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BASIC RESEARCH ARTICLE

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COVID-19 hardship and mental health in Chilean parents: the role of disaster exposure and family resilience

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ABSTRACT

Background: The negative mental health effects of the pandemic on families are well documented, while factors that buffer or increase such effects still need further investigation. Previous exposure to adversity might increase the negative impact of pandemic experiences. On the other hand, family resilience may protect against these negative effects, and may also be regarded as a mediator explaining the negative association between pandemic hardship and mental health.

Objective: The current study focused on the effects of COVID-19-related hardship on parental mental health. We evaluated the impact of the individual experiences with the COVID-19 pandemic on mental health among Chilean parents from a community sample, who were exposed in varying levels to a destructive earthquake and tsunami approximately 10 years earlier.

Method: Participants ($N = 219$) completed online measures of pandemic hardship, mental health, disaster hardship related to the past earthquake, and family resilience. We examined the moderating role of disaster exposure and the moderating and mediating role of family resilience on the current impact of the pandemic on mental health.

Results: Individual exposure levels of COVID-19 hardship were associated with mental health complaints. Both previous disaster hardship and family resilience were associated with mental health complaints. However, previous disaster hardship did not moderate the relationship between pandemic hardship and mental health complaints, nor did family resilience moderate or mediate it.

Conclusions: These results align with the evidence of the negative emotional impact of pandemic-related stressors, and propose family resilience and past disaster exposure as relevant predictors of mental health during the sanitary emergency. Findings are discussed in the broader social context in Chile and warrant adjusting public policies towards those underserved groups heavily affected by the pandemic.

Adversidad por COVID-19 y salud mental en padres chilenos: el papel de la exposición a desastres y la resiliencia familiar

Antecedentes: Los efectos negativos de la pandemia en la salud mental de las familias están bien documentados, mientras que los factores que pueden mitigar o aumentar dichos efectos aún requieren más investigación. La exposición previa a adversidad podría aumentar el impacto negativo de las experiencias pandémicas. Por otro lado, la resiliencia familiar puede proteger contra estos efectos negativos y también puede ser considerada como un mediador que explica la asociación negativa entre la adversidad pandémica y la salud mental.

Objetivos: El estudio actual se centró en los efectos de la adversidad relacionada con el COVID-19 en la salud mental de los padres. Evaluamos el impacto de las experiencias individuales con la pandemia de COVID-19 en la salud mental de padres chilenos de una muestra comunitaria, quienes fueron expuestos en diferentes niveles a un terremoto y tsunami destructivos aproximadamente 10 años antes.

Método: Los participantes ($N = 219$) completaron mediciones en línea sobre la adversidad pandémica, salud mental, adversidad relacionada con el desastre del terremoto pasado y resiliencia familiar. Examinamos el papel moderador de la exposición al desastre y el papel moderador y mediador de la resiliencia familiar en el impacto actual de la pandemia en la salud mental.

Resultados: Los niveles individuales de exposición a la adversidad por COVID-19 estuvieron asociados con quejas de salud mental. Tanto la adversidad del desastre previo como la resiliencia familiar se asociaron con quejas de salud mental. Sin embargo, la adversidad del

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COVID-19; pandemia; desastre; terremoto; adversidad; riesgo comunitario; trauma; salud mental; padres; resiliencia familiar

HIGHLIGHTS

- COVID-19 pandemic hardship was positively associated with mental health complaints among Chilean parents in times of lockdown.
- The hardship experienced from the earthquake was positively associated with current mental health complaints in pandemic times. Yet, having experienced a disaster in the past (i.e. an earthquake 10 years earlier) did not enhance the risk for developing mental health problems from the pandemic hardship suffered.
- Family resilience was negatively associated with mental health complaints during the pandemic. However, it did not buffer the impact of pandemic hardship on the mental health of the parents of our sample.

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desastre previo no moderó la relación entre la adversidad pandémica y las quejas de salud mental; tampoco la resiliencia familiar la moderó o medió.
Conclusiones: Estos resultados concuerdan con la evidencia sobre el impacto emocional negativo de los factores estresantes relacionados con la pandemia y proponen a la resiliencia familiar y la exposición previa a desastres como predictores relevantes de la salud mental durante la emergencia sanitaria. Los hallazgos se discuten en el contexto social más amplio en Chile y justifican el ajuste de las políticas públicas hacia aquellos grupos desatendidos que fueron fuertemente afectados por la pandemia.

1. Introduction

The deleterious impact of the COVID-19 pandemic on mental health and psychopathology has been well-documented (Arora et al., 2022; Leung et al., 2022; Serafini et al., 2020). Yet, research on specific factors that buffer or increase the vulnerability among families remains limited. More insight into these factors might help mental health professionals to identify higher-risk individuals more quickly in future community-wide adversities. This is particularly important for parents, given their influence on children's emotional wellbeing during a crisis (Cobham et al., 2016). One factor that deserves attention as a potential moderator is the impact of exposure to prior adversities, as this may sensitize individuals to the effects of stress. A second factor that may buffer, and thus moderate the effect of pandemic hardship is the level of family resilience. Alternatively, family resilience might serve as a mediator because the level of pandemic hardship might affect resilience and this in turn might impact mental health. The goal of this study is to examine the relationship between the degree of COVID-19 hardship (number of pandemic stressors) and parents' mental health in Chile during COVID-19's first wave and investigate the potential moderating role of varying levels of exposure to an earlier community-wide adversity (earthquake and tsunami '27-F' in 2010) as well as the moderating or mediating role of family resilience on the relation between COVID-19 hardship and mental health.

1.1. COVID-19 hardship and parenting in Chile

At the time of this study (October 2020), Chile had been under strict COVID-19 related confinement measures for around seven months. Parents faced the full schools and childcare facilities closures since the beginning of the school year (March 2020), and were challenged to balance caregiving, homeschooling, and work on top of other pandemic-related stressors (e.g. disease concerns, social isolation). Specific pandemic challenges related to caregiving – i.e. difficulties taking care of and teaching children at home, increased emotional problems in the child – posed a risk for higher parental stress, depression and anxiety (Grasso et al., 2021). Before the pandemic, Chile was among the nations with the highest burden of psychiatric disorders worldwide, combined with low public investment and access to mental health care (Vicente et al., 2012; Vicente et al., 2016). As such, studying factors related to caregivers' mental health during the COVID-19 pandemic in this country is critical.

Research has shown that longer and stricter confinement measures and more pandemic-related adverse events predict mental health problems (Aknin et al., 2022; Brooks et al., 2020). The pandemic crisis compounds multiple stressors – both manageable and potentially traumatic – that can accumulate and affect individuals over a long period of time. Extreme and/or chronic stress may have depleting effects on mental wellbeing (Qi et al., 2021), by affecting behavioural, emotional and physiological mechanisms involved in the onset of psychopathology (Smith & Pollak, 2022). The literature provides evidence for dose–response effects of pandemic adversity on mental health outcomes (Brock et al., 2022; Han et al., 2021; Langhammer et al., 2022). Recent studies have explored the impact of pandemic hardship, by means of the number of negative changes and stressors across domains of daily life, on parental wellbeing. For example, pandemic hardship was associated with more parental internalizing and externalizing symptoms, as well as with decreased child wellbeing (Brock et al., 2022). In line with these findings, a study by Pérez et al. found that pandemic experiences – in particular, economic difficulties and lockdown duration – were associated with increased depressive symptoms among Chilean parents (Pérez et al., 2022). However, the study by Pérez et al. did not account for adverse changes in other life domains, such as home and social life. Thus, our study investigates the role of pandemic hardship, experienced across a more extensive range of life domains, on parental mental health.

1.2. Previous disaster experience

As in other stressful events, the psychological response towards the pandemic is subject to individual differences (Bernabe-Valero et al., 2021; Kowal et al., 2020). Factors explaining why some adults are more vulnerable than others deserve more investigation. One of the factors that might influence the relation

between pandemic hardship and parental mental health is having experienced previous potentially traumatic events. Indeed, the stress sensitization model proposes that individuals become more vulnerable to the psychological impact of adversity as they are exposed to subsequent stressors (Harkness et al., 2015). In the wake of COVID-19, studies support the stress-sensitization hypothesis, showing that prior adversity increased the psychological impact of the pandemic (Ashby et al., 2022; Choi et al., 2023; Hébert et al., 2022; Marzilli et al., 2021; Russo et al., 2022). These studies addressed prior adversity as cumulative trauma of a wide range of adverse events. For the current study, we focused on the impact of a natural disaster that occurred in Chile 10 years before the pandemic: one of the most destructive earthquakes in history – an 8.8-Richter quake with tsunami – on 27 February 2010 (20 Largest Earthquakes in the World Since 1900 | US Geological Survey 2023). The short-term psychological aftermath of the '27-F' on the population was substantial with rising posttraumatic stress symptoms (Leiva-Bianchi, 2011) and worsening of psychiatric conditions such as depression (Cancino et al., 2013). Worldwide, the literature supports the position of the long-lasting effects of earthquakes on disorders like traumatic stress or anxiety (Newnham et al., 2022). To fill the research gap on the role of the potential additive effects of exposure to two *community-level* stressful events on parental mental health, the current study focuses specifically on whether the high levels of hardship experienced by some Chilean parents following the '27-F' disaster might make them psychologically more vulnerable to pandemic hardship, as suggested by stress-sensitization theory.

1.3. Family resilience

During the confinement, families were chronically deprived of community social support resources to deal with the adversity associated with the pandemic (Osofsky et al., 2020), making household members the most – if not only – available source of support. Therefore, aspects of family dynamics that help parents to cope better with pandemic-related adversity deserve further examination. A factor that could buffer pandemic impacts on mental health is family resilience, or the ability of families to withstand crises or stressful events and become more resourceful (Walsh, 2003). According to The Family Resilience Model (Walsh, 1996), family resilience comprises three key components: (1) the family belief system (making meaning of adversity and maintaining a positive outlook); (2) organizational patterns (flexibility, connectedness, and management of social/economic resources); and (3) communication and problem solving (communication clarity among family members, emotional expressiveness with one another, and collaborative problem solving). Although family resilience is often studied as a stable, inherent ability of the family to cope with adversity, it is also conceptualized as a dynamic process of balancing resources and demands in adaptation to circumstances (Zhuo et al., 2022). Research has shown that the emotional impact of adversity can be moderated (Chan et al., 2021; Tang et al. 2023) or mediated by family resilience (Giordano et al., 2023; Wei et al., 2022). Conceiving family resilience as a stable factor of the family positions it as a moderator of the relationship between pandemic adversity and mental health. On the other hand, when conceiving family resilience as an adaptive, dynamic process in response to a challenging environment, it can be a mediating mechanism through which families cope with adversity. So far, no study has explored these two potential roles family resilience might have in affecting parental mental health in the context of COVID-19.

1.4. The current study

The present study will address the following research questions: (1) What is the relation between pandemic hardship and parental mental health?; (2) Does previous disaster hardship moderate the relation between pandemic hardship and parental mental health?; and (3) Does family resilience moderate or mediate the relation between pandemic hardship and parental mental health? We expect that more pandemic hardship will relate to more mental health complaints; that prior earthquake hardship will strengthen the relation between COVID-19 hardship and mental health problems (stress sensitization); and finally, that family resilience may moderate or mediate the association between pandemic hardship and mental health.

2. Method

2.1. Participants

This web-based study ($n = 219$) is part of a larger research on mental health among Chilean parent–child dyads ($N = 219$ parents and 65 children). To be included in the current study, parents had to meet the following inclusion criteria: (1) direct exposure to the earthquake/tsunami of 2010; and (2) having (at least) a child aged 13–15 years (i.e. to make sure they were already parents and faced the '27-F' disaster together with a child aged 3–5 years).

Most participants identified themselves as female (95.4%; $M_{age} = 40.57$; $SD = 6.05$), and were from low-to-mid socioeconomic backgrounds (58.5% earned monthly under 500.000 Chilean pesos, ~636 USD at the starting date of data collection; 53.4% of the participants were unemployed). Detailed demographic characteristics are presented in Table 1.

Table 1. Sociodemographic characteristics of participants ($N = 219$).

Variables	*M* (*SD*) or *n* (%)
Age	40.57 (6.05)
Gender (female)	209 (95.43)
No. children	2.64 (1.06)
Household size[a]	4.49 (1.31)
Marital status	
Single	65 (29.68)
Married/registered partnership	110 (50.23)
Separated/divorced	34 (15.53)
Other/rather not say	10 (4.57)
Living with partner	142 (64.84)
Religious beliefs	
Catholic	114 (52.05)
Protestant	38 (17.35)
Other/rather not say	32 (14.61)
None	35 (15.98)
Race	
Caucasian	186 (84.93)
Native (Mapuche, Aymara, Rapa Nui, Diaguita)	27 (12.33)
Other/rather not say	5 (2.28)
Missing	1 (0.46)
Educational level[b]	
Basic	23 (10.50)
High School	121 (55.25)
Higher education (technical)	38 (17.35)
Higher education (university)	36 (16.44)
None	1 (0.46)
Employment status	
Unemployed	117 (53.42)
Employed/remote work	30 (13.70)
Employed/hybrid	26 (11.87)
Employed/on site	28 (12.79)
Employed/reduced workload	8 (3.65)
Leave/retired	11 (5.02)
Income[c]	
Below 250.000 CLP	71 (32.42)
250.000–500.000 CLP	57 (26.03)
500.000–750.000 CLP	18 (8.22)
750.000–1.000.000 CLP	11 (5.02)
1.000.000–1.500.000 CLP	13 (5.94)
Above 1.500.000 CLP	8 (3.65)
Rather not say	41 (18.72)

Note. [a]Number of people living in the same housing unit.
[b]Basic school in Chile represents the first 8 years of school education. High school takes 4 years. Technical higher education takes 2–3 years and most University bachelor degrees 4–5 years.
[c]250.000 CLP equal ~ 312 USD. Minimum income in Chile is 320.400 CLP ~ 395.69 USD (2020).

2.2. Procedure

An online survey was administered between October and December of 2020. Participants were recruited via social media and provided consent for the use of their data. Parents entered a raffle where they could win one of 10 electronic packs (tablet and speaker) valued in 269 dollars each. This study was approved by the Ethics Committee of the Institute of Education and Child Studies (#ECPW2020-271) and the Data Protection Office of Leiden University.

2.3. Measures

2.3.1. Outcome variables

2.3.1.1. Parents' mental health complaints. The 12-item General Health Questionnaire (GHQ-12) (Goldberg & Williams, 1988) was used to evaluate mental health complaints. Parents rated each item using a 4-point scale ranging from *less than usual* (0) to *much more than usual* (3). The total score (0–36) was used in the analyses. This scale has been validated in the Chilean population (Rivas-Diez & Sánchez-López, 2014). The internal consistency in this study was good (Cronbach's $\alpha = .89$).

2.3.2. Predictor variables

2.3.2.1. COVID-19 hardship. The Epidemic-Pandemic Impact Inventory (EPII, Spanish version) (Grasso et al., 2020) is an event-tailored instrument containing 73 items describing COVID-19 events and negative changes in work life, education, home life, social life, emotional and physical health, economy, physical distancing-quarantine, history of infection, and 19 items of positive changes (not used in this study). Each item is answered based on exposure (example: 'Laid off from work or had to close own business', score 1 if: *Yes, this happened to me* or *happened to another person in our household*; score 0 if: *No/ Not applicable*). Higher scores reflect more pandemic-related hardship (range 0-73). Since this is a recently developed measure, at the time of this study no published psychometric properties of this version were available. An overview of the items and endorse rates can be found in Supplementary Table 1.

2.3.2.2. '27-F' disaster objective hardship. An event-tailored retrospective measure of the extent to which individuals were exposed to the earthquake and tsunami in Chile on February 27th, 2010 (EQ27) was created for this study, following the approach of other disaster measures (King & Laplante, 2005). Its development was led by D.P.L., who has expertise in the creation and scoring of disaster objective hardship measures. Volunteers from the community listed specific hardships they experienced at the time of the earthquake or as consequences of it (e.g. house damage). These hardships were classified in four exposure dimensions commonly used in disaster hardship research: Threat, Loss, Scope, and Change (McFarlane, 1988). The items were translated to Spanish using forward–backward translation by C.E. and two other psychologists. Differential weights were determined for every item based on its relative importance within the dimension. Each dimension had a possible total score of 50 points. The final measure comprised 27 items reflecting the most commonly experienced events associated with the '27-F' disaster, with a maximum score of 200. Higher scores reflect more disaster hardship (for details see Supplementary Table 2).

2.3.2.3. Family resilience. The Family Resilience Assessment Scale (FRAS) (Sixbey, 2008) assesses features of family functioning upon stressful events following Walsh's theoretical framework. The original scale comprises 54 Likert-scale items describing family

functioning during the last six months, with responses ranging between *strongly disagree* (1) to *strongly agree* (4). The subscale Spirituality (4 items) was dropped in this study because it reflects activities within the religious community that were restricted by the sanitary measures. The subscale Utilizing social and economic resources was dropped from the total scale because social resources were extremely limited because of the pandemic and therefore this subscale may have a different meaning compared to non-pandemic times. Moreover, this subscale correlated weakly to moderately with the other subscales ($r = .20–.44$). The total score was therefore based on 42 items from the subscales (1) family communication and problem solving ($r_{\text{inter-scale}} = .50–.85$), (2) maintaining a positive outlook ($r = .36–.85$), (3) family connectedness ($r = .36–.50$), and (4) ability to make meaning of adversity ($r = .36–.64$). Higher scores indicate more perceived family resilience (range 42–168). The original English version was translated to Spanish by C.E. and two mental health clinicians using forward–backward translation, upon permission of the author of the scale. This scale has appropriate psychometric properties. In this study, internal consistency was excellent (Cronbach's $\alpha = .95$).

2.4. Data analysis

Correlation and group comparison analyses were conducted to identify significant bivariate associations and potential covariates. Linear regressions and moderation analyses were conducted using SPSS 27. Mediation analyses were carried out using PROCESS v.4.0.

3. Results

The Missing Value Analysis yielded 10.5% of missingness at the variable level for GHQ-12, 5.9% for EPII, 13.7% for EQ27 and 19.2% for FRAS. Since data were missing completely at random (Little's MCAR test $\chi^2(15) = 22.880$, $p = .087$), analyses were performed on complete cases.

Descriptive statistics and reliability of the study measures are provided in Table 2. The distribution of earthquake hardship was right-skewed and yielded four extreme values; these issues were solved by square-root transformation. EPII and FRAS had one extreme value each, which were solved by winsorizing to the values at 99th and 1st percentile, respectively.

Next, potential covariates were examined (age, gender, marital status, partner living at home, employment status, income, educational level, number of children, number of minor children, household size, ethnicity, and religious beliefs). Bivariate correlations between demographic and (transformed) study variables can be found in Table 3. No significant correlations were found between demographic variables and mental health complaints. Small yet significant associations between pandemic hardship and number of children ($p = .045$), and household size ($p = .011$) were found. Earthquake hardship was negatively associated with income ($p = .004$), while family resilience significantly correlated to unemployment ($p = .012$) and number of children under the age of 18 ($p = .029$). Significant differences in mental health complaints across educational level were found (basic, secondary, technical and university; 1 case without formal education was treated as missing; $F_{(3)} = 2.665$, $p = .049$; Asymptotic Welch's $F_{(3)} = 3.589$, $p = .019$). Therefore, we controlled for educational level (all analyses), household size (all analyses), income (H2), and unemployment (H3 and H4). The number of children correlated highly with household size, thus it was not included as covariate.

Pairwise correlation analysis revealed that higher mental health complaints were associated with higher pandemic hardship ($p < .001$), higher earthquake hardship ($p = .010$), and lower family resilience ($p = .003$). Higher pandemic hardship was significantly associated to higher previous earthquake hardship ($p < .001$).

Hypothesis 1: COVID-19 hardship is associated to mental health outcomes. Higher levels of COVID-19 hardship were significantly associated with higher mental health complaints after controlling for educational level and household size ($\beta = .44$, $p < .001$) (see Table 4).

Hypothesis 2: Previous disaster hardship moderates the relation between pandemic hardship and mental health complaints. The moderation analysis yielded a significant main effect of pandemic hardship on mental health complaints, after controlling for educational level, household size and income ($\beta = .43$, $p < .001$): higher pandemic hardship levels were associated with more mental health complaints. Earthquake hardship did not have a significant main effect on mental health complaints after the effects of pandemic hardship and the covariates were taken into account. The interaction between pandemic and earthquake hardship levels was not significant, thus no moderation effect was found (see Table 4).

Hypothesis 3: Family resilience moderates the relation between pandemic hardship and mental health complaints. After controlling for educational level, household size and unemployment, main effects of pandemic hardship ($\beta = .42$, $p < .001$) and family resilience ($\beta = -.21$, $p = .004$) on mental health complaints were found: higher levels of pandemic hardship and lower levels of family resilience were associated with higher mental health complaints. The pandemic hardship × family resilience interaction did not reach statistical significance (see Table 4).

Table 2. Descriptive statistics of study variables in total sample.

Measures	*n*	*M*	*SD*	Range	Skewness	Kurtosis	*α*
Mental health complaints (GHQ-12)	196	15.89	7.10	1–36	.39	−.24	.89
Pandemic hardship (EPII)	206	27.57	8.39	7–48	.07	−.24	.86
Earthquake hardship (EQ27)	189	4.97	1.88	1–10.20	.22	−.35	.82
Family resilience (FRAS)	177	132.25	14.91	97–164	.05	−.55	.95

Note. Pandemic hardship (EPII) and Family resilience (FRAS) measures were winsorized and earthquake hardship (EQ27) measure was square-root transformed.

Hypothesis 4: Family resilience mediates the relation between pandemic hardship and mental health complaints. After controlling for educational level, household size and unemployment, main effects of pandemic hardship and family resilience on mental health complaints were found ($\beta = .42$, $p < .001$; and $\beta = -.23$, $p = .001$ respectively): higher levels of pandemic hardship and lower levels of family resilience were associated with higher mental health complaints. Family resilience did not mediate the effect of pandemic hardship on mental health complaints (see Table 5).

4. Discussion

The goal of this study was to investigate whether COVID-19 hardship was related to mental health complaints among Chilean parents – predominantly mothers from a mid to low socioeconomic background – and whether the level of exposure to a previous disaster and family resilience during the pandemic influenced this relation. Results showed that higher levels of pandemic hardship were indeed related to higher level of mental health complaints. However, this relationship was not moderated by previous earthquake hardship, and neither moderated nor mediated by family resilience.

As hypothesized, the results show that the pandemic experience had a negative impact on adults' mental health, in line with previous findings (Brock et al., 2022; Qi et al., 2021). This adversity related to the pandemic may deplete individual coping resources to deal with such a sustained, uncontrollable stressful scenario, making parents more prone to develop mental health complaints. This is relevant in the Chilean context, where mental health issues were already highly prevalent before the pandemic (Vicente et al., 2016 Jun).

Interestingly, higher levels of hardship associated with the '27-F' earthquake that happened 10 years earlier were also related to higher current mental health complaint levels. This finding is consistent with the literature evidencing long-lasting effects of disasters on mental health outcomes like depression and anxiety (Newnham et al., 2022). However, previous disaster hardship did not moderate the impact of the pandemic on parental mental health, therefore not supporting the stress sensitization hypothesis. One of the reasons we did not find evidence for stress sensitization might be due to the nature of the specific stressor we focused on. While stress-sensitization is not limited to adverse childhood experiences (ACEs), most research has focused on the lasting effects ACEs have on subsequent mental health functioning (Gerber et al., 2018; Stroud, 2020). Although we found that the disaster (i.e. the earthquake) had an independent negative impact on mental health, experiencing such an event in adulthood may not increase sensitivity to a future major stressor as significantly as ACEs do. ACEs can 'get under the skin' disrupting physiological systems involved in the stress response that are still under development during childhood (Berens et al., 2017) and thus have a greater stress-sensitizing effect than comparable stressors occurring during

Table 3. Correlation matrix of study variables in total sample.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Mental health complaints (GHQ-12)														
2. Pandemic hardship (EPII)	.42**													
3. Earthquake hardship (EQ27)	.19**	.32**												
4. Family resilience (FRAS)	−.22**	−.11	.08											
5. Age	−.11	−.11	.04	−.03										
6. Female gender (yes/no)	.06	.01	.07	.12	−.21**									
7. Educational level	−.12	.01	−.05	.07	.06	.00								
8. Income	−.14	−.07	−.23**	.03	.15	−.13	.62**							
9. Unemployment (yes/no)	−.01	−.07	.05	.19*	−.20**	.10	−.34**	−.37**						
10. Living with partner (yes/no)	−.03	−.02	−.15	−.06	.01	−.01	.03	.23**	.02					
11. No. children	.05	.14*	.02	.01	.13	.03	−.31**	−.10	.06	.07				
12. No. minor children	−.01	.02	−.07	.16*	−.37**	.10	−.08	−.04	.14*	.07	.54**			
13. Household size	.04	.18*	.02	.09	−.01	−.12	−.21**	−.06	.10	.19**	.61**	.44**		
14. Ethnic group (yes/no)	.08	.10	.01	.01	.05	−.05	−.21**	−.22**	.07	.02	.18**	.09	.15*	
15. Religious beliefs (yes/no)	.03	.03	.14	−.13	.00	.01	−.07	−.07	.02	.04	.02	.01	.04	−.04

Note. *N* varied between 149 and 219 (missing values excluded pairwise).
*$p < .05$. two-tailed. ** $p < .01$. two-tailed.

Table 4. Coefficients for multiple regression and moderation models (hypotheses 1, 2, and 3).

Model	*B*	*SE B*	95% CI for *B*		*β*
			LL	UL	
Hypothesis 1 Pandemic hardship is related to mental health complaints[a]					
Educational level	−1.00	.53	−2.05	.04	−.13
Household size	−.44	.37	−1.17	.29	−.08
Pandemic hardship	.36***	.06	.25	.47	.44
Hypothesis 2 Previous disaster hardship moderates the relation between pandemic hardship and mental health complaints[b]					
Educational level	−.56	.76	−2.07	.96	−.07
Household size	−.60	.41	−1.41	.21	−.11
Income	−.31	.48	−1.26	.64	−.06
Pandemic hardship	.36***	.07	.22	.49	.43
Earthquake hardship	−.03	.31	−.65	.58	−.01
Pandemic hardship x Earthquake hardship	−.04	.03	−.10	.03	−.09
Hypothesis 3 Family resilience moderates the relation between pandemic hardship and mental health complaints[c]					
Educational level	−.63	.58	−1.77	.51	−.08
Unemployment	.40	1.07	−1.72	2.52	.03
Household size	−.48	.39	−1.25	.29	−.09
Pandemic hardship	.35***	.06	.23	.47	.42
Family resilience	−.10**	.04	−.17	−.03	−.21
Pandemic hardship x Family resilience	.00	.00	−.01	.00	−.08

Note. CI = confidence interval; LL = lower limit; UL = upper limit.
[a]*N* = 183.
[b]*N* = 150.
[c]*N* = 165.
*$p < .05$. two-tailed. ** $p < .01$. two-tailed. *** $p < .001$. two-tailed.

adulthood. An alternative explanation to differences in how individuals adapted to the previous earthquake is that some individuals might have become more sensitive to stress while others may have developed resilience to it, through a so-called inoculation effect (Kok et al., 2021), buffering impact of later stressors. Considering the research gap on the role of types of stressors regarding the stress sensitization model, future studies should examine the impact of major stressful events other than childhood adversity. This research might be able to identify specific event characteristics that are involved in the sensitizing process and which might provide potential inoculating effects.

Table 5. Coefficients for mediation model (hypothesis 4).

Hypothesis 4 family resilience mediates the relation between pandemic hardship and mental health complaints[a]					
Variables	*B*	SE *B*	95% CI for *B*		*β*
			LL	UL	
	Family resilience				
Educational level	2.89*	1.30	.32	5.45	.18
Unemployment	7.42**	2.36	2.76	12.08	.25
Household size	.98	.89	−.77	2.74	.09
Pandemic hardship ('a')	−.17	.13	−.43	.10	−.10
	Mental health complaints				
Educational level	−.61	.58	−1.75	.54	−.08
Unemployment	.53	1.07	−1.57	2.64	.04
Household size	−.48	.39	−1.26	.29	−.09
Pandemic hardship	.35***	.06	.23	.47	.42
Family resilience ('b')	−.11***	.03	−.18	−.04	−.23
Total, direct and indirect effects model	Mental health complaints				
Educational level	−.93	.59	−2.09	.23	−.12
Unemployment	−.30	1.07	−2.40	1.81	−.02
Household size	−.59	.40	−1.38	.20	−.11
Pandemic hardship (total effect 'c')	.37***	.06	.25	.49	.45
Pandemic hardship (direct effect 'c'')	.35***	.06	.23	.47	.42
Family resilience (indirect effect)[b]	.02	.02	−.02	.06	.02

Note. CI = confidence interval; LL = lower limit; UL = upper limit.
[a]*N* = 165.
[b]Coefficients are bootstrapped (5000 samples).
*$p < .05$. two-tailed. ** $p < .01$. two-tailed. *** $p < .001$. two-tailed.

Contrary to expectations, family resilience did not moderate or mediate the impact of pandemic hardship on mental health complaints. Family resilience was unrelated to both pandemic hardship and the previous '27-F' hardship supporting the notion of family resilience as a stable ability to deal with adversities, regardless of past or current circumstances. However, family resilience was associated to parental mental health complaints. More supportive families might protect individual wellbeing, while stressful, dysfunctional families might create a pathogenic environment leading to more mental health issues (Guerrero-Muñoz et al., 2021). Alternatively, since family resilience was self-reported, individuals with mental health problems might appraise their family functioning more negatively because of their mental health problems (Ingram, 1984); thus the current findings might not necessarily reflect actual family functioning. Further studies are needed to better understand the role of family resilience on adaptation, for example by including the reports of multiple family members (Ho et al., 2022).

Overall, pandemic hardship was associated with mental health complaints, but the proposed interacting factors – previous disaster hardship and family resilience – did not play a role in that association. This could be potentially explained by the fact that the participants in our study (mostly from mid-to-low socioeconomic status) have reasonably higher psychosocial risk than samples from the mainstream literature. This high-risk nature of our sample might decrease or cancel out a buffering role of family resilience or the enhancing role of previous earthquake hardship on pandemic impact. Potentially, other factors might be more relevant to modulate or explain the individual differences in the relation between pandemic hardship and mental health complaints, such as individual resilience (Havnen et al., 2020), coping strategies (Han et al., 2021; Lu et al., 2022), social support (Padmanabhanunni et al., 2023) or pre-existing mental health conditions (Monistrol-Mula et al., 2022), as well as a wider range of traumatic events (e.g. childhood adversity) (McLaughlin et al., 2022). Moreover, since this study focused on objective hardship of events, future studies should pay attention to subjective aspects such as perceived stress, pandemic-related worries and fear, or retrospective measures of traumatic experiences. Subjective stress has been shown to be a better predictor of mental health outcomes than objective exposure to major stressors, as it underlies individual differences in stress vulnerability (Shields et al., 2023). For example, cognitive appraisal is a well-studied mechanism explaining

why the same situation can be perceived as stressful by some individuals and not by others (Lazarus & Folkman, 1987). From a trauma-informed perspective, uncontrollable, potentially traumatic events such as a global pandemic may disrupt individuals' information processing mechanisms, such as the core beliefs about the world, in turn creating psychological distress (Matsudaira et al., 2021). The extent to which such subjective mechanisms are disrupted could help understand individual differences of risk of psychopathology upon a crisis, beyond the objective degrees of hardship experienced.

Not surprisingly, both earthquake and pandemic hardship were related to socioeconomic factors (income and educational level, respectively), as well as associated with each other. Social disadvantage has been documented as a relevant correlate of both adversity and psychopathology (Nurius et al., 2013), contributing to a so-called stress proliferation: underserved individuals exposed to adversity live in conditions that make them more likely to be subsequently exposed to other hazards (Pearlin et al., 2005 Jun). Consequently, these individuals are at higher risk of cascading effects from disaster events on top of psychosocial factors such as low access to financial help or healthcare. This highlights the importance of increasing the local public investment on mental health to WHO-suggested standards in order to protect underserved populations who lack prompt and quality access to healthcare.

This study has a number of limitations. First, the recruitment strategy and participation reward used for this study could have created an overrepresentation of low-income participants in the sample (majority reporting middle to low income, and more than half of the sample were unemployed) which can be problematic for generalization of the results to other populations. On the other hand, a focus on this high-risk population specifically can also be considered a strength of the research, as low-income participants – who suffer harsher psychosocial effects of the pandemic – are generally more difficult to recruit in research (Bonevski et al., 2014) and research on these populations is highly needed. Second, our study considered only the main caregivers, resulting in an overrepresentation of females and therefore contributing to the mother-centrism observed in parenting research. In Chile, mothers are at higher risk of suffering emotional sequelae upon the pandemic plausibly due to role overload and a considerably higher involvement in child care than fathers (Giraldo et al., 2022; Pérez et al., 2022). To better understand these differences, further studies should include more fathers and focus on the role distribution among caregivers. We acknowledge that these two limitations together imply that our sample is mostly characterized by mid-to-low SES mothers. For this reason, our results could be difficult to extrapolate to the general non-clinical adult population from diverse socioeconomic realities in Chile. Third, using sum scores is a widely used approach to quantify disaster exposure (Felix et al., 2019), making it suitable for estimating linear associations between pandemic hardship and mental health outcomes. However, it assumes that each stressor contributes equally to overall event hardship regardless their severity or other relevant features (i.e. duration, frequency, timing or direct vs indirect exposure) which has several methodological implications (Felix et al., 2019). Future research on pandemic impact could benefit from critical item or person-centered approaches in order to identify specific pandemic-related events and contextual factors that can be linked to different levels of psychological adaptation to the crisis (Grasso et al., 2021).

To our knowledge, this is the first study testing the role of past trauma and family resilience on the psychological impact of pandemic hardship – in its various degrees of severity – among Chilean parents. The results highlight the global negative impact that the pandemic had on moderate-to-low income parents (mostly mothers), and show that this negative impact was not influenced by previous exposure to the earthquake or family resilience beyond the negative impact of pandemic-related hardship itself, even though both previous '27-F' hardship and family resilience showed direct associations with mental health. It is necessary to factor in the pandemic effects on mental health in the broader context of increasing inequity in Chile, considering that the mental health public expenditure is considerably below the WHO recommendations. Special attention should be paid to the mental healthcare access of vulnerable groups such as women at higher psychosocial risk (e.g. being household heads while caregiving multiple children, lower socioeconomic status), and preventive strategies based on the degree of hardship experienced during the pandemic should be designed and tested.

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Data availability statement

Only 27.4% of this sample gave consent for their data to be shared, thus this data will be provided upon reasonable request.

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