

# Wishing for an end? Longitudinal analysis of suicidal ideation among informal caregivers inside and outside their household in different welfare systems of Europe

Larissa Zwar, , Hans-Helmut König, and André Hajek 

*Department of Health Economics and Health Services Research, University Medical Center Hamburg-Eppendorf, Hamburg, Germany*

## ABSTRACT

**Objective:** This study examines whether transition to caregiving within or outside the household is associated with changes in suicidal ideation and whether this depends on the type of caregiver relationship, the age or gender of the caregiver, or the welfare system.

**Design:** Longitudinal study.

**Setting:** Ten European countries.

**Participants:** Data from the Survey of Health, Ageing, and Retirement in Europe were used (waves 1, 2, 4, 5, and 6) including participants aged  $\geq 40$  years (pooled Observations = 171,848).

**Measurements:** Suicidal ideation was measured using the Euro-D scale. Caregiving was measured as care inside and outside the household, and for different recipients. Fixed effects logistic regression analyses, adjusted for health and sociodemographic factors, were used.

**Results:** Transitioning into caregiving inside the household was associated with higher odds of suicidal ideation, in particular if they transitioned into care for partners or parents and within Southern and Bismarckian welfare systems. Transitioning into caregiving outside the household was not associated with suicidal ideation, except among those transitioning into caregiving for non-relatives (higher odds of suicidal ideation), and among male and older caregivers (lower odds of suicidal ideation). Suicide ideation was higher among caregivers in Southern compared to Bismarckian or Scandinavian welfare systems.

**Conclusion:** Informal caregiving is associated with suicidal ideation among caregivers inside but not among all caregivers outside the household. The caregiver's characteristics, the care relationship, and the welfare system play an important role. Preventing suicidal ideation requires interventions that focus on informal caregivers and consider their individual and contextual factors.

**Key words:** suicidal ideation, suicide, informal caregiving, caregivers, private caregiving, family, cross-national, Europe, country differences, longitudinal

## Background

Caregiving for people with health-related care needs is still primarily performed by relatives or friends, i.e. informal caregivers (Statistisches Bundesamt, 2020). Caregiving can increase meaning in life and can even improve cognitive functioning (Yu *et al.*, 2018; Zwar *et al.*, 2018). However, it can also be very demanding as is reflected in the negative

impact on health and well-being of caregivers (Bom *et al.*, 2019). One factor that has not received much attention, however, is suicide ideation among informal caregivers.

The World Health Organization categorizes suicide mortality as a public health priority (World Health Organization, 2021). Lifetime prevalence of suicidal ideation, i.e. thoughts about suicide or wishing to die, is much higher than that of suicide attempts or committed suicide (Cao *et al.*, 2015; Nock *et al.*, 2008), but it is one of the main determinants of suicide behavior (Favril *et al.*, 2022). Despite being highly associated with mental disorders, it can occur independently of depression as well (Campos *et al.*, 2016).

*Correspondence should be addressed to:* Larissa Zwar, Department of Health Economics and Health Services Research, University Medical Center Hamburg-Eppendorf, 20246 Hamburg, Germany. Phone: +49 (0) 40 7410-59090; Fax: +49 (0) 40 7410-40261. Email: [lzwar@uke.de](mailto:lzwar@uke.de) Received 27 Feb 2023; revision requested 20 Apr 2023; revised version received 09 May 2023; accepted 06 Jul 2023. First published online 17 August 2023.

Weekly to lifetime prevalence of suicide ideation among dementia caregivers has been reported with a broad range (4.69–77.78%; Solimando *et al.*, 2022). While a few studies have investigated the association between caregiving and suicide ideation and attempted or committed suicide, questions regarding individual or contextual influential factors of the caregiver situation remain unanswered (Molina *et al.*, 2019; O'Dwyer *et al.*, 2021). Also, only very few longitudinal studies have been conducted and their findings were mixed (e.g. Joling *et al.*, 2019; Rosato *et al.*, 2019). For example, a study from the UK found a lower risk of suicidal ideation among caregivers compared to non-caregivers (Rosato *et al.*, 2019). Others found a higher risk of suicide among caregivers (Czeisler *et al.*, 2021; Nakanishi *et al.*, 2022). A recent study from Mexico and Colombia found an association between suicidal ideation of care recipient and caregiver (McKee *et al.*, 2021). However, no significant differences between caregivers and non-caregivers were found in the Netherlands (Joling *et al.*, 2019). Many of the studies, including longitudinal research, focused on suicide ideation after bereavement (Molina *et al.*, 2019; Rosengard and Folkman, 1997). Thus, it remains unclear if suicidal ideation occurred due to caregiving or due to the loss of the care recipient.

In sum, there is not sufficient evidence on the association between informal caregiving and suicide ideation and the risk or protective factors of the care situation. Moreover, more longitudinal studies are needed. The association between caregiving and suicide ideation can only be analyzed with observational data, and they can easily be biased by unobserved variables. Longitudinal data analyzed with fixed effects (FE) regression analysis can reduce this danger of bias considerably and enable the calculation of consistent estimates (Cameron and Trivedi, 2009). Thus, this study aims to fill the research gaps by analyzing the association between informal caregiving and suicidal ideation with a longitudinal design and FE regression analysis. We will also investigate the significance of factors specific to the care situation for this association. These findings are expected to help identify vulnerable groups and develop preventive and supportive measures for informal caregivers.

### **Theoretical framework: theory on suicide thoughts and behavior applied to informal caregiving**

The *integrated motivational-volitional model of suicidal behavior (IMV)* is one of the most prominent ideation-to-action-theories (O'Connor *et al.*, 2016; Forkmann, 2021). It is a biopsychosocial model that takes individual and contextual factors into account.

The theory proposes that suicidal behavior is the result of a three-step process. In the pre-motivational phase, biological, sociodemographic, and personality factors contribute to the individual's vulnerability. Those with a higher level of vulnerability are more easily triggered to transition into the motivational phase. Trigger events can be stressful life events, which result in significant changes in life and have a high emotional impact (Howarth *et al.*, 2020). Informal caregiving can be such a stressful life event, if the requirements of caregiving outweigh the caregiver's resources (Lazarus and Folkman, 1987). In the motivational phase, suicidal ideation develops, which can eventually progress to suicidal behavior (volitional phase). Suicidal ideation can develop if individuals feel defeated and trapped in their situation, if their situation is perceived as hopeless and without any positive thoughts toward the future (O'Connor *et al.*, 2016; Forkmann, 2021). Informal caregivers have reported such thoughts. For example, the desire to escape, needing a reprieve from caregiving, or feeling overburdened, was often reported as reasons for suicide thoughts (O'Dwyer *et al.*, 2013; O'Dwyer *et al.*, 2021). Worries and wishing to prevent ending up in the same situation as their care recipient were also mentioned (Anderson *et al.*, 2019), indicating that the confrontation with the care recipient's situation generated fear of the future. Thus, suicidal ideation among caregivers can result from and be indicative of being unable to cope with the caregiving situation, i.e. experiencing high levels of distress.

According to care-specific stress theory (Pearlin *et al.*, 1990), whether caregiving is experienced as stressful depends on the caregiver's sociodemographic background and the care situation. Individual and contextual factors can influence the vulnerability relevant to developing suicide ideation as well (O'Connor *et al.*, 2016). Thus, when analyzing the association between informal caregiving and suicidal ideation, it is important to take contextual (e.g. caregiving context) and individual factors (e.g. caregiver's age and gender) into account.

Previous research supports this. For example, in Europe the suicide risk is higher among women and older adults (Carrasco-Barrios *et al.*, 2020). Moreover, cross-national differences can occur due to different welfare systems. This cross-country variation is found in global comparison as well as in comparison within Europe (World Health Organization, 2021). Thus, apart from gender and age, the country of residence is important for the suicide risk.

Adding to this, these factors are also of relevance in the caregiving context. For example, female caregivers have higher distress and worse mental health issues than male caregivers (Pinquart and

Sörensen, 2006). Findings regarding age as risk factor are mixed (van den Kieboom *et al.*, 2020), and this may be associated with who provides care for whom. The care relationship is often of relevance for the consequences for health (Pinquart and Sörensen, 2011) or social support (Zwar *et al.*, 2022): that is, spousal caregivers are usually affected worse than adult-child caregivers. Further factors of the care situation, which may influence the appraisal of the situation and the suicide risk, could be the location of informal care provision, inside or outside the household. Previous findings indicated that inside-household caregivers are impacted worse, while outside-household-caregivers can even be positively affected (Kaschowitz and Brandt, 2017).

The welfare system of the country of residence of the caregiver is relevant to caregiving and its consequences as well. The welfare systems in Europe can be clustered into the Scandinavian, Bismarckian, Southern, and Eastern welfare systems (Eikemo *et al.*, 2008; Ferrera, 1996). The *Scandinavian system* is characterized by a strong public responsibility, with universal, generous, and egalitarian welfare state provision and public services (Greve, 2022). It is financed by taxes and public sector provisions, and the state plays a vital role. Thus, many support opportunities are available for the population and for caregivers, which may ease their level of stress and the feeling of entrapment. The *Bismarckian system* provides social security benefits based on wage-dependent contributions and is coordinated by social partners, not the state (Greve, 2022). It is a conservative model, which focuses on supporting a single breadwinner family model. Social benefits and alternatives to caregiving are available. For example, in Germany a care lump sum is provided by the statutory nursing care insurance based on the level of care needs; however, additional services need to be financed privately (Federal Ministry of Justice, 1994). The *Southern system* builds on this conservative model as well. It has undergone several changes during the last decades but many challenges remain, such as an unbalanced distribution of social expenditure and high job insecurity. The health care system (especially the long-term care policy), the labor market, and family policies remain underdeveloped. Care responsibility is therefore primarily placed on the family, mostly women, who are less well-integrated into the labor market and caregivers have fewer perceived alternatives and support than in the other systems (Greve, 2022).

#### PURPOSE AND HYPOTHESES

This study used the biopsychosocial approach of the stress model (Pearlin *et al.*, 1990) and the IMV on

suicide behavior (O'Connor *et al.*, 2016; Forkmann, 2021) as basis to analyze the association between informal caregiving and suicide ideation as well as care-specific risk and protective factors.

First, we analyzed whether the association between informal caregiving and suicidal ideation was found in both *caregiving locations*, inside and outside the household. We expected adults transitioning into care inside to have worse suicidal ideation, whereas we expected no change among those transitioning into care outside. This differentiation was used as basis for the other analyses.

Second, we analyzed *age and gender* as moderators. Based on aforementioned findings, we expected female and older caregivers to have higher suicidal ideation than male and younger caregivers and expected the odds to be higher among those providing care inside the household than among those providing care outside the household.

Third, we analyzed the *caregiver relationship*. We expected suicidal ideation to be increased among care relationships with higher levels of closeness and expectations (e.g. partners).

Fourth, we took the broader context of caregiving into account by analyzing the association between care and suicidal ideation in three European welfare systems. We assumed caregivers in Scandinavian countries to have the lowest odds and those in Southern countries to have the highest odds.

## Method

### Sample

This analytical sample was drawn from the cross-national Survey of Health, Ageing, and Retirement in Europe (SHARE) (Börsch-Supan *et al.*, 2013). SHARE collects data from adults aged  $\geq 50$  years and their partners (who could be  $<50$  years) of the same household with a probability sampling method. In this study, we included participants from waves 1, 2, 4, 5, and 6 (collected from 2004–2015) from Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Switzerland, and Belgium. Other waves and countries were excluded, since they did not collect the analyzed variables consistently. SHARE uses ex-ante harmonization, i.e. one questionnaire is developed and translated into the national language (Börsch-Supan *et al.*, 2013). Participants younger than 40 years were excluded, since the main period of caregiving is in the second half of life (Rothgang and Müller, 2018), which left a sample of 171,848 observations (*Obs.*) pooled over all waves. FE regression analysis was used to analyze the research questions. This method allows us to analyze the association between changes

within individuals in the variables over time (Brüderl and Ludwig, 2015). Due to this, only individuals who experienced a transition into the analyzed variables were used for estimating the coefficients. For example, the basis for calculating the estimate of the association between caregiving inside and suicide ideation was 4,165 transitions from no caregiving to caregiving inside. All who were constantly providing care or constantly not providing care during the analyzed time frame were not used for this estimation. However, they are kept in the sample to allow for the calculation of the other coefficients of the model. More details on this can be found in Statistics.

Ethics committees or institutional review boards of the countries, where data are collected, review the SHARE project continually. The Ethics Committee of the University of Mannheim approved the first four waves, and the Ethics Council of the Max Planck Society approved the continuation of the project (detailed information at <https://share-eric.eu/data/faqs-support>).

## Variables

*Suicidal ideation* was measured with one item from the EURO-D questionnaire (“In the last month, have you felt that you would rather be dead?”; no/yes; Prince *et al.*, 1999), which has good psychometrics (Tomás *et al.*, 2022). This single-item approach is in accordance with other studies’ approaches in this field (O’Dwyer *et al.*, 2021). *Caregiving outside the household* included caregiving for relatives, friends, or other acquaintances outside the household within the last twelve months in terms of personal care, practical household help, or help with paperwork (“Now I would like to ask you about the help you have given to others. [...] In the last twelve months have you personally given any kind of help listed on this card to a family member from outside the household, a friend or neighbor?”; no/yes). *Caregiving inside the household* referred to regular (daily or almost daily) care for relatives or non-relatives during at least the last three months (“Let us now talk about help inside your household. Is there someone living in this household whom you have helped regularly during the last twelve months with personal care, such as washing, getting out of bed, or dressing?”; no/yes). Only participants living with at least one other person in their household were asked this question. To analyze the *caregiver relationship*, two variables were created, which categorized caregivers into five categories describing their relationship with their main care recipient (0 not providing care, 1 providing care for partner or ex-partners, 2 providing care for step-/parents/-in-law, 3 providing care for other relatives, and 4

providing care for non-relatives) either inside or outside the household. Based on the country, where the participant lived, they were categorized into a *welfare system* according to the typology from Ferrera (1996). The typology divides European countries into four systems, depending on how social benefits are provided to ensure an acceptable standard of living for all: the Southern system (Spain, Italy), the Bismarckian system (France, Germany, Switzerland, Belgium, Austria, Netherlands), and the Scandinavian system (Denmark, Sweden) as well as the Eastern system. We focused on the first three systems, since we had no data for the included variables and waves for Eastern Europe.

Participants provided information on sociodemographic factors (*age, gender, marital, and employment status*). Also, self-rated health [1 excellent to 5 poor health, single-item from the SF-36 questionnaire (Ware and Gandek, 1998)] and *number of self-reported chronic diseases* [ever diagnosed by a physician, sum score (theoretical range: 0–14)] were measured.

## Statistics

Logistic FE regression analysis was performed, since they provide a major advantage when using longitudinal observational data (Brüderl and Ludwig, 2015; Gunasekara *et al.*, 2014). Longitudinal data allow us to distinguish between time-constant and time-varying errors. However, time-constant confounders often cannot be measured in observational studies (Brüderl and Ludwig, 2015); thus, the assumption of methods, such as random effects regression, that there are no unobserved confounders is rarely fulfilled, which can severely bias the estimates (Gunasekara *et al.*, 2014). The FE regression analysis relies on the more conservative assumption that there are unobserved time-constant confounders. Therefore, only time-varying variables are used for estimation and all time-constant (observed and unobserved) variables are controlled. Thus, FE regression analysis is a within-estimator and calculates an average treatment effect on the treated by using only the variation within individuals, i.e. analyzing only differences over time within the same individuals (Brüderl and Ludwig, 2015). This conservative approach is a significant advantage, since it significantly reduces the risk of biased estimates, reduces the risk of a type-I error and, if the assumption that all time-varying confounders are controlled is fulfilled, consistent estimates can be calculated (Brüderl and Ludwig, 2015; Wooldridge, 2010).

In the main models, we analyzed transitions into caregiving inside and outside the household in association with suicidal ideation, while adjusting



for time-varying sociodemographic and health variables, based on previous research (Favril *et al.*, 2022). The exception were time-constant variables (e.g. gender), which were already controlled for by FE regression. Further analyses included an interaction effect between caregiving and gender, respective, age. Additionally, the main predictor of caregiving was replaced by a variable measuring the transition into a specific relationship. The main models were calculated again after stratifying the sample by welfare system. Also, two moderator analyses were conducted, which included an interaction effect between caregiving and welfare system with the smallest and the largest category as reference. These analyses and the model analyzing the associations in the Scandinavian sample included a dichotomized variable of marital status (relationship yes/no) and a trichotomized variable of employment status (retired, employed, unemployed). The full tables are provided in the Supplementary Material (Tables A1 and A2).

We did not control for depression in the main analyses, because the item that measured suicide ideation was part of the depression instrument. High correlations between these variables and consequently biased results would have been likely. Instead, self-rated health and chronic diseases were controlled and a sensitivity analysis with an adapted measure of depression (without the item measuring suicide ideation) was conducted (see Supplementary Material, Tables A3 and A4).

Missing values were below 5% in all variables (see Table A5, Supplementary Material). Low levels of missing values usually do not bias the results significantly; thus, it is recommended not to use imputation in this case (Allison, 2001; Van Buuren, 2012). Moreover, FE reduces the danger of bias due to unobserved time-constant variables, which reduces the danger of bias due to missing values further (Brüderl and Ludwig, 2015; Brüderl, 2010; Wooldridge, 2010).

The level of significance was set at alpha level of 0.05. All analyses were conducted with Stata 16.1 (Stata Corp., College Station Texas).

## Results

### Descriptive results

In Table 1, we describe the complete analytical sample (*Obs.* = 171,848) and the two caregiver samples (inside the household, *Obs.* = 10,148, or outside the household, *Obs.* = 44,998), pooled over all five waves. Of the complete sample, 23.15% of the participants lived in a Southern welfare system, 59.03% in a Bismarckian welfare system, and

17.82% in a Scandinavian welfare system. Of the complete sample, 26.18% provided care outside the household. Caregivers outside the household were on average 62.89 years (*SD* = 8.83) of age, 56.48% were female, and 45.17% were retired. Of those participants living not alone, 7.74% were caregivers inside their households. The majority of them provided care for partners (64.52%). Caregivers inside the household were on average 67.74 (*SD* = 10.85) years old, 58.28% were female, and 54.88% were retired.

Suicidal ideation was reported by 6.76% of the complete sample, 9.53% of caregivers inside the household, and 5.92% of caregivers outside the household.

In total, 4,165 transitions into caregiving inside the household and 9,667 transitions into caregiving outside the household were observed. The number of transitions into different caregiving relationships and within each welfare system can be found in Table A6 (Supplementary Material).

### Results of regression and moderator analyses for care inside the household

Transitioning into caregiving inside the household (Table 2) was significantly associated with increased odds of suicidal ideation by 36% (*OR* = 1.36, *CI* [1.18; 1.58], model 1). Age and gender did not significantly moderate this association (models 2 and 3). Transitioning into care for partners (*OR* = 1.36, *CI* [1.15; 1.62]) and for parents (*OR* = 1.67, *CI* [1.11; 2.50]) was significantly associated with increased odds for suicidal ideation (model 4). Stratification by welfare system indicated that the odds of suicidal ideation were significantly increased among those transitioning into caregiving inside the household in a Southern welfare system (*OR* = 1.53, *CI* [1.22; 1.91], model 5) and in a Bismarckian welfare system (*OR* = 1.24, *CI* [1.02; 1.51], model 6). No significant association was found in the Scandinavian welfare system (model 7). Moderator models showed no significant differences when using Southern (model 8) and Bismarckian welfare systems (model 9) as references for comparison.

### Results of regression and moderator analyses for care outside the household

Transitioning into caregiving outside the household (Table 3) did not significantly change the odds of suicidal ideation (model 1, *OR* = 1.09, *CI* [0.99; 1.20]). Gender (*OR* = 1.23, *CI* [1.00; 1.50], model 3) and age (*OR* = 0.99, *CI* [0.98; 1.00], model 4) moderated the association, indicating higher odds of thoughts of suicide among female caregivers and lower odds of thoughts of suicide among all

**Table 1.** Description of the complete sample (*Obs.* = 171,848), the sample of caregivers inside the household (*Obs.* = 10,148) and outside the household (*Obs.* = 44,998) pooled over all five waves

VARIABLES, <i>OBS.</i> (%) / M(SD)	COMPLETE SAMPLE	CAREGIVERS INSIDE THE HOUSEHOLD <sup>a</sup>	CAREGIVERS OUTSIDE THE HOUSEHOLD
<i>Caregiving variables</i>			
Caregivers inside the household <sup>a</sup>			
Yes	10,148 (7.47)		
No	124,505 (91.62)		
No information or filtered <sup>b</sup>	1,245 (0.91)		
Caregivers outside the household			
Yes	44,998 (26.18)		
No	99,915 (58.14)		
No information or filtered <sup>b</sup>	26,935 (15.67)		
Caregivers cared for . . .			
Partner/spouse		6,547 (64.52)	1,139 (2.53)
Parents/Stepparents/ Parents-in-law		1,503 (14.81)	11,457 (25.46)
Other relatives		1,129 (11.13)	15,301 (34.00)
Non-relatives		148 (1.46)	17,076 (37.95)
Missing		821 (8.09)	25 (0.06)
<i>Sociodemographic and health variables</i>			
Age	66.27 (10.47)	67.74 (10.85)	62.89 (8.83)
Gender			
Male	76,842 (44.72)	4,234 (41.72)	19,584 (43.52)
Female	95,006 (55.28)	5,914 (58.28)	25,414 (56.48)
Education (ISCED 1997)			
None/still in school /other	9,660 (5.62)	868 (8.55)	1,040 (2.31)
Primary education (Code 1)	35,772 (20.82)	2,659 (26.20)	5,895 (13.10)
Lower secondary education (Code 2)	29,156 (16.97)	1,798 (17.72)	7,221 (16.05)
Upper secondary education (Code 3)	51,519 (29.98)	2,707 (26.68)	15,338 (34.09)
Post-secondary non-tertiary education (Code 4)	5,294 (3.08)	233 (2.30)	1,712 (3.80)
First stage of tertiary education (Code 5)	36,691 (21.35)	1,663 (16.39)	13,038 (28.97)
Second stage of tertiary education (Code 6)	1,437 (0.84)	71 (0.70)	419 (0.93)
Marital status			
Married and living together with spouse/partner	118,614 (69.02)	8,489 (83.65)	30,329 (67.40)
Registered partnership	2,876 (1.67)	174 (1.71)	893 (1.98)
Married, living separated from spouse/partner	1,935 (1.13)	68 (0.67)	625 (1.39)
Never married	10,133 (5.90)	434 (4.28)	3,033 (6.74)
Divorced	13,603 (7.92)	291 (2.87)	5,096 (11.32)
Widowed	23,475 (13.66)	626 (6.17)	4,854 (10.79)
Current employment status			
Retired	89,286 (51.96)	5,569 (54.88)	20,327 (45.17)
Employed or self-employed	48,103 (27.99)	2,041 (20.11)	16,899 (37.56)
Unemployed	4,892 (2.85)	271 (2.67)	1,554 (3.45)
Permanently sick or disabled	5,679 (3.30)	448 (4.41)	1,412 (3.14)
Homemaker	19,225 (11.19)	1,636 (16.12)	4,063 (9.03)
Other	2,275 (1.32)	157 (1.55)	609 (1.35)
Welfare system			
Southern	39,782 (23.15)	3,474 (34.23)	5,400 (12.00)
Bismarckian	101,440 (59.03)	5,545 (54.64)	28,113 (62.48)
Scandinavian	30,626 (17.82)	1,129 (11.13)	11,485 (25.52)

**Table 1.** Continued

VARIABLES, <i>Obs.</i> (%) / <i>M(SD)</i>	COMPLETE SAMPLE	CAREGIVERS INSIDE THE HOUSEHOLD <sup>a</sup>	CAREGIVERS OUTSIDE THE HOUSEHOLD
Self-rated health	3.02 (1.07)	3.31 (1.08)	2.76 (1.03)
Number of chronic diseases	1.08 (1.18)	1.28 (1.28)	0.92 (1.07)
Suicidal ideation (yes)	11,610 (6.76)	967 (9.53)	2,666 (5.92)

*Obs.* = Observations; ISCED 1997 = International Standard Classification of Education 1997; self-rated health [1 excellent to 5 poor health, single-item from the SF-36 questionnaire (Ware and Gandek, 1998)]; number of chronic diseases (sum score of diseases, which had ever been diagnosed by a physician (theoretical range: 0–14) including chronic diseases: heart attack, high blood pressure or hypertension, high blood cholesterol, stroke, diabetes or high blood sugar, chronic lung disease, asthma, arthritis, osteoporosis, cancer, stomach or duodenal ulcer, peptic ulcer, Parkinson's disease, cataracts, hip fracture or femoral fracture), mean, and standard deviation are given for the continuous variables; frequency and percentage are given for the categorical variables.

<sup>a</sup> Only those who were not living alone were asked if they were providing care inside the house.

<sup>b</sup> 10.28% of the complete sample had missing information regarding caregiving because they were living alone and therefore not asked about care provision inside their household.

caregivers with higher age. Significantly increased odds for thoughts of suicide were only found among those transitioning into care outside the household for non-relatives (OR = 1.16, CI [1.02; 1.31], model 5). Stratified analyses by welfare system indicated a significant association with increased odds of suicidal ideation by 32% among those transitioning into caregiving in the Southern welfare system (OR = 1.32, CI [1.07; 1.64], model 5). The association was not significant in the Bismarckian or the Scandinavian system (models 6 and 7). The Southern welfare system differed significantly in this association (model 8) from the Bismarckian (OR = 0.74, CI [0.58; 0.95]) and the Scandinavian welfare systems (OR = 0.70, CI [0.51; 1.00]). This was also found in the second moderator analyses with the Bismarckian welfare as reference category (Southern OR = 1.35, CI [1.06; 1.72]), while the Scandinavian and Bismarckian systems did not differ significantly (model 9).

## Discussion

This longitudinal study provides new evidence to previous research, which had rarely used longitudinal designs to study the association between informal caregiving and suicidal ideation and had not been able to provide information on biopsychosocial risk or protective factors specific to the caregiving situation (O'Dwyer *et al.*, 2021). Our findings fill these research gaps by showing that care-specific aspects including the location of caregiving, the caregivers' age and gender, their relationship to the care recipient, and their welfare system are significant for suicidal ideation among informal caregivers.

Adults who transitioned into caregiving inside the household had higher odds of suicidal ideation, which was not found among those transitioning into caregiving outside the household. This confirms our

first hypothesis regarding the caregiving location and strengthens former findings of coresidential caregiving being more problematic (Kaschowitz and Brandt, 2017). In line with the IMV theory (O'Connor *et al.*, 2016), caregivers inside the household may feel more trapped than those who leave the house to provide care. The lack of physical distance may provide fewer opportunities for respite. Caregivers outside the household may be involved in less personal care tasks, and therefore, suicide ideation worsened only among caregivers inside the household. In our questionnaire, caregiving inside focused only on personal care, which is the most stressful care task (Lopez-Anuarbe and Kohli, 2019).

We could not confirm our second set of hypotheses on the significance of the caregiver's characteristics for care inside the household. Although these caregivers were mostly characterized by risk factors of suicidal ideation in Europe (Carrasco-Barrios *et al.*, 2020), i.e. on average older and most were female, the association was not significantly influenced by age or gender. However, the care relationship was relevant. Only care for partners and for parents was associated with higher odds of suicidal ideation, which confirms our hypothesis. Interestingly, the odds among those looking after parents were twice as high as among those looking after partners inside their household. These findings are not in line with findings of worse mental health among spousal compared to adult-child caregivers (Pinquart and Sorensen, 2011). While the majority of inside caregivers support partners, there are still 14% providing care for their parents in their household. This emphasizes the need to analyze depressive symptoms separately from suicidal ideation and take the location of caregiving into account. Sharing a household with care-dependent parents may present additional challenges that are particularly relevant to suicidal ideation. In contrast to our hypothesis, age and





**Table 2.** Continued

VARIABLES	MAIN MODEL (CAREGIVING YES/NO)	MODERATOR MODEL (GENDER)	MODERATOR MODEL (AGE)	MODEL CAREGIVING RELATIONSHIP	MODEL SOUTHERN WELFARE SYSTEM	MODEL BISMARCKIAN WELFARE SYSTEM	MODEL SCANDINAVIAN WELFARE SYSTEM <sup>a</sup>	MODERATOR MODELS (WELFARE SYSTEM) <sup>a</sup>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Caregiving inside the household (ref. No) × Southern welfare system (ref. Scandinavian welfare system)								0.94 (0.49–1.80)	
Caregiving inside the household (ref. No) × Bismarckian welfare system (ref. Scandinavian welfare system)								0.79 (0.42–1.48)	
Caregiving inside the household (ref. No) × Southern welfare system (ref. Bismarckian welfare system)									1.20 (0.89–1.61)
Caregiving inside the household (ref. No) × Scandinavian welfare system (ref. Bismarckian welfare system)									1.27 (0.67–2.40)
Observations	11,933	11,933	11,933	11,742	3,863	7,086	984	11,933	11,933
N	3,828	3,828	3,828	3,786	1,206	2,300	322	3,828	3,828

Odds ratio and 95% confidence intervals are provided in the table. All models are adjusted for age, marital status, employment status, self-perceived health, and number of chronic diseases; the moderator analyses including the moderator gender, age or welfare system are also adjusted for these variables. Main effects of gender and welfare systems were omitted due to the lack of transitions. Levels of significance: \*\*\**p* < 0.001, \*\**p* < 0.01, \**p* < 0.05.

<sup>a</sup> Models 7, 8, and 9 included a dichotomized variable of marital (married or in a registered relationship vs. not married, widowed, or divorced) and a trichotomized variable of employment status (retired, employed, or unemployed) to account for the small sample and the low number of transitions in the Scandinavian welfare system.

**Table 3.** Results of fixed effects regression analyses with informal caregiving outside the household as main predictor

VARIABLES	MAIN MODEL II	MODERATOR	MODERATOR	MODEL	MODEL	MODEL	MODERATOR MODEL		
	(CAREGIVING YES/NO)	MODEL (GENDER)	MODEL (AGE)	CAREGIVING RELATIONSHIP	SOUTHERN WELFARE SYSTEM	BISMARCKIAN WELFARE SYSTEM	SCANDINAVIAN WELFARE SYSTEM <sup>a</sup>	(WELFARE SYSTEM) <sup>a</sup>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Caregiving outside the household (ref. No)	1.09 + (0.99–1.20)	0.95 (0.80–1.12)	2.16* (1.18–3.97)		1.32* (1.07–1.64)	1.06 (0.94–1.18)	0.98 (0.76–1.27)	1.39** (1.12–1.73)	1.03 (0.92–1.16)
Caregiving outside the household – relationship (ref. No caregiving)									
Caregiving for (ex-)partner				1.11 (0.75–1.64)					
Caregiving for step-/parents/ -in-law				1.16 (0.97–1.40)					
Caregiving for other relatives				0.97 (0.85–1.12)					
Caregiving for non-relatives (e.g. friends)				1.16* (1.02–1.31)					
Welfare system									
Southern welfare system									[omitted]
Bismarckian welfare system								[omitted]	
Scandinavian welfare system								[omitted]	[omitted]
Caregiving outside the household (ref. No) × Bismarckian welfare system (ref. Southern welfare system)								0.74* (0.58–0.95)	
Caregiving outside the household (ref. No) × Scandinavian welfare system (ref. Southern welfare system)								0.70* (0.50–0.98)	
Caregiving outside the household (ref. No) × Southern (ref. Bismarckian welfare system)									1.35* (1.06–1.72)
Caregiving outside the household (ref. No) × Scandinavian (ref. Bismarckian welfare system)									0.95 (0.72–1.25)

**Table 3.** Continued

VARIABLES	MAIN MODEL II	MODERATOR	MODERATOR	MODEL	MODEL	MODEL	MODERATOR	MODEL	
	(CAREGIVING YES/NO)	MODEL (GENDER)	MODEL (AGE)	CAREGIVING RELATIONSHIP	SOUTHERN WELFARE SYSTEM	BISMARCKIAN WELFARE SYSTEM	SCANDINAVIAN WELFARE SYSTEM <sup>a</sup>	MODEL (WELFARE SYSTEM) <sup>a</sup>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Gender (ref. male)		[omitted]							
Caregiving outside the household (ref. no) × gender (ref. male)		1.23* (1.00–1.50)							
Age at interview (in years)	1.01* (1.00–1.03)	1.01* (1.00–1.03)	1.02** (1.00–1.03)	1.01* (1.00–1.03)	0.99 (0.97–1.01)	1.03*** (1.01–1.04)	1.02 (0.99–1.06)	1.02** (1.00–1.03)	1.02** (1.00–1.03)
Caregiving outside the household (ref. no) × Age at interview			0.99* (0.98–1.00)						
Observations	15,195	15,195	15,195	15,189	3,871	9,603	1,721	15,195	15,195
N	4,852	4,852	4,852	4,850	1,230	3,093	529	4,852	4,852

Odds ratio and 95% confidence intervals are provided in the table. All models were adjusted for age, marital status, employment status, self-perceived health, and number of chronic diseases; the moderator analyses including the moderator gender, age or welfare system were also adjusted for these variables. Main effects of gender and welfare systems were omitted due to the lack of transitions. Levels of significance: \*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ , + $p < 0.10$ .

<sup>a</sup>Models 7, 8, and 9 included a dichotomized variable of marital (married or in a registered relationship vs. not married, widowed, or divorced) and a trichotomized variable of employment status (retired, employed, or unemployed) to account for the small sample and the low number of transitions in the Scandinavian welfare system.

gender were of relevance for the association between caregiving outside the household and suicide ideation. Caregivers outside the household had lower odds of suicidal ideation with increasing age. This can be seen as positive for older caregivers, since suicide risk is usually higher among older adults (Carrasco-Barrios *et al.*, 2020). Caregiving outside the household can counteract loneliness, in particular among older adults (Hajek and König, 2020), by providing meaning to life and social interaction (Dahlberg *et al.*, 2022), and thereby prevent suicidal ideation. However, it may also reflect that older adults are less likely to report suicide thoughts than those of younger age (Lee, 2023; Nock *et al.*, 2008).

Women had higher odds of suicidal ideation when transitioning into caregiving outside the household. Women usually provide more personal care (Pinquart and Sörensen, 2006) and may do this inside as well as outside the household. Thus, female caregivers outside the household may feel a similar entrapment as caregivers inside.

Another relevant factor for caregivers outside was the care relationship. In contrast to our hypothesis, only caregivers for non-relatives outside the household had higher odds of suicidal ideation. Caregivers of non-relatives may have a very close relationship with the care recipients and provide care due to a lack of available family caregivers, thus, resulting in a similar situation without alternatives as has been found among family caregivers inside the household. Caregiving to non-relatives and the consequences for them has not received as much investigation, despite the increase of this group in recent years (Klaus and Ehrlich, 2021). Further investigation focused on them is recommended.

Last, we investigated caregiving in three European welfare systems. As hypothesized, odds for suicidal ideation were significantly higher among adults transitioning into caregiving inside and outside the household in the Southern welfare system. The Southern welfare system is still developing, in particular, the long-term care system currently relies mostly on the family (Greve, 2022). Caregivers in this system may be aware that there are no (affordable) alternatives to informal caregiving, which can foster the feeling of being trapped in their caregiver role and not perceiving any improvement in their situation in the (near) future (O'Connor *et al.*, 2016). We also found higher odds of suicidal ideation among caregivers inside, but not outside the household, in the Bismarckian system. This is also a conservative system, relying mostly on family as caregivers; however, it has better social security options, which can improve the general situation if they are used (Greve, 2022). Thus, the care systems in both Bismarckian and Southern welfare systems

are apparently not providing enough support to prevent suicidal ideation among caregivers inside the household. The Southern system in particular needs to improve their support options to prevent suicidal ideation among caregivers inside and outside the household.

We compared our findings with the odds ratio calculated by Chen *et al.* (2010) as a benchmark similar to Cohen's *d* to interpret the size of our effects. We use the lifetime prevalence of suicide ideation among a cross-national European adult sample as disease rate of the nonexposed population (i.e. non-caregivers) (5.5%, Castillejos *et al.*, 2021). Accordingly, odds ratios of 1.52, 2.74, and 4.72 indicate small, medium, and large effects. Our findings therefore indicate small effects. Still, a broad range of previous research has indicated the vulnerability of informal caregivers (Bom *et al.*, 2019) and suicide ideation is a major risk factor for suicide behavior (O'Connor *et al.*, 2016; Forkmann, 2021). Thus, even small effects are of relevance in the context of informal caregiving and add to aforementioned literature indicating the risks of informal caregiving for health and well-being of caregivers.

There are a few limitations to the study. Sensitivity analyses indicated that depressive symptoms seem to account for age and gender differences formerly attributed to caregiving. However, the other effects remained significant even if their size was smaller. Thus, caregiving contributes to changes in suicide ideation in addition to mental health.

We used a dichotomized single-item to measure suicidal ideation, although a multi-item measure would be preferred due to its psychometric advantages (Sarstedt and Wilczynski, 2009). However, using single-item measures is an established method to analyze suicidal ideation (O'Dwyer *et al.*, 2021). Also, we measured passive suicide ideation (i.e. wishing one was dead), which is to be differentiated from active suicide ideation (e.g. thinking about ending one's life, Wastler *et al.*, 2023). Thus, results might not generalize to more severe forms of suicide ideation. Last, selection bias could be problematic but is quite small in SHARE data (Börsch-Supan *et al.*, 2013), and the FE regression method reduces the bias due to time-constant variables further.

## Conclusion and implications

Our findings contribute innovative and important new insights about the informal caregiving situation and its association with suicidal ideation. The findings indicate that especially caregivers inside

the household are vulnerable to suicide ideation. Our findings are of particular relevance for older groups and individuals with lower socioeconomic status, who are more likely to be involved in caregiving (Quashie *et al.*, 2022; Rothgang and Müller, 2018) despite higher risk and underreporting suicide thoughts (Kim *et al.*, 2014; Pitkälä *et al.*, 2000). Our biopsychosocial approach showed that individual factors, such as age and gender, and social aspects, such as the caregiver relationship, are of relevance for the association. Moreover, contextual factors, such as the location of caregiving and the welfare system, need to be taken into account, too. This adds to previous research, which had not analyzed the context of caregivers in relation to suicide ideation.

Suicidal ideation was more likely among caregivers inside the household and caregivers in Southern (and Bismarckian) welfare systems. Additionally, primarily caregivers of parents inside their own household showed higher suicidal ideation, as well as younger and female caregivers outside the household. Thus, more care options that allow to provide care for parents outside, instead of inside the household, would be helpful. As our study shows, inside-household caregivers are mainly spousal caregivers and a small but (in regard to suicidal ideation) highly vulnerable group of parental caregivers. Spousal caregivers are usually less inclined to look for and be provided with support (Pinquart and Sorensen, 2011; Zwar *et al.*, 2022). More outreach and low-threshold services could therefore help to support these hidden groups in their seemingly hopeless situation and prevent the development of suicidal ideation.

Also, aspects of poverty prevention and a broader range of affordable ambulatory care options could help with this. The most vulnerable caregivers were indicated to be part of the Southern welfare systems, which are not well positioned with regard to these social security measures. However, developments in recent years give reason to hope that further improvements will be made in this direction (Greve, 2022), which are urgently needed to prevent the increased suicide ideation risks found among these caregivers.

Moreover, support for non-relative caregivers, in particular younger and female caregivers, seems to be needed. Often caregiving support options refer only to family caregivers; however, there is a growing group of non-related caregivers outside the household (i.e. friends and neighbors) (Klaus and Ehrlich, 2021). Likely, the increasing group of singles and widowed women with care needs draws upon support from them. Our findings further emphasize the need to direct more attention in terms of research and support to these caregivers.

## Conflict of interest

None.

## Description of authors' roles

LZ contributed to conception, design, and analysis of the data and drafted the manuscript. HHK and AH contributed to review and editing. All authors read and approved the final manuscript.

## Acknowledgments

This study uses data from the Survey of Health, Ageing, and Retirement in Europe (SHARE), release 8.0.0 (10th Feb. 2022) of waves 1 (DOI: 10.6103/SHARE.w1.800), 2 (DOI: 10.6103/SHARE.w2.800), 4 (DOI: 10.6103/SHARE.w4.800), 5 (DOI: 10.6103/SHARE.w5.800), and 6 (DOI: 10.6103/SHARE.w6.800). Data are available free of charge for registered users at <http://www.share-project.org>.

## Supplementary material

To view supplementary material for this article, please visit <https://doi.org/10.1017/S1041610223000601>

## References

- Allison, P. D. (2001). *Missing Data*. Thousand Oaks, CA: Sage Publications.
- Anderson, J. G., Eppes, A. and O'dwyer, S. T. (2019). "Like death is near": expressions of suicidal and homicidal ideation in the blog posts of family caregivers of people with dementia. *Behavioral Sciences (Basel)*, 9, 22.
- Bom, J., Bakx, P., Schut, F. and Van Doorslaer, E. (2019). The impact of informal caregiving for older adults on the health of various types of caregivers: a systematic review. *The Gerontologist*, 59, E629–E642.
- Börsch-Supan, A. *et al.* (2013). Data resource profile: the survey of health, ageing and retirement in Europe (Share). *International Journal of Epidemiology*, 42, 992–1001.
- Brüderl, J. (2010). Kausalanalyse mit Paneldaten. In: C. Wolf and H. Best (Eds.), *Handbuch Der Sozialwissenschaftlichen Datenanalyse*. Wiesbaden: Vs Verlag Für Sozialwissenschaften.
- Brüderl, J. and Ludwig, V. (2015). Fixed-effects panel regression. In: H. Best and C. Wolf (Eds.), *The Sage Handbook of Regression Analysis and Causal Inference*. London: Sage Publications Ltd.
- Cameron, A. C. and Trivedi, P. K. (2009). *Microeconometrics Using Stata*. College Station, TX: Stata Press.



- Campos, R. C. et al.** (2016). Self-report depressive symptoms do not directly predict suicidality in nonclinical individuals: contributions toward a more psychosocial approach to suicide risk. *Death Studies*, 40, 335–349.
- Cao, X.-L. et al.** (2015). Prevalence of suicidal ideation and suicide attempts in the general population of China: a meta-analysis. *International Journal of Psychiatry in Medicine*, 49, 296–308.
- Carrasco-Barríos, M. T. et al.** (2020). Determinants of suicidality in the European general population: a systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, 17, 4115.
- Castillejos, M. C., Huertas, P., Martín, P. and Moreno Kuestner, B.** (2021). Prevalence of suicidality in the European general population: a systematic review and meta-analysis. *Archives of Suicide Research*, 25, 810–828.
- Chen, H., Cohen, P. and Chen, S.** (2010). How big is a big odds ratio? Interpreting the magnitudes of odds ratios in epidemiological studies. *Communications in Statistics—Simulation and Computation*, 39, 860–864.
- Czeisler, M. et al.** (2021). Mental health, substance use, and suicidal ideation during a prolonged COVID-19-related lockdown in a region with low SARS-CoV-2 prevalence. *Journal of Psychiatric Research*, 140, 533–544.
- Dahlberg, L., Mckee, K. J., Frank, A. and Naseer, M.** (2022). A systematic review of longitudinal risk factors for loneliness in older adults. *Aging & Mental Health*, 26, 225–249.
- Eikemo, T. A., Huisman, M., Bambra, C. and Kunst, A. E.** (2008). Health inequalities according to educational level in different welfare regimes: a comparison of 23 European countries. *Sociology of Health & Illness*, 30, 565–582.
- Favril, L., Yu, R., Uyar, A., Sharpe, M. and Fazel, S.** (2022). Risk factors for suicide in adults: systematic review and meta-analysis of psychological autopsy studies. *Evidence-Based Mental Health*, 25, 148–155.
- Federal Ministry of Justice** (1994). *Social Code Book XI*. Berlin: Federal Ministry of Justice.
- Ferrera, M.** (1996). The ‘southern model’ of welfare in social Europe. *Journal of European Social Policy*, 6, 17–37.
- Forkmann, T.** (2021). Psychologische Erklärungsmodelle Suizidalen Erlebens Und Verhaltens. In: *Suizidales Erleben Und Verhalten: Ein Handbuch* (p 69).
- Greve, B.** (2022). *De Gruyter Handbook of Contemporary Welfare States*. Berlin/Boston: De Gruyter GmbH.
- Gunasekara, F. I., Richardson, K., Carter, K. and Blakely, T.** (2014). Fixed effects analysis of repeated measures data. *International Journal of Epidemiology*, 43, 264–269.
- Hajek, A. and König, H.-H.** (2020). Which factors contribute to loneliness among older Europeans? Findings from the survey of health, ageing and retirement in Europe: determinants of loneliness. *Archives of Gerontology and Geriatrics*, 89, 104080.
- Howarth, E. J. et al.** (2020). Are stressful life events prospectively associated with increased suicidal ideation and behaviour? A systematic review and meta-analysis. *Journal of Affective Disorders*, 266, 731–742.
- Joling, K. J., Ten Have, M., De Graaf, R. and O’dwyer, S. T.** (2019). Risk factors for suicidal thoughts in informal caregivers: results from the population-based Netherlands Mental Health Survey And Incidence Study-2 (NEMESIS-2). *BMC Psychiatry*, 19, 1–9.
- Kaschowitz, J. and Brandt, M.** (2017). Health effects of informal caregiving across Europe: a longitudinal approach. *Social Science & Medicine*, 173, 72–80.
- Kim, S., Ha, J. H., Yu, J., Park, D.-H. and Ryu, S.-H.** (2014). Path analysis of suicide ideation in older people. *International Psychogeriatrics*, 26, 509–515.
- Klaus, D. and Ehrlich, U.** (2021). Corona-Krise= Krise Der Angehörigen-Pflege? Zur Veränderten Situation Und Den Gesundheitsrisiken Der Informell Unterstützungs- Und Pflegeleistenden In Zeiten Der Pandemie.
- Lazarus, R. S. and Folkman, S.** (1987). Transactional theory and research on emotions and coping. *European Journal of Personality*, 1, 141–169.
- Lee, S.** (2023). Passive suicidal ideation in older adults from 12 European countries. *Journal of Population Ageing*, 16, 137–154.
- Lopez-Anuarbe, M. and Kohli, P.** (2019). Understanding male caregivers’ emotional, financial, and physical burden in the United States. *Healthcare (Basel)*, 7, 72.
- Mckee, G. B. et al.** (2021). Suicidal ideation after acute traumatic brain injury: a longitudinal actor-partner interdependence model of patients and caregivers in Latin America. *Rehabilitation Psychology*, 66, 433–441.
- Molina, N. et al.** (2019). Suicidal ideation in bereavement: a systematic review. *Behavioral Sciences*, 9, 53.
- Nakanishi, M. et al.** (2022). Adolescent carers’ psychological symptoms and mental well-being during the Covid-19 pandemic: longitudinal study using data from the UK Millennium Cohort Study. *Journal of Adolescent Health*, 70, 877–884.
- Nock, M. K. et al.** (2008). Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *British Journal of Psychiatry*, 192, 98–105.
- O’Connor, R. C., Cleare, S., Eschle, S., Wetherall, K. and Kirtley, O. J.** (2016). The integrated motivational-volitional model of suicidal behavior. In: *The International Handbook of Suicide Prevention*. Chichester: Wiley.
- O’Dwyer, S., Moyle, W. and Van Wyk, S.** (2013). Suicidal ideation and resilience in family carers of people with dementia: a pilot qualitative study. *Aging and Mental Health*, 17, 753–760.
- O’Dwyer, S. T. et al.** (2021). Suicidality in family caregivers of people with long-term illnesses and disabilities: a scoping review. *Comprehensive Psychiatry*, 110, 152261.
- Pearlin, L. I., Mullan, J. T., Semple, S. J. and Skaff, M. M.** (1990). Caregiving and the stress process: an overview of concepts and their measures. *The Gerontologist*, 30, 583–594.
- Pinquart, M. and Sorensen, S.** (2011). Spouses, adult children, and children-in-law as caregivers of older adults: a meta-analytic comparison. *Psychology and Aging*, 26, 1–14.
- Pinquart, M. and Sorensen, S.** (2006). Gender differences in caregiver stressors, social resources, and health: an updated meta-analysis. *The Journals of Gerontology: Series B*, 61, 33–45.
- Pitkälä, K., Isometsä, E. T., Henriksson, M. M. and Lönnqvist, J. K.** (2000). Elderly suicide in Finland. *International Psychogeriatrics*, 12, 209–220.
- Prince, M. J. et al.** (1999). Development of the EURO-D scale—a European, Union initiative to compare symptoms of

- depression in 14 European centres. *British Journal of Psychiatry*, 174, 330–338.
- Quashie, N. T., Wagner, M., Verbakel, E. and Deindl, C.** (2022). Socioeconomic differences in informal caregiving in Europe. *European Journal of Ageing*, 19, 621–632.
- Rosato, M., Tseliou, F., Wright, D. M., Maguire, A. and O'reilly, D.** (2019). Are volunteering and caregiving associated with suicide risk? A census-based longitudinal study. *BMC Psychiatry*, 19, 296.
- Rosengard, C. and Folkman, S.** (1997). Suicidal ideation, bereavement, HIV serostatus and psychosocial variables in partners of men with AIDS. *AIDS Care*, 9, 373–384.
- Rothgang, H. and Müller, R.** (2018). *Barmer Pflegereport 2018. Schriftenreihe Zur Gesundheitsanalyse*. Siegburg: Asgard.
- Sarstedt, M. and Wilczynski, P.** (2009). More for less? A comparison of single-item and multi-item measures. *Die Betriebswirtschaft*, 69, 211.
- Solimando, L. et al.** (2022). Suicide risk in caregivers of people with dementia: a systematic review and meta-analysis. *Aging Clinical and Experimental Research*, 34, 2255–2260.
- Statistisches Bundesamt** (2020). *Pflegestatistik 2019: Pflege Im Rahmen Der Pflegeversicherung - Deutschlandergebnisse*.
- Tomás, J. M., Torres, Z., Oliver, A., Enrique, S. and Fernández, I.** (2022). Psychometric properties of the EURO-D scale of depressive symptomatology: evidence from SHARE wave 8. *Journal of Affective Disorders*, 313, 49–55.
- Van Buuren, S.** (2012). *Flexible Imputation of Missing Data*. Boca Raton: CRC Press.
- Van Den Kieboom, R., Snaphaan, L., Mark, R. and Bongers, I.** (2020). The trajectory of caregiver burden and risk factors in dementia progression: a systematic review. *Journal of Alzheimer's Disease*, 77, 1107–1115.
- Ware, J. E., Jr. and Gandek, B.** (1998). Overview of the SF-36 Health Survey and the International Quality of Life Assessment (IQOLA) project. *Journal of Clinical Epidemiology*, 51, 903–912.
- Wastler, H. M. et al.** (2023). An empirical investigation of the distinction between passive and active ideation: understanding the latent structure of suicidal thought content. *Suicide and Life-Threatening Behavior*, 53, 219–226.
- Wooldridge, J. M.** (2010). *Econometric Analysis of Cross Section and Panel Data*. Cambridge: MIT Press.
- World Health Organization** (2021). *Suicide Worldwide in 2019: Global Health Estimates*. Geneva: World Health Organization.
- Yu, D. S. F., Cheng, S. T. and Wang, J.** (2018). Unravelling positive aspects of caregiving in dementia: an integrative review of research literature. *International Journal of Nursing Studies*, 79, 1–26.
- Zwar, L., König, H.-H. and Hajek, A.** (2018). The impact of different types of informal caregiving on cognitive functioning of older caregivers: evidence from a longitudinal, population-based study in Germany. *Social Science & Medicine*, 214, 12–19.
- Zwar, L., König, H.-H. and Hajek, A.** (2022). Social support for informal caregivers of spouses and parents(-in-law) aged 60 years and older during the Covid-19 pandemic: findings from a representative German online survey. *The Journals of Gerontology: Series B*, 78, 264–279.