The Moderating Role of Caregiving on Fear of COVID-19 and Post-Traumatic Stress Symptoms

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Abstract: Caregiving has been associated with increased levels of fear and post-traumatic stress symptoms (PTSS) during COVID-19 pandemic. However, there is a lack of studies that analyze when the relationship between fear and PTSS occur, using informal caregiving as a moderator variable. To explore this moderating role, we conducted a cross-sectional online study between November 2020 and January 2021. A total of 503 men and women from the Spanish general population completed the survey. Sociodemographic and Covid-19-related data, fear of COVID-19, PTSS symptoms, and current psychological history were assessed. Prevalence of informal caregiving in the sample was 16.5%. Increased levels of fear and PTSS were found in caregivers compared to non-caregivers. Female gender and high number of COVID-19 related risk factors was also associated with fear and PTSS severity. The moderation analyses showed an interaction effect between caregiving and fear of COVID-19 when predicting PTSS symptoms. Particularly, results showed that informal caregivers reported greater PTSS symptoms, when compared to non-caregivers with same levels of fear of COVID-19. This evidence suggests that being a caregiver could increase the fear’s impact on PTSS severity in the context of pandemics. Further studies with larger samples are needed to confirm these findings.

Keywords: COVID-19 fear; post-traumatic symptoms; caregiver; informal caregiver; pandemics

1. Introduction

Several studies have analyzed the COVID-19 pandemic’s effects on mental health of general and vulnerable populations—such as healthcare workers, the elderly, or chronic-disease patients [1–5]. All reviews agree that the pandemic has increased mental health problems globally, with generalized fear as the central feature of its psychological impact [6,7].

Fear is a common emotional response during pandemics [7–10] and it can have a positive influence on infection control measures and prevention behaviors, such as isolation compliance, mask usage, hand-washing, or social distancing [11]. For this reason, some prevention strategies have intended propagated fear in order to curb the spread of coronavirus and reduce the consequences of the pandemic [12]. However, the use of this strategy, along with strict lockdown measures, has been associated with excessive fear and a lack of sense of security, specially promoted by the media [12–14]. As a result of this situation, previous authors found that fear of the COVID-19 and its effects is currently far greater than the negative experiences lived during this pandemic [12]. These findings merit special attention, since besides its adaptive function, excessive and prolonged fear has been associated with greater risk of developing of psychopathology [15–18].

In this regard, failure to reduce fear responses is one of the major reasons behind the development of post-traumatic stress symptoms (PTSS) [19,20], and increased prevalence of these symptoms have been also found during COVID-19 pandemic [21].

Prevalence of PTSS during COVID-19 and other pandemics—such as Ebola, Zika, or SARS—has been estimated around 20% [22,23]. The heightened prevalence of stress-related disorders after COVID-19 outbreak has been linked with higher fear of becoming...
infected, along with other variables such as younger age, female gender, or having infected relatives/friends [24–28]. Moreover, excessive fear has been also associated with social problems like panic buying, stigmatization of healthcare workers, and xenophobia [29–31].

Regarding this COVID-19-related stress reactions, different authors have emphasized that fear experienced during COVID-19 pandemic not only represents being scared of getting infected. In fact, a recent study has found that fear as regards the health consequences of COVID-19 only constitute a third of the anxieties reported by the European population [12]. In this sense, fear appears to be a multidimensional phenomenon which involves different domains—including bodily, interpersonal, behavioral, and cognitive features [32,33]. Given its importance in the context of a pandemic, several studies have examined which variables increase the risk of experiencing intense fear. Again, female gender as well as lower educational level, intolerance of uncertainty or perceived vulnerability to the disease have been identified as strong risk factors for fear, not only in current COVID-19 pandemic, but also in the previous aforementioned epidemics [8,17,30,34–36]. Fear is also associated with lower self-efficacy and insecure attachment, especially in the use of avoidance behaviors to manage anxiety and as preventive strategies [37,38]. Besides these factors, previous evidence also suggests a relationship between high levels of fear, the perceived risk for loved ones, and concerns about infecting family members, especially in those who have a caregiving role [17,39–41].

Informal caregiving, which is defined as the unpaid care provided to dependent relatives or family members [42], seems to increase even more the psychological consequences of the COVID-19 pandemic. Greater levels of anxiety, depression and even somatic symptoms have been found in this population [40,43–46], while its caregiving intensity and burden increased during this period [47,48]. Due to the complete closure of day-care centers, the loss of support services and the saturation of healthcare capacities, informal caregivers had played an even more important role during COVID-19 pandemic [43,49,50]. For this reason, informal care has been considered an additional stressor that can negatively affect the physical and mental health of an already vulnerable population [43,51–53].

Although being considered a stressor, there is still weak evidence about the specific role of this variable in the development of stress-related disorders during COVID-19 pandemic. More particularly, to the best of our knowledge, there are no studies that examine in which way informal caregiving impacts the relationship between fear of COVID-19 and post-traumatic symptoms. For this reason, the aim of this study was to examine the potential moderator effect of caregiving in the relationship between both variables.

Based on the aforementioned evidence, the following exploratory hypotheses were tested:

**Hypothesis 1.** Higher levels of fear of COVID-19 and greater PTSS symptoms will be significantly associated with female gender, younger age, lower education levels, informal caregiving, and higher number of COVID-19-related variables.

**Hypothesis 2.** High levels of fear of COVID-19 will be significantly associated with greater PTSS severity.

**Hypothesis 3.** Informal caregiving would moderate the association between fear of COVID-19 and PTSS severity.

### 2. Materials and Methods

#### 2.1. Study Design and Participants

This cross-sectional study was approved by the Committee of Research and Ethics of the Miguel Hernández University of Elche (reference number: DPS.JCC.01.20).

Sampsize program [54] was used to calculate the minimum sample size. In Spain, prevalence of informal caregiving is estimated at 16% [55]. Based on this rate, the minimum sample size required for this study was 207 (with a 5% margin of error and 95% confidence
level). Inclusion criteria were as follows: (1) age ≥ 18, (2) living in Spain during COVID-19 crisis, and (3) signing informed consent before participating in the study.

Potential participants were recruited between November 2020 to January 2021 using a multi-modal strategy. First, a survey was distributed via social media platforms. To minimize the bias of nonprobability sampling, 10 initial participants (‘seeds’) were selected to initiate the survey link distribution. Seeds were selected based on gender, age category, geographical location, and occupational status. Then, survey was distributed via the mailing lists of the Miguel Hernández University. Participants were invited to participate in the study using the following statement: “Researchers of the Miguel Hernández University want to know how the COVID-19 pandemic is affecting you. For this reason we are developing a tool for preventing emotional problems during the pandemic. Tracking your mood during these days can help us improve the accuracy of the tool that will be used by healthcare professionals. Would you like to collaborate in our study? Please followed this link to our website for more details”. All participants were directed to an external survey website (preventep.com (accessed on 1 January 2021)), which host information about the aim of the study, the Participant Information Statement text and a link to the online questionnaire. Chatbot technology of the SurveySparrow platform was used to display survey questions in a conversational manner, which has been pointed out as a cost-effective assessment method [56,57]. These recruitment strategies yielded a total sample of 503 individuals from the Spanish general population.

2.2. Measures

Participants provided information about age, gender, educational level, and occupational risk of exposure to COVID-19 (e.g., frontline responders or healthcare workers).

Informal caregiving was ascertained by asking participants: “Do you assisted a family member or relative who has health problems without receiving any salary?”. Response alternatives were: (1) yes; (2) not now, but I have assisted a family member/relative during the last 12 months; and (3) no. Only participants who answer ‘no’ to this question were classified as non-informal caregivers.

Post-traumatic stress symptoms (PTSS) were assessed with the Post-traumatic Stress Disorder (PTSD) Checklist for DSM-5 (PCL-5) [58]. PCL-5 is made up of 20 Likert-type items that assess PTSD symptoms according to DSM-5 diagnostic criteria [59]. Participants rate how much each symptom has bothered them on a five-point scale (0 = not at all, 4 = extremely). As in previous studies [60], items asking about symptoms of reexperiencing and trouble remembering parts of the stressful experience were deleted from the PCL-5, since the pandemic is an ongoing stressor [61,62]. This instrument has been widely used for assessing PTSD symptoms prior and during COVID-19 pandemic [22,63], because of its good psychometric properties. Total score of the scale, ranging from 0 to 72, indicated severity of PTSS symptoms.

Fear of COVID-19 was evaluated using the Fear of COVID-19 Scale (FCV-19S) [7], in its Spanish version [64]. This unidimensional measure includes seven items with Likert-type response options ranging from 1 (strongly disagree) to 5 (strongly agree). Scores in each item of the scale item are adding up to a total score of 7 to 35 points, with higher values indicating greater fear of COVID-19. The Spanish version of the FCV-19S has shown acceptable internal consistency and test-retest reliability (α = 0.82 and ICC = 0.72) [64].

Similar to previous research [65], a COVID-19 risk factors index was created by adding up each positive answer (yes) of four ad-hoc items assessing: (1) occupational risk of exposure to COVID-19 (e.g., frontline responders or healthcare workers); (2) self-reported COVID-19 symptoms/diagnosis or hospitalization due to COVID-19; (3) family or relatives who were infected, hospitalized or dead because of COVID-19; and (4) having received psychological treatment during the epidemic. Higher scores indicate the presence of more COVID-19-related risk factors (ranging from 0 to 4).
2.3. Analysis Strategy

Data were analyzed using the SPSS 27.0 software. First, means, standard deviations, and bivariate correlations were computed for all variables.

To test whether caregiving moderates the relationship between fear of COVID-19 (predictor variable) and PTSS symptoms (outcome variable), a simple moderation analysis was also conducted using PROCESS Macro Model 1 [66]. The conceptual model is shown in Figure 1. Variables that were significantly correlated with PTSS symptomatology, were included as covariates in moderation analysis. Post-hoc simple slope analyses were performed to estimate conditional effects of the moderator variable. The interaction effect (Fear of COVID-19 × Caregiving) was considered significant when 95% confidence intervals (CIs) did not include zero [66]. Bootstrapping resampling technique (with 10,000 replications) was used to estimate 95% CIs and continuous variables were mean centered to avoid potential multicollinearity effects [67]. The confidence level was set at 95%.

![Figure 1. Conceptual diagram of the moderation model.](image)

3. Results

3.1. Sample Characteristics

Table 1 shows the demographic, psychological and COVID-19 related characteristics of the total sample (N = 503). Participants’ mean age was 35.54 ± 12.79 (ranging 18–75 years) and 82.50% (n = 415) were female. Regarding informal caregiving during COVID-19 pandemic, prevalence of caregivers was 16.50% (n = 85).

Table 1. Demographic, psychological, and COVID-19 related characteristics of the sample.

| Variables                                               | Total (N = 503) | Range          |
|---------------------------------------------------------|----------------|----------------|
| Gender, % (n)                                           |                |                |
| Male                                                    | 17.50 (88)     |                |
| Female                                                  | 82.50 (415)    |                |
| Age, M ± SD                                             | 35.54 ± 12.79  | 18–75          |
| Educational level, % (n)                                |                |                |
| Elementary/primary                                      | 2.40 (12)      |                |
| Secondary/technical                                     | 40.60 (204)    |                |
| University or higher                                    | 57.10 (287)    |                |
| Informal caregiving, % (n)                              | 16.90 (85)     |                |
| Fear of COVID-19 (FCVS-19), M ± SD                      | 18.73 ± 6.08   | 7–35           |
| Post-traumatic stress symptoms (PCL-5), M ± SD          | 21.52 ± 12.78  | 0–72           |
| COVID-19 risk factors, M ± SD ‡                        | 2.31 ± 0.86    | 0–4            |
| a Potential/direct occupational exposure to COVID-19, % (n) | 13.70 (69)     |                |
| b Friends/relatives infected with COVID-19, % (n)        | 83.50 (420)    |                |
| c Reported COVID-19 symptoms/diagnosis, % (n)           | 45.70 (230)    |                |
| d Receiving psychiatric/psychological treatment, % (n)   | 15.50 (78)     |                |

a COVID-19 risk factors score is the sum of the positive answers in a, b, c, and d risk factors.
Mean score of COVID-19-related risk factors was 2.31 ± 0.86 (ranging from 0 to 4). Specifically, 83.50% \((n = 420)\) of the sample reported having friends or relatives infected with COVID-19. Moreover, overall prevalence of self-reported COVID-19 symptoms or diagnosis was 45.70% \((n = 230)\). Data about occupational status showed that almost 14% \((n = 69)\) of the sample were working in a job with direct or high potential exposure to COVID-19. Finally, regarding participants’ psychological status, 15.50% \((n = 78)\) reported having received or asked for psychological support during COVID-19 pandemic. According to PCL-5 scores, the mean PTSS severity of the sample was 21.52 ± 12.78, and mean levels of fear of COVID-19 were 18.73 ± 6.08.

3.2. Correlations between Study Variables

Correlations between study variables and internal consistency (McDonald’s omega coefficients) are displayed in Table 2. Results showed that fear of COVID-19 was strongly associated with PTSS symptomatology \((r = 0.59, p < 0.001)\). A direct association was also found between fear of COVID-19 and informal caregiving \((r = 0.16, p \leq 0.01)\).

|                | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
|----------------|----|----|----|----|----|----|----|
| 1. Fear of COVID-19 | (0.87) |    |    |    |    |    |    |
| 2. PTSS symptoms    | 0.587 ** (0.92) |    |    |    |    |    |    |
| 3. Informal Caregiving (ref. no) a | 0.162 ** 0.175 ** - |    |    |    |    |    |    |
| 4. Gender (ref. male) b | -0.247 ** -0.117 ** -0.068 - |    |    |    |    |    |    |
| 5. Age              | 0.081 -0.096 * 0.005 0.012 - |    |    |    |    |    |    |
| 6. Educational level (ref. elementary) c | 0.016 0.041 0.005 -0.078 0.094 * - |    |    |    |    |    |    |
| 7. COVID-19 risk factors | 0.131 ** 0.216 ** 0.122 ** 0.023 -0.165 ** -0.091 * - |    |    |    |    |    |    |

Notes. Correlations were computed using Pearson’s correlation for continuous variables, point-biserial for binary variables and Spearman’s rank for ordinal variables. Reliability coefficients (McDonald’s omega) are displayed in parentheses. a 0 = non-caregiver, 1 = informal caregiver; b 0 = female, 1 = male; c 0 = elementary, 1 = secondary, 2 = university. * \(p < 0.05\), ** \(p < 0.01\).

Moreover, bivariate correlations indicated that increased levels of fear were associated with female gender \((r = −0.25, p \leq 0.001)\) and higher number of COVID-19 risk factors \((r = 0.13, p = 0.003)\). Conversely, fear of COVID-19 was not associated with age \((r = 0.08, p = 0.070)\) or educational level \((r = 0.02, p = 0.712)\).

Higher levels of PTSS symptoms were also associated with caregiving \((r = 0.18, p \leq 0.001)\), higher scores in COVID-19 risk factors \((r = 0.22, p \leq 0.001)\) and female gender \((r = −0.12, p = 0.009)\). Unlike fear of COVID-19, results indicated that when age decreased, PTSS symptoms increased \((r = −0.10, p = 0.032)\).

3.3. Moderation Analysis

Table 3 shows the results of the simple moderation analysis. The total model accounted for 39.60% of the variance in PTSS symptomatology. Results indicated that age \((b = −0.13, p = 0.001)\) and COVID-19 risk factors index \((b = 1.17, p = 0.002)\) significantly predict PTSS symptoms. Although informal caregiving was not significant when predicting PTSS severity \((b = 1.34, p = 0.289)\), the interaction between fear of COVID-19 and caregiving was statistically significant in the model \((b = 0.60, p = 0.001)\). Simple slopes analyses showed that relationship between fear and PTSS was significant among informal caregivers and non-caregivers. However, fear of COVID-19 had a stronger effect on PTSS symptoms in caregivers (see Figure 2). Simple slope values for the informal caregivers group were \(b = 1.717 (95\% \text{ CI} = 1.366–2.077, p = 0.001)\), meanwhile the slope values of the non-caregivers group were \(b = 1.115 (95\% \text{ CI} = 0.949–1.282, p = 0.001)\).
Table 3. Caregiving as a moderator of the relationship between fear of COVID-19 and PTSS symptoms.

| Variables                  | B (SE)       | 95% CI          | p    |
|----------------------------|--------------|-----------------|------|
| Fear of COVID-19           | 1.115 (0.085) | [0.949, 1.282]  | **   |
| Informal caregiving        | 1.341 (1.263) | [−1.141, 3.824] | 0.289|
| Fear x Caregiving          | 0.602 (0.200) | [0.209, 0.995]  | **   |
| Covariates                 |              |                 |      |
| Gender (ref. = male)       | 0.936 (1.215) | [−1.452, 3.323] | 0.442|
| Age                        | −0.127 (0.036) | [−0.197, −0.057] | **   |
| COVID-19 risk factors     | 1.714 (0.538) | [0.658, 2.770]  | **   |
| Constant                   | 21.459 (1.969)| [17.590, 25.328]| **   |

Total variance explained by the model: $R^2 = 0.396$ ($p = 0.001$). Notes. B = unstandardized coefficients, SE = standard error, CI = confidence interval. * $p < 0.05$, ** $p < 0.01$. Significant results are displayed in bold.

Figure 2. Plots and simple slopes for the significant moderation effect of caregiving. Caregiving moderates the relationship between fear of COVID-19 (displayed on the $x$-axis) and PTSS (displayed on the $y$-axis). Mean of fear of COVID-19 was 18.73 with a standard deviation of 6.08. Simple slope analyses were conducted at three levels of fear: low (one standard deviation below the mean), average (mean value of fear of COVID-19) and high (one standard deviation above the mean). Notes: b = unstandardized coefficients, ** $p < 0.01$.

4. Discussion

In this cross-sectional study, we hypothesized that informal caregiving during COVID-19 pandemic could moderate the relationship between fear of COVID-19 and PTSS symptoms. Prevalence rates of informal caregiving (16.5%) found in our sample were similar to the previously reported in Spain [55]. Our first hypothesis assumed that higher levels of fear of COVID-19 and greater PTSS symptomatology will be significantly associated with female gender, younger age, lower education levels, informal caregiving, and higher number of COVID-19-related variables. In this regard, we found increased levels of distress in caregivers when compared to non-caregiving population, which is consistent with previous studies [40,43–46]. Along with prior evidence, our findings also showed that higher levels of fear and PTSS symptomatology were associated with caregiving [17,39–41,53].
We also hypothesized that high levels of fear of COVID-19 will be significantly associated with greater PTSS severity. This hypothesis was confirmed since both mental health outcomes (fear and PTSS) were found to be strongly correlated \((r = 0.59)\) and mean severity scores were similar to previous studies \([64,68,69]\). Regarding other variables that could increase psychological distress in our sample, fear and PTSS symptoms were also associated with female gender and higher scores in COVID-19-related risk factors \([17,25,27,30,34–36,53,70,71]\). These risk factors included occupational risk of COVID-19, self-reporting of COVID-19 diagnosis, having relative/friends diagnosed with the disease and being under psychological treatment.

Finally, we also assumed that informal caregiving would moderate the association between fear of COVID-19 and PTSS severity. As hypothesized, the moderation analysis showed that informal caregiving during COVID-19 pandemic affected the strength of the relationship between fear and PTSS symptoms. In this regard, our findings suggest that being a caregiver could increase the fear’s impact on the severity of PTSS. Although we did not find specific studies with which to compare these results, variables associated with caregiving have been found to moderate the development of post-traumatic symptoms after a strong stressor like a natural disaster \([72]\). Moreover, our regression model showed that a younger age and a greater number of COVID-19 risk factors directly predict PTSS symptoms, which is also consistent with previous findings \([73,74]\).

Several published studies have pointed out the worsening in the care situation during COVID-19 pandemic \([43,47,48]\). However, the relationship between caregiving and mental health outcomes has been mainly analyzed in a comparative, descriptive manner. These statistical analyses do not allow to conclude about the nature of these associations \([75]\). For this reason, the findings of this study could be useful to understand when caregiving impacts mental health of the general population during COVID-19 pandemic. In this sense, our results suggest that, even without considering specific caregiving variables, assessing regularly care for a person with a chronic health problem or disability could be useful to detect individuals at higher risk of developing severe PTSS when experiencing fear of COVID-19.

These findings should be seen in the light of several limitations. First, the potential bias associated with the use of self-report measures to assess mental health status. Second, the representativeness of the sample could be improved using a random selection method, since female gender was more prevalent in our study. Nonetheless, higher women’s participation in online surveys regarding COVID-19 pandemic has been also found in previous studies \([46,70,76]\). Third, findings are cross-sectional which did not allow us to confirm the directionality of fear and PTSS symptoms’ association.

However, to the best of our knowledge, this is the first study that specifically examines the role of informal caregiving during COVID-19 pandemic in the relationship between fear and PTSS. Further studies with larger and more heterogeneous samples are needed to confirm our findings. Moreover, future studies could deepen understanding of identifying caregiver characteristics and variables associated with caregiver burden associated with fear and PTSS development in the context of pandemics.

5. Conclusions

Post-traumatic symptoms are the most frequent psychopathological manifestation of fear. This study is a first approximation to determine the role of caregiving in mental health impact of COVID-19 pandemic. We have focused on analyzing when the relationship between fear of COVID-19 and development of PTSS occur, using informal caregiving as the moderator variable. Evidence from this study suggest that regularly care for a person with health problems increases the fear’s impact on mental health status. In this sense, we have found that informal caregivers showed greater PTSS severity in comparison with non-caregivers with same levels of fear of COVID-19. Although further studies are needed, these findings could help to understand in which contexts the relationship between PTSS
and fear is stronger. This could be useful to develop targeted treatments and prevention strategies to reduce the risk of developing PTSS in this population.

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**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

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**References**

1. Zhao, Y.-J.; Jin, Y.; Rao, W.-W.; Li, W.; Zhao, N.; Cheung, T.; Ng, C.H.; Wang, Y.-Y.; Zhang, Q.-E.; Xiang, Y.-T. The prevalence of psychiatric comorbidities during the SARS and COVID-19 epidemics: A systematic review and meta-analysis of observational studies. *J. Affect. Disord.* 2021, 287, 145–157. [CrossRef]

2. Rajkumar, R.P. COVID-19 and mental health: A review of the existing literature. *Asian J. Psychiatry* 2020, 52, 102066. [CrossRef]

3. Luo, M.; Guo, L.; Yu, M.; Jiang, W.; Wang, H. The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public—A systematic review and meta-analysis. *Psychiatry Res.* 2020, 291, 113910. [CrossRef]

4. Pappa, S.; Ntella, V.; Giannakas, T.; Giannakoulis, V.G.; Papoutsi, E.; Katsaounou, P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain Behav. Immun.* 2020, 88, 901–907. [CrossRef]

5. Wu, T.; Jia, X.; Shi, H.; Niu, J.; Yin, X.; Xie, J.; Wang, X. Prevalence of mental health problems during the COVID-19 pandemic: A systematic review and meta-analysis. *J. Affect. Disord.* 2021, 281, 91–98. [CrossRef]

6. Nikopoulou, V.A.; Holeva, V.; Parlapani, E.; Karamouzi, P.; Voitsidis, P.; Porfyri, G.-N.; Blekas, A.; Papigkioti, E.; Katsaounou, P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A proposed cutoff score for the Greek version of the Fear of COVID-19 Scale (FCV-195). *Int. J. Ment. Health Addict.* 2020, 1–14. [CrossRef]

7. Ahorsu, D.K.; Lin, C.-Y.; Imani, V.; Saffari, M.; Griffiths, M.D.; Pakpour, A.H. The Fear of COVID-19 Scale: Development and initial validation. *Int. J. Ment. Health Addict.* 2020, 1–9. [CrossRef] [PubMed]

8. Taylor, S. *The Psychology of Pandemics: Preparing for the Next Global Outbreak of Infectious Disease*; Cambridge Scholars Publishing: Newcastle upon Tyne, UK, 2019; ISBN 978-1-5275-4118-4.

9. Pakpour, A.H.; Griffiths, M.D. The fear of COVID-19 and its role in preventive behaviors. *J. Concurr. Disord.* 2020, 2, 58–63.

10. Schimmenti, A.; Starcevic, V.; Giardina, A.; Khazaal, Y.; Billieux, J. Multidimensional Assessment of COVID-19-Related Fears (MAC-RF): A theory-based instrument for the assessment of clinically relevant fears during pandemics. *Front. Psychiatry* 2020, 11, 748. [CrossRef] [PubMed]

11. Harper, C.A.; Satchell, L.P.; Fido, D.; Latzman, R.D. Functional fear predicts public health compliance in the COVID-19 pandemic. *Int. J. Ment. Health Addict.* 2020, 1–14. [CrossRef] [PubMed]

12. Gruchola, M.; Sławek-Czochra, M. “The culture of fear” of inhabitants of EU countries in their reaction to the COVID-19 pandemic—A study based on the reports of the Eurobarometer. *Saf. Sci.* 2021, 135, 105140. [CrossRef]

13. Coco, G.L.; Gentile, A.; Bosnar, K.; Milovanović, I.; Bianco, A.; Drid, P.; Pišot, S. A cross-country examination on the fear of COVID-19 and the sense of loneliness during the first wave of COVID-19 outbreak. *Int. J. Environ. Res. Public Health* 2021, 18, 2586. [CrossRef]

14. Bendau, A.; Petzold, M.B.; Pyrkosch, L.; Maricic, L.M.; Betzler, F.; Rogoll, J.; Große, J.; Ströhle, A.; Plag, J. Associations between COVID-19 related media consumption and symptoms of anxiety, depression and COVID-19 related fear in the general population in Germany. *Eur. Arch. Psychiatry Clin. Neurosci.* 2021, 271, 283–291. [CrossRef] [PubMed]

15. Gunnell, D.; Appleby, L.; Arensman, E.; Hawton, K.; John, A.; Kapur, N.; Khan, M.; O’Connor, R.C.; Pirkis, J. COVID-19 Suicide Prevention Research Collaboration. Suicide risk and prevention during the COVID-19 pandemic. *Lancet Psychiatry* 2020, 7, 468–471. [CrossRef]

16. Koçak, O.; Koçak, Ö.; Younis, M. The psychological consequences of COVID-19 fear and the moderator effects of individuals’ underlying illness and witnessing infected friends and family. *Int. J. Environ. Res. Public Health* 2021, 18, 1836. [CrossRef]

17. Mertens, G.; Gerritsen, L.; Duijndam, S.; Salemink, E.; Engelhard, I.M. Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. *J. Anxiety Disord.* 2020, 74, 102258. [CrossRef] [PubMed]
18. Ornella, F.; Schuch, J.B.; Sordi, A.O.; Kessler, R.C. “Pandemic fear” and COVID-19: Mental health burden and strategies. *Braz. J. Psychiatry* 2020, 42, 232–235. [CrossRef]

19. Meng, L.Y.; Milad, M.R. Post-traumatic stress disorder: The relationship between the fear response and chronic stress. *Chronic Stress* 2017, 1, 2470547017713297. [CrossRef] [PubMed]

20. González, P.; Martinez, K.G. The role of stress and fear in the development of mental disorders. *Psychiatr. Clin. N. Am.* 2014, 37, 535–546. [CrossRef]

21. Al Falasi, B.; Al Mazrouei, M.; Al Ali, M.; Al Dhamani, M.; Al Ali, A.; Al Kindi, M.; Dalkilinc, M.; Al Qubaisy, M.; Campos, L.; Al Tunaji, H.; et al. Prevalence and determinants of immediate and long-term PTSD consequences of coronavirus-related (CoV-1 and CoV-2) pandemics among healthcare professionals: A systematic review and meta-analysis. *Int. J. Environ. Res. Public Health* 2021, 18, 2182. [CrossRef] [PubMed]

22. Salehi, M.; Amanat, M.; Mohammad, M.; Salmanian, M.; Rezaei, N.; Saghazadeh, A.; Garakani, A. The prevalence of post-traumatic stress disorder related symptoms in Coronavirus outbreaks: A systematic-review and meta-analysis. *J. Affect. Disord.* 2021, 282, 527–538. [CrossRef]

23. Yuan, K.; Gong, Y.-M.; Liu, L.; Sun, Y.-K.; Tian, S.-S.; Wang, Y.-J.; Zhong, Y.; Zhang, A.-Y.; Su, S.-Z.; Liu, X.-X.; et al. Prevalence of post-traumatic stress disorder related to infectious disease pandemics in the twenty-first century, including COVID-19: A meta-analysis and systematic review. *Mol. Psychiatry* 2021, 1–17. [CrossRef]

24. North, C.S.; Suris, A.M.; Pollio, D.E. A nosological exploration of PTSD and trauma in disaster mental health and implications for the COVID-19 pandemic. *Behav. Sci.* 2020, 10, 73. [CrossRef] [PubMed]

25. González-Sanguino, C.; Ausín, B.; Castellanos, M.A.; Saiz, J.; López-Gómez, A.; Ugidos, C.; Muñoz, M. Mental health consequences during the initial stage of the 2020 Coronavirus pandemic (COVID-19) in Spain. *Brain Behav. Immun.* 2020, 87, 172–176. [CrossRef] [PubMed]

26. Taylor, S.; Landry, C.A.; Rachor, G.S.; Paluszek, M.M.; Fergus, T.A.; McKay, D.; Asmundson, G.J. Development and initial validation of the COVID Stress Scales. *J. Anxiety Disorder* 2020, 72, 102232. [CrossRef]

27. Vindegaard, N.; Benros, M.E. COVID-19 pandemic and mental health consequences: Systematic review of the current evidence. *Brain Behav. Immun.* 2020, 89, 531–542. [CrossRef]

28. Bao, Y.; Sun, Y.; Meng, S.; Shi, J.; Lu, L. 2019-nCoV epidemic: Address mental health care to empower society. *Lancet* 2020, 395, e37–e38. [CrossRef]

29. Devakumar, D.; Shannon, G.; Bhopal, S.S.; Abubakar, I. Racism and discrimination in COVID-19 responses. *Lancet* 2020, 395, 1194. [CrossRef]

30. Taylor, S.; Landry, C.A.; Rachor, G.S.; Paluszek, M.M.; Asmundson, G.J. Fear and avoidance of healthcare workers: An important, under-recognized form of stigmatization during the COVID-19 pandemic. *J. Anxiety Disorder* 2020, 75, 102289. [CrossRef]

31. Yuen, K.F.; Wang, X.; Ma, F.; Li, K.X. The psychological causes of panic buying following a health crisis. *Int. J. Environ. Res. Public Health* 2020, 17, 3513. [CrossRef]

32. Taylor, S.; Landry, C.A.; Paluszek, M.M.; Fergus, T.A.; McKay, D.; Asmundson, G.J.G. COVID stress syndrome: Concept, structure, and correlates. *Depress. Anxiety* 2020, 37, 706–714. [CrossRef] [PubMed]

33. Schimmenti, A.; Billieux, J.; Starcevic, V. The four horsemen of fear: An integrated model of understanding fear experiences during the COVID-19 pandemic. *Clin. Neuropsychiatry* 2021, 17, 41–45. [CrossRef]

34. Doshi, D.; Karunakar, P.; Sukhabogi, J.R.; Prasanna, J.S.; Mahajan, S.V. Assessing Coronavirus fear in Indian population using the fear of COVID-19 scale. *Int. J. Ment. Health Addict.* 2020, 1–9. [CrossRef] [PubMed]

35. Sit, S.M.-M.; Lam, T.-H.; Lai, A.Y.-K.; Wong, B.Y.-M.; Wang, M.-P.; Ho, S.-Y. Fear of COVID-19 and its associations with perceived personal and family benefits and harms in Hong Kong. *Transl. Behav. Med.* 2021, 11, 793–801. [CrossRef] [PubMed]

36. Solymosi, R.; Jackson, P.; Pösch, K.; Yesberg, J.A.; Bradford, B.; Kyprianides, A. Functional and dysfunctional fear of COVID-19: A classification scheme. *Crime Sci.* 2021, 10, 1–23. [CrossRef] [PubMed]

37. Segal, S.; Sharabany, R.; Maaravi, Y. Policymakers as safe havens: The relationship between adult attachment style, COVID-19 fear, and regulation compliance. *Personal. Individ. Differ.* 2021, 177, 110832. [CrossRef]

38. Jørgensen, F.; Bor, A.; Petersen, M.B. Compliance without fear: Individual-level protective behaviour during the first wave of the COVID-19 pandemic. *Br. J. Health Psychol.* 2021, 26, 679–696. [CrossRef]

39. Ng, K.Y.Y.; Zhou, S.; Tan, S.H.; Ishak, N.D.B.; Goh, Z.Z.S.; Chua, Z.Y.; Chia, J.M.X.; Chew, E.L.; Shwe, T.; Mok, J.K.Y.; et al. Understanding the psychological impact of COVID-19 pandemic on patients with cancer, their caregivers, and health care workers in Singapore. *JCO Glob. Oncol.* 2020, 6, 1494–1509. [CrossRef]

40. Park, S.S. Caregivers’ mental health and somatic health during COVID-19. *J. Gerontol. Ser. B* 2021, 76, e235–e240. [CrossRef]

41. Pérez-Fuentes, M.; Herrera-Peco, I.; Jurado, M.; Oropesa, N.; Linares, J.G. Predictors of threat from COVID-19: A cross-sectional study in the Spanish population. *J. Clin. Med.* 2021, 10, 692. [CrossRef]

42. Heger, D.; Korfhage, T. Care choices in Europe: To each according to his or her needs? *Inq. J. Health Care Organ. Provis. Financ.* 2018, 55, 46958018780848. [CrossRef]

43. Budnick, A.; Hering, C.; Eggert, S.; Teubner, C.; Suhr, R.; Kuhlmeier, A.; Gellert, P. Informal caregivers during the COVID-19 pandemic perceive additional burden: Findings from an ad-hoc survey in Germany. *BMC Health Serv. Res.* 2021, 21, 1–11. [CrossRef]
44. Giebel, C.; Lord, K.; Cooper, C.; Shenton, J.; Cannon, J.; Pulford, D.; Shaw, L.; Gaugham, A.; Tetlow, H.; Butchard, S.; et al. A UK survey of COVID-19 related social support closures and their effects on older people, people with dementia, and carers. Int. J. Geriatr. Psychiatry 2021, 36, 393–402. [CrossRef] [PubMed]
45. Savla, J.; Roberto, K.A.; Blieszner, R.; McCann, B.R.; Hoyt, E.; Knight, A.L. Dementia caregiving during the “Stay-at-Home” phase of COVID-19 pandemic. J. Gerontol. Ser. B 2021, 76, e241–e245. [CrossRef] [PubMed]
46. Schorren, N. The Impact of COVID-19 on Wellbeing, Depression, and Physical Activity of Informal Caregivers and Non-Caregivers during isolation. Available online: http://essay.utwente.nl/82470/ (accessed on 28 April 2021).
47. Cohen, S.A.; Kunicki, Z.J.; Drohan, M.M.; Greaney, M.L. Exploring changes in caregiver burden and caregiving intensity due to COVID-19. Gerontol. Geriatr. Med. 2021, 7, 233372141999279. [CrossRef] [PubMed]
48. Rodrigues, R.; Simmons, C.; Schmidt, A.E.; Steiber, N. Care in times of COVID-19: The impact of the pandemic on informal caregiving in Austria. Eur. J. Ageing 2021, 1–11. [CrossRef]
49. Kent, E.E.; Ornstein, K.A.; Dionne-Odom, J.N. The family caregiving crisis meets an actual pandemic. J. Pain Symptom Manag. 2020, 60, e66–e69. [CrossRef] [PubMed]
50. Koh, Z.Y.; Law, F.; Chew, J.; Ali, N.; Lim, W.S. Impact of Coronavirus disease on persons with dementia and their caregivers: An audit study. Ann. Geriatr. Med. Res. 2020, 24, 316–320. [CrossRef]
51. Cheng, S.-T.; Zhang, F. A comprehensive meta-review of systematic reviews and meta-analyses on nonpharmacological interventions for informal dementia caregivers. BMC Geriatr. 2020, 20, 1–24. [CrossRef]
52. Prime, H.; Wade, M.; Browne, D.T. Risk and resilience in family well-being during the COVID-19 pandemic. Am. Psychol. 2020, 75, 631–643. [CrossRef]
53. Wade, M.; Prime, H.; Johnson, D.; May, S.S.; Jenkins, J.M.; Browne, D.T. The disproportionate impact of COVID-19 on the mental health of female and male caregivers. Soc. Sci. Med. 2021, 275, 113801. [CrossRef]
54. Glaziou, P. Sampsize Home Page. Available online: Sampsize.sourceforge.net (accessed on 15 March 2021).
55. Eurofound European Quality of Life Survey 2016: Quality of Life, Quality of Public Services, and Quality of Society; Publications Office of the European Union: Luxembourg, 2016.
56. Espinoza, J.; Crown, K.; Kulkarni, O. A guide to chatbots for COVID-19 screening at pediatric health care facilities. JMIR Public Health Surveill. 2020, 6, e18808. [CrossRef]
57. Laranjo, L.; Dunn, A.G.; Tong, H.L.; Kocaballi, A.B.; Chen, J.; Bashir, R.; Surian, D.; Gallego, B.; Magrabi, F.; Lau, A.Y.S.; et al. Conversational agents in healthcare: A systematic review. J. Am. Med. Inform. Assoc. 2018, 25, 1248–1258. [CrossRef]
58. Blevins, C.A.; Weathers, F.W.; Davis, M.T.; Witte, T.K.; Domino, J.L. The posttraumatic stress disorder checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. J. Trauma Stress 2015, 28, 489–498. [CrossRef]
59. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 5th ed.; American Psychiatric Association: Arlington, VA, USA, 2013.
60. Pakenham, K.I.; Landi, G.; Boccolini, G.; Furlani, A.; Grandi, S.; Tossani, E. The moderating roles of psychological flexibility and inflexibility on the mental health impacts of COVID-19 pandemic and lockdown in Italy. Int. J. Environ. Res. Public Health 2021, 18, 6125. [CrossRef] [PubMed]
61. Tsur, N.; Abu-Raiya, H. COVID-19-related fear and stress among individuals who experienced child abuse: The mediating effect of complex posttraumatic stress disorder. Child Abuse Negl. 2020, 110, 104694. [CrossRef]
62. Bridgland, V.M.E.; Moeck, E.K.; Green, D.M.; Swain, T.L.; Nayda, D.M.; Matson, L.A.; Hutchison, N.P.; Takarangi, M.K.T. Why the COVID-19 pandemic is a traumatic stressor. PLoS ONE 2021, 16, e0240146. [CrossRef]
63. Moshier, S.J.; Lee, D.J.; Bovin, M.J.; Gauthier, G.; Zax, A.; Rosen, R.C.; Keane, T.M.; Marx, B.P. An empirical crosswalk for the PTSD checklist: Translating DSM-IV to DSM-5 using a veteran sample. J. Trauma. Stress 2019, 32, 799–805. [CrossRef]
64. Martinez-Lorca, M.; Martinez-Lorca, A.; Criadó-Álvarez, J.J.; Armesilla, M.D.C.; Latorre, J.M. The fear of COVID-19 scale: Validation in Spanish university students. Psychiatry Res. 2020, 293, 113350. [CrossRef] [PubMed]
65. Pakenham, K.I.; Landi, G.; Boccolini, G.; Furlani, A.; Grandi, S.; Tossani, E. The moderating roles of psychological flexibility and inflexibility on the mental health impacts of COVID-19 pandemic and lockdown in Italy. J. Context. Behav. Sci. 2020, 17, 109–118. [CrossRef] [PubMed]
66. Hayes, A.F. Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach, 2nd ed.; Guilford Publications: New York, NY, USA, 2017; ISBN 978-1-4625-3465-4.
67. Aiken, L.S.; West, S.G.; Reno, R.R. Multiple Regression: Testing and Interpreting Interactions; Sage: Thousand Oaks, CA, USA, 1991.
68. Mistry, S.K.; Ali, A.R.M.M.; Akther, F.; Yadav, U.N.; Harris, M.F. Exploring fear of COVID-19 and its correlates among older adults in Bangladesh. Glob. Health 2021, 17, 1–9. [CrossRef]
69. Bakioğlu, F.; Korkmaz, O.; Erkan, H. Fear of COVID-19 and positivity: Mediating role of intolerance of uncertainty, depression, anxiety, and stress. Int. J. Ment. Health Addict. 2020, 1–14. [CrossRef] [PubMed]
70. Austin, B.; González-Sanguino, C.; Castellanos, M.A.; Muñoz, M. Gender-related differences in the psychological impact of confinement as a consequence of COVID-19 in Spain. J. Gend. Stud. 2021, 30, 29–38. [CrossRef]
71. Özdin, S.; Bayrak Özdin, Ş. Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in Turkish society: The importance of gender. Int. J. Soc. Psychiatry 2020, 66, 504–511. [CrossRef]
72. Hicks, T.A.; Bountress, K.E.; Resnick, H.S.; Ruggiero, K.J.; Amstadter, A.B. Caregiver support buffers posttraumatic stress disorder symptoms following a natural disaster in relation to binge drinking. Psychiat. Trauma Theory Res. Pract. Policy 2020. [CrossRef]
73. Xiong, J.; Lipsitz, O.; Nasri, F.; Lui, L.M.W.; Gill, H.; Phan, L.; Chen-Li, D.; Iacobucci, M.; Ho, R.; Majeed, A.; et al. Impact of COVID-19 pandemic on mental health in the general population: A systematic review. J. Affect. Disord. 2020, 277, 55–64. [CrossRef] [PubMed]

74. Bonsaksen, T.; Heir, T.; Schou-Bredal, I.; Ekeberg, Ø.; Skogstad, L.; Grimholt, T.K. Post-Traumatic Stress disorder and associated factors during the early stage of the COVID-19 pandemic in Norway. Int. J. Environ. Res. Public Health 2020, 17, 9210. [CrossRef] [PubMed]

75. Fairchild, A.J.; McQuillin, S.D. Evaluating mediation and moderation effects in school psychology: A presentation of methods and review of current practice. J. Sch. Psychol. 2010, 48, 53–84. [CrossRef]

76. Altieri, M.; Santangelo, G. The psychological impact of COVID-19 pandemic and lockdown on caregivers of people with dementia. Am. J. Geriatr. Psychiatry 2021, 29, 27–34. [CrossRef] [PubMed]