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Changes in care provision to older parents during COVID-19 and the well-being of adult children: The moderating roles of the child-parent relationship and pandemic-related measures

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Abstract

Objective: The study addresses the associations between changes in care provision to older parents since the pandemic and worsened depression and anxiety in adult children. It also explores whether pandemic-related control measures and child-parent relationships moderated these associations.

Background: Changes in informal care during the pandemic, such as increased or decreased caregiving frequency, may have affected caregivers' psychological well-being. Limited research exists on how stressors and resources shape the well-being of adult children caregivers.

Method: Data from 740 respondents in the first SHARE Corona Survey (SCS) who provided care for their parents during the pandemic were analyzed. Changes in depression and anxiety were assessed using data from SCS and pre-pandemic Wave. Logistic regression analyses were conducted, with added interactions between the moderators - pandemic measures and child-parent relationship characteristics - and changes in care frequency.

Results: Increased caregiving frequency during the pandemic was associated with worsened depression. Stricter pandemic measures intensified this effect but also reduced the likelihood of anxiety for those who provided care less often. A higher quality of relationship with the mother in childhood was marginally associated with lower depression among those increasing caregiving but worsened depression for those decreasing it.

Conclusion: To address post-pandemic caregiving challenges, efforts should focus on reducing caregiver stress and considering the enduring influence of early child-parent relationships.

Key words: informal care, child-parent relationship, psychological well-being, COVID-19, SHARE

1. Introduction

The increase in life expectancy has led to higher rates of disability in older adults. Informal care plays a crucial role in responding to the rise in care demands, and caregivers are often considered to be a shadow workforce (Bookman & Harrington, 2007; Lindt et al., 2020; Mak et al., 2021). Informal care is typically defined as unpaid support to family or other social network members for long-term illness or disability and includes instrumental and personal care (Roth et al., 2015). About a third of the European population provides informal care, of which the care provided by adult children forms a substantial subset (de Klerk et al., 2021; Verbakel et al., 2018).

Although informal care is associated with certain benefits, there is ample evidence of detrimental effects on caregivers' psychological well-being, in particular, higher levels of depression and anxiety than in non-caregivers (e.g., Bom et al., 2019; OECD, 2011). During the COVID-19 pandemic, exacerbation of depressive and anxiety symptoms of informal caregivers was documented (Altieri & Santangelo, 2021; Gallagher et al., 2020; Muldrew et al., 2022; Rodrigues et al., 2021). Considering the vital role that informal caregivers play in their care-receivers' lives, deterioration in caregivers' psychological well-being may lead to the depletion of their emotional resources and hamper their capacity to provide care (Mak et al., 2021).

According to the caregiver stress process model (SPM, Pearlin et al., 1990), caregivers' psychological well-being is shaped by caregiving-related stressors, contextual factors, including demographic and cultural characteristics, and the presence of available resources. It has been argued that stressors that are not buffered by resources have deleterious effects on caregivers' well-being (Wister et al., 2022). Unlike spouse-caregiver relations, which have been examined by numerous studies, research on adult children who care for their parents and on the explanatory factors of their psychological well-being remains limited (Fenton et al., 2022; Lindt et al., 2020).

The primary stressor in our study was assessed through the increased frequency of care provided to older parents since the pandemic, indicating an intensification of the caregiving role (Bom et al., 2019; OECD, 2011). Most empirical evidence suggests that increased care provision, as opposed to decreased care, is linked to worsened psychological well-being during the pandemic (e.g., Bergman & Wagner, 2021). Increased care provision is considered a significant contributor to caregiving stress, leading to negative consequences for caregivers' well-being. The underlying mechanism involves the restrictions imposed on personal and social life by intensive caregiving, which entails social, emotional, and financial costs (MacLeod et al., 2021; Sambasivam et al., 2019).

The primary aim of the study was to explore the associations between caregiving and well-being within the unique context of the coronavirus. In order to gain a comprehensive understanding of these associations, we considered two moderating factors. The first factor is the strictness of pandemic-related policy measures implemented by governments to minimize the rapid spread of the virus, which has been reported as a contributing factor to caregiving stress (e.g., Muldrew et al., 2022). The second factor is the quality of the caregiver-care-receiver relationship, that was recognized as a beneficial aspect of care and a source of resilience during the pandemic (Lightfoot et al., 2021; MacLeod et al., 2021; Tulloch et al., 2022). Thus, the second aim of the study was to examine the moderating roles of the pandemic-related measures and the child-parent relationship on the association between changes in care frequency and the psychological well-being of adult children caregivers.

2. The moderating effect of pandemic-related measures on the association between changes in care provision and the psychological well-being of caregivers

Empirical evidence has shown that informal care provision during the initial phase of the pandemic was prone to changes. Some studies reported a general decrease in care provision, particularly to children, relatives, and non-kin. The primary reasons for this decline were the strict control measures imposed by governments, which included restrictions on physical contact. Additionally, caregivers may have refrained from visiting their frail care-receivers for fear of infecting them with the virus and contracting the virus themselves. By contrast, the provision of care to older parents increased, attesting to the more active role adult children took in supporting older adults after the beginning of the pandemic (Bergmann & Wagner, 2021; Tur Sinai et al., 2021; Verbakel et al., 2021). First, cuts in formal care services shrank the available

care network, amplifying the caregiving responsibilities of informal caregivers (Mak et al., 2021; Muldrew et al., 2022; Rodrigues et al., 2021). Second, lockdowns and "stay-at-home" measures led to social isolation and deteriorating health of care-receivers, which in turn increased care demands (Archer et al., 2021; Giebel et al., 2021; Lightfoot et al., 2021; Rainero et al., 2021).

Pandemic-related measures may have worsened the stress already faced by caregivers due to increased care provision. This may have negatively affected their well-being, as they may have faced barriers in providing care and dealing with limited access to formal care. This increased burden on caregivers was highlighted in a qualitative study conducted in Belgium, in which an adult son said: "This is truly ending up again in a situation where you really become, well, the nurse in fact" (D'herde et al., 2020). Pandemic-related measures may also have caused amplified stress due to people's perceptions of the severity of the virus. Caregivers who were concerned about transmitting the virus to their parents may have chosen to limit physical contact and practice self-isolation, which could have negatively impacted their mental health (Lightfoot et al., 2021; Muldrew et al., 2022). It's worth noting that there is a lot of variation across European countries in terms of the measures taken to address the pandemic, with different countries using different and sometimes opposing approaches (Egger et al., 2021). This variation also extends to access to formal care services, which doesn't always fit into traditional welfare regime classifications (Tur Sinai et al., 2021). Given the unique circumstances of the pandemic, we sought to examine the effect of changes in care provision on the well-being of adult children and ascertain whether this relationship was moderated by the presence of pandemic-related restrictions.

3. The moderating effect of the adult child-parent relationship characteristics

According to the SPM, adult child-parent relationship characteristics are considered resources that can buffer care-related stress (Fenton et al., 2022). Yet, these resources have received limited attention. Based on the intergenerational solidarity model, which aims to decipher the dynamics between generations within a family (Bengston & Roberts, 1991), we assessed the relationship through two dimensions: associational and affectual. The associational dimension is typically measured by the frequency of intergenerational contact. Frequent contact reflects cohesion and solidarity in the relationship and may serve as a source of mutual emotional support. Vergauwen and colleagues (2021) pointed to an increase in the frequency of contact between older European adults and their non-cohabiting children during the pandemic, especially in countries implementing more stringent measures. The changes that were observed not only included an increase in providing instrumental care to parents but also involved finding ways to maintain the child-parent relationship during uncertain times. This was achieved through alternative communication methods like digital contact, compensating for the limitations in face-to-face interaction. Although the effect of frequency of contact on the psychological well-being of older parents has been investigated, (e.g., Brugiavini et al., 2022), to the best of our knowledge, its influence on the well-being of adult children caring for their parents remains unexamined.

The affectual aspect of the relationship, as described by Bengston and Roberts (1991), signifies a high-quality bond. Studies have shown that emotional closeness and satisfaction with the relationship with the parent were associated with reduced care-related burden (Fenton et al., 2022) and served as a protective buffer against the link between caregiving burden and depression (Lin et al., 2013). These findings suggest that genuine affection and willingness that motivate caregiving can serve as a robust buffer against the stress typically associated with caregiving (Funk, 2015; Vangen & Herlofson, 2023).

Our study focused on the emotional aspect of the relationship between parents and children during childhood. We take a life course perspective, which emphasizes the significance of early experiences in shaping future outcomes (Elder, 1994; Damri & Litwin, 2019). The empirical literature describes multiple mechanisms contributing to the buffering effect of early relationships on the well-being of adult children caregivers. First, based on attachment theory (Bowlby, 1988), it has been argued that the early child-parent relationship is the initial learning environment in which social and mental development takes place, serving as a prototype for social behaviors and coping abilities in later life. Thus, caregivers who had responsive and emotionally available parents may be better equipped to tolerate the stressful caregiving process, which in turn may enhance their psychological well-being (Carpenter, 2001; Kuscu et al., 2009).

Another mechanism, also based on attachment theory (Bowlby, 1988) and proposed by Cicirelli (1993), suggests that emotional intimacy formed during infancy can persist and evolve into mental representations

of the parent as responsive and supportive. When adult children are faced with their older parent's illness or dependence, they may activate caregiving behaviors to prevent the loss of their parent for as long as possible. This strong dedication to preserving their parent's existence may help mitigate caregiving stress and its adverse effects on the adult children's well-being. The third mechanism is based on the social exchange paradigm, specifically the concept of "delayed reciprocity" (Molm & Cook, 1995). It suggests that a high-quality child-parent relationship established in early life enables caregiving to become a reciprocation of love and affection when circumstances shift, and the older parent requires assistance (Funk, 2015).

Although representing the basic components of early child-parent relationships, quantitative studies have evaluated the child-parent relationship in a contemporary context (e.g., Carpenter, 2001; Cicirelli, 1993; Kuscu et al., 2009). Only a few studies have examined the associations between relationship quality measures in childhood, assessed retrospectively, and the psychological well-being of adult children caregivers. These studies focused on negative evaluations of the relationship, such as parental abuse and maltreatment during childhood (e.g., Kong & Martire, 2019; Kong & Moorman, 2015). We are not aware of studies examining the effect of early child-parent relationships on adult children caregivers' well-being during the pandemic.

In prior research, the role of the parent-child relationship in buffering the negative psychological well-being related to caregiving was examined only concerning mothers (e.g., Carpenter, 2001; Cicirelli, 1993). A recent study that considered the effect of neglect by both parents in childhood on the psychological well-being of adult children caregivers found such an effect only for mothers. This may confirm the cardinal role mothers (generally the primary caregivers) play in the children's emotional development (Kong et al., 2021) and the importance of considering the effect of the mother-child and father-child relationship during childhood separately.

To gain a comprehensive understanding of how caregiving affects the psychological well-being of adult children during a global health crisis, we studied the relationship between changes in care provision and increased levels of depression and anxiety following the pandemic. Additionally, we analyzed the impact of pandemic-related measures on this relationship. We also examined how the frequency of contact with parents during the pandemic moderates this relationship and paid special attention to the quality of child-parent relationships during childhood.

4. Study hypotheses

In the context of the pandemic, both increased and decreased informal care frequency were reported. This study examines how changes in care frequency provided to parents during the pandemic can affect caregivers. According to the Stress Process Model (SPM) and existing research, providing increased care may negatively affect caregivers' well-being. The study also considers the potential effects of decreased care provision, which could either reduce stress by lowering the risk of contamination and lessening the caregiving burden or conversely cause distress due to limited face-to-face interaction and support. As a result, the study's hypotheses concerning decreased care are exploratory. We formulated four sets of hypotheses: the first set addresses the direct effect of changes in care frequency on the mental health of adult children, the second focuses on the moderating effect of stricter pandemic-related measures, the third on the moderating role of the current child-parent relationship, and the fourth examines the moderating role of the parent-child relationship in childhood.

4.1 Changes in the frequency of care and the mental health of children who are caregivers

1a. Higher frequency of care provided to an older parent following the COVID-19 outbreak is related to worsened depression and anxiety.

1b. Lower frequency of care provided to an older parent following the COVID-19 outbreak is related to the mental health of adult children.

4.2 The moderating role of stricter pandemic-related measures

2a. Stricter pandemic-related measures exacerbate the association between the higher frequency of care and worsened depression and anxiety.

2b. Stricter pandemic-related measures moderate the relationship between decreased care frequency and the mental health of adult children.

4.3 The moderating role of the current child-parent relationship

3a. The association between higher frequency of care and worsened depression and anxiety is weaker in the presence of higher frequency of electronic contact with the parent during the pandemic.

3b. Higher frequency of electronic contact with the parent during the pandemic moderates the association between decreased care frequency the mental health of adult children.

4.4 The moderating role of the child-parent relationship in childhood

4a. The association between higher frequency of care with worsened depression and anxiety is weaker in the presence of higher quality of the relationship in childhood with mother and father (assessed separately).

4b. Higher quality of the relationship in childhood with the parent moderates the association between decreased care frequency and the mental health of adult children.

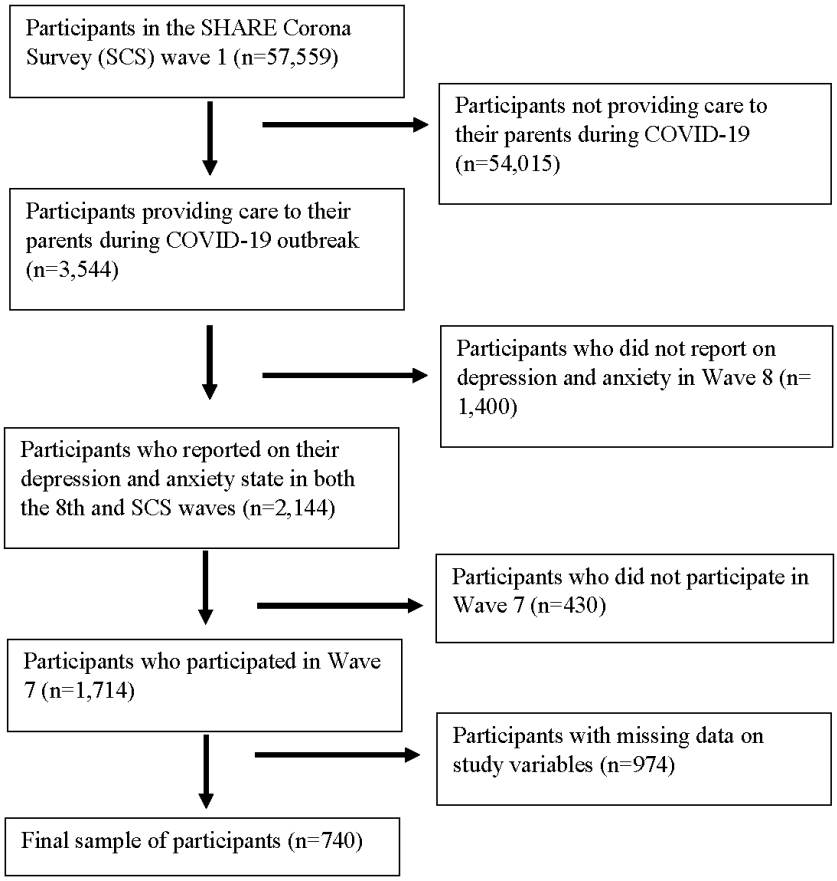
5. Material and methods

5.1 Data and participants

Data were obtained from SHARE, a multidisciplinary panel survey covering 27 European countries and Israel. Respondents aged 50 years and older and their partners of any age, living in the community, were biennially interviewed about their health, socioeconomic situation, and family and social networks (Börsch-Supan et al., 2013). The analytic sample comprised respondents from 25 European countries and Israel who participated in the first SHARE Corona Survey (SCS), conducted between June and August 2020, which examined the effect of the pandemic on older Europeans' lives (Börsch-Supan et al., 2022; Scherpenzeel et al., 2020). We included respondents who reported providing care to their parents living in a separate household during the pandemic. The provision of care included helping in activities of daily living (ADL) (personal care such as feeding, bathing, etc.) or in instrumental activities of daily living (IADL) (providing medications, food, and household repairs).

Other information extracted from the SCS included changes in the frequency of care, the strictness of pandemic-related policy measures, and the frequency of contact with the parents. We linked data from the SCS and from Wave 8 (2019-March 2020) to track changes in respondents' depression and anxiety states. We also incorporated data from SHARE Wave 7 (2017), a retrospective wave, to address the quality of child-parent relationships in childhood. Most of the background variables were derived from the SCS. The final sample included a total of 740 participants (Figure 1). We compared the sample group with those who reported providing care to their parents but had missing data. The results showed that the respondents from the study sample were slightly younger, but there were no significant differences in other background characteristics such as gender, financial adequacy, or subjective health status.

Figure 1: Participant selection flowchart



5.2 Measures

5.2.1 Dependent variables: Changes in depression and anxiety in adult children following the pandemic

Depression and anxiety were measured in the first SCS, while controlling for depression and anxiety in the pre-pandemic wave (Wave 8), so that the dependent variables reflected the change in depression and anxiety following the pandemic. Depression was assessed identically in both Wave 8 and SCS with the item: "In the last month, have you been sad or depressed?" which was dichotomized to (1) depressed and 0 (not depressed). Based on a previous study (Litwin & Levinsky, 2022), anxiety was assessed in Wave 8 as feeling "irritable", and in SCS as feeling "nervous, anxious, or on the edge", both dichotomized to (1) anxious and (0) not anxious.

5.2.2 Independent variables

Changes in care frequency provided to parents following the outbreak of the pandemic were assessed by asking the respondents "Compared to before the outbreak of Corona, how often did you help your parents living from outside your home to obtain necessities?" for providing support in instrumental activities of daily living (IADL). For activities of daily living (ADL), the same question was posed, but it referred to "personal care". The final variable was categorized into three groups: 1 = respondents indicated that the care was provided "less often" in either ADL or IADL; 2 = respondents reported providing care to parents more often than before the pandemic; and 3 = a reference category indicating no change in care frequency.

The stringency index was used to address differences in COVID-19 restrictions and policy measures implemented during the COVID-19 pandemic to limit the spread of the virus. These measures included workplace closures, restrictions on gatherings, public transportation shutdowns, and "stay-at-home" orders,

all of which could have influenced the provision of care. We used the Oxford COVID-19 Government Response Tracker data, which produces a single number per country per date ranging between 0-100, with higher values signifying more stringent policies. We matched the Oxford data with information from the SCS using the exact interview date of all participants, assigning participants values that matched their country and interview date (Hale et al., 2022).

Adult child-parent relationship characteristics in *the present* included the frequency of electronic contact with the parents *during the pandemic*, measured on a scale ranging from 1 (never) to 5 (daily). The quality of the relationship with the parents in *childhood* was assessed separately for the mother and father using the following question: "How would you rate the relationship with your parent?" answered on a scale ranging from 1 (poor) to 5 (excellent).

5.2.3 Control variables

We controlled for individual characteristics whose associations with the psychological well-being of caregivers are well-established in the literature (Allen et al., 2022; Bom et al., 2019; Wister et al., 2022). These variables included **background characteristics** and were obtained from the SCS : respondents' *age* (years), *gender* (0 for men, 1 for women) and *marital status* dichotomized to living as a single (1) or with a partner (0). *Poor financial adequacy* was assessed by the perceived ability to make ends meet, ranging from 1 (easily) to 4 (with great difficulty). To assess *poor subjective health status*, respondents were asked to retrospectively rate their health before the pandemic on a scale ranging from 1 (excellent) to 5 (poor). The *number of respondents' living children* was not available in the SCS data and therefore taken from the previous wave (8).

Duration of care is also considered a strong predictor of caregiving strain (Lindt et al., 2020), therefore we included it in the analyses. This measure was based on information collected in both the pre-pandemic (Wave 8) and pandemic (SCS) waves. Respondents who did not report providing care to their parents before the pandemic and initiated care following the pandemic outbreak were assigned a value of 0, while those who provided care both before and during the pandemic were assigned a value of 1. We controlled for **geographical proximity** to the parents, which is recognized as an important factor influencing the ability to provide care (Guo et al., 2011) and has been associated with psychological outcomes among adult children caregivers (Li et al., 2019). During the pandemic, greater distance was associated with increased frequency of child-parent electronic contact, compensating for limited face-to-face interactions (Vergauwen et al., 2022). We measured geographical proximity separately for fathers and mothers, on a scale ranging from 1 (living in the same building) to 7 (living at a distance of more than 500 km from the parent). In cases where parents co-reside, we assigned the same proximity value to both the mother and father. To represent the overall proximity to parents, we then calculated a mean variable that accounts for the proximity values of both parents. Due to the unavailability of this measure in the SCS, we utilized data from Wave 8, the wave conducted before the pandemic.

The adjusted models controlled for a **macro-cultural aspect**, namely European regions spanning the north-south gradient, based on the SCS Wave. These regions were chosen because of variations in family care obligations, long-term care regimes, and their associations with the psychological well-being of informal caregivers (Brenna & Di Novi, 2016). The regions include Northern Europe (Sweden, Denmark), Western Europe (Austria, Germany, France, Switzerland, Belgium, Luxembourg), Southern Europe (Spain, Italy, Greece, Israel, Croatia, Slovenia), Eastern Europe (Czech Republic, Poland) and the Baltic States (Estonia).

5.3 Data Analysis

We begin by presenting descriptive statistics of the study variables. We used adjusted logistic regression models, separately conducted for the depression and anxiety outcomes. The first step in each model was entering the independent study variables, namely changes in care frequency, the stringency index, and relationship characteristics. In the second step, we (separately) investigated the moderating effects of the stringency index and relationship characteristics on the association between changes in care frequency and worsened psychological well-being. The moderating variables were mean-centered before inclusion in the regression models. We assessed multicollinearity using variance inflation factors (VIF). None of the VIF scores exceeded 2 in our analysis, indicating the absence of multicollinearity.

Table 1: Descriptive statistics of study variables (n= 830)

	Mean (SD)/ n (%)	Range
Background characteristics		
Women	496 (67.03%)	
Age	60.97 (5.22)	42-81
Number of living children	2.10 (1.18)	0-10
Poor subjective health before COVID-19	2.62 (0.93)	1-5
Single	170 (22.97%)	
Poor financial adequacy	1.98 (0.96)	1-4
Geographical proximity to parents	3.44 (1.37)	1-7
Duration of care for parents		
Care provision initiated during the pandemic	384 (51.89%)	
Provided care to parents before COVID-19	356 (48.11%)	
Macro-cultural level: Geographic regions		
North	112 (15.14%)	
West	233 (31.49%)	
East	146 (19.73%)	
South	179 (24.19%)	
Baltic	70 (9.46%)	
Stressors related to caregiving		
Changes in frequency of care following the outbreak of COVID-19[1]		
Lower frequency	145 (19.59%)	
Higher frequency	103 (13.92%)	
Stringency index	48.63 (11.26)	22.22-75.93
Resources: Child-parent relationship characteristics		
Frequency of electronic contact with parents during COVID-19	3.69 (1.38)	1-5
Relationship with mother in childhood	3.88 (0.95)	1-5
Relationship with father in childhood	3.62 (1.08)	1-5
Psychological well-being during COVID-19 (dependent variables)		
Depression	162 (21.89%)	
Anxiety	210 (28.38%)	
Psychological well-being before COVID-19		
Depression	298 (40.27%)	
Anxiety	222 (30.00%)	

Note: [1]Reference categories: Gender: male; Marital status: living with a partner; Changes in frequency of care: no change

6. Results

Descriptive statistics (Table 1) showed that 21.89% of the respondents who provided care to their parents during the initial phase of the pandemic reported experiencing depression and 28.38% indicated that they have felt anxious. Before the pandemic, 40.27% of respondents reported experiencing depression and 28.38% reported feeling anxious. Women made up 67.03% of the respondents. Their mean age was 60.97 (SD=5.22), 22.97% reported being single, and the average number of living children was 2.10 (SD=1.18) . Respondents rated their health before the pandemic as ranging between “very good” and “good” (M=2.62, SD=0.93), and the average perceived ability to make ends meet during the pandemic was almost “fairly easy” (M=1.98, SD=0.96). In addition, 48.11% of respondents reported providing care to their parents before the pandemic as well, and the average geographical proximity to the parents was 3.44 (SD=1.37), indicating that the participants were distributed between the categories of living 1 to 5 km away (category 3) and 5 to 25 km away (category 4). The distribution of the study participants in the geographic regions was as follows: 15.14% from the Northern region, 31.49% from the Western region, 19.73% from the Eastern region, 24.19% from the Southern region and 9.46% from the Baltic states.

Regarding stressors, 13.92% of respondents reported providing care to their parents with higher frequency than before the pandemic, and 19.59% reported a lower frequency of care, with the remaining reporting no change. The average stringency index was 48.63 (SD=11.26), reflecting a medium strictness of the restriction policies.

Concerning child-parent relationship characteristics, respondents reported a high frequency of electronic contact with the parents during COVID-19, between "about once a week" and "several times a week" (M=3.69, SD=1.38). They evaluated their relationship with mothers and fathers in childhood as ranging between "good" and "very good" (M=3.88, SD=0.95 and M=3.62, SD=1.08, respectively).

Multivariate analyses comprised logistic regression models for both depression and anxiety outcomes. Each model included the main independent study variables and was adjusted for covariates. In the next step, we added interactions between the moderating variables and the two levels of changes in the frequency of care variable (lower and higher).

Table 2: Odds ratio estimated for changes in care frequency, stringency index, and relationship with parents on worsened depression and anxiety of adult children during COVID-19: Logistic regression (n=830)

	Depression OR (95% CI)	Anxiety OR (95% CI)
Depressed/anxious before the pandemic[a]	3.03 (2.04-4.41)***	1.56 (1.08-2.25)**
Stressors related to caregiving		
Changes in care frequency after the outbreak of COVID-19[a]		
Lower frequency	0.96 (0.57-1.61)	1.25 (0.82-1.99)
Higher frequency	2.32 (1.38-3.91)***	1.44 (0.89-2.34)
Stringency index	1.02 (1.00-1.04)**	1.01 (0.99-1.03)
Child-parent relationship characteristics		
Frequency of electronic contact with parents during COVID-19	0.88 (0.77-1.01)*	0.98 (0.86-1.12)
Relationship with mother in childhood	0.91 (0.73-1.15)	1.18 (0.96-1.44)
Relationship with father in childhood	1.09 (0.89-1.32)	0.81 (0.67-0.96)**
Covariates		
Women[a]	2.03 (1.27-3.23)***	2.16 (1.45-3.22)***
Age	0.99 (0.96-1.04)	0.97 (0.93-1.00)*
Number of living children	0.97 (0.81-1.16)	0.93 (0.79-1.08)
Poor subjective health before COVID-19[a]	1.73 (1.37-2.19)***	1.32 (1.08-1.62)***
Single[a]	0.67 (0.41-1.09)	0.86 (0.56-1.33)
Poor financial adequacy	1.11 (0.88-1.38)	1.31 (1.08-1.60)***
Geographical proximity to parents	0.92 (0.78-1.07)	1.02 (0.88-1.16)
Provided care to parents before COVID-19[a]	1.15 (0.76-1.76)	1.49 (1.03-2.17)**
Macro-cultural level: Geographic regions[a]		
West	1.04 (0.51-2.11)	0.76 (0.42-1.37)
East	1.89 (0.88-4.07)	1.08 (0.56-2.07)
South	1.22 (0.56-2.67)	1.14 (0.59-2.19)
Baltic	1.88 (0.76-4.63)	1.28 (0.59-2.76)
Pseudo R-squared	0.15	0.09

Note: [a]Reference categories: Depressed/anxious: not depressed/anxious; Changes in care frequency: no change; Gender: male; Marital status: living with a partner; Duration of care: care initiated during the pandemic; Geographic regions: Northern region

*** p<0.01, ** p<0.05, * p<0.1

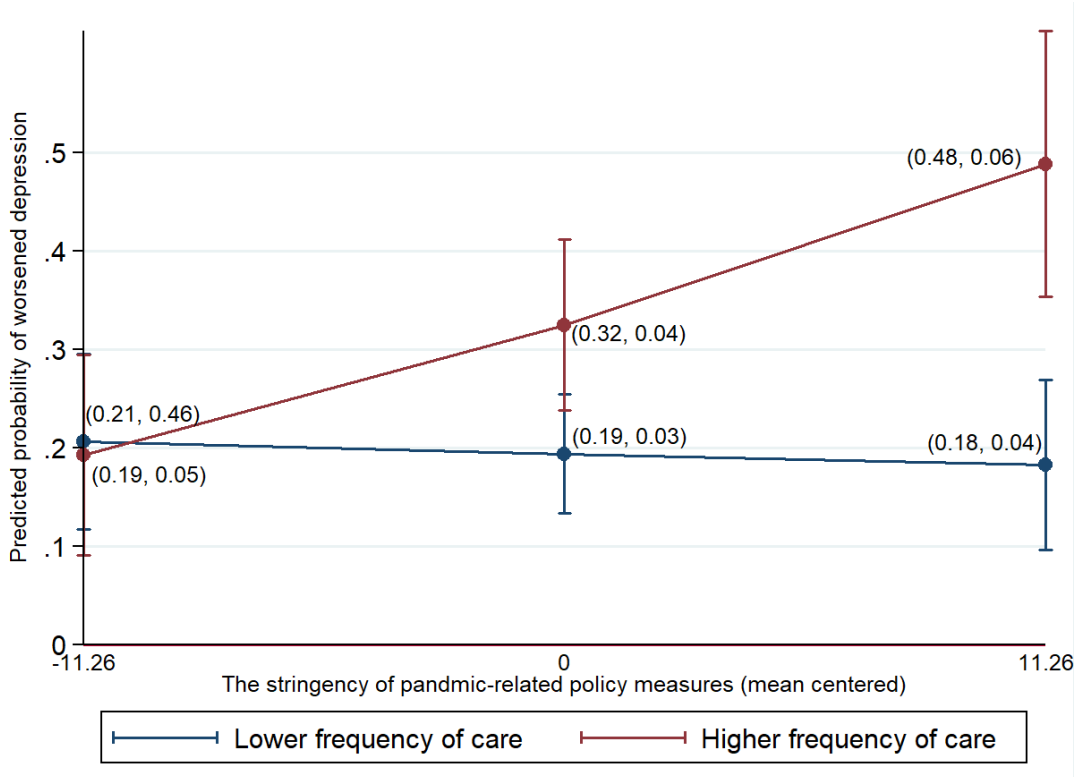
According to Table 2, the more frequent caregiving was, the more likely it was for depression to worsen. This partially confirms hypothesis 1a, which included both depression and anxiety. Additionally, stricter pandemic-related control measures, as indicated by a higher stringency index, were linked to worsened depression. Concerning child-parent relationship characteristics, there was a borderline significant association between more frequent electronic contact with parents during the pandemic and a reduced likelihood of worsened depression. Lastly, a higher quality of relationship with fathers during childhood was significantly associated with a lower likelihood of experiencing increased anxiety.

Table 3: Odds ratio estimated for interaction effects of stringency index and relationship characteristics on the association of care frequency with worsened depression and anxiety of adult children during COVID-19 (n=830)

	Depression OR (95% CI)	Anxiety OR (95% CI)
Stringency index × Changes in care frequency after the outbreak of COVID-19		
Lower frequency	0.98 (0.93-1.02)	0.96 (0.93-1.00)**
Higher frequency	1.06 (1.02-1.11)**	1.00 (0.95-1.04)
Relationship characteristics × Changes in care frequency after the outbreak of COVID-19		
Frequency of electronic contact × Lower frequency of care	1.02 (0.72-1.46)	0.78 (0.56-1.07)
Frequency of electronic contact × Higher frequency of care	0.87 (0.61-1.24)	0.98 (0.70-1.40)
Quality of relationship with mothers in childhood × Lower frequency of care	1.75 (1.04-2.95)**	1.16 (0.76-1.77)
Quality of relationship with mothers in childhood × Higher frequency of care	0.57 (0.31-1.03)*	0.65 (0.37-1.11)
Quality of relationship with fathers in childhood × Lower frequency of care	0.92 (0.58-1.45)	1.09 (0.74-1.61)
Quality of relationship with fathers in childhood × Higher frequency of care	0.76 (0.48-1.22)	1.03 (0.67-1.59)

Note: [a]adjusted for respondents' age, gender, marital status, number of children, geographical proximity to the parents, financial adequacy, health status, duration of care and geographic regions in Europe
*** p<0.01, ** p<0.05, * p<0.1

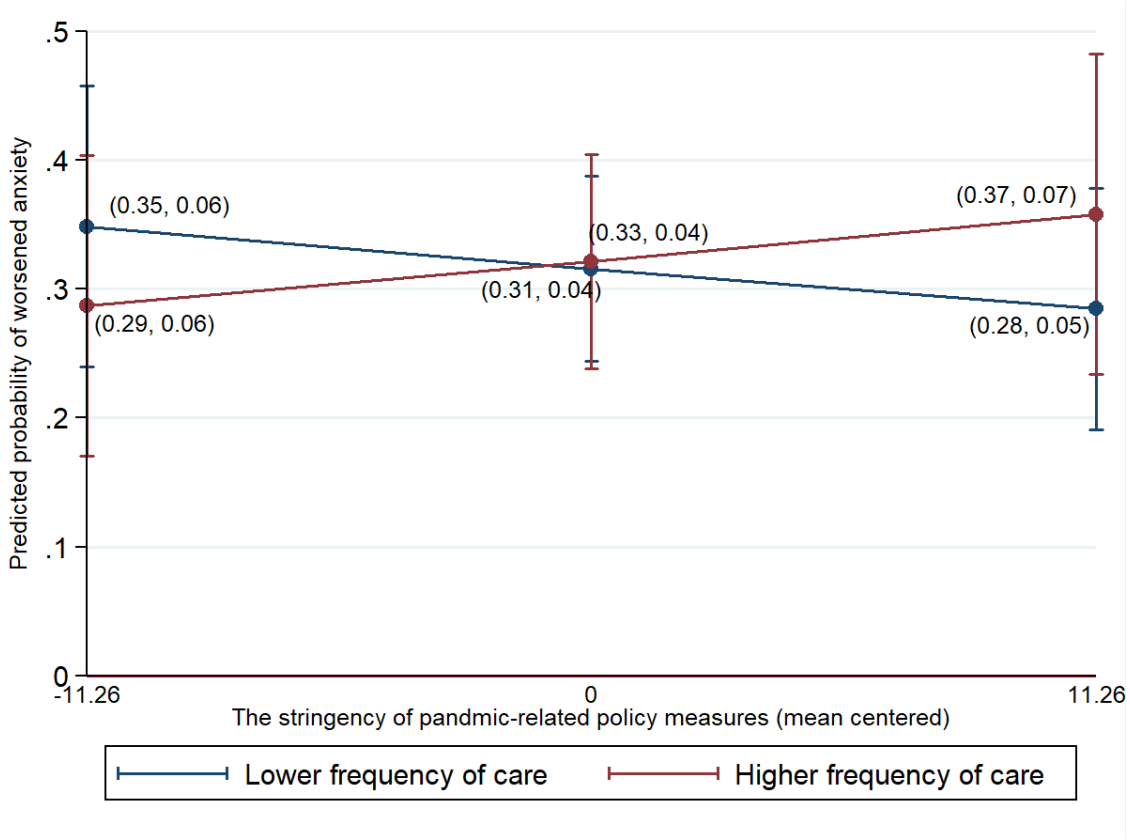
Figure 2: Interaction of stringency of policy measures and care frequency on depression



Note: (Predicted marginal proportions, SE)
Participants who provided higher frequencies of care to their parents (red line) showed a significant increase in the predicted probability of worsened depression in the face of more stringent pandemic-related policy measures.

Regarding the interaction effects, as per Hypothesis 2a, we anticipated that among those who increased the frequency of care, stricter pandemic-related measures would have a positive association with worsened depression and anxiety. As presented in Table 3, the hypothesis was partially confirmed by a significant association concerning depression (refer to Figure 2 for illustration). As per Hypothesis 2b, we identified a significant association between stricter pandemic-related control measures and reduced likelihood of experiencing anxiety for those who provided less frequent care (see Figure 3 for illustration).

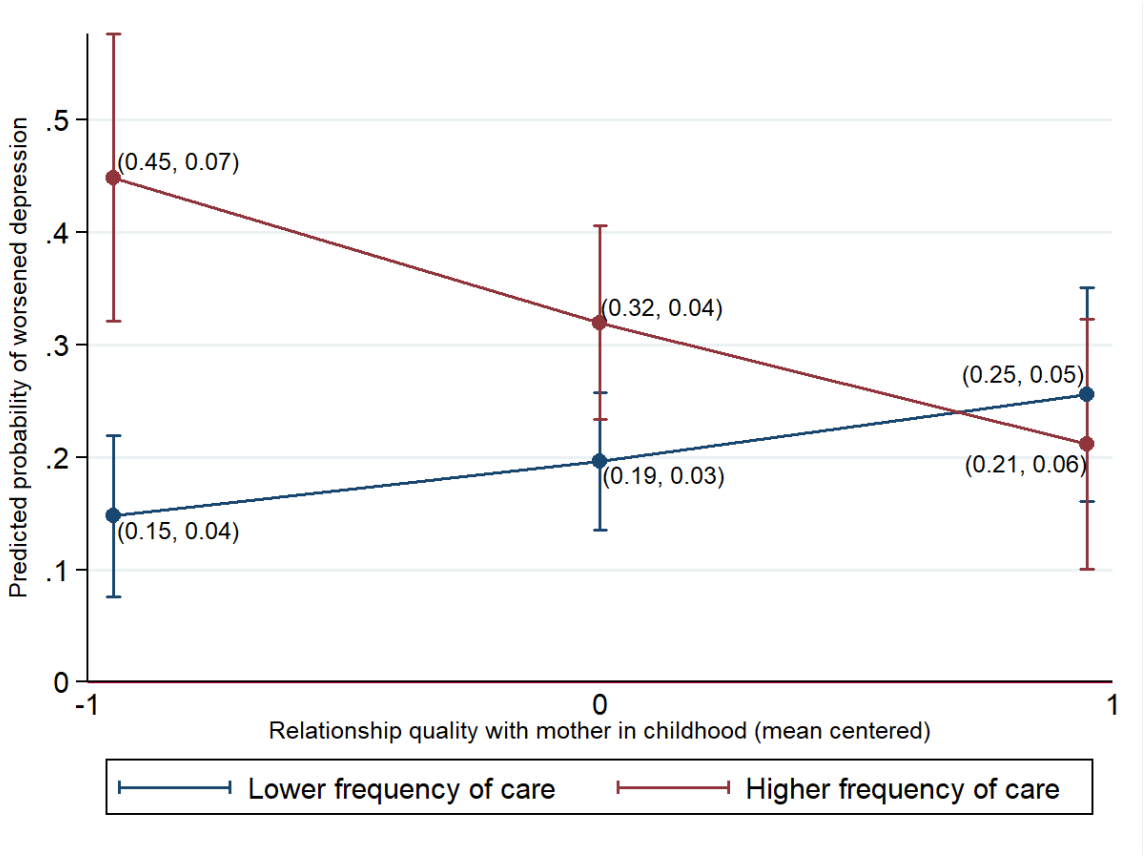
Figure 3: Interaction of stringency of policy measures and care frequency on anxiety



Note: (Predicted marginal proportions, SE)
Participants who provided lower frequencies of care to their parents (blue line) showed a significant decrease in the predicted probability of worsened anxiety in face of more stringent pandemic-related policy measures.

Our study investigated the impact of two relationship characteristics on the well-being of caregivers. We hypothesized (3a) that among those who provided a higher frequency of care, more frequent electronic contact with parents would buffer against worsened depression and anxiety. However, we found no evidence to support this hypothesis. We also hypothesized (4a) that a higher quality of relationship with the parent in childhood would protect against worsened well-being among those who increased their care frequency. Hypothesis 4b further proposed that a higher quality of the relationship in childhood with the parent moderates the association between decreased care frequency and the mental health of adult children. We observed a differential effect of the child-mother relationship on respondents' well-being based on their caregiving frequency (Figure 4). For those who provided more frequent care, a higher quality of relationship with mothers in childhood was associated with a reduced likelihood of experiencing depression. This finding reached borderline significance. Conversely, for those who provided less-frequent care, a higher quality of relationship with the mother in childhood was significantly associated with worsened depression.

Figure 4: Interaction of relationship quality and care frequency on worsened depression



Note: (Predicted marginal proportions, SE)
Participants who provided lower frequencies of care to their parents (blue line) showed a significant increase in the predicted probability of worsened depression as the quality of the relationship with the mother in childhood was rated higher. Conversely, participants who provided higher frequencies of care (red line) showed a borderline significant decrease in the predicted probability of worsened depression as the relationship quality with the mother was rated higher.

7. Discussion

The objective of this study was to explore whether there is a link between the increased care provision for older parents during the initial phase of the pandemic and the decline in well-being of adult children. The study was based on the Stress Process Model (SPM) which suggests that caregivers' well-being is influenced by the interplay between stressors and resources. Our hypotheses focused on the association between increased care provision, which could be considered as a stressor, and the negative impact on adult children's depression and anxiety.

We anticipated that stricter control measures would exacerbate caregiver stress, thus worsening the mental health of those who increased their caregiving frequency. We also predicted that the relationship between the adult child and parent could act as a resource and buffer the negative effect of increased care provision on the caregiver's well-being.

In line with previous studies conducted by Beach et al. (2021), Bom et al. (2019), and Lin et al. (2013), our research found that individuals who provided more frequent care to their parents after the COVID-19 outbreak were more likely to experience worsened depression. Additionally, stricter pandemic-related measures were associated with a decline in mental health, in terms of depression. This could be because caregivers were concerned about the impact of lockdowns and "stay-at-home" orders on their parents' well-being, which could have negatively affected their mental health as well (Lightfoot et al., 2021).

In our investigation, we also examined the moderating role of pandemic-related measures on the relationship between changes in care frequency and the well-being of caregivers. We discovered that stricter

control measures were linked to increased depression in caregivers who provided care to their parents more often. This could be because some caregivers, particularly those who had higher levels of in-person contact with their parents, may have chosen to adopt self-isolation practices to avoid getting infected with the virus. This may have had an impact on their mental health. Another possible explanation is that the implementation of stringent measures made it more challenging for caregivers to provide care and access formal care services, which added to the stress of meeting the increased care demands of their parents. This was also noted by previous studies (D'herde et al., 2021; Lightfoot et al., 2021; Muldrew et al., 2022). It was interesting to find that caregivers who provided less frequent care experienced less anxiety when stricter control measures were implemented. This could be because they were less worried about getting infected by the virus. The results suggest that pandemic restrictions can impact caregivers' well-being in different ways. Restrictions can create stress by making it difficult to provide care or access formal care services. Additionally, stricter measures were closely associated with heightened perceptions of virus severity and caregivers' concerns regarding their own safety and that of their care-receivers. These findings highlight the unique challenges faced by caregivers during the pandemic, which adds to the already significant challenges of caregiving.

One of the main goals of the study was to investigate how changes in care provision affect the well-being of adult children and whether this is moderated by characteristics of the relationship between children and parents. To examine the adult child-parent relationship, we used two dimensions: the affectual and associational aspects (Bengston & Roberts, 1991). We evaluated the quality of the adult child-parent relationship during childhood, separately for mothers and fathers, to assess the affectual dimension. The results showed that a lower quality of relationship with fathers during childhood was associated with a higher likelihood of experiencing worsened anxiety. Although we did not observe the same outcome in relation to mothers, this suggests that parental emotional support during childhood can have a long-lasting impact on the well-being of children in later life (Damri & Litwin, 2019).

We found a differential interaction effect related to the relationship with mothers. Caregivers who increased the frequency of care for their parents during the pandemic showed that a higher quality of relationship with their mother acted as a protective factor against the worsening of depression. Although the finding was borderline significant, the protective effect is in line with attachment theory. It suggests that supportive and emotionally available maternal behaviors during childhood may have served as a model for social behaviors and coping abilities, such as managing the stressful caregiving process and dealing with the role reversal in the child-parent relationship (Archer et al., 2021; Bowlby, 1988; Carpenter, 2001).

On the other hand, an emotionally stronger child-mother relationship during childhood had a reverse impact, worsening depression in those who decreased their care frequency during the pandemic. According to Funk's research in 2015, a good quality of child-parent relationship created at an early stage encourages caregiving as a reciprocal expression of love and warmth. Therefore, when care is given willingly and affectionately, the restricted ability to provide care during the pandemic, probably due to other caregiving or support duties, may have negatively affected the mental health of adult children. The limited capacity to provide care is acknowledged as a source of intrapsychic strain by the SPM (Pearlin et al., 1990). This strain comprises perceptions and emotions like guilt, loss of control, and reduced effectiveness, all of which contribute to poorer psychological outcomes (Wister et al., 2021). Consistent with Kong and Martire's study (2019), the moderating effect of the child-parent relationship in childhood was found only with respect to mothers. Our study suggests that the quality of the relationship with mothers in childhood may have had a more prominent effect on psychological well-being than did the relationship with fathers, possibly because of the central role of mothers as primary caregivers (Cicirelli, 1993).

We assessed the associational dimension of the child-parent relationship by examining the frequency of electronic contact with parents during the pandemic. We expected a higher frequency of contact to reflect greater intergenerational cohesion and stronger relationships during a health crisis, potentially acting as a buffer against the negative effect of increased care responsibilities. We found no significant moderating effect for either depression or anxiety. It is possible that electronic contact did not effectively buffer the negative influence on caregivers' psychological well-being because it may have involved components that did not directly reflect intergenerational solidarity (Vergauwen et al., 2022), such as scheduling medical appointments and sharing information about the pandemic.

The study has several limitations. First, care was operationalized as provision of support in either ADL or IADL. Optimally, each type of care should be addressed separately. But we drew on previous studies that related to both types as provision of care (Allen et al., 2022; Wister et al., 2022). Our study sought to gain

insight into the effect of providing care to an older parent during the pandemic. We measured changes in care frequency since the outbreak of the pandemic but care frequency may have increased over time independently of the pandemic. Yet, our study adopted a pandemic-specific approach by assessing the worsening of depression following the pandemic. We also considered the strictness of pandemic-related policy measures and explored the moderating effect of these measures on the association between care frequency and caregivers' well-being. As for the study design, the independent and moderating variables were not measured in previous waves (except for the relationship with parents in childhood, which was assessed retrospectively), thus limiting our ability to draw causal conclusions.

Measurement of child-parent relationship characteristics presents another set of limitations. Previous waves of SHARE included measures of contemporary relationship quality, such as emotional closeness and satisfaction with the relationship, but in the SCS wave, frequency of contact was the only available measure for assessing the parent-child relationship during the pandemic. Therefore, the study lacks detailed insights into the quality of these interactions. Additionally, when examining the quality of the child-parent relationship in childhood, we relied on retrospective assessments, and as suggested by Nivison and colleagues (2021), retrospective reports of childhood caregiving quality should be interpreted with caution when used as a proxy for prospective data.

Because of the active role adult children play in supporting their older parents, in particular in times of global crisis when formal care is restricted, policymakers should give priority to sustaining their well-being. Efforts should focus on reducing caregiving burden by reinforcing the formal care systems and the informal care networks. Our study has demonstrated the significance of considering the long-term consequences of early child-parent relationships on later-life caregiving experiences (Kong et al., 2021) and the pivotal role of the emotional component within caregiving relationships (Vangen & Herlofson, 2023). The potential influence of the child-mother relationship on adult children's well-being appeared to vary based on caregiving frequency. Specifically, for those who increased their care frequency, a high-quality relationship with the mother in childhood was a protective factor against depression, albeit borderline significant. However, for those who reduced their care frequency, a high-quality relationship with the mother in childhood had an effect of exacerbating depression. Future research should aim to validate these findings. Furthermore, clinical efforts should concentrate on enhancing the quality of emotional relationships with parents and settling parental conflicts from the past.

Finally, It has been observed that pandemic restrictions have further added to the existing stressors of the caregiving process. These stressors may include difficulties in accessing formal care, feelings of guilt, worries, and loss of control due to the inability to provide adequate care. These mechanisms may still be relevant in the post-pandemic era, especially in aging societies where there is an imbalance between care demands and available resources (Raiber & Verbakel, 2021).

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Data availability statement

The SHARE data are available to the research community upon individual registration: http://www.share-project.org/data-access/user-registration.html.

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Information in German

Deutscher Titel

Änderungen in der Pflege von älteren Eltern während COVID-19 und das Wohlbefinden von erwachsenen Kindern: Die moderierenden Rollen der Beziehung zwischen Kind und Eltern sowie pandemiebezogene Maßnahmen

Zusammenfassung

Fragestellung: Die Studie untersucht die Zusammenhänge zwischen Veränderungen in der Pflege älterer Eltern seit der Pandemie und einer Verschlechterung von Depressionen und Angstzuständen bei erwachsenen Kindern. Außerdem wird untersucht, ob pandemiebezogene Kontrollmaßnahmen und die Beziehungen zwischen Kindern und Eltern diese Zusammenhänge moderieren.

Hintergrund: Veränderungen in der informellen Pflege während der Pandemie, wie eine erhöhte oder verringerte Pflegefrequenz, könnten das psychische Wohlbefinden der Pflegepersonen beeinflusst haben. Es gibt nur wenige Untersuchungen darüber, wie Stressfaktoren und Ressourcen das Wohlbefinden von erwachsenen Kindern, die ihre Eltern pflegen, beeinflussen.

Methode: Es wurden die Daten von 740 Befragten der ersten SHARE-Corona-Umfrage (SCS) analysiert, die ihre Eltern während der Pandemie pflegten. Veränderungen bei Depressionen und Ängsten wurden anhand von Daten aus der SCS und der Welle vor der Pandemie untersucht. Es wurden logistische Regressionsanalysen durchgeführt, die Interaktionen zwischen den Moderatoren - Pandemiemaßnahmen und Merkmale der Eltern-Kind-Beziehung - und Veränderungen in der Betreuungshäufigkeit einschlossen.

Ergebnisse: Eine erhöhte Pflegehäufigkeit während der Pandemie war mit einer höheren Depressivität assoziiert. Strengere pandemiebedingte Maßnahmen verstärkten diesen Effekt, reduzierten jedoch auch die Wahrscheinlichkeit von Angstzuständen bei denen, die weniger häufig Pflege leisteten. Eine höhere Qualität der Beziehung zur Mutter in der Kindheit war geringfügig mit einer verminderten Depressivität bei denjenigen assoziiert, die ihre Betreuungsintensität erhöhten, aber mit einer Zunahme der Depressivität bei denjenigen, die sie verringerten.

Schlussfolgerung: Um die Herausforderungen der Pflege nach der Pandemie zu adressieren, sollten sich die Bemühungen darauf konzentrieren, den Stress der Pflegepersonen zu reduzieren und den dauerhaften Einfluss der frühen Eltern-Kind-Beziehungen zu berücksichtigen.

Schlagwörter: informelle Pflege, Eltern-Kind-Beziehung, psychisches Wohlbefinden, COVID-19, Fertilität, SHARE

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