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ORIGINAL INVESTIGATION

Fit for caring: factors associated with informal care provision by older caregivers with and without multimorbidity

Andrea E. Schmidt[1] · Stefania Ilinca[1] · Katharine Schulmann[1] · Ricardo Rodrigues[1] · Andrea Principi[2] · Francesco Barbabella[2,3] · Agnieszka Sowa[4] · Stanislawa Golinowska[4,7] · Dorly Deeg[5] · Henrike Galenkamp[5,6]

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Abstract Due to an increased prevalence of chronic diseases, older individuals may experience a deterioration of their health condition in older ages, limiting their capacity for social engagement and in turn their well-being in later life. Focusing on care provision to grandchildren and (older) relatives ('informal care') as forms of engagement, this paper aims to identify which individual characteristics may compensate for health deficits and enable individuals with multimorbidity to provide informal care. We use data from the SHARE survey (2004–2012) for individuals aged 60 years and above in 10 European countries. Logistic regression estimates for the impact of different sets of characteristics on the decision to provide care are presented separately for people with and without multimorbidity. Adapting Arber and Ginn's resource theory, we expected that older caregivers' resources (e.g., income or having a spouse) would facilitate informal care provision to a greater extent for people with multimorbidity compared to those without multimorbidity, but this result was not confirmed. While care provision rates are lower among individuals suffering from chronic conditions, the factors associated with caregiving for the most part do not differ significantly between the two groups. Results, however, hint at reciprocal intergenerational support patterns within families, as the very old with multimorbidity are more likely to provide care than those without multimorbidity. Also, traditional gender roles for women are likely to be weakened in the presence of health problems, as highlighted by a lack of gender differences in care provision among people with multimorbidity.

Keywords (Multi)morbidity · Extra-residential care · Grandchild care · Older people · Europe · SHARE

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✉ Stefania Ilinca
ilinca@euro.centre.org

[1] European Centre for Social Welfare Policy and Research, Vienna, Austria

[2] National Institute of Health and Science on Ageing (INRCA), Ancona, Italy

[3] Department of Health and Caring Sciences, Linnaeus University, Kalmar, Sweden

[4] Center for Social and Economic Research (CASE), Warsaw, Poland

[5] EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, The Netherlands

[6] Department of Epidemiology and Biostatistics, VU University Medical Center, Amsterdam, The Netherlands

[7] Institute of Public Health Jagiellonian University, Krakow, Poland

Introduction

As people live longer their chances of developing a range of chronic conditions increase, leading to a greater need for care and to rising costs of care for both private households and public providers. In addition, multimorbidity (that is, the simultaneous presence of two or more chronic diseases) has become one of the key challenges confronting Europe's health care systems (European Commission 2015). In an attempt to address this issue, one of the objectives of the EU's active aging agenda is to increase older people's engagement and participation in society, including the provision of 'informal care,' i.e., care provided by family members or friends, which is the focus of this study (Zaidi et al. forthcoming).

Informal care by older people constitutes an important social contribution. However, with a decline in health, older caregivers' willingness and ability to engage in caregiving could lessen (if, for example, they feel less confident leaving their homes). The question of which factors are relevant for people with multimorbidity, as opposed to those without, as motivators to provide care is the main focus of our study. For instance, having sufficient financial resources to acquire assistive devices, or the possibility to receive help from a spouse might allow those with health limitations to remain independent and (continue to) provide informal care to others in the community if they wish to do so. Other characteristics, like familial and social norms, may also act as strong motivators for care provision among those with and without multimorbidity alike (EUROFAMCARE 2006; Mooney et al. 2002; Sadiraj et al. 2011).

We consider two types of care provision: extra-residential care to frail members of one's immediate social circle, and non-custodial care to grandchildren. These two forms of care are similar in that they are more likely to have positive spillover effects on a caregiver's well-being as long as caregiving activities are low intensity in nature (see, for example, Coe and van Houtven 2009), which is the case for most caregivers (Brandt et al. 2009; Glaser et al. 2010). The two types of care differ in that care to (grand)children tends to be more amenable to planning, more predictable, and less influenced by a reversal of intergenerational hierarchies than extra-residential care for older people (Knijn et al. 2013).

It has been argued that with increasing prevalence of chronic diseases in later stages of life, older people display a reduced level of social engagement (Strain et al. 2002). While previous research has looked at individual determinants of grandparenting (Igel and Szydlik 2011) and extra-residential care (Brandt et al. 2009; Hank 2011), the role of multimorbidity in care provision has produced ambiguous results at best (Hank 2011). Focusing on the question of which individual level characteristics may compensate for a prevalence of multiple chronic diseases in the decision to provide informal care, we examine the provision of the above-mentioned types of informal care by people aged 60 years and over. Besides analyzing the factors associated with care provision for people with and without multimorbidity separately, our contribution to the extant literature goes beyond single country studies (Mentzakis et al. 2008; Carmichael et al. 2010; Coe and van Houtven 2009), as the current analysis is applied to a multi-country setting (Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden and Switzerland), allowing us to identify the main trends in Europe after adjusting for country differences (Brandt et al. 2009; Hank 2011).

Moreover, previous studies have identified several often interrelated determinants of care provision at the individual level. These include employment status (Carmichael et al. 2010; Van Bavel and De Winter 2013), gender (Hank and Buber 2009; Schmid et al. 2011), household or family structure (Hank 2005; Kyung et al. 2015), socio-economic status (Brandt et al. 2009; Pfau-Effinger and Rostgaard 2011), and kinship ties (EUROFAMCARE 2006), among others. Building on this literature, the main questions we address in the present analysis are how a caregiver's multimorbidity status interacts with each of these factors in the decision to provide or not provide care, and which characteristics act as compensating resources for people with multimorbidity.

Theoretical framework

An adaptation of Arber and Ginn's theory about resources in old age (1991) provides the theoretical framework for our analysis. We adhere to their concept of an "interlocking" set of resources (Arber and Ginn 1991, p. 68) that includes material (e.g., income), health (e.g., ability to care for oneself), and caring (e.g., access to social support) resources, each of which contributes negatively or positively to the accumulation of a global stock of resources on which the individual draws in engaging in a given activity (see Fig. 1). As the resource stock is limited, participation in productive activities—here, informal caregiving—is adjusted according to the resources at the individual's disposal. Given that no a priori hierarchy or interaction between the different types of resources is assumed (Arber and Ginn 1991), we expect that gains in one area can compensate for losses in another (e.g., financial resources can counterbalance loss of strength and functioning). In other words, with one type of resource in decline such as accumulating health deficits due to multimorbidity, the other types gain in relative importance within the global stock of resources. Therefore, if we focus on deficits in individual health status, people with multimorbidity would be expected to attach greater importance to the availability of (higher) income or a co-residing spouse in order to be able to (continue to) participate in caring activities and thus compensate for their deteriorating health.

In operationalizing our framework, we adapt Igel and Szydlik's model for grandchild care (2011) and identify three main sets of factors affecting informal care provision: opportunity structures, family structures, and socio-demographic characteristics. We also include individual health status as a factor influencing informal care provision, represented by the lack or presence of multimorbidity. Drawing the strands together, we aim to identify which individual level characteristics can compensate for multimorbidity in the provision of informal care. As multimorbidity negatively affects the stock of health resources and therefore the general stock of resources, we are interested

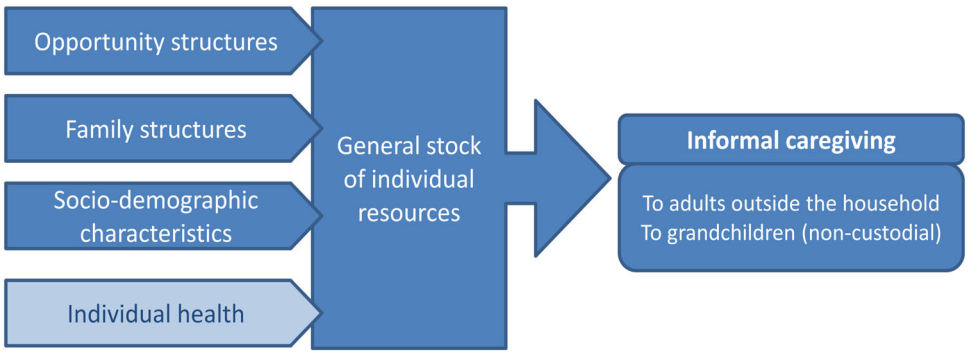

Fig. 1 A theoretical framework for the analysis of informal care provision

in the relative importance of other factors in the decision to remain actively involved in caregiving.

To the best of our knowledge, no study to date has explored how the factors associated with caregiving differ for people in good and in poor health, and only a few studies consider health as a predictor in analyzing the factors associated with care provision. While self-perceived health has been shown to be negatively associated with the provision of non-intensive extra-residential care (Brandt et al. 2009; Hank 2011), studies addressing the impact of multimorbidity and the existence of health problems on extra-residential care provision have been contradictory (Carmichael et al. 2010; Hank 2011). For grandparenting, Albertini et al. (2007) find that *better* health in older age correlates positively with social support to children and grandchildren in European countries. Similar results are found in an analysis by Igel and Szydlik (2011), in which better self-perceived health is positively correlated with the probability of providing care to grandchildren.

We account for two forms of informal caregiving in this study: (i) extra-residential 'informal care' activities provided on a regular basis to frail, ill or disabled family members, friends or neighbors, and (ii) non-custodial care for grandchildren. These tend to represent less intensive and more voluntary forms of caregiving than co-residential care (Colombo et al. 2011; Glaser et al. 2010; Mentzakis et al. 2008) and are thus closely in line with the concept of social engagement (Reid 1934), the main focus of our analysis. Conversely, co-residential care has more obligatory, duty-driven connotations and is generally provided more intensively (Carmichael and Charles 1998; Ettner 1996; Schmid et al. 2011; Schulz and Beach 1999), albeit less commonly than extra-residential care (Huber et al. 2009). Therefore, we exclude this latter form of care from our measure of informal caregiving and account for it independently. The three main blocks of individual characteristics deemed relevant in the decision to provide informal care are summarized below.

Opportunity structures reflect "opportunities or resources for solidarity" which "promote, hinder or prevent social interaction," such as access to financial resources, education (and related social and cultural capital), and labor market activity (Igel and Szydlik 2011, p. 212). These might allow older people to compensate for health limitations if necessary, thus allowing them to remain active and engaged in caring activities (Fig. 1). Previous studies have shown, for example, that higher educated and more affluent individuals are more likely to provide care to grandchildren (Igel and Szydlik 2011; Glaser et al. 2010) as they are generally more integrated into their family network. For extra-residential care to frail older adults, Brandt et al. (2009) reported a positive association between higher education, as well as a household's capacity to make ends meet, with provision of informal help, but not with (more intensive) informally provided personal care. A number of studies, however, do not discriminate between co- and extra-residential care provision, which may explain the reported negative associations for example with being in paid employment (Carmichael et al. 2010; Coe and van Houtven 2009; Heitmueller 2007).

For older individuals, caregiving responsibilities are a known catalyst for early retirement decisions and labor market exit (King and Pickard 2013; Van Bavel and de Winter 2013; Hochman and Lewin-Epstein 2013). Employment, as well as other time and energy intensive activities, can limit the potential for informal caregiving as they draw on the same limited stock of individual resources (Burr et al. 2005; Hank and Stuck 2008; Principi et al. 2012). We also consider (other) forms of social participation, such as volunteering, educational activities, leisure (participation in clubs), and religious activities. Studies investigating the relationship between informal care provision and participation in other discretionary activities have pointed to a negative correlation between informal care provision and leisure activities, specifically physical activity (Satariano et al. 2002; Wilcox et al. 2000) and participation in education (Withnall 2000).

Family structures reflect the importance of household configurations and family relations for care provision (Colombo et al. 2011; Glaser et al. 2010). They indicate the need for support in the caregiver's household or community

(Hank 2005; Kyung et al. 2015; Pfau-Effinger and Rostgaard 2011)—this is especially relevant in the case of grandparenting, where care provision is conditional on the existence of grandchildren within the family nucleus. Conversely, support from family members or a spouse can act as a compensating resource for an older individual's health limitations, supporting and motivating older persons to remain actively engaged in informal caregiving if they wish to do so. In fact, availability of a partner has been shown to increase the probability of providing grandchild care (Igel and Szydlik 2011). For older people in good health who require little or no support in order to carry out informal care tasks, a larger household or the presence of a spouse might be of less relevance, or even create competing interests, thus crowding out caregiving activities.

Socio-demographic characteristics include age and gender, two variables that are consistently associated with (informal) care provision. Even though women are more likely to be engaged in caregiving overall (Schmid et al. 2011), they are also more affected by chronic conditions in older age, and have less access to both financial and caring resources (Arber and Ginn 1991). In grandparenting, men's involvement is often dependent upon their spouse's involvement, although men do tend to be more involved in grandparenting than in other types of caregiving (Gray 2005; Guzman 1999). In general, the likelihood of providing care decreases with age (Albertini et al. 2007; Colombo et al. 2011), yet men become more involved in caregiving to frail adults as they get older (Rodrigues et al. 2012).

While we focus on individual level characteristics in the analysis, we recognize that cultural-contextual factors are also key determinants of the degree to which older individuals provide informal support to others. We partly adjust for such differences through the cross-country design of the study (see also Brandt et al. 2009; Hank 2011; Schmid et al. 2011).

Through the lens of the resources stock framework, we hypothesize that if factors in the three resource domains indeed act as compensating resources for declining health, then it should be possible to identify significant differences between their roles in the multimorbidity and non-multimorbidity group, respectively. Based on the literature review, we would expect opportunity structures, income and family structures (especially the presence of a spouse), to act as compensators. As other forms of social participation (i.e., other than informal care provision) must also draw on the same limited stock of resources, we expect the effect of social engagement to be weaker in the multimorbidity group. Finally, we expect that higher age reduces the likelihood to provide informal care especially for those with multimorbidity, a group where gender effects are expected to be smaller too.

Data

We use data from the three panel waves of the Survey of Health, Ageing and Retirement in Europe (SHARE) on Europeans aged 60 and older, collected in 2004–2005, 2006–2007, and 2011–2012, respectively, retaining for analysis only the 10 countries that have participated in all panel waves (Börsch-Supan et al. 2008; Malter and Börsch-Supan 2013). Despite this restriction, the sample includes a diverse group of countries, capturing different realities of continental Europe: Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden, and Switzerland. The analysis sample consists of 56,609 observations, corresponding to 35,655 individuals who provided valid responses on informal care activities. The first two survey waves contribute approximately 28 % each to the final sample (15,655 observations in the first wave and 16,180 in the second), while circa 43 % of observations originate from the most recent wave (24,744). Due to significant levels of attrition in some SHARE countries, the resulting panel is unbalanced: 6380 individuals are observed in all waves, 8194 in two waves, while 21,080 individuals are observed just once.

Informal caregiving is proxied by two binary dependent variables, indicating whether the individual has provided either of two types of informal care within the previous 12 months or during the time elapsed from the prior interview. The first refers to the provision of extra-residential care to adults, including help with personal care, household chores, and paperwork provided to family members, friends, or neighbors outside the household. The second, grandchild care provision, indicates whether the individual has looked after his/her grandchildren without the presence of the children's parents.[1]

Multimorbidity is used as a proxy for health impairment and as the grouping variable in the present study. It is measured as a binary indicator of the presence of two or more versus zero or one chronic conditions from a set that includes heart attack or any other heart problem, stroke or cerebral vascular disease, diabetes or high blood sugar, chronic lung disease, asthma, arthritis or rheumatism, osteoporosis, cancer or malignant tumor, stomach or duodenal ulcer, Parkinson disease, cataracts, hip or femoral fracture. This choice is driven on the one hand by the fact that multimorbidity is an objective and comparable indicator, and on the other by the fact that it is a precise measure reflecting only one aspect of the general health status of the individual. By focusing on the accumulation

[1] As in SHARE wave 4 only one member of the household is presented with the question on grandparenting and is instructed to refer to the entire household when answering, we have imputed positive values for the partner of a respondent who has reported to have provided care to grandchildren.

of chronic conditions rather than on a more general health indicator, we minimize the potential for biases linked to reverse causality. That is, while informal caregiving is determined to some extent by the health status of the individual and in turn can have an impact on it, it is unlikely that care activities are causally linked to chronicity in older individuals. We also chose multimorbidity as our health status indicator because few older adults live free of any chronic conditions (Sassi and Hurst 2008; Barnett et al. 2010). In addition, multimorbidity is a better proxy for difficulties in daily living that associate with participation in caregiving activities. The prevalence of both types of care provision by multimorbidity status among the older Europeans sampled for this study is presented in Table 1, while Table 2 presents the country level disaggregation. Descriptive statistics for the independent variables used in

Table 1 Descriptive statistics for regression variables, by multimorbidity status in European countries

	No multimorbidity		Multimorbidity		Total	
	N	%	*N*	%	*N*	%
Extra-residential care	10,357	28.7	2483	20.4	13,020	26.7
Grandparenting	15,174	39.6	3772	30.5	18,946	37.3
Opportunity structures						
Primary education	13,490	32.2	6223	45.8	19,713	35.5
Secondary education	20,443	48.8	5577	41.1	26,020	46.9
Tertiary education	7983	19.1	1777	13.1	9760	17.6
1st income quartile	11,216	26.2	4413	32.0	15,629	27.6
2nd income quartile	11,304	26.4	4136	30.0	15,440	27.3
3rd income quartile	10,509	24.6	3121	22.6	13,630	24.1
4th income quartile	9786	22.9	2124	15.4	11,910	21.0
Active on labor market	5247	12.44	505	3.72	5752	10.32
Family structures						
Household size: 1–2 pers.	37,528	87.7	12,169	88.2	49,697	87.79
Household size: 3–4 pers.	4789	11.2	1394	10.1	6183	10.92
Household size: 5+ pers.	498	1.2	231	1.7	729	1.29
Has children	38,374	89.6	12,325	89.3	50,699	89.6
Married	30,787	71.9	8512	61.7	39,299	69.4
Care inside the hh	2376	7.23	1082	11.41	3458	8.16
Other forms of social participation[a]						
Volunteering	7774	18.6	1696	12.7	9470	17.1
Education	3295	7.9	581	4.3	3876	7.0
Clubs	11,178	26.7	2558	19.1	13,736	24.9
Religious activities	5139	12.3	1440	10.7	6579	11.9
Socio-demographic characteristics						
Age: 60–69	23,320	54.5	4501	32.6	27,821	49.2
Age: 70–79	13,771	32.2	5419	39.3	19,190	33.9
Age: 80+	5705	13.3	3873	28.1	9578	16.9
Female	22,475	52.5	8129	59.4	30,667	54.2
Health status						
Poor mental health[b]	8366	20.1	5731	43.3	14,097	25.7
Suffers from disability[c]	19,293	45.1	11,345	85.2	30,638	54.1
Observations	42,815	75.6	13,794	24.4	56,609	100

Countries included: Austria, Germany, Sweden, the Netherlands, Spain, Italy, France, Denmark, Switzerland, and Belgium

[a] Includes a set of binary variables recording participation in voluntary, educational, religious, and club activities within the previous 12 months

[b] Measured as a score higher than 3 on the EURO-D scale

[c] Measured as the presence of one or more limitations in activities of daily living (ADLs)

Table 2 Proportion of older population providing informal care services by multimorbidity status and country (in %)

	Extra-residential care			Grandparenting		
	No multimorbidity	Multimorbidity	Total	No multimorbidity	Multimorbidity	Total
Country						
Austria	20.7	17.0	19.9	30.2	23.5	28.7
Belgium	35.7	26.6	33.1	46.3	33.7	42.7
Denmark	40.6	28.8	37.6	49.5	30.8	45.1
France	24.8	18.2	22.9	41.1	29.9	38.0
Germany	30.5	22.0	28.5	32.1	27.6	31.1
Italy	21.5	16.8	20.1	34.1	30.5	33.0
Netherlands	35.3	26.9	33.7	49.1	41.3	47.7
Spain	11.4	7.8	10.3	30.8	27.5	29.8
Sweden	38.7	25.2	35.8	47.1	31.8	43.9
Switzerland	27.4	21.9	26.5	33.5	28.4	32.7
Observations	10,537	2483	13,020	15,174	3772	18,946

the specification of the empirical model are shown in Table 1 and follow the configuration of the theoretical framework.

Methods

For the multivariate analysis, we specified separate logistic regression models for the groups with and without multimorbidity for the probability of providing grandparenting and extra-residential care, pooling observations across countries and waves (see Table 3). We included three sets of individual characteristics and other forms of social participation (including grandparenting and extra-residential care giving in the parallel models) as regressors based on the framework for analysis (Fig. 1), as well as functional decline (ADL limitations) and mental health problems. While we maintained a set of comparable regressors between models, one difference is noteworthy. As grandchild care provision is conditioned by the presence of grandchildren in the family structure, only those individuals who report having at least one grandchild were maintained in the analysis sample. Furthermore, the indicator for having children was omitted from the grandparenting models as it almost perfectly predicts the outcome.

To allow comparability between groups, we present prediction results (i.e., average marginal effects) rather than coefficient values (Mood 2010). In assessing the statistical significance of the differences between predictions for the two groups, we follow the methodology proposed by Auspurg and Hinz (2011). In all analyses, we account for the effects of local and time characteristics by including a full set of country and wave controls, and their interactions.

We use the repeated observations for each individual in the sample in order to tease out the unmeasured, time-constant effect or unobserved heterogeneity by including individual random effects in all estimations (Greene 2009; Cameron and Trivedi 2010) and avoid potential overestimation of the significance of identified effects by using bootstrap estimation with 300 replications. We also confirmed the robustness of our results by verifying that coefficient values and statistical significance do not change considerably[2] with alternative model specifications, individual cross-sections for survey waves and pooled estimation. This sensitivity check confirms that attrition, while present in our data, is not likely to introduce bias in our analysis. All statistical analyses were performed with the STATA software package, version 12 (StataCorp 2011).

Results

More than one in three Europeans aged 60 years or above on average provide grandchild care (37.3 %) while 26.7 % provide extra-residential care to adult members of their family or social circle (the equivalent of 13,020 individuals) (see Table 1). There are considerable differences across countries, with a tendency for higher participation in Northern Europe (over 40 % of older adults in Denmark, Sweden, and the Netherlands provide grandchild care and more than one in three provide extra-residential care) (see Table 2). Not surprisingly, individuals who suffer from multimorbidity are less likely to offer care in all countries.

[2] We report virtually no changes in statistical significance and coefficient sign, with changes in coefficient values to the first or to the second decimal. The authors, upon request, can provide detailed results.

Table 3 Results from the multivariate analysis (Average Marginal Effects) in European countries

	Care outside the household			Grandparenting		
	No multimorbidity	Multimorbidity	Group diff.[a]	No multimorbidity	Multimorbidity	Group diff.[a]
Opportunity structures						
Education (ref. Primary)						
Secondary education	0.047***	0.034***	1.297	0.063***	0.042**	1.441
Tertiary education	0.060***	0.059***	0.004	0.097***	0.084***	0.267
Income (ref. 1st quartile)						
2nd income quartile	0.027***	0.024*	0.057	0.049***	0.045**	0.051
3rd income quartile	0.036***	0.019	1.559	0.093***	0.057***	3.425
4th income quartile	0.032***	0.008	2.622	0.104***	0.104***	0.000
Active on labor market	0.010	0.036	1.482	−0.034***	−0.017	0.283
Family structures						
Household size	−0.011	−0.011	0.000	0.016	0.031*	0.657
Has children	−0.021*	−0.014	0.186	–	–	
Married	−0.029***	−0.013	2.056	0.152***	0.133***	1.322
Provided care inside the hh.	0.064***	0.057**	0.116	−0.050***	−0.063**	0.292
Forms of social participation						
Participated in voluntary work	0.110***	0.114***	0.062	0.032***	0.046*	0.489
Participated in education activities	0.049***	0.046*	0.019	0.061***	0.055*	0.039
Participated in clubs	0.038***	0.039***	0.007	0.059***	0.054***	0.090
Participated in religious activities	0.063***	0.030*	4.447*	0.050***	0.033	0.663
Provided care outside the hh.	–	–		0.105***	0.120***	0.785
Provided grandchild care	0.076***	0.075***	0.008	–	–	
Socio-demographic characteristics						
Female	−0.0007	0.003	0.139	0.047***	0.012	5.767*
Age (ref. 60–69)						
70–79	−0.100***	−0.090***	0.719	−0.278***	−0.291***	0.402
80+	−0.190***	−0.151***	9.269**	−0.589***	−0.531***	8.937**
Health status						
Poor mental health (depression)	0.015*	−0.003	2.932	−0.017	−0.018	0.005
No. of ADLs	−0.015**	−0.036**	3.328	−0.010	−0.030	1.504
Observations	35,217	11,417	46,634	28,783	9746	48,173

Countries included: Austria, Germany, Sweden, the Netherlands, Spain, Italy, France, Denmark, Switzerland, and Belgium

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; All models include a full set of dummies for country, wave, and their interactions—results not shown

[a] Values refer to χ^2 (1) distribution. Group differences are tested for significance using the methodology proposed by Auspurg and Hinz (2011)

However, we note that the margin of difference between participation rates in the two morbidity groups is lower in the countries where overall participation rates are lower than the European average (i.e., Italy, Spain and Austria). Conversely, in Denmark and Sweden, the countries with the highest proportion of the older population involved in informal caregiving activities, participation is approximately 13 percentage points higher in the non-multimorbidity group for extra-residential care and more than 15 percentage points higher for grandparenting activities.

Table 3 presents the results for the multivariate analysis by morbidity group, for each of the two types of informal care provision. In the first set of individual characteristics (opportunity structures), higher income and education level are strongly associated with the provision of care in the non-multimorbidity group but relatively less relevant for sufferers of two or more chronic diseases, contradicting our hypothesis. In fact, among the latter, only the second income quartile (compared to the first) shows a positive association with caregiving for extra-residential care. Labor market participation is not found to be a significant predictor for extra-residential care provision. It is negatively associated with grandparenting among those in better health, but not for people with multimorbidity. Overall, we find that income and education have a stronger overall effect on provision of grandparenting care than on extra-residential care provision, pointing to a greater importance of opportunity structures for the first type of care.

We find family structures have a limited impact on both grandchild care and extra-residential informal care provision. Larger household size is positively associated with grandchild care among those with multimorbidity, while for extra-residential care we find no significant effect. Being married increases the probability of providing grandchild care in both groups, with a stronger effect for those without multimorbidity. We note, however, that the reference category here generally refers to widowed, divorced, or separated individuals and not to those never married (given the sample restriction on people with grandchildren in the family). There is no significant effect of being married for extra-residential care provision among those with multimorbidity. Finally, care provision inside the household is negatively associated with grandparenting and positively with extra-residential care in both groups.

The socio-demographic characteristics of the caregiver prove to be important factors for care provision, with some significant differences in the importance of (very old) age and gender between multimorbidity groups. Those belonging to the oldest age group (80+) are less likely to provide extra-residential informal care by over 15 percentage points as compared to younger seniors (60–69 years), and the effect is even stronger for provision of grandchild care, albeit less so for people with multimorbidity. For grandchild care, we find that women are (almost 5 percentage points) more likely to be involved than men, but this effect disappears in the multimorbidity group, while for extra-residential care we do not find a significant gender effect.

All social participation variables are positively and significantly correlated with the probability of providing informal care, pointing to a reinforcement effect of social engagement. We also find that participation in religious activities has a significantly reinforcing effect for the non-multimorbidity group but loses its importance for individuals suffering from two or more chronic conditions, with the group differences being statistically significant for extra-residential care. The positive association with religious activities (especially for those without multimorbidity) underlines the strong altruistic character of informal care provision.

Not surprisingly, additional health limitations are found to be more prohibitive in providing care and support to others for people with multiple chronic conditions. For those with multimorbidity, ADL limitations negatively affect the decision to provide both types of care, while for those without multimorbidity a significant negative association is found only for extra-residential care. Poor mental health, however, is positively associated with the provision of extra-residential informal care, though the effect might be spurious as it is statistically significant only in the multimorbidity group.

In addition to the significant differences between morbidity groups highlighted above (very old age, gender, religious participation) only three factors vary between morbidity groups when taking into account differences in significance levels of average marginal effects of individual regressors, namely: higher income (for extra-residential care), labor market participation (for grandchild care), and being female (for grandchild care).

Discussion

Overall, we find no evidence for a greater compensating effect of financial resources, education, or caring resources for older people with multimorbidity in European countries. Rather, our results show that higher education—closely related to social class, and cultural and social capital—is associated with higher engagement in social support and care to others both for those with *and* without multimorbidity, as attested in previous studies for the general older population (Igel and Szydlik 2011; Brandt et al. 2009). While this finding does not mean that older people might not adapt their patterns of participation with declining health status—as showcased by the substantially lower participation rates for people with multimorbidity (Table 1)—it suggests that education and income cannot compensate for declining health resources in the general resource stock.

Similarly, our family structure indicators display lower than expected group variability. We find some evidence for competing interests tied to the presence of a spouse among older people without multimorbidity which could prevent them from providing care outside the household. Contrary to what we expected, no evidence for a compensating effect of a spouse is found for those with multimorbidity. Our findings also reflect dynamics possibly related to intergenerational transfers taking place within the household of older people with multimorbidity: a larger household encourages older people with multimorbidity to provide care to grandchildren, for example, in the case of frail parents receiving care from their children and looking after grandchildren in return (Grundy 2005). The fact that we find that people with multimorbidity in the oldest age groups are (relatively) more likely to provide care than those without multimorbidity provides further evidence for this pattern.

While in the general population unpaid work, and care work in particular, has a strong gender dimension, our results hint to an interesting interaction between gender roles and multimorbidity status. Women might be expected to fulfill traditional roles in informal care provision to a lesser extent once they are affected by two or more chronic diseases themselves as confirmed for grandparenting in our study. Generally, our results are in line also with previous findings of smaller gender effects in informal care provision in older population groups (Rodrigues et al. 2012;

Colombo et al. 2011) and for grandparenting in the presence of multimorbidity (Baydar and Brooks-Gunn 1998; Gray 2005; Hank and Buber 2009). Very old age (i.e., being aged 80 years or older) reduces the likelihood to provide informal care albeit significantly less so for those with multimorbidity. For grandparenting, part of the explanation of the reduced effect in the oldest age groups could be that with older ages of grandchildren the need for custodial care is also smaller. At the same time, those with multimorbidity might receive help from others, making them more likely to (continue to) provide care also in very old age, for example out of feelings of reciprocity (Grundy 2005). We find a positive association between social participation forms like volunteering, educational, religious, and leisure activities and the decision to provide informal care. While this contradicts our original hypothesis, the result is supported by previous findings that caregivers are likely to be more motivated and have more developed social networks which facilitate social participation (Burr et al. 2005). In line with such results, the lower reinforcement effect of social participation in the multimorbidity group could be an indication that activities in old age are selected more carefully (Strain et al. 2002; Baltes and Baltes 1990).

All in all, our findings suggest that the presence of multimorbidity does not significantly alter the factors associated with older people's decision to engage in caregiving activities, despite the reasonable variation in social participation rates between the two groups. Having said that, (higher) income and education are more strongly associated with grandparenting than with extra-residential care (in both the morbidity groups), most likely due to the fact that the latter type of care is less easy to plan than care to children and characterized by a (possible) reversal of intergenerational hierarchies (Knijn et al. 2013). Factors beyond income and education, such as social norms and values might therefore be of greater importance in care to frail adults, and older people with multimorbidity might be expected to provide extra-residential care despite suffering from health problems themselves.

In light of these results, we suggest an alternative pathway through which individual level characteristics may be related to informal care provision, namely via (unobserved) values, attitudes, and motivations rather than external factors related to socio-economic status or socio-demographic characteristics (Atchley 1989; O'Brien et al. 2014). In fact, older people with multimorbidities often engage in social activities or even remain active in the labor market in order to maintain their autonomy (O'Brien et al. 2014). Furthermore, despite the loss of autonomy it can entail, multimorbidity is often framed by older people as a "normal" stage in the aging process with which it is possible to cope and continue to carry out multiple activities as long as they do not become too burdensome (Clarke and Bennett 2013). Maintaining caring responsibilities toward others in spite of health conditions could in fact be a coping strategy for older people with multimorbidities, a way to maintain their social role (Löffler et al. 2012). In addition, the activities considered in this study—grandparenting and informal care to dependent people—are both value-laden tasks. Social norms, such as filial obligations, are known to play an important role in the decision to provide care (England and Folbre 2003; Finley et al. 1988; Lowenstein and Daatland 2006) and may therefore be strong enough to offset health impairments. The role of these factors in predicting the patterns of caregiving among older individuals was beyond the scope of this paper, but should merit further research.

Limitations

We acknowledge three limitations of the present study. First, while we accounted for potential country differences, the focus of the analysis is on the association between individual characteristics and care provision in old age. However, external factors, such as the availability and affordability of formal care services or cultural norms play a very important role in determining older people's engagement in care (Colombo et al. 2011; Rodrigues et al. 2012). Further research is needed to unravel country specificities by considering macro-level factors that influence older people's decisions to provide informal care (Brandt et al. 2009; Hank 2011).

Secondly, we do not account in our study for differences in care intensity. Future studies, drawing on more detailed datasets, could explore how the intensity of care provision affects caregivers' availability; whether the presence of multiple chronic conditions in older age reduces, or even excludes, high-intensity caregiving; and if people who provide high-intensity care also participate in other, more discretionary forms of social engagement. Similarly, a more dynamic analysis, accounting for transitions into morbidity states could shed light on deeper causal effects in the provision of caregiving at older ages.

Finally, we must acknowledge that the decision to provide informal care is likely to be equally influenced by the characteristics of the care recipient as it is by the characteristics of the caregiver. While the dataset used in the present analysis does not allow a fine-grained analysis of care dyads (caregiver–care recipient), future research would be well served to follow such an approach.

Conclusions

We conclude that a caregiver's multimorbidity status does not significantly alter the factors associated with the decision to provide informal care in older age. Rather, suffering

from two or more chronic diseases only modulates the associations of certain factors with informal caregiving. It is thus unlikely that health deficits in older age can be compensated for by other individual resources to a significant extent with regard to participation in caregiving activities. The lower participation rates of older people in poorer health show that they have more limited capacity to provide care or remain engaged in other forms of social participation. Public policies should therefore be called upon, on the one hand, to target groups of older people shown to be most vulnerable to social isolation, including people with multimorbidity. On the other hand, their vulnerable status invites further investigation into the ways in which social participation (including caregiving) affects health both in positive and negative ways. Policies could then focus on promoting those types of caregiving most beneficial to this group's health status while avoiding an acceleration of functional decline when engaged in other types of care provision.

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