

The Effects of Informal Care Provision on Mental Health Across European Countries

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Department of Social Research

Faculty of Social Sciences

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Author:

Andreas Nolan

Supervisor(s):

Katri Aaltonen

Mirkka Danielsbacka

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Author(s): Andreas Nolan

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Abstract

Given Europe's rapid population aging, it is important to consider whether countries on the continent are equipped to provide social services to their older inhabitants. Often, care work for older individuals is provided informally (i.e. unpaid) by family members, rather than through government services. Though engaging in helping behaviors can sometimes lead to positive health benefits, previous research has identified a number of physical and mental health declines that informal caregivers experience while engaging in particularly intensive care work. With data from waves 6, 7, and 8 (spanning the years 2015 to 2020) of the Survey of Health, Ageing, and Retirement in Europe (SHARE), I used panel fixed-effects models to examine within-person variation in depression scores after a respondent starts providing daily or almost daily informal care. I focused specifically on differences between caregivers providing informal care *inside* their home versus those providing it *outside* their home. The final sample encompassed 18 countries and contained 23,488 respondents when observing informal care inside the home and 31,481 respondents when observing informal care outside the home. Overall, my results substantiate previous research that has found that the effect of informal caregiving on depressive symptoms is more pronounced for in-home versus out-of-home caregivers. However, my research strengthens this claim through a more precise comparison of these two informal caregiving contexts by isolating the specific type of care work provided and time commitment

involved. In addition, my results show that belonging to a larger household minimizes the declines in mental health from providing personal care *outside* the home, and there is preliminary evidence to suggest that countries with greater government responsibility for long-term care dampen the depressive consequences of providing care *inside* the home. Further, countries with greater governmental responsibility for long-term care provision appear to be more successful at shrinking the pool of informal caregivers that provide particularly intensive forms of care. Together, these findings underscore that policy interventions designed to assist informal caregivers must take into consideration a wide constellation of potential caregiving relationships and place renewed attention towards out-of-home caregivers. Still, more comprehensive social support metrics are needed to understand how social support can buffer the emotional burden of caregiving work.

Keywords: Informal care; long-term care; mental health; caregivers; international comparison; longitudinal study; social support

1. Introduction

Europe's population has been aging for some time. At the start of the 2000s, the continent already had a larger share of people older than 60 than people younger than 15 (Harper, 2014). This demographic shift is expected to continue over the next several decades: by 2060, the percentage of the population over 60 is expected to be almost double that of those under 15. Gori et al. (2015) notes that these changes have produced a growing need for long-term care services, resulting in an evolution of long-term care policies since the 1990s. Still, European countries are grappling with how to advance their long-term care capabilities: currently, long-term care in many countries depends on substantial time and financial investment from families, rather than the government (Verbeek-Oudijk et al., 2014). In fact, most of the long-term care for older individuals is provided by informal (i.e. unpaid) caregivers, such as spouses or children (Wittenberg, 2015). The role that these caregivers play in supporting an older population is so substantial that the demand for formal care services can largely rest on the availability informal care (Wittenberg, 2015). This precarious balance between informal and formal care services raises the question of how long-term care will be delivered in the coming decades, since an aging population will presumably require an increase in informal care provision as well as greater access to formal care services.

One complication with relying heavily on informal caregiving is that this work can be physically and emotionally taxing for the caregiver. While several studies have noted the potential health benefits of altruistic and assisting behavior (Brown et al., 2005; Brown et al., 2008; Danielsbacka et al., 2022; Hays et al., 1997; Schwartz et al., 2003), intensive caregiving has been found to have a deleterious effect on mental and physical wellbeing due to the emotional and time-consuming nature of the work (Broese van Groenou et al., 2013; Capistrant

et al., 2012b; Caputo et al., 2016; Hiel et al., 2015; Kaschowitz & Brandt, 2017; Litwin et al., 2014; Pruchno, 1990; Schulz & Beach, 1999; Schultz & Sherwood, 2008). In this way, caregiving relationships often extend beyond simple altruistic behaviors, and involve considerable labor and emotional investment from care providers.

Gori et al. (2015) emphasizes the need for equity and efficiency when developing long-term care services. Part of realizing this goal involves addressing the physical and emotional needs of informal caregivers who fill an essential role in providing long-term care. Doing so will not only benefit caregivers' wellbeing, but ensure the viability of informal care work as populations age. 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 performing caregiving work. This could also help level the established socioeconomic inequalities in caregiver wellbeing across Europe (Brandt et al., 2021).

This paper focuses specifically on changes to caregivers' mental health, measured by their EURO-D depression scores, after starting intensive (daily or almost daily) caregiving work. In this section, I first highlight some of the factors shaping the relationship between caregiving and depression, devoting specific attention towards the role social support can have in moderating this relationship. Next, I note the importance of the caretaking context; namely, the specific tasks performed by caregivers and whether this work is done inside or outside of the caregiver's home. Finally, I consider whether a country's long-term care policies can ameliorate some of the mental health challenges faced by caregivers.

Factors shaping the relationship between caregiving and depression: health and social support

Researchers have already identified several mechanisms that could explain the relationship between providing informal care and declines in mental health. One is that the burden of care work erodes a caregiver's physical health: previous studies have shown that providing informal care may increase rates of hypertension and mortality due to the stress induced from this practice (Capistrant et al., 2012b; Schulz & Beach, 1999). Additionally, caregivers may neglect their own health needs in order to focus their efforts on caring for others (Zivin & Christakis, 2007). Given the well-established association between poor health status and negative mental health (Ohrnberger et al., 2017), it is crucial to examine the role of the respondent's health status as a mediator in the relationship between care provision and depression.

One potential moderator of the relationship between caregiving and depression is the quality of social support a caregiver receives while doing this work. Numerous studies have investigated the effects of receiving social support while providing care work and have concluded that social support buffers the burden felt by caregivers (Chang et al., 2001; Clay et al., 2008; Muñoz-Bermejo et al., 2020; Tolkacheva et al., 2011; Turner et al., 1998; Thompson et al., 1993). Identifying precisely how social support impacts caregiver wellbeing is challenging because researchers must decide how to measure social support: for instance, it can be measured as general network size, network satisfaction, or as emotional support or task sharing with caregiving-specific duties. As a consequence, some indicators may obscure this relationship: Hiel et al (2015) found the explanatory role of social support on the relationship between caregiving and caregivers' mental health to be insignificant, but note this may have been due to insufficient availability of social support indicators. This project aims to expand the scope of

these indicators to include different measures of social network size like partnership status, household size, and number of children in order to observe how they moderate the association between intensive caregiving and the caregiver's mental health.

Caregiving contexts: location of work and tasks performed

The relationship between informal caregiving and depression is also shaped by the context in which caregiving takes place. One example is the physical location of caregiving: caregiving inside the home often corresponds with a higher intensity to the role since caregivers cannot distance themselves from their work, both physically and emotionally (Litwin et al., 2014; Kaschowitz & Brandt, 2017). Additionally, Broese van Groenou et al. (2013) suggests that the more positive evaluations of caregiving by non-kin versus spouses or adult children could be due to the fact that these caregivers have different motivations and opportunities to take up care work. Essentially, non-kin caregivers, who are likely providing this care outside of their own homes, may be more likely to enter the caregiving relationship voluntarily and experience fewer obligations when providing care. These differences seem to be born out in group-level outcomes for caregivers, with in-home caregivers demonstrating greater depressive symptoms and mortality risks than out-of-home caregivers (Caputo et al., 2016; Kaschowitz & Brandt, 2017).

However, another component of the caregiving context is the type of assistance a caregiver provides; namely, the set of activities that make up 'caregiving.' Identifying what tasks constitute caregiving is important when discussing its effects on physical and mental health because recent research has highlighted inconsistencies in the definition of caregiving across studies (Lee & Burke, 2018). In addition, the effect of caregiving on wellbeing often depends on the types of care a caregiver provides: caregivers' depressive symptoms, self-rated health, and

cognitive functioning all appear to be impacted differently depending on whether the care work centers around physical, mental, or emotional work (Bassi et al., 2020; Zwar, König, & Hajek, 2018a; Zwar, König, & Hajek, 2018b). Thus, it is important to isolate distinct care tasks in order to understand their differing effects on mental wellbeing.

Personal care is defined in the SHARE survey as help with activities like “washing, getting out of bed, or dressing,” constituting a combination of physical and intimate work. In contrast, “practical household help” and “help with paperwork,” which are included as two other types of assistance behavior, encompass work solely physical in nature. As a result, I expect that personal care should prove the most deleterious form of helping behavior to an assistance-provider’s mental health, in line with thinking from Zwar et al. (2018a). Building on this assumption, some previous studies of caregiving inside and outside the home have suffered from inconsistencies in the definition of caregiving inside versus outside the home, overweighing either the time commitment or intensity of work involved in caregiving inside the household, which could have suppressed the effects of caregiving outside the household (Caputo et al., 2016; Kaschowitz & Brandt, 2017). This 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, caregivers inside and outside the home should experience similar levels of burden.

Caregiving contexts: long-term care policy

Caregiving also takes place in the context of national and regional health care systems with different approaches to and financing for long-term care services. While some scholars have started classifying different approaches to long-term care policy (Ariaans et al., 2021), as noted

by Kaschowitz & Brandt (2017), to date most country-level welfare typologies do not focus specifically on caregiving. Using classifications developed by Haberkern & Szydlik (2008) which classified countries as family-based, service-based, or mixed according to 1) “the individual’s duty to provide care for disabled relative(s)” and 2) “by the benefits for care recipients especially the offered and utilized ambulant care benefits,” Kaschowitz & Brandt (2017) sought to identify the potential role of the country context in the relationship between informal caregiving and health. While the authors predicted that caregivers in family-based countries would experience larger declines in mental health than caregivers in service-based countries, since these caregivers would need to take on higher degrees of responsibility and exertion, they ultimately found little evidence that caregiving was more burdensome these family-based care systems.

Still, research suggests that the effects of caregiving could differ based on a country’s approach to long-term care. For example, countries with more generous long-term care policies tend to have higher levels of caregiver wellbeing (Bom & Stöckel, 2021; Brenna and Di Novi, 2016; Uccheddu et al., 2019; Van den Broek and Grundy, 2018). These differences 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. In the case of long-term care, specialization theory posits that generous policy would allow formal professionals to manage intensive and highly-skilled services, while family members and other informal care providers would complete less burdensome care tasks (Bom & Stöckel, 2021). If a country’s long-term care policy is not generous, these intensive and highly-skilled forms of long-term care would also have to be completed by informal caregivers. As a result, a country’s long-term care policy plays an important role in shaping the caregiving population, with caregivers in

less generous welfare states needing to take on intensive caregiving roles compared to caregivers in more generous welfare states (Bakx et al., 2015; Bom & Stöckel, 2021). Thus, it is important to revisit 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 another useful typology of European countries based on their approach to caregiving. These classifications focus on who carries the responsibility for providing long-term care and assistance 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 Eastern and Southern 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 might shape caregiver wellbeing. Because of this, I use these typologies developed by Verbeek-Oudijk et al. (2014) to expand on the question of how long-term care policy impacts the relationship between caregiving and depression raised by Kaschowitz & Brandt (2017). Welfare systems that place greater responsibility for long-term care on the government (i.e. the Northern Cluster) should lessen the burden felt by informal caregivers more than systems that rely most-heavily on families to provide personal care (i.e. the Eastern and Southern Cluster).

2. Research hypotheses

Based on previous literature, I have four hypotheses for my analyses:

1. Providing informal *personal* care outside the household daily or almost daily will lead to larger increases in depression than providing different types of assistance outside the household, such as help with housework or paperwork.
2. The effect of providing informal care *outside* the household on depression levels will be similar to that of providing informal care *within* the household when the time commitment involved and tasks performed are similar; specifically, when both types of care involve activities like “dressing, bathing or showering, eating, getting in or out of bed, using the toilet”.
3. Individuals with higher levels of social support, as measured by having a partner, having a larger household size, and have higher numbers of children, will experience smaller declines in mental health when caregiving, compared to those with lower levels of social support.
4. Countries that espouse government responsibility for long-term care will demonstrate the least deleterious mental health repercussions for informal caregivers, while countries that place responsibility for long-term care on families will demonstrate the most harmful mental health repercussions for informal caregivers.

3. Data and Methods

Data and Variables

Data for this analysis was 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. Data is measured in waves, with data collection taking place roughly every two years.

SHARE data is particularly suited to my research question because it allows me to use longitudinal data in order to examine the physical and mental health burdens of providing personal care among adults, even more so because many of the respondents and their family members are at an age where they may start providing and/or receiving personal care.

For my analysis, I included all respondents aged 50 or above for waves 6, 7, and 8 (2015, 2017, 2019). Since I conducted a fixed-effects panel regression, I first ensured that each respondent had complete data for my outcome and explanatory variables for at least two waves. Next, in order to isolate the effect of *beginning* informal care work on mental health, I removed all respondents who transitioned *out* of a caregiving role from my analysis, since panel fixed-effects models do not isolate the direction of within-person variation (Mummolo & Peterson, 2018). After removing respondents with missing values and who participated in only one wave of the survey, I was left with 51,636 person-waves nested in 23,488 respondents when observing informal care *inside* the household, and 69,512 person-waves nested in 31,481 respondents when observing informal care *outside* the household. The available countries across both final samples were Austria, Belgium, Croatia, the Czech Republic, Denmark, Estonia, France, Germany, Greece, Israel, Poland, Slovenia, Spain, Sweden, Switzerland, Italy, and Luxembourg. Tables 1 and 2 below illustrate the panel structure of the data set, and demonstrate that the data was unbalanced: while some respondents are lost during follow up, the panel is also continuously refreshed each wave with resampled populations and, at times, new country additions. As a result, the data was both left- and right-censored. The respondents left in the sample participated in roughly 2.2 waves when looking at caregiving inside the household, and 2.2 waves when looking at caregiving outside the household.

Table 1: Description of Panel Data Structure—Care Inside the Household

<i>Frequency</i>	<i>Percentage</i>	<i>Pattern</i>
15,130	64.4	1_1
4,660	19.8	111
3,416	14.5	11_
282	1.2	_11
23,488	100.0	

Table 2: Description of Panel Data Structure—Care Outside the Household

<i>Frequency</i>	<i>Percentage</i>	<i>Pattern</i>
20,173	64.1	1_1
6,550	20.8	111
4,359	13.8	11_
399	1.3	_11
31,481	100.0	

I included a number of variables to understand the relationship between personal care provision and a respondent’s mental health. My primary outcome variable was the respondent’s score on the EURO-D depression scale, a composite index of 12 items measuring various attributes of a respondent’s mental health including depression, pessimism, suicidality, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment, and tearfulness (Prince et al., 1999). Each of these items is scored individually as a 0 or 1 and summed as an index to form a range of scores from 0 (not depressed) to 12 (very depressed). Individuals with a score of 4 or higher are classified as having a high likelihood of clinical depression. Because the scale is numerical and contains over 7 levels, I treated it as a continuous variable for my analysis.

I had two main independent variables, one for each of my analyses of informal care *within* and *outside* the home. For assessing care inside the home, my primary independent variable was whether or not 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 household during the past 12 months. This variable was coded so that the reference category (0) was *not* providing near-daily personal care, and 1 indicated providing

near-daily personal care. For care *outside* the home, I constructed my primary independent variable using three different variables in the SHARE survey: the first asks respondents if they have “personally given any kind of help listed on this card to a family member from outside the household, a friend or neighbour?”; the second specifies the type of care provided by asking “Which types of help have you given to this person in the last twelve months?” with options for “personal care,” “practical household help,” and “help with paperwork”; the third asks “How often altogether have you given such help to this person?” This new variable for personal care outside the household was coded as binary in order to match the coding for personal care inside the household, where 0 is *not* providing daily personal care, and 1 indicates providing daily personal care. Since respondents are able to indicate up to three different individuals to whom they provided assistance, a respondent was coded as having provided daily personal care as long as they provided this form of care to *at least* one individual. Prior to wave 6 in the SHARE survey, there was no way to distinguish personal care from other types of assistance outside the household, so this newly-constructed variable enabled an analysis of the difference between in-home and out-of-home informal care provision that was not possible for Kaschowitz & Brandt (2017). I used these two similarly-coded binary variables in order to more accurately compare caregiving inside the home to caregiving outside the home.

In addition to my independent and dependent variables, I included several sets of covariates. The first set constituted sociodemographic variables and controls for maturation and generation effects, which included employment status (retired, employed or self-employed, unemployed, permanently sick or disabled, and homemaker or other), ability to make ends meet (with great difficulty, with some difficulty, fairly easily, easily), gender (male, female), years of education (continuous), age (continuous), and wave (6, 7, 8). The second set constituted

subjective health status (excellent/very good, good, fair, poor). The third set consisted of social support measures which included partnership status (married or in a registered partnership, never married/divorced/widowed), size of household (1, 2, 3, 4 or more), and number of children (0, 1, 2, 3, 4 or more). Gender and years of education were ultimately excluded in the final analyses since these are time-constant in the SHARE dataset. Partnership status, size of household, and number of children all had minimal within-subject variation and were nearly time-constant, but were still treated as time-varying in the final analyses.

In order to test whether differences in the division of responsibility for long-term care impact the relationship between informal caregiving and depression, I created a new 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 and Eastern Cluster consisted of Italy, Spain, Portugal, Estonia, Hungary, Czech Republic, Poland, Slovenia and Switzerland.

Importantly, the inclusion and operationalization of these variables was in line with previous research on this topic (Hiel et al., 2015; Kaschowitz & Brandt, 2017; Pruchno, 1990; Schulz & Sherwood, 2008). The only deviations from previous literature were the inclusion of the ability of the household to make ends meet (rather than income) as well as the number of children and support received from outside the household. Though income's relationship with health is well-established (Ettner, 1996; Lynch & Kaplan, 1997), I chose to include the variable measuring the ability to make ends meet over income since it captures self-rated financial stability, which might not be reflected in an individual's overall income or income decile. Therefore, this indicator may be a better way to capture monetary strain in the SHARE sample

than traditional income measures. Interactions between care provision and partnership status, household size, and number of children were included to test whether social support moderates the relationship between caregiving and depression. Though Hiel et al. (2015) did not find significant interaction effects between care provision and both partnership status and household size, their analysis was limited to in-home caregiving, and these variables may serve as better social support indicators for caregivers outside the home.

The complete descriptive statistics for all outcome variables and covariates can be found in Table 3 below. Roughly 5.7% of respondents provided daily or almost daily personal care to someone living within their home. In contrast, while roughly 28.4% of respondents reported providing assistance to someone outside the household, only 1.4% of respondents reported providing daily or almost daily personal care to someone outside of the household.

Table 3: Descriptive Statistics

Variable	Informal Care Inside the Home					Informal Care Outside the Home				
	Perso n- years	No. of person s	Mean (SD)	Withi n- perso n SD	% perso n- years	Perso n- years	No. of person s	Mean (SD)	Withi n- perso n SD	% perso n- years
EURO-D Scale	51,636	23,488	2.2 (2.1)	1.1		69,512	31,481	2.3 (2.2)	1.1	
Provides Daily Personal Care?										
Yes	2,964	2,266			5.7	979	832			1.4
No	48,672	22,937			94.3	68,533	31,360			98.6
Age	51,636	23,488	68.4 (8.6)	2.1		69,512	31,481	69.6 (9.0)	2.1	
Years of Education	51,636	23,488	11.4 (4.3)	0.0		69,512	31,481	11.2 (4.3)	0.0	
Sex										
Male	24,605	11,187			47.6	30,044	13,615			43.2
Female	27,031	12,301			52.4	39,468	17,866			56.8
Can Make Ends Meet?										
With Great Difficulty	5,189	3,559			10.0	7,542	5,150			10.9
With Some Difficulty	11,853	8,340			22.9	16,654	11,743			24.0
Fairly Easily	14,701	10,807			28.5	19,758	14,594			28.4
Easily	19,893	11,974			38.5	25,558	15,522			36.8
Employment Status										
Retired	33,327	16,888			64.5	46,545	23,306			67.0

Employed/Self-Employed	11,130	6,792	21.5	13,540	8,307	19.5
Unemployed	983	831	1.9	1,266	1,058	1.8
Sick or Disabled	1,011	756	2.0	1,468	1,097	2.1
Homemaker/Other	5,185	3,016	10.0	6,693	3,922	9.6
Subjective Health Status						
Very Good/Excellent	14,279	9,127	27.6	18,045	11,572	26.0
Good	20,454	13,761	39.6	26,887	18,091	38.7
Fair	13,340	9,330	25.8	19,101	13,253	27.5
Poor	3,563	2,657	6.9	5,479	4,043	7.9
Marital Status						
Married/In a Partnership	46,022	21,232	89.1	48,705	22,679	70.1
Not in a Partnership	5,614	2,999	10.9	20,807	10,080	29.9
Household Size						
1	632	618	1.2	16,167	8,194	23.3
2	39,034	19,056	75.6	40,818	20,373	58.7
3	7,255	4,641	14.0	7,587	4,893	10.9
4 or more	4,715	2,863	9.1	4,940	3,022	7.1
Number of Children						
0	2,803	1,461	5.4	5,978	2,965	8.6
1	8,502	4,458	16.5	12,177	6,289	17.5
2	23,827	11,432	46.1	30,300	14,485	43.6
3	10,588	5,260	20.5	13,564	6,681	19.5
4 or more	5,916	3,044	11.5	7,493	3,808	10.8
Wave						
6	23,206	23,206	44.9	31,082	31,082	44.7
7	8,358	8,358	16.2	11,308	11,308	16.3
8	20,072	20,072	38.9	27,122	27,122	39.0
Country Cluster						
Northern	7,295	3,208	17.1	10,118	4,406	17.4
Central	13,135	5,986	30.7	18,455	8,362	31.7
Southern and Eastern	22,301	10,223	52.2	29,613	13,560	50.9
Total	51,636	23,488	100.0	69,512	31,481	100.0

Methods

In order to account for the longitudinal nature of the SHARE data and to establish a greater causal claim regarding the relationship between caregiving and depression, I used a panel fixed-effects model for my analyses. Fixed-effects analyses focus on within-person variation, rather than between-person variation, allowing for an analysis of how an individual's depression levels change once they start providing intensive care. While a random effects model would have suited my research question and allowed me to observe the mediating role of time-constant variables like gender and years of education, conducting the Hausman Test for my regression

analysis of the relationship between in-home personal care and depression revealed that my random effects model yielded biased estimates ($p < 0.001$, Appendix A). 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 dataset (Brüderl & Ludwig 2015).

As mentioned earlier, while panel fixed-effects analyses capture the effects of within-person variation, they do not capture the specific *direction* of this within-person variation (Mummolo & Peterson, 2018). For example, with regards to caregiving, respondents can transition into a caregiving role ($0 \rightarrow 1$) but they can also transition out of a caregiving role ($1 \rightarrow 0$). Since I am interested in the isolating the impact of transitions into caregiving on an individual's wellbeing, I removed all respondents from my dataset who experienced a transition out of caregiving. Considering that many studies do not isolate the relevant variation in the treatment they are observing when using panel fixed-effects models (Mummolo & Peterson, 2018), this step added another degree of analytical rigor that might be missing from previous literature.

4. Results

Descriptive Results

Since fixed-effects analyses rely on within-person variation, information on the transitions from not providing daily personal care to providing daily personal care, both inside and outside of the household, can be found in Appendix B. Transitions into caregiving were much more common for caregiving within the household, with 6.2% of surveyed individuals providing care in one wave after not having provided it in the previous wave, compared to 1.9% for individuals outside the household.

Among informal caregivers providing daily or almost daily care inside the household, roughly 38.1% reported EURO-D scores that qualified for depression (≥ 4), compared to 22.1% of the non-caregiving population. In the initial regression analysis including all control variables, there was a Rho value of 0.69. For daily or almost daily caregivers outside the household, the rate was 33.9%, compared to 24.9% for the non-caregiving population. In the initial regression analysis including all control variables, there was a Rho value of 0.66.

It is important to consider how informal caregivers are distributed across different country clusters. For informal caregiving inside the home, it is only possible to show data for daily personal care: in the Southern and Eastern Cluster, 6.5% of respondents reported providing daily personal care, compared to 6.6% of respondents in the Central cluster and 3.8% of respondents in the Northern Cluster (see Appendix C). For caregiving outside the household, it is possible to distinguish between different levels of caregiving. While those in the Southern Cluster were the most likely to report providing daily personal care, at 1.7% of respondents compared to 1.6% in the Central Cluster and 0.5% in the Northern Cluster, this trend is reversed when observing any type of assistance outside the household: 45.7% of individuals in the Northern Cluster reported providing general assistance outside the home in the past 12 months, compared to 36.2% of those in the Central Cluster and 21.6% of those in the Southern & Eastern Cluster.

The main recipients of informal caregiving varied depending on whether care was provided inside or outside the home (see Appendix D). Daily personal care within the home was predominantly provided to spouses/partners (reported by 76.1% of caregivers) followed by children (10.4%). Daily personal care outside of the home was mostly given to mothers (reported by 38.3% of caregivers) but was closely followed by spouses/partners (27.7%). Daily caregiving

outside the home was more widely given to different family members than was caregiving inside the home. Still, the vast majority of recipients belonged to the caregiver's immediate family, regardless of whether or not daily personal care was provided inside or outside of the house, with spouses/partners, children, mothers, mothers-in-law, and fathers comprising 95.0% and 73.7% of responses respectively. In contrast, any form of assistance outside the home was mostly provided to children (reported by 28.4% of those providing support) and was more dispersed outside of the immediate family, with neighbors and friends composing 21.17% and 18.61% of cases.

Fixed-Effect Regression

I first attempt to pinpoint the emotional burden of providing time-intensive personal care outside of the household by distinguishing this form of care from other types of assistance. To do this, I utilized the variables related to assistance provision outside the home (i.e. the type of assistance task and the time commitment involved) in order to create separate tiers of assistance 'intensity': not providing any form of assistance, providing assistance, providing personal care, and providing daily personal care. Table 4 illustrates that the positive relationship between providing assistance to someone outside the household and depression is largely dependent on the type of assistance given and the time spent providing it. When individuals started providing forms of assistance other than personal care, there was no change to their depression scores. When individuals started providing less-than-daily personal care, they grew depressed by 0.11 units, though this relationship was not quite statistically significant ($p < 0.10$). However, individuals who started providing daily personal care witnessed their depression scores rise by roughly 0.32 units.

Table 4: Longitudinal associations between providing assistance outside the home and depression, separated by different types of assistance

	Coefficient
Out-of-Home Assistance Intensity (<i>ref. No assistance provided</i>)	
<i>Provides Assistance</i>	0.010 (0.032)
<i>Provides Personal Care</i>	0.115 (0.069)
<i>Provides Daily Personal Care</i>	0.321*** (0.081)
Observations	57,532
R^2 (<i>within</i>)	0.055

Controlling for Sociodemographic Conditions, Health Measures, and Social Support

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Since the variable measuring in-home personal care in the SHARE dataset is binary, with 0 indicating no provision of *daily* personal care and 1 indicating the provision of daily informal personal care, I now turn to my similarly-coded variable for daily informal caregiving outside the home for my comparative analyses of these two types of care work. Using this variable, it is possible to assess whether caregiving inside the home is truly more deleterious to an informal care provider's mental health than caregiving outside the home. Table 5 illustrates that this was the case: individuals who began providing daily personal inside the household experienced an increase of roughly 0.47 units to their depression scores, compared to an increase of 0.29 units for individuals providing this care outside of the household.

Table 5: Longitudinal associations between providing daily personal care and depression, separated by caregiving inside versus outside the household

	Inside the Household	Outside the Household
Provides daily personal care (<i>ref = less than daily care or</i>)	0.473*** (0.049)	0.289*** (0.076)

<i>no care)</i>		
Observations	51,636	69,512
R^2 (<i>within</i>)	0.065	0.053

Controlling for sociodemographic conditions, health measures, and social support

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

I now turn to the role of social support variables in explaining the relationship between caregiving and depression. To measure this, I ran three fixed effects panel regressions measuring the relationship between daily or almost daily personal caregiving on depression scores while including interaction terms for the caregiver’s marital status (Model 1), household size (Model 2), and number of children (Model 3). The full results can be seen in Appendix E. Overall, the social support variables did not substantially moderate the relationship between caregiving and depression. For marital status and number of children, there were no significant interaction terms, for either caregivers inside or outside the household. However, the interaction effect for marital status for informal caregivers *outside* the household did trend in the predicted direction: those who had never been married or who were divorced were 0.29 units more depressed than those who were in a partnership, and this was significant at $p = 0.097$. Household size did appear to moderate the relationship between caregiving and depression for informal caregivers outside the household, and can be viewed in Figure 1. Caregivers with household sizes of two were significantly less depressed by -0.391 units compared to caregivers living alone. Additionally, the interaction terms for household sizes of three and four were nearly significant: caregivers in households with three people were less depressed by -0.41 units ($p = 0.12$) and caregivers in households with four or more people were less depressed by -0.61 units ($p = 0.06$) than

caregivers living alone. For caregivers inside the home, however, household size did not moderate the relationship between caregiving and depression.

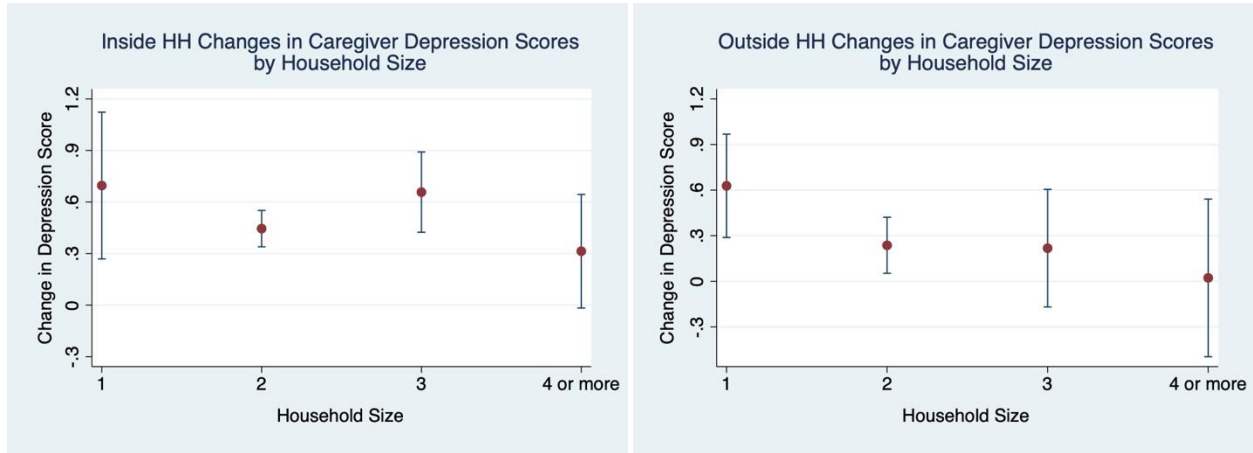


Figure 1: Interaction terms for household size for informal caregivers inside and outside the household (HH), including mean value and 95% confidence intervals.

To answer the question of whether the relationship between caregiving and depression is shaped by long-term care typologies, I ran an additional fixed-effects regression with country clusters of similar policies as interaction terms, presented in Figure 2 below with the full table in Appendix F. Here, the results were somewhat mixed: regarding caregiving work inside the household, the findings trended in the predicted direction: individuals in both the Central and Northern cluster grew less depressed (by -.20 and -.19 units, respectively) when they started providing daily caregiving work compared to individuals in the Southern and Eastern cluster countries; however, the small sample size meant that these trends were not quite statistically significant ($p = 0.07$ for the Central cluster and $p = 0.19$ for the Northern Cluster). Regarding caregiving outside the household, there were no significant moderating effect of country groupings on the relationship between providing daily personal care and depression.

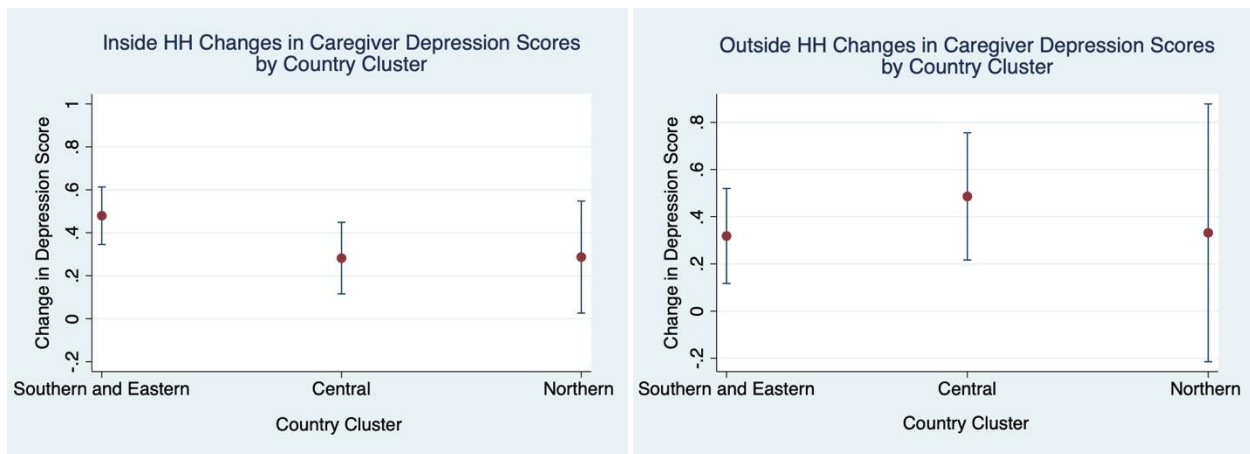


Figure 2: Country-cluster differences in relationship between care provision and depression for informal caregivers inside and outside the household (HH), including mean value and 95% confidence intervals

5. Discussion

While previous studies have identified the link between informal care provision and increased depressive symptoms, a degree of uncertainty remained regarding the factors that can make this relationship more or less burdensome. Specifically, previous research has found informal caregiving outside of the home to be less deleterious to mental health than caregiving inside the home (Caputo et al., 2016; Kaschowitz & Brandt, 2017). However, these findings have often been muddled by inconsistencies in the definition of caregiving inside versus outside of the home. Caputo et al. (2016) note as a limitation that in-home caregivers were asked if they had “sole responsibility for someone ill in their homes,” while out-of-home caregivers were instead asked if they “regularly spent time caring for someone ill outside their home,” which could encompass less burdensome or time-consuming caregiving activities. Similarly, previous waves of the SHARE survey did not allow for a precise comparison between caregiving inside and outside of the home. Prior to wave 6, while respondents could indicate if they provided personal care to someone within the home, care outside the home was generalized to assistance that

encompassed not only personal care but also household tasks and paperwork, which could have diluted the observed effects of out-of-home personal care provision. Using a new variable which distinguished between these tasks for out-of-home caregivers, I was able to construct a new variable which asked respondents if they had provided roughly daily personal care to someone outside of their home, in line with the definition of in-home personal care.

In line with hypothesis 1, my results suggest that the observed effects of out-of-home care are diluted when combined with other forms of assistance, since starting to provide daily or almost daily personal care outside the household is associated with greater increases in depressive symptoms than other forms of assistance. Providing forms of assistance besides personal care to someone outside the household within the past year yielded no change to a respondent's depressive symptoms. In contrast, starting to provide personal care led to a mild (though not statistically significant) increase in depressive symptoms. However, there was a pronounced effect on mental health when the provision of personal care was coupled with a time-intensive commitment: respondents who started providing daily personal care to someone outside the household showed notable and significant increases in depressive symptoms.

Using this newly-constructed variable allowed for a more direct test of previous studies which found that caregiving outside the home is less deleterious to mental health than caregiving inside the home. In contrast to hypothesis 2, this study found that starting to provide daily personal care inside the home is indeed more burdensome than providing daily personal care outside the home. A degree of similarity between these two experiences is likely due to the composition of personal care recipients in the sample. Broese van Groenou et al. (2013) highlights that non-kin caregivers report more positive evaluations of caregiving than family caregivers, and while this study's descriptive statistics revealed that assistance outside the

household is often provided to neighbors or friends, daily personal care outside the home is predominantly provided to immediate family members, mostly mothers and partners/spouses. Since daily personal care inside the household is primarily given to spouses/partners, both personal care inside and outside the home are concentrated among kin, which could explain why both are associated with higher levels of depression. However, while all caregivers in this analysis provided daily or almost-daily care, there could still be a relatively substantial difference in the time in-home versus out-of-home informal caregivers spend providing care: Litwin et al. (2017) notes the difficulties in-home caregivers face distancing themselves from their care work, and it is possible that the in-home daily caregivers in this sample still provided substantially more care than the out-of-home daily caregivers, leading to a greater decline in their mental health.

There was some evidence that higher degrees of social support can buffer the mental health toll of caregiving, which was predicted in hypothesis 3. While none of the social support variables moderated the relationship between caregiving and depression for in-home caregivers, they did for out-of-home caregivers. First, regarding household size, out-of-home caregivers who did not live alone grew less depressed than caregivers who did live alone. Second, out-of-home caregivers who were married or in partnerships grew less depressed than caregivers who were not, though this result was not quite statistically significant ($p < 0.1$). Still, the fact that social support metrics did not moderate the relationship between caregiving and depression for in-home caregivers is surprising given its documented impact in previous research (Chang et al., 2001; Clay et al., 2008; Muñoz-Bermejo et al., 2020; Tolkacheva et al., 2011; Turner et al., 1998; Thompson et al., 1993). However, Hiel et al. (2015) notes that data on social support may not be robust enough in SHARE survey in order to assess its impact. One of the primary challenges

with the social support indicators used in this study (partnership status, household size, and number of children) is that these caregiver support networks sometimes overlap with care recipient, complicating the pathway by which social support might buffer the emotional toll of caregiving. This complication is most obvious when assessing caregiving inside the household: for example, even if household size is a reliable metric for social support, in this instance the care recipient was automatically a member of the caregiver's household. In contrast, household size served as an uncomplicated social support indicator when observing out-of-home care since the source of social support had no overlap with the care recipient(s). Utilizing a metric like total social network size could serve as a more precise marker of the degree of social support a caregiver has; alternatively, a metric like satisfaction with network size could prove even more valuable by highlighting the degree to which caregivers feel supported regardless of their social network's size. Still, it is important to consider that these metrics for social support may not meaningfully shape the relationship between caregiving and depression if the social support does not relate specifically to caregiving: without splitting caregiving tasks or perceiving a degree of emotional support from those in their social network, caregivers may not experience the mental health buffer these networks can provide. Alternatively, in some situations an extensive social network may actually serve as a resource competitor for caregivers: investing substantial time and energy into these networks that may make it more taxing to take on intensive caregiving tasks.

While hypothesis 4 predicted that caregivers in countries where governments assume greater responsibility for long-term care would show better mental health outcomes, the results provided mixed levels of support. For informal caregivers working inside the home, the differences between country clusters followed the predicted trend: caregivers grew less

depressed in the Central and Northern Clusters than in the Southern & Eastern Cluster, though these results did not quite reach statistical significance. One reason why informal caregivers in the Central and Northern Clusters experienced similar mental health effects from their work could be due to the fact that both clusters espouse governmental responsibility in some form, even if responsibility is also split with family members in Central Cluster countries. Just as Tolkacheva (2011) notes the importance of *perceived* social support in promoting caregiver wellbeing, perhaps any notable degree of government responsibility eases the caregiving burden, even if family members are still expected to take on a marked share of responsibility. In Southern Cluster countries, on the other hand, informal caregivers may carry the full burden of caregiving work for their loved ones. In addition, the degree of governmental responsibility in both the Central and Northern Clusters likely shields these caregivers from doing the most intensive forms of care work, while informal caregivers in the Southern cluster may be forced to take them on. The split between family and government responsibility for long-term care also raises the question of how autonomous caregivers in these countries feel regarding their work: recent literature has highlighted that caregivers who feel obligated to perform their care duties experience greater mental health declines than caregivers who view their work as more voluntary (Adelman et al., 2014; Brenna & Di Novi, 2016; Schulz et al., 2012). The family-based structure of long-term care in Southern countries likely creates a higher degree of obligation to perform long-term care duties, substantiated by Brenna & Di Novi (2016), more severely impacting caregivers' mental health than in the Northern and Central Clusters.

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. This result is

surprising because higher levels of government-supported long-term care services should help ease informal caregivers' burden regardless of whether their work takes place inside or outside the home. One possible explanation for this is that many of the care recipients for informal caregivers working outside the home may also have been using publicly funded long-term care, 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 a separate residential long-term care facilities. Thus, informal caregivers working outside of the home may not perceive a substantial difference in government support depending on whether they are embedded in a primarily government-provided or family-provided long-term care system since their loved ones are still required to live away from home. In contrast, informal caregivers may feel the impacts of government support acutely if, for example, the government-provided services are what allow their partner to continue living in-home.

However, the lack of significant country cluster interactions for informal caregivers working outside the home highlights an important point: providing time-intensive personal care is an emotionally taxing undertaking regardless of the welfare context. In fact, focusing on this specific form of intensive assistance may have 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 (Brandt, 2013). Specifically, countries with 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

caregiving propensity across the Northern, Central, and Southern and Eastern Clusters based on the type of assistance provided outside the home: individuals in the Southern 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.

While this study yielded useful important insights into the relationship between caregiving and depression, it had several 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, since only respondents who experience a change in the dependent variable are included in the analyses: for this reason, the sample size of intensive daily caregivers in the Northern Cluster was particularly low since few respondents ever provided daily or almost daily informal care. In addition, many SHARE respondents completed a retrospective survey instead of the standard survey during wave 7. Thus, the fixed-effects models for this study had much lower sample size than a three-wave analysis of SHARE data usually would. As a result, several important relationships may have been diluted in the final results. Another limitation of this study is that while a key contribution to the literature was establishing a comparable definition of informal caregiving inside and outside the home based off of a caregiver's time commitment and performed tasks, it is still impossible to identify precisely how much time caregivers within the household 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. Identifying even more

specific subgroups of informal caregivers would allow for targeted assistance for those who need it most. Finally, these macro-level long-term care typologies may be insufficient for identifying the role the government plays in supporting individual caregivers: utilizing typologies that combine these national policies with the types of caregiver support, caregiver subgroups, and geographic barriers to long-term care may create a more nuanced picture of how long-term care initiatives impact the caregiving relationship.

These results provide insights for researchers and policymakers interested in strengthening long-term care systems. Most important, the pronounced caregiving burden for both in-home and out-of-home informal caregivers underscores that any program aiming to assist informal long-term care providers must have a broad enough focus to address a constellation of different caregiving relationships: spouses, children, friends, and neighbors all play instrumental roles in caring for older populations, though out-of-home (and particularly non-spousal) informal caregivers may be the less visible faces of this work. Additionally, these results suggest that devising generous long-term care policies can ameliorate the burden faced by informal caregivers and shape a more effective division of care work between the state and an individual's community. The availability of comprehensive long-term care services frees informal caregivers from needing to provide intensive care they are not qualified or eager to perform, which may allow them to provide less intensive forms of care that are more emotionally sustainable and could even delay a care recipient's need for formal care services.

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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.

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This paper 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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Appendix A:

Compressed Hausman Test between fixed effects and random effects models for association between daily in-home care provision and depression

	FE Coefficient	RE Coefficient	Difference	Sqrt S.E.
Provides Personal care (<i>ref: No</i>)	0.473	0.546	-0.073	0.034
Sociodemographic Conditions	✓	✓		
Subjective Health Measures	✓	✓		
Social Support Measures	✓	✓		
Chi2 (22) = 830.14 Prob > chi2 = 0.000				

Appendix B:
Transitions into caregiving

Inside the Household			Outside the Household		
Provided daily personal care?	Provided daily personal care in next wave?		Provided daily personal care?	Provided daily personal care in next wave?	
	No	Yes		No	Yes
No	25,735 93.75%	1,715 6.25%	No	37,173 98.12%	711 1.88%
Yes	0 0.00%	698 100.00%	Yes	0 0.00%	147 100.00%

Appendix C:

Distribution of individuals providing assistance by country cluster and assistance type

	Inside the Household			Outside the Household		
	Southern & Eastern	Central	Northern	Southern & Eastern	Central	Northern
Provided Assistance*	--	--	--	6,410 21.6%	6,676 36.2%	4,625 45.7%
Provided Personal Care*	--	--	--	1,453 4.9%	1,040 5.7%	446 4.4%
Provided Daily Personal Care	1,451 6.5%	869 6.6%	276 3.8%	496 1.7%	289 1.6%	50 0.5%

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 household.

Appendix D:
Care recipients by assistance type

Care recipient	Daily or Almost Daily Personal Care <i>Inside</i> the Home			Daily or Almost Daily Personal Care <i>Outside</i> the Home			Any Assistance <i>Outside</i> the Home		
	Freq	% of Responses	% of Cases	Freq	% of Responses	% of Cases	Freq	% of Responses	% of Cases
Spouse/partner	2,255	74.59	76.11	267	26.07	27.27	949	3.81	4.82
Child	309	10.22	10.43	55	5.37	5.62	5607	22.51	28.45
Mother	208	6.88	7.02	341	33.30	34.83	3527	14.16	17.90
Mother-in-law	62	2.05	2.09	68	6.64	6.95	1022	4.10	5.19
Father	37	1.22	1.25	68	6.64	6.95	1005	4.03	5.10
Grandchild	35	1.16	1.18	22	2.15	2.25	491	1.97	2.49
Brother	22	0.51	0.52	11	1.07	1.12	572	2.30	2.90
Sister	17	0.56	0.57	24	2.34	2.45	932	3.74	4.73
Housekeeper/Home health provider	14	0.46	0.47	0	0.00	0.00	4	0.02	0.02
Friend	13	0.43	0.44	36	3.52	3.68	3670	14.73	18.62
Neighbor	12	0.40	0.40	44	4.30	4.49	4173	16.75	21.17
Father-in-law	10	0.33	0.34	15	1.46	1.53	328	1.32	1.66
Other relative	10	0.33	0.34	27	2.64	2.76	862	3.46	4.37
Niece	5	0.17	0.17	3	0.29	0.31	121	0.49	0.61
Daughter-in-law	4	0.13	0.13	1	0.10	0.10	145	0.58	0.74
Professional helper	3	0.10	0.10	0	0.00	0.00	2	0.01	0.01
Step-child	2	0.07	0.07	0	0.00	0.00	0	0.00	0.00
Son-in-law	2	0.07	0.07	1	0.10	0.10	114	0.46	0.58
Aunt	2	0.07	0.07	17	1.66	1.74	330	1.32	1.67
Stepmother	1	0.03	0.03	3	0.29	0.31	52	0.21	0.26
Minister, priest, other clergy	1	0.03	0.03	0	0.00	0.00	4	0.02	0.02
Stepfather	1	0.02	0.02	0	0.00	0.00	21	0.08	0.11
Grandparent	1	0.02	0.02	0	0.00	0.00	17	0.07	0.09
Uncle	1	0.02	0.02	3	0.29	0.31	94	0.38	0.48
Nephew	1	0.02	0.02	1	0.10	0.10	86	0.35	0.44
Colleague/Ex-colleague	0	0.00	0.00	2	0.20	0.20	191	0.77	0.97
Ex-spouse/partner	0	0.00	0.00	5	0.49	0.51	68	0.27	0.35
Other acquaintance	0	0.00	0.00	8	0.78	0.82	467	1.87	2.37
None of these	4	0.13	0.13	2	0.20	0.20	59	0.24	0.30

Total	3023	100.00	102.0 2	102 4	100.00	104.6 0	2494 6	100.0	126.4 0
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Appendix E:

Longitudinal associations between providing daily personal care and depression including social support interaction terms for marital status, household size, and number of children

	Model 1		Model 2		Model 3	
	<i>Inside HH</i>	<i>Outside HH</i>	<i>Inside HH</i>	<i>Outside HH</i>	<i>Inside HH</i>	<i>Outside HH</i>
Provides daily personal care (<i>ref. = less than daily care or no care</i>)	0.466*** (0.052)	0.220* (0.087)	0.696** (0.218)	0.628*** (0.174)	0.395 (0.177)	0.333 (0.276)
Provides daily personal care x marital status (<i>ref. married or in a partnership</i>)						
<i>Never Married</i>	0.061 (0.134)	0.286 (0.172)				
Provides daily personal care x household size (<i>ref. 1</i>)						
2			-0.251 (0.220)	-.391* (0.195)		
3			-0.038 (0.247)	-0.410 (0.262)		
4 or more			-0.382 (0.275)	-.606 (0.316)		
Provides daily personal care x number of children (<i>ref. 0</i>)						
1					-0.18 (0.206)	-0.029 (0.321)
2					0.254	-0.020

					(0.190)	(0.297)
3					0.053	-0.105
					(0.203)	(0.320)
4 or more					-0.002	-0.085
					(0.215)	(0.369)
Observations	51,636	69,512	51,636	69,512	51,636	69,512
R^2 (within)	0.065	0.054	0.065	0.054	0.065	0.054

Controlling for Sociodemographic Conditions, Health Measures, and Social Support

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

HH= Household

Appendix F:

Longitudinal associations between providing daily personal care and depression including interaction terms for long-term care country typologies

	<i>Inside Household</i>	<i>Outside Household</i>
Provides daily personal care <i>(ref. Less than daily care or no care)</i>	0.479 ^{***} (0.068)	0.318 ^{**} (0.103)
Provides daily personal care x country groupings <i>(ref. Southern Cluster)</i>		
<i>Central Cluster</i>	-0.197 (0.107)	0.168 (0.171)
<i>Northern Cluster</i>	-0.192 (0.148)	0.014 (0.297)
Observations	42,731	58,186
<i>R</i> ² (within)	0.065	0.054

Controlling for Sociodemographic Conditions, Health Measures, and Social Support

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Southern & Eastern= Italy, Spain, Portugal, Estonia, Hungary, Czech Republic, Poland, Slovenia, Switzerland;

Central= Austria, France, Belgium, Germany; Northern= Netherlands, Sweden, Denmark