which may, in turn, contribute to maintaining good health. The converse of this is that those who are living with others may have poorer health and

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wellbeing which has led to them living with other family members, or that in living with others they may relinquish a level of activity which has led to a level of deconditioning or reduced independence. These outcomes may also reflect the values of individualism and independence which are often present in Western culture; that people tend to remain independent where possible and when this independence is compromised their wellbeing is similarly at risk.

This last point is further supported when considering the findings in the context of existing studies. A small number of studies compared the three household types and are therefore comparable to some extent with this study. Of those, it is those carried out in a Westernised setting which the findings here support: that those who are partnered experience the better health outcomes while those who live with others who are not their partners scored lower (Michael, Berkman, Colditz and Kawachi 2001; Hughes and Waite, 2002). Those studies which compared three groups and showed those living alone to be at the highest risk of poorer health outcomes, were those studies carried out in India and Japan: countries which tend to value a more collective and less individualistic lifestyle (Sok and Yun 2011; Sarkar, Shekhar and Mondal 2012). This would point to the importance of social and cultural norms and values, something which has been shown to affect the experience of later life even between European countries (De Jong Gierveld and Van Tilburg 1999). What is also important to note is that those living with others made up a small percentage of the overall sample, and those living alone still demonstrated poorer health and wellbeing than the average therefore the population of older women living alone remains a potentially vulnerable group. Those living alone not only make up a significant proportion of the sample but are a group expected to grow in the future and therefore remain a population of interest.

This indicates further research is required to examine in detail the health and wellbeing of those living with extended families in the UK, to reduce these variations in health outcomes.

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It also supports further research which examines life course trajectories and the role of societal influences in determining health and wellbeing outcomes in later life.

Role of living alone in predicting health outcomes

While these differences between the household typologies were found to be significant, the regressions indicated that household composition was not consistently a predictor of health and wellbeing outcomes once other factors were included in the final regression models. Only two of the final models found household composition to be a significant predictor of health and wellbeing, pointing to the effects of other variables in determining health outcomes. The exceptions were the SF-12 MCS and life satisfaction for which living with others was a significant predictor variable in the final model. This may be for several reasons. One reason could be that those with poorer mental health are more likely to live with others, either out of preference or a perception of requiring additional support. It may also be that socio-economic or physical health factors which can contribute to poorer mental health or reduced life satisfaction may also contribute to decisions around cohabiting. If decisions around household composition are made based on levels of dependency rather than preference, this could affect mental health outcomes and life satisfaction. A final consideration may be that external services such as health or social care may perceive those living with others to be well-supported both physically and emotionally and therefore this may negatively affect the services provided. Conversely, if those living alone are perceived to be vulnerable, they may receive, or be more willing to accept, a different level of support. While a small proportion of the overall sample, those living with others than their partner require further research to better understand these variations in mental health and wellbeing.

Living alone was not, in this sample, a predictor of health or wellbeing outcomes once other variables were accounted for. Well-known determinants of health and wellbeing in later life

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such as age, income and education mediated the effect of household composition. This suggests that the vulnerabilities associated with living alone can be countered by other factors and this is an area which requires further research.

Other significant findings

Aside from household composition, other factors were found to be significant in predicting health outcomes which had not been indicated as a result of the initial literature search. Variations between the UK regions were significant in several final models and support previous findings which indicated inequities between the four countries (Timmins 2013). Comparison between the four regions has been of further interest since the devolution of administrative powers in 1999 and indicates the need for further research in this area to better understand the variations (Bevan *et al*. 2014).

In addition to region in terms of UK country, geographical location was also shown to be a significant predictor for better mental health and subjective health outcomes for those living in rural areas. This contrasts to previous research (Rolls *et al*. 2010; Khan, Hafford-Letchfield and Lambert. 2018) which indicated the reverse. Given the heterogeneity of ageing in rural areas this suggests further research is indicated (Burholt *et al*. 2017).

Employment was consistently found to be a predictor of better health outcomes which is perhaps unsurprising given that individuals are more likely to be employed if they are in better health (Di Gessa *et al*. 2017). However, given the importance of employment in maintaining identity, social contact, financial independence, and routine it may indicate that being in employment can also contribute to supporting better health and wellbeing (Jahoda 1982). As the government moves towards encouraging individuals to work for longer it is important that we better understand the implications of employment in later life and the role it plays in contributing to health and wellbeing. Further research is required to understand

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employment in later life: how it can affect health and wellbeing and how to increase access to employment. Furthermore, if the value of employment is beyond financial remuneration, research is also required regarding other meaningful occupations in later life such as unpaid care work, voluntary work and leisure activities including IT use.

Implications for policy, practice and research

The descriptive analysis shows that women who live alone tend to be older and in poorer health than cohabiting counterparts. The results from the regressions confirm that, on the whole, the effect of living alone is mediated by SES and demographic factors, although it remains the case that women living alone are, in general, more vulnerable by being older and demonstrating poorer health outcomes. This adds to the evidence which shows that policy must address social and economic inequalities across the life course in order to improve health and wellbeing in later life. This may be in the form of adequate income, access to secure housing or improved access to education; something to be taken into account with changes to UK health service provision (Department of Health and Social Care 2021). For those working with older adults, suggestion is made that those living alone with lower SES may be at greater risk of poorer health and wellbeing and therefore warrant additional support.

These results indicate that older women who live with people other than their spouses may be at higher risk of poorer mental health. This suggests that this group may need closer monitoring or additional support than received currently. Clinicians or other professionals coming into contact with this population should be aware that those living with extended family, for example, may still need additional support beyond the household. Further research is required to better understand the mental health of this population including potential confounders which was beyond the scope of this analysis. Further research should

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also include longitudinal studies to examine the effect of living alone over time, and research into potentially mediating variables such as time-use or lifestyle factors.

Limitations

The main limitation of this study is the cross-sectional nature of the analysis which limits conclusions regarding causal mechanisms. However, as the primary aim was to establish current trends and patterns in the health and wellbeing of older women living alone, cross-sectional analysis was deemed appropriate. The study is based on UK data which may affect the generalisability to other populations. The small number of ethnic minority participants, while increased with the Ethnic Minority Boost Sample and representative of the UK population, means that statistical tests may not show important variations between ethnic groups.

Conclusion

This paper describes the analysis of selected variables from the UKHLS, contributing to knowledge by increasing understanding of the role of household composition in the health and wellbeing of older women. Analysis focussed on answering the research question: Is living alone a predictor of poorer health and wellbeing?

Comparisons were made between three household composition groups: those living with partners, those living alone and those living with others who are not their partners. Tests of association indicated that there are significant differences in the health outcomes between the household composition groups. Those living with partners consistently demonstrated better health and wellbeing followed by those living alone and then those living with others. Regressions showed that, generally, the effects of household composition were mediated by other, well-known, determinants of health such as SES and age. One exception of this was that living with others (not partners) was a significant predictor for poorer mental health as

represented by the SF-12 MCS and lower life satisfaction even when controlling for the other determinants of health. Those living alone were shown to have poorer health and wellbeing than average and made up a significant proportion of the overall sample. Areas for further research are highlighted based on these findings.

In addition to SES and age, geographical factors and employment status were significant in predicting health and wellbeing and have been suggested as areas for further research. The nature of the relationship between health, wellbeing and employment is of particular interest given the complexity of the phenomenon and the current political agenda with regards to work in later life (Department for Work and Pensions 2014). Mention is made of the ways in which employment could be considered beyond traditional paid work such as in the case of voluntary work. These require further investigation for this population particularly as to its contribution to health and wellbeing.

Availability of data

Data held by UK Data Service at https://www.ukdataservice.ac.uk/

Code availability

Not applicable

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