

Original Article


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Emotion dysregulation and family functioning moderate family caregiving burden during the pandemic

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Abstract

Objectives. Since the onset of COVID-19 pandemic, additional risk factors affecting family caregivers' mental health have arisen. Therefore, personal stress coping strategies and family dynamics became important factors in reducing the impact of the pandemic on family caregivers' mental health. The present research aimed to estimate the association between COVID-19 stressors and family caregiving burden. Moreover, moderating effects of emotion dysregulation and family functioning on this association were investigated.

Methods. This study analyzed data collected in April 2021 from 154 family caregivers ($M_{\text{age}} = 38.79$, $SD_{\text{age}} = 9.36$, range = 22–64) recruited through Amazon's Mechanical Turk (MTurk). The impact of COVID-19 stressors on family caregiving burden was tested, and moderating impacts of emotion dysregulation and family functioning were also investigated.

Results. Both COVID-19 stress exposure and stress appraisal were positively associated with family caregiving burden. Emotion dysregulation and problematic family functioning were also positively associated with family caregiving burden. A significant moderating effect of emotion dysregulation was found, such that family caregivers with higher emotion dysregulation were likely to feel more caregiving burden when they experienced more COVID-19 stressors.

Significance of results. The current research highlighted the role of emotion regulation in reducing the negative impact of COVID-19 stressors on family caregiving burden. The research also emphasizes the need for intervention programs to improve emotion regulation strategies to decrease family caregiving burden during the pandemic.

The COVID-19 pandemic arrived in the United States in early 2020, and surges of viral variants have stretched into the third year despite public health efforts to prevent the spread of the disease through vaccines, mask recommendations and mandates, social distancing, and other shelter at home and quarantine-related guidance. Beyond the direct viral impacts on physical health, given the unexpectedly prolonged duration of the pandemic, individuals' mental health has been affected by unstable and uncertain situations created by COVID-19. Notably, the mental health of the subpopulation who are more vulnerable to stress, such as people caring for a family member (i.e., family caregivers), may be particularly adversely affected by the pandemic (Greenberg et al. 2020; Larson et al. 2021; Russell et al. 2020).

Caregiving burden during the COVID-19 pandemic

The strains that constitute caregiving burden are characterized by the tangible and emotional stresses associated with providing care to others and which often co-occur with mental health symptoms (Akkuş et al. 2022; Rajovic et al. 2021). Moreover, caregiving burden may be exacerbated during times of stress, especially when stressors last and when caregivers have few associated opportunities for exerting control over them (Beach et al. 2021; Iovino et al. 2021). In this context, the continuing pandemic, limited access to support resources, and changes in healthcare system may constitute tremendous stressors differentially affecting the caregiving burden of family caregivers (Irani et al. 2021; Masoud et al. 2022; Rajovic et al. 2021; Russell et al. 2021a). Moreover, these heightened strains may be exacerbated among those caring for recipients with intense needs associated with behavioral health and medical conditions (Iovino et al. 2021; Tambling et al. 2022). Thus, caregivers for recipients with diagnosed health conditions were likely to feel remarkably burdened during the pandemic (Akkuş et al. 2022; Iovino et al. 2021; Lightfoot et al. 2021), but caregivers for recipients without any health conditions or significant illness may also experience additional caregiving burden (Russell et al. 2021b) and burnout (Vertsberger et al. 2022). For example, due to

several periods of community lockdown impacting school day operations and children's shifts to participating in online classes from home, parents' burden increased as they took on additional roles monitoring and scaffolding their children's education in addition to caring for other daily needs while spending time with their children all day (Chafouleas and Iovino 2021).

Caregiving burden and COVID-19-related stress

Since the occurrence of the pandemic, caregivers have been exposed to multiple uncontrollable COVID-19 pandemic-related stressors (i.e., COVID-19 stressors) (Budnick *et al.* 2021; Irani *et al.* 2021). Their caregiving burden may be affected by both total stressor exposure and the related but distinct appraised stressfulness of the pandemic. While the pandemic is considered an event with pervasive impacts across multiple stressor domains, studies seeking comprehensive measurement of event-related stress must both address the variability of exposure by type as well as the impact of felt stress on those who participate. Such an approach – one that accounts for both counts of events and individuals' perceptions of how stressful exposure was – is recognized as a more reliable predictor of mental health outcomes (Cohen *et al.* 1983; Epel *et al.* 2018). These accumulated stress exposures may aggravate the caregiving burden of caregivers (Beach *et al.* 2021). For example, parental burnout occurred due to multiple stressful COVID-19-related events, including unstable employment status, financial distress, and children's online classes (Vertsberger *et al.* 2022). Family caregivers for adults were also exposed to additional stressors, such as limited access to support groups or daycare facilities (Irani *et al.* 2021). Perceived stressfulness due to COVID-19 may be another significant determinant affecting long-term caregiving burden (Cluver *et al.* 2020). As the pandemic endures, several COVID-19 stressors experienced by caregivers have amplified caregiving burden (Archer *et al.* 2021) and depressive symptoms (Rajovic *et al.* 2021; Wister *et al.* 2022). Moreover, information about the disease and the steps taken within a given community to respond to surges in infection rates were erratic, without a cohesive national response in the United States, for the first year of the pandemic. These inconsistent crisis responses and uncertainty further caused negative psychological symptoms, increasing the burnout and compassion fatigue among caregivers (Akkuş *et al.* 2022).

Caregiving burden and coping strategies

Caregiving burden may be associated with a decrease in the quality of care provided, adversely affecting care recipients. Thus, previous research has investigated various coping strategies to reduce caregiving burden (Iovino *et al.* 2021; Moskowitz *et al.* 2019), such as individual strategies (e.g., mindfulness, self-compassion) used to regulate negative emotions (Lloyd *et al.* 2019; Tkatch *et al.* 2017) or interpersonal strategies whereby caregivers leverage social resources by seeking support from family members or other relationships in one's social network (Teahan *et al.* 2018). Emotion regulation skills – including the extrinsic approaches to engage with others and the intrinsic strategies to self-regulate one's experience – are considered effective for alleviating caregiving burden (Russell *et al.* 2021a). The transactional model of stress and coping (Lazarus and Folkman 1984) posits that coping strategies would attenuate the association between COVID-19 stressors and family caregiving burden. Therefore, adaptive emotion regulation may buffer the impact of COVID-19 stressors on family caregiving burden (Iovino *et al.* 2021), whereas difficulties in emotion

regulation (i.e., emotion dysregulation) may amplify the negative impact of the stressors on caregiving burden. For example, recent research indicates parents' rumination strengthened the association between COVID-19-related parental stress and burnout, whereas positive reappraisal weakened the association (Vertsberger *et al.* 2022).

Another potential factor that may buffer the effects of stress on caregiver burden is family functioning (Russell *et al.* 2021c). Family interactions that are rewarding and characterized by warmth, affection, and support might reduce the impact of COVID-19 stressors on the family caregiving burden. Structural family theory (Mitrani *et al.* 2005) emphasizes the importance of family experiences affecting the level of family caregivers' stress. This theoretical framework posits that protective family patterns (e.g., family cohesion, closeness, disagreement resolution) would reduce the degree of caregivers' stressfulness due to caregiving. On the other hand, problematic family interactions might amplify the degree of caregivers' psychological symptoms and caregiving burden (Liu and Huang 2018), including more depressive symptoms (Epstein-Lubow *et al.* 2009) and lower quality of life (Rodríguez-Sánchez *et al.* 2011). Considering that caregiving families were likely to experience worse family functioning during the pandemic (Larson *et al.* 2021), problematic family functioning may increase the negative impact of COVID-19 stressor on caregiving burden. While several cross-sectional and short-term studies have reported on caregivers' experiences in the early months of the pandemic (Akkuş *et al.* 2022; Beach *et al.* 2021; Budnick *et al.* 2021), few studies have considered the longer-term impacts of specific COVID-19 pandemic-related stress (i.e., COVID-19 stress) on caregiving burden.

In the current study, we expected that COVID-19 stressor exposure and stress appraisal would each be positively associated with the caregiving burden of family caregivers 1 year into the pandemic. Moreover, we expect that greater emotion dysregulation and poor family functioning would amplify the impact of COVID-19 stressor exposure and stress appraisal on caregiving burden.

Method

Participants

The present research derived data from a longitudinal dataset of 1,565 U.S. adults (53% female, mean age 38 years old), recruited via Amazon's Mechanical Turk (MTurk) online worker pool. Adults aged 18 years or older residing in the United States and able to read English were eligible to participate in the research project. Study participants submitted informed consent before participation in the IRB-approved research project launched by the University of Connecticut (exempt protocol #X20-157). The data were collected at six time-points from April 2020 (Wave 1: W1) – at the first peak of average 7-day new COVID-19 diagnoses – through April 2021 (Wave 6: W6). At each time point, the online-based survey was open for a 2-week data collection window. Participants received \$2 in Amazon.com credit after completing each survey. To protect against that known challenges of online, crowdsourced recruitment (Kees *et al.* 2017), inattentive responses were screened on two criteria: geolocation screening identified cases from outside the United States, and inattentive responses were identified through captcha and distractor items. We also excluded quick responders (those who responded to the entire survey in less than 10 min).

Of the 503 participants completed a survey in April 2021 (i.e., W6), the current study selected data from the 154 participants who

reported currently providing caregiving to their family members living in their homes. Although we instituted additional screens to eliminate those with excessive missing data, none of the 154 identified caregivers were disqualified on that basis from the present analysis. See Table 1 for further sample characteristics.

Measures

COVID-19 stressors

The expanded COVID-19 Stressor Scale (Russell et al. 2021c) was used to measure COVID-19 related stressors that participants experienced. The original stressor scale includes two indicators (i.e., stressor exposure and stress appraisal), and each indicator has 23 items covering four types of stressors (Hynes et al. 2021; Park et al. 2020; Tambling et al. 2020). These include the original three domains – infection-related stress, personal daily activity-related stress, and financial and resource-related stress (26 items total; Park et al. 2020); a fourth, family-related stress set of 7 items was also developed and tested (Russell et al. 2021c) as well as the addition of 3 items to the infection-related stress domain which ask if respondents know someone who died or was serious ill from COVID-related illness, if they have cared for a loved one who they believed had COVID-19, and if they believed they have COVID-19. Stressor exposure was measured by asking whether participants experienced any of 33 different stressors using 1 (*yes*) and 0 (*no*) responses and then summing the positively endorsed items. Stress appraisal was assessed by asking the degree of the stressfulness of each stress experience using a five-point Likert scale ranging from 1 (*not at all stressful*) to 5 (*extremely stressful*), then summing responses for a total appraisal score. Considering research questions, we selected three domains including infection-related, personal daily-related, and financial and resource-related stress in this study.

Family caregiving burden

Family caregiving burden was assessed using the Burden Scale for Family Caregivers (BSFC-s; Pendergrass et al. 2018). Caregivers reported a degree of agreement toward 10 statements using a four-point Likert scale: 0 (*strongly disagree*) to 3 (*strongly agree*). The 10 statements include the following examples: “My life satisfaction has suffered because of the care,” “I often feel physically exhausted,” “From time to time, I wish I could ‘run away’ from the situation I am in.” Caregiving burden was scored by summing up caregivers’ responses to each item. A higher degree of agreement indicates that caregivers perceived a higher burden from their caregiving. In addition, levels of caregiving burden based on the cutoff values were suggested (Pendergrass et al. 2018): 0–4 = *none to mild*; 5–14 = *moderate*; 15–30 = *severe to very severe*. The Cronbach’s alpha for this scale was .93.

Emotion dysregulation

Emotion dysregulation was reported using the Difficulties in Emotion Regulation-Short Form (DERS-SF; Kaufman et al. 2016). DERS-SF has six subscales (i.e., awareness, clarify, goals, impulse, non-acceptance, and strategies), and each subscale is measured using three items. Participants rated the frequency of experiencing difficulties in each item using a five-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*). The total score of DERS-SF was calculated by summing participants’ responses of all 18 items after reversing three items. A higher score indicates participants experienced more emotion dysregulation. The Cronbach’s alpha for the scale was .94.

Table 1. Demographic characteristics (n = 154)

| | M (SD)/n (%) |
|--|----------------------------|
| Age | 38.79 (9.36), range: 22–64 |
| Gender | |
| Male | 63 (40.9%) |
| Female | 91 (59.1%) |
| Race/ethnicity | |
| White, Non-Hispanic | 114 (74.0%) |
| Black, Non-Hispanic | 10 (6.5%) |
| Others, Non-Hispanic | 14 (9.1%) |
| Hispanic (e.g., Asian, Hawaiian, American Indian) | 16 (10.4%) |
| Education level | |
| Elementary school diploma | 0 (0.0%) |
| High school diploma or the equivalent (GED) | 37 (24.0%) |
| Associate’s degree | 30 (19.5%) |
| Bachelor’s degree | 71 (46.1%) |
| Master’s degree | 12 (7.8%) |
| Professional degree (MD, DDS, DVM, LLB, JD, DD) | 3 (1.9%) |
| Doctoral degree (Ph.D. or Ed.D.) | 1 (0.6%) |
| Working status | |
| Employed (Full time and part time) | 134 (87.0%) |
| Marital status | |
| Married | 96 (62.3%) |
| Single | 27 (17.5%) |
| Divorced | 12 (7.8%) |
| Separated | 0 (0.0%) |
| Widowed | 1 (0.6%) |
| Living with, but no married to a significant other | 18 (11.7%) |
| Household income | |
| Less than \$5,000 | 3 (1.9%) |
| \$5,000–\$9,999 | 4 (2.6%) |
| \$10,000–\$14,999 | 0 (0.0%) |
| \$15,000–\$19,999 | 6 (3.9%) |
| \$20,000–\$29,999 | 11 (7.1%) |
| \$30,000–\$39,999 | 17 (11.0%) |
| \$40,000–\$49,999 | 8 (5.2%) |
| \$50,000–\$59,999 | 15 (9.7%) |
| \$60,000–\$79,999 | 36 (23.4%) |
| \$80,000–\$99,999 | 18 (11.7%) |
| \$100,000–\$124,999 | 17 (11.0%) |
| \$125,000–\$149,999 | 7 (4.5%) |

(Continued)

Table 1. (Continued.)

| | <i>M (SD)/n (%)</i> |
|--|--------------------------|
| \$150,000–\$199,999 | 7 (4.5%) |
| More than \$200,000 | 5 (3.2%) |
| Caregiving recipient | |
| Child (any family member under 18) | 116 (75.3%) |
| Older adults (parents, grandparents, aunt or uncle at least one generation older than you) | 41 (26.6%) |
| Other | 6 (3.9%) |
| The number of caregiving recipient | |
| One | 145 (94.2%) |
| Two (and more) | 9 (5.8%) |
| Medical or psychological diagnosis of caregiving recipient | 80 (51.9%) |
| Acute (short-term) medical diagnosis | 11 (7.1%) |
| Chronic (on-going) medical diagnosis | 48 (31.2%) |
| Behavioral/developmental diagnosis | 20 (13.0%) |
| Cognitive/learning impairment diagnosis | 18 (11.7%) |
| Others | 2 (1.3%) |
| Number of diagnoses | 0.64 (0.72), range = 1–3 |
| 0 | 71 (48.1%) |
| 1 | 64 (41.6%) |
| 2 | 13 (8.4%) |
| 3 | 3 (1.9%) |

Family functioning

The General Functioning (GF) subscale of the McMaster Family Assessment Device (FAD; Byles et al. 1988) was used to assess participants' perception toward their problematic family functioning by determining the level of agreement with 12 statements including: "Planning family activities is difficult because we misunderstand each other" and "In times of crisis we turn to each other for support" (reverse-scored). Participants rated the extent of their agreement with each statement using a four-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). The scale score was calculated by averaging participants' responses. A higher FAD score indicates that participants perceived their family functioning as more problematic. The Cronbach's alpha of FAD was .94.

Control variables collected at the baseline

Demographics of the participants were considered as control variables in the current research: Gender (1 = *male* and 0 = *female*), race/ethnicity (1 = *White, non-Hispanic* and 0 = *Other race/ethnicity*), and marital status (1 = *married* and 0 = *non-married*) were reported at baseline; current age, working status (1 = *employed* and 0 = *not employed*), and income (1 = *less than \$5,000* to 14 = *more than \$200,000*) were captured at the 1-year follow-up.

Analytic strategy

We analyzed 154 participants' demographic data from baseline (i.e., W1) and several key variables of interest from the W6 data.

Descriptive and correlation analyses were performed to investigate the characteristics of participants and all research variables. We employed the moderation model (Model 1) suggested by PROCESS macro in SPSS 28.0 (Hayes 2012) to test the concurrent moderating effects of caregivers' emotion dysregulation and family functioning.

Results

Demographic characteristics of 154 participants and the results of correlation analyses are presented in Tables 1 and 2, respectively. The average age of the participants was 38.76 ($SD = 9.36$, range = 22–64), more than half of whom were female (59.1%, $n = 91$); the majority were White, non-Hispanic (74.0%, $n = 114$). Slightly less than half had a Bachelor's degree (46.1%, $n = 71$), and 24.0% ($n = 37$) had a high school diploma or GED. The majority of participants were married (62.3%, $n = 96$) and 87.0% ($n = 134$) were employed. Median household annual income of participants was \$60,000–\$79,999. Of the participants, 75.3% ($n = 116$) provided their caregiving to children and 26.6% ($n = 41$) were taking care of older adults (e.g., their parents or grandparents). In addition, 5.8% of participants ($n = 9$) had two or more caregiving recipients. Slightly more than half of participants (51.9%, $n = 80$) reported their caregiving recipients had at least one medical or psychological diagnosis. Among these care recipients, 60.0% ($n = 48$ out of 80) were diagnosed with chronic or on-going medical conditions, and 25.0% ($n = 20$ out of 80) had behavioral or developmental conditions. Of the participants caring for their children, 18.1% of their caregiving recipients (i.e., children) ($n = 21$) has medical or psychological diagnosis. Moreover, 78.0% of the participants caring for older adults ($n = 32$) reported medical or psychological diagnosis of their caregiving recipients.

Stress exposure

We examined associations among COVID-19 stressor exposure and caregiving burden and the moderating effects of emotion dysregulation and family functioning (see Table 3). The number of COVID-19 stressors to which participants were exposed was positively associated with level of caregiving burden ($B = 0.49$, $p < .001$). In addition, participants with higher emotion dysregulation were likely to report higher levels of caregiving burden ($B = 0.28$, $p < .001$). We found no significant interaction effect between COVID-19 stress exposure and emotion dysregulation on caregiving burden ($B = -0.01$, $p = .067$). Problematic family functioning was significantly associated with family caregiving burden ($B = 8.53$, $p < .001$). There was, however, no significant interaction between COVID-19 stressor exposure and family functioning ($B = -0.14$, $p = .529$).

Stress appraisal

Next, we investigated whether COVID-19 stress appraisal was associated with caregiving burden and whether emotion dysregulation and family functioning moderated the association (see Table 4). Participants reporting higher appraised stressfulness of COVID-19 were likely to report more caregiving burden ($B = 0.17$, $p < .001$). Participants' level of emotion dysregulation was also positively associated with caregiving burden ($B = 0.27$, $p < .001$). Moreover, we found a significant interaction between COVID-19 stress appraisal and emotion dysregulation on caregiving burden ($B = -0.005$, $p < .01$). This result indicated that family

Table 2. Correlation among research variables and demographics (*n* = 154)

| | <i>M (SD, range)/%</i> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------------------|------------------------|----------|----------|---------|---------|----------|--------|--------|--------|---------|-------|
| 1. Stressor exposure | 4.67 (4.24, 0–26) | – | | | | | | | | | |
| 2. Stress appraisal | 13.03 (15.78, 0–113) | .946*** | – | | | | | | | | |
| 3. Family caregiving burden | 11.50 (7.33, 0–30) | .386*** | .433*** | – | | | | | | | |
| 4. Family functioning | 1.77 (0.45, 1–3.33) | .244** | .292*** | .576*** | – | | | | | | |
| 5. Emotion dysregulation | 34.10 (13.68, 18–77) | .355*** | .359*** | .543*** | .521*** | – | | | | | |
| 6. Age | 38.79 (9.36, 22–64) | –.156 | –.178* | –.115 | –.199* | –.348*** | – | | | | |
| 7. Gender ^a | 40.9% | –.059 | –.066 | –.055 | .087 | .042 | –.040 | – | | | |
| 8. Race ^b | 74.0% | –.082 | –.123 | –.174* | –.222** | –.125 | .180* | –.049 | – | | |
| 9. Marital status ^c | 62.3% | –.083 | –.089 | –.117 | –.254** | –.099 | .040 | .020 | .243** | – | |
| 10. Working status ^d | 87.0% | –.081 | –.061 | –.177* | –.007 | –.181* | .086 | .243** | –.097 | –.021 | – |
| 11. Median income | \$50,000 – \$59,999 | –.265*** | –.281*** | –.191* | –.243** | –.122 | .231** | .113 | .164* | .451*** | .165* |

Note. ****p* < .001, ***p* < .01, **p* < .05.

^aGender: 1 = Male.

^bRace: 1 = White, non-Hispanic.

^cMarital status: 1 = Married.

^dWorking status: 1 = Employed.

Table 3. The results of moderation analyses: IV = Stressor exposure

| | Model 1 | | | | | Model 2 | | | | |
|-----------------------------|----------|-----------|----------|----------|-----------------------|----------|-----------|----------|----------|-----------------------|
| | <i>B</i> | <i>SE</i> | <i>t</i> | <i>p</i> | <i>R</i> ² | <i>B</i> | <i>SE</i> | <i>t</i> | <i>p</i> | <i>R</i> ² |
| Age | 0.04 | 0.05 | 0.79 | .429 | | 0.10 | 0.06 | 1.76 | .081 | |
| Gender | –0.87 | 1.00 | –0.87 | .386 | | –0.36 | 1.02 | –0.35 | .726 | |
| Race | –1.49 | 1.15 | –1.29 | .198 | | –2.36 | 1.15 | –2.05 | .043 | |
| Marital status ^a | 0.58 | 1.12 | 0.51 | .610 | | 0.30 | 1.15 | 0.26 | .794 | |
| Working status ^b | –2.99 | 1.54 | –1.94 | .054 | | –1.04 | 1.55 | –0.67 | .503 | |
| Income | 0.06 | 0.20 | 0.28 | .784 | | –0.17 | 0.20 | –0.82 | .414 | |
| Stressor exposure (SE) | 0.49 | 0.13 | 3.74 | .000 | | 0.46 | 0.14 | 3.33 | .001 | |
| Family functioning | 8.53 | 1.16 | 7.38 | .000 | 0.43*** | | | | | |
| SE × Family functioning | –0.14 | 0.21 | –0.63 | .529 | 0.44 | | | | | |
| Emotion dysregulation | | | | | | 0.28 | 0.04 | 6.56 | .000 | 0.39*** |
| SE × Emotion dysregulation | | | | | | –0.01 | 0.01 | –1.85 | .067 | 0.40 |

Note. ****p* < .001, ***p* < .01, **p* < .05.

^aMarital Status: 1 = Married.

^bWorking status: 1 = employed.

caregivers with more emotion dysregulation had more caregiving burden when they experienced a higher stressfulness of COVID-19 (Fig. 1). On the other hand, family functioning was associated with caregiving burden (*B* = 8.45, *p* < .001), but it did not moderate the association between COVID-19 stress appraisal and caregiving burden (*B* = –0.07, *p* = .157).

Discussion

The present study aimed to investigate the association between COVID-19 related stressors and caregiving burden, examining links between stress exposure and appraisals of stressfulness separately. Moreover, in both cases, we tested whether caregivers' emotion dysregulation and family functioning would moderate the

impact of the stressors on their caregiving burden. The level of family caregiving burden reported by this sample one year after the start of the pandemic was moderate, considering suggested cut-off values from the measure's authors (Pendergrass et al. 2018). We found that COVID-19-specific stress was positively associated with caregiving burden. This result is consistent with research reporting high levels of caregiving burden during the pandemic (Budnick et al. 2021; Rajovic et al. 2021; Russell et al. 2020). More specifically, during the pandemic, both the total amount of stress exposure and perceived stressfulness were positively associated with caregiving burden.

Regarding the second aim of this study, we found moderating effects of caregivers' emotion dysregulation. Caregivers with higher emotion dysregulation were likely to report higher burden when encountering COVID-19 related stressors than were

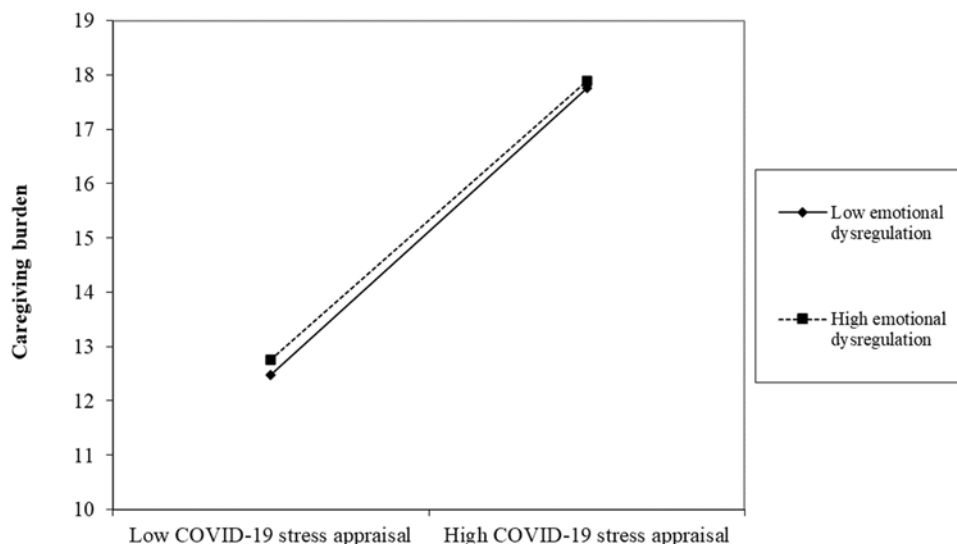
Table 4. The results of moderation analyses: IV = Stress appraisal

| | Model 1 | | | | | Model 2 | | | | |
|-----------------------------|----------|-----------|----------|----------|-----------------------|----------|-----------|----------|----------|-----------------------|
| | <i>B</i> | <i>SE</i> | <i>t</i> | <i>p</i> | <i>R</i> ² | <i>B</i> | <i>SE</i> | <i>t</i> | <i>p</i> | <i>R</i> ² |
| Age | 0.03 | 0.05 | 0.61 | .540 | | 0.09 | 0.06 | 1.57 | .119 | |
| Gender | -0.66 | 0.98 | -0.67 | .503 | | 0.01 | 1.00 | 0.01 | .990 | |
| Race | -1.13 | 1.13 | -1.00 | .321 | | -1.91 | 1.12 | -1.71 | .089 | |
| Marital status ^a | 0.47 | 1.10 | 0.42 | .674 | | 0.20 | 1.11 | 0.17 | .866 | |
| Working status ^b | -3.33 | 1.50 | -2.23 | .027 | | -1.63 | 1.48 | -1.10 | .273 | |
| Income | 0.04 | 0.20 | 0.21 | .832 | | -0.20 | 0.20 | -1.03 | .305 | |
| Stress appraisal (SA) | 0.16 | 0.04 | 4.35 | .000 | | 0.17 | 0.04 | 4.47 | .000 | |
| Family functioning | 8.45 | 1.14 | 7.39 | .000 | 0.45*** | | | | | |
| SA × Family functioning | -0.07 | 0.05 | -1.42 | .157 | 0.46 | | | | | |
| Emotion dysregulation | | | | | | 0.27 | 0.04 | 6.69 | .000 | 0.42*** |
| SA × Emotion dysregulation | | | | | | -0.005 | 0.002 | -2.78 | .006 | 0.45** |

Note. ****p* < .001, ***p* < .01, **p* < .05.

^aMarital Status: 1 = Married.

^bWorking status: 1 = employed.

**Figure 1.** The interaction between COVID-19 stress appraisal and emotion dysregulation on caregiving burden.

those with better regulatory skill. This effect indicates that individuals with better regulatory skill were better able to modulate the negative effects of COVID-19-specific stress. In other words, regulatory skill aids in stress management, as reported by similar studies examining outcomes from early in the pandemic (Hussong et al. 2022; Russell et al. 2021c). Our study provides reports of family experiences 12 months into the pandemic and adds nuance by examining the potential for different experiences by cumulative stress events and – separately – their stressfulness. Regarding the former, we note the current results are in line with 60-day impacts (from Wave 3) on mental health reported from this sample of caregivers earlier in the pandemic (Russell et al. 2021a) and with other studies collecting data in 2020 (Astle et al. 2021; Wu et al. 2020). With regard to the latter, both moderation models indicate a predisposition to better regulatory skill dampens the association between stress and burden. We also note that effects were clearer when examining appraisals of stress than exposure,

though the moderation effect is small, thus warranting caution in interpretation. The effect of regulatory disposition on the stress appraisal to burden outcome may be relatively gentle because perception of stressfulness for each COVID-specific stressor measured in our appraisal score are more potent than the more diffuse ability to regulate negative affect broadly; in other words, the specific features of COVID-19-related strains were more salient on perceptions of caregiving burden than one's general ability to overcome them. One might find that an emotion regulation measure specific to the same stressful pandemic experiences would better illustrate the associations at play with caregiving, particularly if items spoke to the family experiences of monitoring and responding to stresses within families rather than as individuals (to our knowledge, no such measure exists).

Meanwhile, a significant moderating effect of family functioning was not found in this study. One explanation for this nonsignificant result is that our hypothesis was built on evidence that families

would experience the pandemic as stressful and that the relationships within a household would be strained as a result (Larson et al. 2021). There is theoretical support for this supposition, found in the spillover hypothesis that demonstrates how stresses are transferred within family systems (Kouros et al. 2014; Price et al. 2016), and evidence of transmission of parents' stress to children during the pandemic (via communication patterns; Hussong et al. 2022). However, not all families experienced deterioration in the quality of their relationship patterns. Indeed, several studies reported gains in family cohesion or perceived closeness since the start of the pandemic (Astle et al. 2021; Li et al. 2021; Lightfoot et al. 2021) despite high levels of stress. Reports of improved outcomes despite high stress reflect compensatory rather than direct spillover or crossover effects (Nelson et al. 2009), wherein the transfer of stress between family members occurs in the opposite direction. For example, parents might seek closeness and build positive relationships with children to compensate for dissatisfaction or discomfort in another domain (like those impacted by the pandemic, such as work routines, financial stability, connection to peers, and broader support systems). Furthermore, the pandemic may provide opportunities for family caregivers to relief their caregiving burden by experiencing positive family functioning, such as spending more time with caregiving recipients and other family members, experiencing supports within deepened family relationships, and recognizing resilience of their family during the pandemic (Lightfoot et al. 2021).

While this paper adds valuable information about family experiences 1 year into the COVID-19 pandemic, several limitations should be noted. This analysis employed a cross-sectional methodology, so causal relationships between COVID-19 stressors and caregiving burden could not be estimated. The participants for this study were recruited from the online worker population of Amazon's MTurk, while sampling U.S. adults through MTurk does not yield a strictly representative sample – for example, our sample was 71% White, non-Hispanic (compared to 61.6% nationally; US Census Bureau 2021) – previous research has shown that health related studies based on MTurk Survey data yield findings comparable those obtained from more probabilistic samples (Mortensen and Hughes 2018). Considering the sample's socioeconomic status, including income and educational attainment, the present results might not be generalizable to the population at large. Analyses potentially detecting the impact of family dysfunction and its interaction with stress may have been underpowered since participants were not specifically selected based on patterns of family dynamics. Additional information about perceived social support throughout the pandemic would have also strengthened descriptions of the potential moderators of caregiver burden over time. Since the data for the present study were collected one year after the occurrence of the pandemic, the considerable impact of the pandemic on caregiving burden may have been reduced given the potential for adaptation and resilience in the intervening months (Park et al. 2021). Moreover, this study considered family caregivers as a singular group embracing parents, adult caregivers for their older parents, and family caregivers for recipients with illness. Depending on the type of family caregivers, there may be differences in COVID-19 pandemic-related challenges that they encountered, affecting their caregiving burden. The participants reported their caregiver status and caregiving recipients' information, but not their specific caregiving activities, and hours and duration of caregiving.

Implications for future research

This study highlighted the importance of family caregivers' stress management strategies to reduce the negative impact of the pandemic on their caregiving burden. Intervention programs customized to address the uncontrollable circumstances brought to bear on families during the COVID-19 pandemic (e.g., school and workplace disruptions) would be helpful for caregivers to cope with the additional strains caregivers assumed during the pandemic. We suggest the development of an online intervention program that could include synchronous family caregivers coaching and group social support opportunities, as well as asynchronous resources on stress management techniques, available resources within a specific community, and linkages to higher levels of mental health support for those with exacerbated needs. Online intervention programs like this are ideal for community crises like pandemics, when patterns of resource engagement are disrupted and access to in-person supports are limited (Hirschman et al. 2021; Lake et al. 2022). More specifically, the intervention enhancing emotion regulation strategies of family caregivers would help the caregivers coping with their distress while encountering multiple stressors.

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