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The Effect of Informal Caregiving on Depression: An Asymmetric Panel Fixed-Effects Analysis of In-Home and Out-Of-Home Caregivers Across Europe

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ABSTRACT

Previous research has shown that providing intensive informal care can have a negative effect on an individual's mental health. However, few studies have been able to draw a precise comparison between the experiences of in-home and out-of-home caregivers. This study used data from 16 countries collected from 2011–2019 as part of the Survey of Health, Ageing and Retirement in Europe (SHARE) to conduct asymmetric panel fixed-effects models that examined within-person variation in depression scores after a respondent started providing daily or almost daily personal care either inside or outside of their home. The results substantiated previous findings that in-home caregivers experience more pronounced increases to their reported depressive symptoms after starting to provide daily personal care than do out-of-home caregivers. In addition, in-home caregivers in countries with greater governmental responsibility for long-term care provision (The Northern and Central Clusters) reported fewer increases to their depressive symptoms after starting to provide care than caregivers in countries where long-term care responsibility predominantly rests on families (The Southern and Eastern Cluster). Further, Northern Cluster countries most successfully shrank the pool of out-of-home care providers. Together, these findings underscore the context-specific nature of caregiver wellbeing.

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Asymmetric panel fixed-effects; cross-national comparison; depression; informal caregiving; long-term care policy; SHARE survey

Introduction

Europe's population has been aging for some time, and this demographic shift is expected to continue over the 21st century (Harper, 2014). These changes have produced a growing need for long-term care services and a resulting evolution of long-term care policies since the 1990s (Gori et al., 2015). Still, European countries are grappling

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with how to improve long-term care delivery: individuals in need of long-term care often receive assistance through a delicate balance of formal and informal care services (Bergeot & Tenand, 2023; Bonsang, 2009; Carrino et al., 2018; Verbeek-Oudijk et al., 2014; Wittenberg, 2015). Informal care provides necessary health resources to care recipients and can replace unskilled types of formal care, but it can also increase the demand for formal care services (Bergeot & Tenand, 2023; Bonsang, 2009; Carrino et al., 2018). This balance between informal and formal care raises the question of how long-term care will be delivered in the coming decades, since an aging population may require greater access to both kinds of care resources.

In designing long-term care policies that respond to these shifting needs, it is important to consider how informal caregivers are impacted by the care they provide. Various studies have documented the potential health benefits of altruistic and assisting behavior (Brown et al., 2005; Danielsbacka et al., 2022; Schwartz et al., 2003) while some studies of caregiving have found positive health effects from providing care in certain contexts, particularly during earlier stages of care, when care is less specialized and demanding, or when caregiver wellbeing is captured through self-measured health scales (Bom et al., 2019; Coe & van Houtven, 2009; DiNovi et al., 2015; Roth et al., 2015; Schulz & Sherwood, 2008; Trivedi et al., 2014). However, studies of *intensive* caregiving have often found it to have negative effects on physical and mental wellbeing due to the emotional, labor-intensive, and time-consuming nature of providing care (Broese van Groenou et al., 2013; Caputo et al., 2016; Hiel et al., 2015; Kaschowitz & Brandt, 2017; Litwin et al., 2014; Schulz & Sherwood, 2008). Though the long-term physical and mental health effects from providing informal care are less clear (Bom et al., 2019; Coe & van Houtven, 2009; de Zwart et al., 2017; Kenny et al., 2014), intensive caregiving can pose meaningful challenges to caregivers' physical and mental health throughout the course of care.

However, there is still much to learn about what can make the caregiving relationship less physically and emotionally taxing for caregivers. Identifying these mechanisms will allow governments to better support caregivers, especially those at greater risk of experiencing mental or physical health challenges from providing care. Accordingly, this paper focuses specifically on changes to caregivers' EURO-D depression scores after starting to perform daily or almost daily personal caregiving (DPC). We study the effects among in-home and out-of-home caregivers and investigate how the caregiving relationship is shaped by the welfare state context. In the next section, we describe unresolved questions from previous research that inform this analysis.

Location of caregiving and types of assistance

Where caregivers perform care tasks shapes the relationship between informal caregiving and depression. For example, caregiving inside the home often corresponds with a higher intensity to the role than caregiving outside of the home since caregivers have a harder time gaining physical and emotional distance from their care tasks (Kaschowitz & Brandt, 2017; Litwin et al., 2014). Group level outcomes for caregivers suggest this produces differential effects on wellbeing, with in-home caregivers demonstrating greater depressive symptoms and mortality risks than out-of-home caregivers (Caputo et al., 2016; Kaschowitz & Brandt, 2017). These differences in wellbeing may also relate to differing care recipient populations for in-home and out-of-home caregivers: non-kin caregivers, who are generally providing care outside of the home, tend to have more positive evaluations of caregiving than spouses or adult children, likely because they enter the caregiving relationship more voluntarily and experience fewer obligations to perform care tasks (Broese van Groenou et al., 2013).

Additionally, the effect of caregiving on wellbeing hinges on the tasks a caregiver performs: caregivers' depressive symptoms and self-rated health appear to be impacted differently depending on whether their care centers around physical, mental, or emotional needs (Bassi et al., 2020; Zwar et al., 2018). However, previous comparisons of in-home versus out-of-home caregiving have suffered from inconsistencies in the definition of caregiving across these two settings, overweighing either the time commitment or intensity involved with in-home caregiving due to survey constraints (Caputo et al., 2016; Kaschowitz & Brandt, 2017). The present study aims to interrogate exactly how pronounced the differences in mental health outcomes are for informal caregivers providing care inside versus outside the home when comparing caregiving tasks of equal time and intensity.

Welfare regimes and long-term care policy

Caregiving takes place in the context of welfare regimes with different approaches to health care policy and long-term care services. Some research suggests that the health impacts of caregiving are shaped by these differences. For example, countries with generous long-term care policies tend to have higher levels of caregiver wellbeing (Bom & Stöckel, 2021; Brenna & DiNovi, 2016; Uccheddu et al., 2019). This may, in part, be due to the *specialization* theory outlined by Brandt (2013), which suggests that generous welfare states enable an effective division of labor between informal and formal care services: countries with more comprehensive long-term care policies allow family members and other informal caregivers to complete less burdensome care tasks while formal care services manage intensive and highly-skilled tasks (Bom & Stöckel, 2021). Thus, specialization theory posits that a country's long-term care policy plays an important role in shaping the caregiving population, with informal caregivers in less generous welfare states taking on intensive caregiving roles more often than informal caregivers in more generous welfare states (Bakx et al., 2015; Bom & Stöckel, 2021).

Cultural norms around caring for family members might also explain differences in the uptake of caregiving and its effects on caregivers across countries. Caregivers in countries with stronger norms regarding family-provided care may be more likely to take up informal (and intensive) caregiving roles than caregivers in countries without this norm (Brenna & DiNovi, 2016; Verbakel, 2018). Navigating this division between formal and informal care services also raises the question of how autonomous caregivers in these countries feel: recent literature highlights that caregivers who feel obligated to perform their care duties experience greater mental health declines than those who view caregiving as more voluntary (Adelman et al., 2014; Brenna & DiNovi, 2016; Schulz et al., 2012). In this way, family members in countries with family-based approaches toward care may feel a higher degree of obligation to perform long-term care duties than those in countries without strong family-based care norms, which could adversely affect their mental health (Brenna & DiNovi, 2016).

For these reasons, it is important to explore variations in caregiver wellbeing across the EU in order to question whether these differences are partially due to competing approaches to long-term care provision. Verbeek-Oudijk et al. (2014) offers a useful typology of European countries based on their approach to caregiving. These classifications focus on who carries the responsibility for providing assistance and long-term care to those with a health impairment: specifically, whether formal responsibility for providing this care rests with the government (the Northern Cluster), with both the government and family (the Central Cluster), or mainly with the family (the Southern & Eastern Cluster). This isolates the typology's focus on caregivers, rather than both caregivers and care recipients, allowing for a focused analysis of how governmental approaches to long-term care shape caregiver wellbeing. With this typology, we can explore whether caregivers in countries with family-based models of care grow more depressed than caregivers in countries with government-based models of care.

Research hypotheses

Based on previous literature, we have two hypotheses for our analyses:

(1) The effect of providing informal personal care *outside* the home on reported depressive symptoms will be similar to that of providing

informal personal care *inside* the home when care intensity is similar (i.e., within-person changes to EURO-D scores will be similar for in-home and out-of-home caregivers).

(2) Countries that espouse greater government responsibility for long-term care (the Northern Cluster) will demonstrate the least deleterious effects on mental health for informal caregivers, while countries that place responsibility for long-term care on families (Southern & Eastern Cluster) will demonstrate the most harmful effects on mental health for informal caregivers (i.e., within-person changes to EURO-D scores will vary across country clusters)

Methods

Data and variables

Data were obtained from the Survey of Health, Ageing and Retirement in Europe (SHARE), a panel study spanning 29 countries (Börsch-Supan et al., 2013). Since 2004, SHARE has collected data on the health and living conditions of Europeans aged 50 years and over in waves roughly every two years. SHARE is particularly well-suited for our research question because it allows us to use longitudinal data, and many of the respondents and their family members are at an age where they may start providing and/or receiving personal care.

For our analyses, we included all respondents aged 50 or above from waves 4, 5, 6, 7, and 8 (2011– 2019) who had complete data for our outcome and explanatory variables for at least two waves. Our data included 143,057 person-waves nested in 50,032 respondents when observing care *inside* the home, and 70,622 person-waves nested in 31,952 respondents when observing care *outside* the home.

We included a number of variables to understand the relationship between personal care provision and a respondent's mental health. Our primary outcome variable was the respondent's score on the EURO-D depression scale, a composite index of 12 items summed to form a range of scores from 0 (not depressed) to 12 (very depressed) (Prince et al., 1999). Probable depression is typically indicated by a score of 4 or higher on the index (Castro-Costa et al., 2007).

We had two main independent variables, one for each of our analyses of providing daily or almost daily personal care (DPC) to at least one individual (1) *inside* or (2) *outside* the home. For assessing DPC inside the home, our independent variable was whether or not (1/0) the respondent has regularly ("daily or almost daily during at least three months") provided personal care ("such as washing, getting out of bed, or dressing") to someone within their home during the past 12 months. For DPC *outside* the home, we constructed a matching dichotomized variable using three different variables in the SHARE survey. Respondents were coded as having provided daily care if on these questions they indicated they had (1) “personally given any kind of help listed on this card to a family member from outside the home, a friend or neighbour,” (2) provided “personal care” specifically, and (3) done this “daily.” Since our variables captured the transition into DPC specifically, the 0 values included respondents who provided no assistance, some assistance, as well as non-daily personal care. Prior to wave 6 in the SHARE survey, there was no way to distinguish personal care from other types of assistance outside the home, so this newly-constructed variable enabled us to examine the differences between in-home and out-of-home informal caregiving in a way that was not possible for Kaschowitz and Brandt (2017). Consequently, this limited the available waves to study out-of-home caregiving to waves 6 through 8, as opposed to waves 4 through 8 for in-home caregiving. Even so, these two similarly-coded binary variables allowed us to more accurately compare caregiving inside the home to caregiving outside the home.

In addition to our independent and dependent variables, we included several covariates in line with previous research on caregiver wellbeing (Hiel et al., 2015; Kaschowitz & Brandt, 2017; Schulz & Sherwood, 2008). These covariates included employment status (retired, employed or self-employed, and non-employed), ability to make ends meet (with great difficulty, with some difficulty, fairly easily, easily), gender (male, female), years of education (continuous), partnership status (married/in a partnership, divorced/never married/widowed), and subjective health status (excellent/very good, good, fair/poor). In addition, previous studies of caregiving have noted that failing to control for the health of the care recipient can lead to an overestimation of the impact of caregiving (Bom et al., 2019; Roth et al., 2015). Accordingly, we controlled for the health of the respondent’s mother and father (excellent/very good, good, fair/poor, not alive, not collected), health of their cohabitating partner (excellent/very good, good, fair/poor, no longer cohabitating [e.g. death or divorce], never cohabitated with a partner), as well as for whether or not the respondent had children. We also controlled for age and wave in order to account for maturation and generation effects. Gender and years of education were ultimately excluded in the final panel fixed-effects analyses since these are time-constant in the SHARE dataset.

In order to test whether differences in the division of long-term care responsibility impact the relationship between informal caregiving and depression, we created a variable which grouped countries according to their categorization in Verbeek-Oudijk et al. (2014). From the available countries in the SHARE dataset, the Northern Cluster consisted of the Netherlands, Sweden and Denmark; the Central European Cluster consisted of Austria, France, Belgium and Germany; and the Southern & Eastern Cluster consisted of Italy, Spain, Portugal, Estonia, Hungary, the Czech Republic, Poland, Slovenia and Switzerland. Since some countries in the SHARE dataset are not included in these long-term care typologies, the sample size for these analyses was smaller than for the other analyses, with 130,830 person-waves nested in 44,690 respondents for in-home caregiving and 59,068 person-waves nested in 26,694 respondents for out-of-home caregiving.

The complete descriptive statistics for all outcome variables and covariates can be found in Table 1. Roughly 8.2% of respondents provided DPC to someone living within their home. In contrast, while roughly 29.2% of respondents reported providing some type of assistance to at least one person outside the home, only 2.5% of respondents reported providing DPC outside the home.

Analysis

To establish a greater causal claim regarding the relationship between caregiving and depression, we used a panel fixed-effects model focusing on within-person variation. This allowed for an analysis of how an individual's reported depressive symptoms change once they start providing intensive care. Further, controlling for all time-constant variables by using a fixed-effects model added a layer of confidence to the relationships that emerged from the analysis (Brüderl & Ludwig, 2015). However, as noted by Mummolo and Peterson (2018), panel fixed effects models do not isolate the direction of within-person variation, meaning that a standard fixed-effects model assumes that the effect of transitioning *into* DPC on wellbeing would be of equal magnitude and opposite directionality to the effect of transitioning *out of* DPC. Because of this, we employ an asymmetric fixed-effects model as outlined by Allison (2019) and utilized by Uccheddu et al. (2019) in order to separate transitions into and out of DPC. To do this, we created new counter variables for each of our caregiving variables: one would be set to 0 and change to 1 every time a respondent transitioned *into* DPC, and the other would be set to 0 and change to 1 every time a respondent transitioned *out of* DPC. Then, we created two additional variables: one captured the total number of these transitions into DPC, while the other captured the total number transitions out of DPC. In our sample, respondents experienced either 0, 1, or 2 transitions into and out of DPC. By including the sum of transitions into and out of DPC as independent variables in our analyses, we could test separately the impacts of transitioning into and out of DPC. In line with Uccheddu et al. (2019), we treat these variables capturing the total number of transitions into and out of DPC as continuous: though 112 in-home caregivers experienced two transitions into and out of DPC during the five SHARE waves, they are too small of a subsample to test separately from caregivers who experience only one transition into DPC. Interactions between DPC and country cluster were

Table 1. Descriptive statistics.

	Informal Care Inside the Home				Informal Care Outside the Home			
Variable	*Person-years*	*No. of persons*	*Mean (SD)*	*% person-years*	*Person-years*	*No. of persons*	*Mean (SD)*	*% person-years*
EURO-D Scale	143,057	50,032	2.3 (2.2)		70,622	31,952	2.3 (2.2)	
Provides Daily Personal Care?								
Yes	11,666	8,804		8.2	1,764	1,586		2.5
No	131,391	49,153		91.8	68,858	31,831		97.5
Transition: into DPC								
0	134,504	50,032		94.0	69,812	31,952		98.9
1	8,446	5,402		5.9	810	710		1.1
2	107	93		0.1	–	–		–
Transition: out of DPC								
0	135,850	50,032		95.0	69,653	31,952		98.7
1	7,115	4,554		5.0	969	849		1.4
2	92	83		0.1	–	–		–
Age	143,057	50,032	66.9 (9.0)		70,622	31,952	69.6 (9.0)	
Years of Education	143,057	50,032	11.1 (4.4)		70,622	31,952	11.2 (4.3)	
Sex								
Male	68,403	23,927		47.8	30,254	13,706		42.8
Female	74,654	26,105		52.2	40,368	18,246		57.2
Can Make Ends Meet?								
With Great Difficulty	13,215	8,748		9.2	7,752	5,277		11.0
With Some Difficulty	34,372	21,734		24.0	16,937	11,944		24.0
Fairly Easily	42,977	27,119		30.0	20,057	14,809		28.4
Easily	52,493	26,277		36.7	25,876	15,708		36.6
Employment Status								
Retired	85,067	34,267		59.5	47,312	23,679		67.0
Employed/Self-Employed	36,829	17,312		25.7	13,687	8,395		19.4
Not Employed	21,161	11,291		14.8	9,623	5,822		13.6
Subjective Health Status								
Very Good/Excellent	37,480	20,299		26.2	18,314	11,742		25.9
Good	54,374	30,939		38.0	27,358	18,393		38.7
Fair/Poor	51,203	26,322		35.8	24,950	15,394		35.3
Marital Status								
Married/In a Partnership	126,146	44,850		88.2	49,545	23,059		70.2
Not in a Partnership	16,911	7,510		11.8	21,077	10,215		29.8
Health of Cohabitating Partner								
Very Good/Excellent	28,096	15,983		19.6	11,431	7,568		16.2
Good	42,381	24,901		29.6	16,898	11,551		23.9
Fair/Poor	41,180	22,073		28.8	15,170	9,839		21.5
Never Cohabitated with a Partner	11,712	6,018		8.2	20,352	10,091		28.8
No Longer Cohabitating (e.g. Death or Divorce)	19,688	10,743		13.8	6,771	4,195		9.6
Health of Mother								
Very Good/Excellent	2,930	2,115		2.1	1,278	1,028		1.8
Good	7,590	5,352		5.3	3,252	2,520		4.6
Fair/Poor	15,791	9,543		11.0	6,858	4,808		9.7
Not Alive	61,228	40,416		42.8	20,856	16,290		29.5
Alive but not Captured	55,518	36,608		38.8	38,378	23,118		54.3
Health of Father								
Very Good/Excellent	1,347	964		0.9	548	428		0.8
Good	3,063	2,225		2.1	1,276	1,014		1.8
Fair/Poor	5,562	3,657		3.9	2,327	1,757		3.3
Not Alive	69,807	45,914		48.8	22,336	17,272		31.6
Alive but not Captured	63,278	40,261		44.2	44,135	26,134		62.5
Has Children?								
Yes	134,731	47,575		94.2	64,542	29,403		91.4

(*Continued*)

Table 1. (Continued).

	Informal Care Inside the Home				Informal Care Outside the Home			
Variable	*Person-years*	*No. of persons*	*Mean (SD)*	*% person-years*	*Person-years*	*No. of persons*	*Mean (SD)*	*% person-years*
No	8,326	3,675		5.8	6,080	3,013		8.6
Wave								
4	29,954	29,954		20.9	–	–		–
5	39,415	39,415		27.6	–	–		–
6	40,462	40,462		28.3	31,528	31,528		44.6
7	9,111	9,111		6.4	11,485	11,485		16.3
8	24,115	24,115		16.9	27,609	27,609		39.1
Country Cluster								
Northern	21,736	7,642		16.6	10,106	4,399		17.1
Central	38,777	12,939		29.6	18,669	8,440		31.6
Southern and Eastern	70,317	24,109		53.7	30,293	13,855		51.3
Total	143,057	50,032		**100.0**	70,622	31,952		**100.0**

included to test whether the relationship between caregiving and depressive symptoms is the same in different country clusters.

In the SHARE survey, cohabitating partners are often both interviewed: because of this, an unobserved component of our regression may be correlated between these partners. We considered clustering standard errors in order to account for this; however, doing so would have required excluding observations where a respondent experienced a change in whether or not they lived with a partner (e.g. if a couple separated and an ex-spouse moved out between waves) from our sample, which could have introduced bias to our results. Instead, we keep these respondents in our main sample, but include the outputs of all our models run with clustered standard errors in our Supplementary Materials. The results from the models run with clustered standard errors are in line with our main models.

Preliminary results have previously been published as a master's thesis (Nolan, 2023).

Results

Descriptive results

Transitions into caregiving were more common for DPC within the home, with 6.4% of surveyed individuals providing care in one wave after not having provided it in the previous wave, compared to 1.9% of individuals outside the home (Supplementary Table S1). The most common transitions into out-of-home DPC were from those providing non-daily personal care in the previous wave, and the least common transition was from those providing no forms of assistance in the previous wave.

Table 2. Distribution of individuals providing assistance by country cluster and assistance type.

	Inside the Home			Outside the Home		
	Southern & Eastern	Central	Northern	Southern & Eastern	Central	Northern
Provided Assistance*	–	–	–	6,916 22.8%	6,880 36.9%	4,653 46.0%
Provided Personal Care*	–	–	–	1,890 6.2%	1,247 6.7%	485 4.8%
Provided Daily Personal Care	6,419 9.1%	3,248 8.4%	1,183 5.4%	913 3.0%	486 2.6%	93 0.9%

Southern & Eastern = Italy, Spain, Portugal, Estonia, Hungary, Czech Republic, Poland, Slovenia, Switzerland; Central = Austria, France, Belgium, Germany; Northern = Netherlands, Sweden, Denmark.
*Only asked for care outside the home.

Among caregivers providing DPC inside the home, roughly 38.9% reported EURO-D scores that qualified for depression (≥4), compared to 23.4% of the non-caregiving population. For DPC outside the home, the rate was 34.5%, compared to 24.9% for the non-caregiving population. The Rho values for in-home and out-of-home DPC revealed a strong positive correlation with a respondent’s depression score.

The main recipients of caregiving varied depending on whether care was provided inside or outside the home (see Supplementary Table S2). DPC inside the home was predominantly provided to spouses/partners (reported by 74.0% of caregivers) followed by children (10.9%). DPC outside of the home was mostly given to mothers (reported by 38.1% of caregivers) but was closely followed by spouses/partners (28.3%). DPC outside the home was more widely given to individuals outside the immediate family than DPC inside the home.

Caregiving patterns differed expectedly between country clusters (Table 2). Provision of DPC was most common among respondents in the Southern & Eastern Cluster and least common in the Northern Cluster. However, it was most common for respondents in the Northern Cluster to provide general assistance outside the home.

Fixed-effect regressions

Our first regression analysis examined whether the effect of DPC on depression is similar for in-home and out-of-home caregivers. Table 3 illustrates that this was not the case: individuals who began providing daily personal inside the home experienced an increase of roughly 0.46 units to their reported depressive symptoms, compared to an increase of 0.27 units for individuals providing this care outside of the home. The effect of transitioning out of DPC also varied between these settings: individuals providing in-home DPC experienced a decrease of 0.29 units to their depression scores, compared to a 0.41 decrease among out-of-home caregivers. These analyses run with clustered standard errors for interviewed partners can be found in Supplementary Table S3.

Table 3. Longitudinal associations between providing daily personal care and depression, separated by caregiving inside versus outside the home.

	Inside the Home	*Outside* the Home
Transition into Care	0.460***	0.273***
	(0.026)	(0.076)
Transition out of Care	−0.287***	−0.415***
	(0.028)	(0.069)
Observations	143,057	70,622
R^2 (within)	0.047	0.039

Controlling for sociodemographic conditions, health, and health of family members.
Standard errors in parentheses.
$^+p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$.

To answer the question of whether the relationship between caregiving and depression is shaped by long-term care typologies, we ran fixed-effects regressions with country clusters of similar long-term policies as interaction terms (Figure 1, Supplementary Table S4). For DPC inside the home, the findings supported our hypothesis: individuals in both the Central and Northern Cluster reported fewer increases to their depressive symptoms (by −0.15 and −0.16 units, respectively) when they started

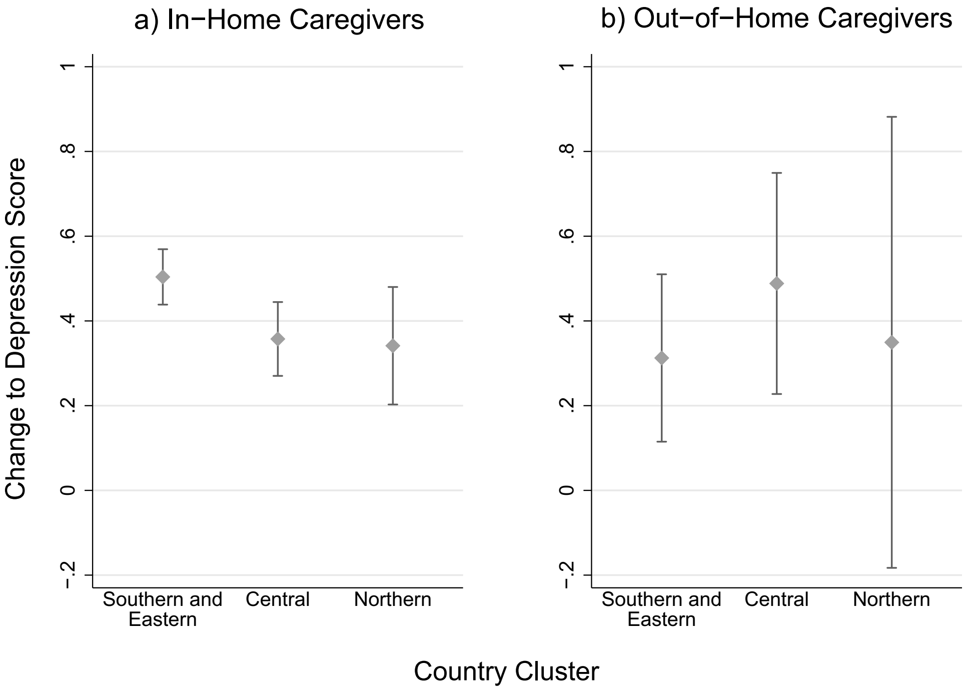

Figure 1. Change to (a) in-home and (b) out-of-home caregiver depression scores after transitioning into care based on country cluster, including mean value and 95% confidence intervals. Results from asymmetric panel fixed-effects model, controlling for sociodemographic conditions, health, and health status of family members.

providing daily care compared to individuals in the Southern & Eastern Cluster countries. For DPC outside the home, there were no significant heterogeneous effects of country groupings on the relationship between providing daily personal care and depressive symptoms. That is, out-of-home caregivers reported similar increases to their depressive symptoms across the three country clusters. Clustering standard errors for interviewed partners did not change these results, which can be seen in Supplementary Table S5.

Discussion

While previous research has identified differences in the emotional impact of in-home and out-of-home caregiving, some studies have been limited by dissimilar definitions of in-home versus out-of-home caregiving (Caputo et al., 2016; Kaschowitz & Brandt, 2017). In the present study, we were able to compare similar levels of caregiving inside and outside home. In contrast to hypothesis 1, we found that starting to provide DPC inside the home was indeed more burdensome than providing DPC outside the home. While our effect sizes for the effect of informal care on depressive scores for in-home caregivers were in line with those observed by Kaschowitz and Brandt (2017), the effect size for out-of-home caregiving was higher than they reported, indicating that our newly-constructed variable accounting for the intensity of care reveals a more burdensome relationship than previously observed. The effect sizes of 0.46 and 0.27 units on the EURO-D scale constitute a roughly 20% increase in reported depressive symptoms for in-home caregivers and a 12% increase for out-of-home caregivers. These changes are of a similar magnitude to the effects of being married, developing a functional limitation, and receiving maternity leave benefits on depression when using the EURO-D scale as a continuous outcome variable, as reported by Avendano et al. (2015).

One explanation for the differing impacts of caregiving between these settings could be the compositions of care recipients that these DPC providers assist: the vast majority of in-home DPC providers assist spouses, while out-of -home DPC providers take care of more diffused care recipients like mothers, spouses, children, and other loved ones. Spousal caregivers may experience a primary obligation toward their loved one’s care that is shared for other care recipients: siblings may split responsibilities caring for mothers, spouses may split responsibilities caring for children, and so on. Thus, in-home caregivers may, on average, shoulder greater responsibilities for care and experience a smaller degree of instrumental and social support than out-of-home caregivers. Additionally, it is possible that in-home daily caregivers still provide more hours of care than daily out-of-home caregivers, with this higher caregiving intensity contributing to their greater reporting of depressive symptoms. Conversely, out-of-home caregivers experienced a greater *decrease* in depressive symptoms after transitioning out of care. This might also have to do with the composition of care recipients: Seltzer and Li (2000) posit that the relief some caregivers experience after transitioning out of care, either due to nursing home placement or bereavement, could be from the regained time they have for social participation and personal endeavors. However, the death of a spouse or their relocation to a nursing home might constitute the loss of their spouse's primary social connection. Since in-home caregivers constitute the majority of spousal caregivers in our sample, they may be more likely to face this challenge to post-care social participation.

Hypothesis 2 predicted that caregivers in countries where governments assume greater responsibility for long-term care would show the smallest increase to their depressive symptoms. The results supported this hypothesis for in-home caregivers: individuals who started providing daily care in the Central and Northern Clusters reported smaller increases to their depressive symptoms than individuals in the Southern & Eastern Cluster. One reason why informal caregivers in the Central and Northern Clusters experienced similar mental health effects could be due to the fact that both clusters espouse governmental responsibility in some form, even if this responsibility is also split with family members in Central Cluster countries. This degree of government support could decrease the caregiving burden for caregivers in the Central and Northern Clusters while those in the Southern Cluster take on greater duties. Additionally, the less prominent family-based care norms in the Northern and Central Clusters might drive these caregivers to take up care tasks more voluntarily than caregivers in the Southern Cluster, leading to more positive evaluations of these tasks.

In contrast to these findings for caregiving inside the home, including country cluster interaction terms in regressions analyzing caregiving *outside* the home revealed no significant differences in caregiver wellbeing across different long-term care typologies. One possible explanation for this is that many of the care recipients for out-of-home informal caregivers may also be using formal care services, either in their own homes or in residential facilities. This seems particularly likely in the case of partners or spouses: presumably many used to live with their caregiving spouses before their health needs required them to move into separate long-term care facilities. Thus, out-of-home informal caregivers may not perceive substantial differences in government support depending on the welfare context since their loved ones are still required to live away from home.

However, the lack of significant country cluster interactions for out-of-home informal caregivers reflects some research finding minimal differences in caregiver wellbeing by region (Bom & Stöckel, 2021; Kaschowitz & Brandt, 2017). This highlights an important fact: providing intensive personal care can be a challenging undertaking regardless of the welfare context. In fact, focusing on this specific form of intensive caregiving may overshadow broader country-level trends in assistance provision and wellbeing: specialization theory posits that country-level differences in caregiver wellbeing may be due to the *composition* of the caregiver population in each country, rather than differences in the caregiving relationship itself (Bom & Stöckel, 2021; Brandt, 2013). Specifically, generous welfare states allow for informal caregivers to focus on unspecialized and less time-intensive tasks, with demanding forms of care being handled by formal resources. In line with this thinking, this study's descriptive statistics revealed that there was a difference in assistance propensity across the Northern, Central, and Southern & Eastern Clusters based on the type of assistance provided outside the home: individuals in the Southern & Eastern Cluster were *less* likely to perform any sort of assistance outside the home when compared to individuals in the Northern or Central Clusters, but were *more* likely to provide daily personal care. In this way, generous welfare states may be more effective at preventing individuals from taking on intensive informal care roles, but the individuals who take on these intensive roles may experience a similar emotional burden no matter where they live.

Limitations

While this study yielded useful insights into the relationship between caregiving and depression, it had some limitations that, if resolved, could provide an even clearer picture of caregiving's mental health effects. Panel fixed-effects models often have small sample sizes, resulting in lower statistical power, and our sample contained quite little variation in our caregiving variables. This was particularly pronounced for our analyses of caregivers in the Northern Cluster, the geographic area where DPC was the least common, and for out-of-home DPC providers, where we could only use three waves of data. Another limitation of this study is that it is still impossible to identify precisely how much time caregivers within the home spent performing care tasks: daily or almost daily care could constitute less than an hour's-worth of caregiving to over several hours, and these commitments likely result in different caregiver burdens. Similarly, while we could observe that most out-of-home DPC providers transitioned into daily care from having provided non-daily personal care in the previous wave, we have no way of isolating the transitions into DPC from different forms of assistance for in-home caregivers: if a greater proportion of in-home DPC providers transitioned from less intensive forms of assistance, this could have exaggerated the observed mental health differences between these groups. Further research is needed on the effects of different patterns of caregiving transitions on caregivers' mental health.

Conclusion

This study provides insights for researchers and policymakers interested in strengthening long-term care systems. Most importantly, the caregiving burden for both in-home and out-of-home informal caregivers underscores that assistance programs for informal long-term care providers must consider a diverse set of caregiving arrangements: spouses, children, friends, and neighbors all play instrumental roles in caring for older populations, though out-of-home (and particularly non-kin) informal caregivers may be the less visible faces of these caregiving relationships. Policymakers should consider how the long-term care policies they develop benefit caregivers and care recipients across these different contexts. The results also suggest that generous long-term care policies may ameliorate the caregiving burden, primarily by allowing informal caregivers to take on less-intensive care tasks. This could allow informal caregivers to provide emotionally sustainable forms of care even as the need for long-term care increases.

Key points

- Starting to provide informal care was associated with larger increases in reported depressive symptoms for in-home versus out-of-home caregivers
- Individuals who started to provide informal care in the Northern Cluster or Central Cluster reported smaller increases in reported depressive symptoms than informal caregivers in the Southern and Eastern Cluster
- Individuals in the Northern Cluster were the *least* likely to provide intensive out-of-home care and the *most* likely to provide general forms of assistance

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Data availability statement

This paper uses data from SHARE Waves 4, 5, 6, 7, and 8 (DOIs: 10.6103/SHARE.w4.800, 10.6103/SHARE.w5.800, 10.6103/SHARE.w6.800, 10.6103/SHARE.w7.800, 10.6103/SHARE.w8.800), see Börsch-Supan et al. (2013) for methodological details. This paper also uses data from the generated easySHARE data set (DOI: 10.6103/SHARE.easy.800), see Gruber et al. (2014) for methodological details. The easySHARE release 8.0.0 is based on SHARE Waves 1, 2, 3, 4, 5, 6, 7 and 8 (DOIs: 10.6103/SHARE.w1.800, 10.6103/SHARE.w2.800, 10.6103/SHARE.w3.800, 10.6103/SHARE.w4.800, 10.6103/SHARE.w5.800, 10.6103/SHARE.w6.800, 10.6103/SHARE.w7.800, 10.6103/SHARE.w8.800).

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