Relationship among Child Maltreatment, Parental Conflict, and Mental Health of Children during the COVID-19 Lockdown in China

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Abstract
Children are more likely to experience maltreatment and parental conflict in a pandemic context, which can exacerbate their vulnerability to psychological disorders. The purpose of the present study was to examine mental health symptoms in children aged 0 to 10 years and consider related factors from the perspectives of maltreatment and parental conflict during the COVID-19 lockdown. Participants were 1286 parents aged 18 years and over with children aged 0 to 10 years were included. Several multivariable linear regressions were used to analyze the data. The largest variance in child mental health was explained by child maltreatment, as more maltreatment predicted higher reported psychological problems (standardized beta = 0.49, P < 0.001). Comparatively, parental conflict predicted less variance in mental health problems than maltreatment (standardized beta = 0.18, P < 0.001). Children who experienced more maltreatment experience and exposure to COVID-19 showed elevated levels of mental health symptoms (standardized beta = 0.06, p < 0.05), as did those who experienced parental conflict and pandemic exposure (standardized beta = 0.06, p < 0.05). The findings highlight that tailored programs that focus on a healthy family environment and strategic parental support services may be particularly effective in reducing children’s mental health problems due to COVID-19 exposure.

Keywords Child Maltreatment · Parental Conflict · Mental Health · COVID-19

1 Introduction
Since late 2019, the world has changed dramatically with the outbreak of the coronavirus disease 2019 (COVID-19) pandemic (World Health Organizing, 2020). To control the crisis, most countries have adopted strategies such as isolation, school closure, and social distancing. Under such circumstances, parents were asked to support their children with home schooling while working from home, during which time children were more likely to experience maltreatment and parental conflict (Lawson et al., 2020; Singh et al., 2020). These disadvantages exacerbate the vulnerability of children to psychological disorders in a pandemic context (Fegert et al., 2020). Specifically, previous studies reported that during the COVID-19 pandemic, as many as 40.1% of parents in the United States had observed signs of distress in their children (Rosen et al., 2020), and approximately 20% of children in China had developed psychological problems such as depression and anxiety (Xie et al., 2020). Due to difficulties in accessing respondents, most studies have focused on school-aged children or adolescents (Duan et al., 2020; Tang et al., 2021), and only a few have explored mental health in younger children. As it has been indicated that this pandemic may have increased long-term adverse consequences on younger children (Shen et al., 2020), while life course theory claims a persisting negative effect of mental health disorders from early childhood to adulthood (Sonuga-Barke et al., 2017), it is necessary to examine the mental health of young children under
pandemic threats. Thus, this study examines mental health symptoms in children aged 0 to 10 years and explores the relationship of maltreatment and parental conflict with children’s mental health.

### 1.1 Child Maltreatment and Children’s Mental Health

In general, child maltreatment comprises behaviors of physical and psychological aggression that have negative effects on children’s health; these behaviors include nonviolent discipline, psychological aggression, physical assault, and neglect (Straus et al., 1998). As noted by the ecological-transactional model (Cicchetti & Lynch, 1995), an increase in individual-level risk factors associated with maltreatment at any ecological level represents a deviation from the normal development conditions. Thus, children who are maltreated are more likely to have negative developmental outcomes and psychopathologies (Osofsky & Lieberman, 2011). A previous study indicated that children who are maltreated have a greater risk of developing internalizing and externalizing disorders than those who are not (Osofsky & Lieberman, 2011). Whether different types of child maltreatment predicted the same level of mental health remained unclear. While one prior study assumed different levels of impact on mental health from abusive behaviors (Scott et al., 2010), another meta-analysis found no appreciable differences across maltreatment types (Norman et al., 2012). Thus, the first aim of this study was to examine whether child maltreatment increased the risk of psychological problems among Chinese children in the COVID-19 context, with a specific discussion of each type of maltreatment.

### 1.2 Parental Conflict and Children’s Mental Health

On the household level, the pandemic has disrupted every family member’s daily life. Parents cope with overwhelming stress from lockdown, homeschooling, and income reduction. Stresses in such a context may result in conflicts between family members, which in turn may exacerbate the negative effects of the pandemic on children’s mental health. As the spillover hypothesis demonstrates (Nelson et al., 2009), destructive conflicts between parents spill over into the parent–child relationship, leading to increased negative parenting, while negative parenting behaviors such as harsh discipline and neglect were associated with negative emotions with respect to aggression, anxiety, and depression among children (Sturge-Apple et al., 2006). The hypothesis also posits that negative parental conflict, including physical and verbal aggression, requires excessive emotions and energy that make parents less emotionally available to their children (Engfer, 1988; Sturge-Apple et al., 2006). In response, children become more vulnerable to developing psychological problems. Meanwhile, prior studies have shown that parental conflict predicts internalizing and externalizing problems among children (Carmody et al., 2015; Coln et al., 2013; Hosokawa & Katsura, 2017). Hence, it is reasonable for this study to assume that children who live with parental conflict would experience elevated levels of mental disorders in the COVID-19 pandemic.

### 1.3 Exposure to COVID-19 as a Moderator

Clearly, all families who participated in this study experienced the COVID-19 pandemic. For the purposes of our study, we measured “exposure to COVID-19” or “exposure to the pandemic” by determining whether subjects experienced infection or close contact among family members, neighbors, or friends during the COVID-19 pandemic. Based on this definition, exposure to COVID-19 may affect the associations between child maltreatment, parental conflict, and mental health in young children. On the one hand, the cumulative risk model (Evans et al., 2013) proposes that the impact of child maltreatment on mental health is larger if individuals are exposed to another trauma. A previous study verified that greater exposure to disaster increased the risk of mental health problems in individuals who previously experienced child maltreatment (Inoue et al., 2019). Thus, exposure to COVID-19 may increase the negative effects of parental conflict on children’s mental health. The diathesis-stress model proposes that exposure to the pandemic increased mental health risks via the interactions of predisposing stressors and environmental stress (Fegert et al., 2020). In some studies, veterans exposed to parental conflict were found to have an increased risk of mental health problems if they experienced another trauma (Cabrera et al., 2007; Fritch et al., 2010), whereas this association has not been observed in other studies (Rudenstine et al., 2015; Stein et al., 2005). The inconsistency here could be attributed to the characteristics of trauma and to variances in the cultural setting and methodological design between studies (Braun-Lewensohn et al., 2009; Schalinski et al., 2016). In this study, we examine whether exposure to the COVID-19 pandemic moderates the associations between child maltreatment, parental conflict, and mental health. If so, we try to further examine if the moderation varies between maltreatment types.

### 1.4 Study Aims

The current study aims to examine the relationships of child maltreatment and parental conflict with mental health symptoms among children in China and to further explore
whether exposure to the pandemic moderates those relationships. Our first hypothesis proposes that child maltreatment and parental conflict are associated with an increase in the number of reported mental health problems. Our second hypothesis proposes that exposure to COVID-19 increases the positive associations between child maltreatment, parental conflict, and later behavioral and emotional problems. Third, we assume that these moderating effects vary between types of maltreatment.

2 Methods

2.1 Procedure and Participants

The survey was conducted online from April 21st to April 28th, 2020, during the COVID-19 lockdown in China, and the questionnaires were distributed and retrieved through a web-based platform. Convenience sampling and cluster sampling methods were used to choose participants from Hubei, Henan, and Shenzhen. A small sampling from other regions was also included. Parents aged 18 years and over with children aged 0 to 10 years were included. In total, 1286 questionnaires were collected. Participants received a small gift (e.g., 1–3 RMB) as a token of appreciation at the end of the session. All participants gave consent after being informed about the aim of the survey and joined the study voluntarily. The study was approved by the Ethics Committee of Peking University Medical Center.

2.2 Measures

2.2.1 Outcome Variables

Children’s mental health was assessed with the parent-report Child Behavior Checklist (CBCL) (Achenbach, 1991b). The depression, social problems, and aggressive behavior scales were used in the present study. Then, 24 items were included in the checklist: ten items about depression, five items about social problems, and nine items about aggressive behavior. Respondents answered the 24 items on a 3-point rating scale from 0 (none) to 2 (most of the time). The scores for each item were summed up to an overall mental health score ranging from 0 to 48, with higher scores indicating a higher level of psychological distress. Good discriminative validity and reliability have been reported for the CBCL (Achenbach, 1991a). In this study, Cronbach’s alpha for the CBCL was 0.92.

2.2.2 Independent Variables

Child maltreatment was assessed with the parent-to-child version of the Conflict Tactics Scale (CTS-PC) with answers from parents (Straus et al., 1998), which has shown good performance in previous studies in terms of respondent comprehension, validity and reliability. The 18-item measure was used to evaluate the prevalence of four behaviors within a two-week interval: four items about nonviolent discipline, five items about psychological aggression, four items about physical assault, and five items about neglect. Items were answered on a five-point scale with responses including “never happened” (0), “once in the past two weeks” (1), “twice in the past two weeks” (2), “3 times” (3), “4 times” (4), and “more than 4 times” (5). Scores were summed up within each item, ranging from 0 to 20, 0 to 25, 0 to 20, and 0 to 25, respectively. Cronbach’s alpha of the total CTS-PC score in this study was 0.89. For the four subscales, Cronbach’s alpha was 0.74 for nonviolent discipline, 0.82 for psychological aggression, 0.74 for physical assault, and 0.88 for neglect.

Parental conflict was measured by several questions concerning three major circumstances during the COVID-19 pandemic, including “arguments with your partner”, “physical conflict with your partner”, and “less affection with your partner”. The respondents were asked to rate their behaviors from 1 (never) to 5 (always). Cronbach’s alpha of parental conflict in this study was 0.69.

Exposure to COVID-19 was assessed with a question to describe whether there was any COVID-19 infection or close contact among the family members, neighbors, or friends of the respondents during the pandemic. In this study, “0” refers to “no”, while “1” denotes “yes”.

2.2.3 Covariates

Following previous studies (Guo et al., 2020; Prime et al., 2020), this study took the following demographic and socioeconomic characteristics into consideration: child gender (male/female), child age (3 years old and below/3 to 6 years old/over 6 years old), province (Hubei/Henan/Guangdong/else), family income level (low/middle/high), and parental education level (high school diploma or lower/associate degree/undergraduate degree/graduate degree).

2.3 Statistical Analyses

Data in this study were analyzed via SPSS software version 22.0. Descriptive analyses were conducted to present the characteristics of the main variables: experiences of child maltreatment and parental conflict, exposure to COVID-19, mental health symptoms, and other covariates. Mean and
standard deviation were computed for continuous variables, while frequency and percentage were used for categorical variables. The main analyses included several multivariable linear regressions on child mental health conducted in three steps, with the same covariates used in each step: gender, age, province, family income level, and parental education level. In the first step, we examined the specific associations between independent and dependent variables. Model 0 includes every predictor separately to estimate its “raw” contribution to the mental health of children. Model 1 includes three main predictors (parental conflict, child maltreatment, exposure to COVID-19) together to determine which factor is the strongest predictor of mental health outcomes. Model 2 refines the main analyses above with specific discussions of four types of maltreatment (nonviolent discipline, psychological aggression, physical assault, and neglect). In the second step, variables representing interactions among child maltreatment, parental conflict, and exposure to the COVID-19 pandemic were added. In addition, the whole sample was divided into 2 groups by the number of children in a family to examine its differences in the moderating effects of COVID-19 exposure on the relationships between child maltreatment, parental conflict and child mental health. In the final step, interactions between exposure to the COVID-19 pandemic and four types of maltreatment were examined in each model.

3 Results

3.1 Description of Samples

Table 1 presents the descriptive analysis of the sample characteristics for Chinese children aged 0–10 during the COVID-19 pandemic. Of the 1286 participants, more than half (54.25%) were girls, and approximately 69.43% were older than 6 years of age. Nearly 22.4% were from Hubei, 14.6% were from Henan, 42.0% were from Guangzhou, and the remaining subjects were from other provinces. In terms of exposure to COVID-19, 18.20% reported COVID-19 infection or close contact among family members, neighbors, and friends. The level of child mental health symptoms averaged 31.73 (range from 0 to 48). More details can be seen in Table 1.

3.2 Child Maltreatment, Parental Conflict and Mental Health

The results of the linear regressions are presented in Table 2. In Model 1, the largest variance in child mental health was explained by child maltreatment, as more maltreatment predicted higher reported psychological problems (effect size beta = 0.49). Furthermore, three kinds of maltreatment (nonviolent discipline, psychological aggression, and neglect) were found to be associated with more mental health symptoms. Reported neglect predicted a substantial increase in mental health risk with a standardized beta of 0.32 (Model 2). Comparatively, parental conflict predicted less variance in mental health problems than maltreatment (standardized beta = 0.18) in Model 1.

3.3 Moderating Effects of Exposure to COVID-19

Table 3 reveals two interactions. The first interaction is between child maltreatment and pandemic exposure, and the second interaction is between parental conflict and pandemic exposure. Children who experienced more maltreatment experience and exposure to COVID-19 showed elevated levels of mental health symptoms (standardized beta = 0.06, p < 0.05), as did those who experienced parental conflict and pandemic exposure (standardized beta = 0.06, p < 0.05) (Fig. 1).

Table 4 presents the interaction results of COVID-19 exposure with child maltreatment and parental conflict across families with a different number of children. Only child maltreatment presented significant interactions with pandemic exposure in one-child families (standardized beta = 0.08, p < 0.05).

Table 5 presents the interactive effects of four types of child maltreatment (nonviolent discipline, psychological aggression, physical assault, and neglect) and pandemic exposure on child mental health. In particular, physical assault (standardized beta = 0.07) and neglect (standardized beta = 0.09) presented significant interactions with pandemic exposure (see Fig. 2).

4 Discussion

This study examined the independent associations between child maltreatment, parental conflict, and mental health outcomes in Chinese children aged 0–10 years during the COVID-19 lockdown. We found that child maltreatment was related to substantially higher levels of mental health symptoms, and after controlling for covariates, the experience of parental conflict was also linked to higher reported mental health problems. In addition, we found some evidence for interactions between exposure to COVID-19, child maltreatment, and parental conflict on child mental health. The interaction effects of COVID-19 exposure and child maltreatment on mental health symptoms were significant only among one-child families. Three types of maltreatment (nonviolent discipline, psychological aggression, and neglect) were associated with more mental health
The findings suggest that children who experience maltreatment are at higher risk for mental health problems, which reminds us of the importance of prevention and intervention programs to reduce child maltreatment potential during the COVID-19 pandemic. In addition, this study reveals a positive relationship between the mental health of children in China and their experience of parental conflict. The present finding is supported by ecological system theory and the spillover hypothesis, which both stress the importance of the household environment in children’s psychological well-being (Krishnan, 2010; Sturge-Apple et al., 2006). During the COVID-19 lockdown, parents experienced increased demands related to daily life, income, and child care, whereas caregiver resources were restricted; this combination resulted in a higher level of parental stress and marital conflict (Fegert et al., 2020). Such conflicts between parents can overwhelm symptoms, but only physical assault and neglect showed interactive effects with COVID-19 exposure.

Our findings reveal that child maltreatment is associated with more mental health problems among children aged 0–10 years, consistent with a previous study (Guo et al., 2020). The association between child maltreatment and poorer mental health could be attributed to the following reasons. First, child maltreatment may lower self-compasion, which elicits negative responses to personal adversities and is linked to higher mental health risk (Tanaka et al., 2011). Second, children who experience maltreatment are at higher risk of insecure attachments (Cicchetti & Toth, 2005), which are linked with greater depressive symptoms (Toth & Cicchetti, 1996). Finally, children who are maltreated have more difficulty with emotion regulation, which predicts lower peer acceptance, more internalizing symptomatology, and higher-reported mental disorders (Kim & Cicchetti, 2010). The findings suggest that children who experience maltreatment are at higher risk for mental health problems, which reminds us of the importance of prevention and intervention programs to reduce child maltreatment potential during the COVID-19 pandemic.

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### Table 1

Descriptive characteristics of study population and bivariate linear regression analysis of the relationship of socio-demographic characteristics, and related factors, with child mental health (N = 1286)

| Variables                          | N | Mean | Percentage/SD | B   | Std. Error | Beta |
|-----------------------------------|---|------|---------------|-----|------------|------|
| Child gender                      |   |      |               |     |            |      |
| Male                              | 544 | 45.75 |               | 0.404 | 0.431      | 0.028 |
| Female                            | 645 | 54.25 |               | 0.404 | 0.431      | 0.028 |
| Child age                         |   |      |               |     |            |      |
| ≤3                                | 153 | 12.31 |               | 0.404 | 0.431      | 0.028 |
| 3–6                               | 227 | 18.26 |               | 0.404 | 0.431      | 0.028 |
| >6                                | 863 | 69.43 |               | 0.404 | 0.431      | 0.028 |
| Number of children                |   |      |               |     |            |      |
| 1                                 | 594 | 46.2  |               | 0.404 | 0.431      | 0.028 |
| >1                                | 692 | 53.8  |               | 0.404 | 0.431      | 0.028 |
| Province                          |   |      |               |     |            |      |
| Hubei                             | 288 | 22.4  |               | 0.404 | 0.431      | 0.028 |
| Henan                             | 188 | 14.6  |               | 0.404 | 0.431      | 0.028 |
| Guangdong                         | 540 | 42.0  |               | 0.404 | 0.431      | 0.028 |
| Others                            | 270 | 21.0  |               | 0.404 | 0.431      | 0.028 |
| Family income level               |   |      |               |     |            |      |
| Low income (< 100,000 Yuan)       | 789 | 61.35 |               | 0.404 | 0.431      | 0.028 |
| Middle income (100,000–200,000 Yuan) | 267 | 20.76 |               | 0.404 | 0.431      | 0.028 |
| High income (> 200,000 Yuan)      | 230 | 17.89 |               | 0.404 | 0.431      | 0.028 |
| Parental education level          |   |      |               |     |            |      |
| High school diploma or lower      | 371 | 28.85 |               | 0.404 | 0.431      | 0.028 |
| Associate degree                  | 237 | 18.43 |               | 0.404 | 0.431      | 0.028 |
| Undergraduate degree              | 460 | 35.77 |               | 0.404 | 0.431      | 0.028 |
| Graduate degree                   | 218 | 16.95 |               | 0.404 | 0.431      | 0.028 |
| COVID-19 exposure                 |   |      |               |     |            |      |
| Yes                               | 234 | 18.20 |               | 0.404 | 0.431      | 0.028 |
| No                                | 1052| 81.80 |               | 0.404 | 0.431      | 0.028 |
| Parental conflict (Mean, SD)      | 4.99 | 1.87  |               | 1.437 | 0.108      | 0.364*** |
| Child maltreatment (Mean, SD)     | 13.16| 11.75 |               | 0.345 | 0.015      | 0.558*** |
| Nonviolent discipline             | 9.59 | 4.17  |               | 0.688 | 0.046      | 0.393*** |
| Psychological aggression          | 9.38 | 4.92  |               | 0.715 | 0.037      | 0.481*** |
| Physical assault                  | 5.98 | 2.94  |               | 1.057 | 0.063      | 0.430*** |
| Neglect                           | 6.22 | 2.67  |               | 1.296 | 0.067      | 0.484*** |
| Child mental health (Mean, SD)    | 31.728 | 7.230 |            |      |            |      |

Notes: B: coefficient, Std Error: standard error; * p < 0.05, *** p < 0.001
measurements between studies. Although in this study the direct effect of pandemic exposure on children’s mental health is insignificant, it indeed strengthens the relationship between parental conflict, child maltreatment, and mental health problems in children. Prime et al. suggested that parental conflict, financial insecurity, and life disruptions predict children’s vulnerabilities (Prime et al., 2020). One recent study indicated that COVID-19 exposure exacerbated anxiety, depression, and PTSD in rural adolescents who had adverse childhood experiences (Guo et al., 2020). Moreover, the association between child maltreatment and mental health symptoms could only be enhanced by pandemic exposure in one-child families. It is possible that a greater number of children in a family would help to shape the household environment and yield negative effects on children’s mental health (Pruett et al., 2017). A recent study found that parents who had conflicts with spouses during the COVID-19 pandemic were more likely to report higher stresses for their children (Russell et al., 2020). Children may be affected by observing, witnessing, and learning about their parents’ disruptive conflicts and aggressive behaviors (Xuan et al., 2018). In summary, this study highlights that the experience of parental conflict spills over into mental health symptoms in children.

In contrast to a prior study (Guo et al., 2020), this study found that exposure to the COVID-19 pandemic had no relationship with mental health symptoms in children. A possible reason could be differences in sample size and  

Table 2  Multiple linear regression with COVID-19 exposure, parental conflict, child maltreatment predicting child mental health

|                          | Model 0 | Model 1 | Model 2 |
|--------------------------|---------|---------|---------|
|                          | B       | Std. Error | Beta | B       | Std. Error | Beta | B       | Std. Error | Beta |
| COVID-19 exposure        | 1.107   | 0.589    | 0.058  | 0.650   | 0.499      | 0.034 | 0.509   | 0.489      | 0.026 |
| Parental conflict        | 1.443   | 0.114    | 0.362*** | 0.721   | 0.107      | 0.181*** | 0.642   | 0.105      | 0.161*** |
| Child maltreatment       | 0.344   | 0.015    | 0.557*** | 0.308   | 0.017      | 0.491*** | 0.244   | 0.053      | 0.136*** |
| Nonviolent discipline    | 0.236   | 0.053    | 0.133*** |         |            |       | 0.218   | 0.059      | 0.143*** |
| Psychological aggression | 0.275   | 0.058    | 0.183*** |         |            |       | 0.141   | 0.094      | 0.056   |
| Physical assault         | 0.185   | 0.090    | 0.075*  |         |            |       | 0.141   | 0.094      | 0.056   |
| Neglect                  | 0.906   | 0.078    | 0.342*** |         |            |       | 0.874   | 0.084      | 0.322*** |

Notes: B: coefficient, Std. Error: standard error; Control variables: Child gender, child age, province, family income level, parental education level. All the models were adjusted for confounding  * p<0.05, *** p<0.001

Table 3  Multiple linear regressions for interaction effects of COVID-19 exposure, child maltreatment, and parental conflict predicting child mental health

|                          | Model 1 | Model 2 |
|--------------------------|---------|---------|
|                          | B       | Std. Error | Beta | B       | Std. Error | Beta |
| COVID-19 exposure        | 0.220   | 0.193     | 0.029  | 0.237   | 0.193      | 0.032 |
| Parental conflict        | 1.312   | 0.200     | 0.176*** | 1.324   | 0.199      | 0.177*** |
| Child maltreatment       | 3.632   | 0.197     | 0.492*** | 3.598   | 0.197      | 0.488*** |
| COVID-19 exposure & Child maltreatment | 0.441   | 0.184     | 0.060*  |         |            |       |
| COVID-19 exposure & Parental conflict | 0.390   | 0.173     | 0.056*  |         |            |       |

Notes: B: coefficient, Std. Error: standard error; Control variables: Child gender, child age, province, family income level, parental education level. All the models were adjusted for confounding  * p<0.05, *** p<0.001

Fig. 1  The interaction effects of COVID-19 exposure, child maltreatment, and parental conflict, predicting child mental health.
a sense of happiness and resilience. Children could obtain more emotional support from other sibling(s) in multi-child families, and vulnerability would be mitigated once maltreatment existed (Wu & Sun, 2020; Hu & Qian, 2021). These findings underscore the importance of family structure in shaping child mental resilience and vulnerability during the pandemic. Here, we argue that we should look at the type of child maltreatment; in our study, physical abuse and neglect are the two most important predictors of mental health symptoms moderated by pandemic exposure. Perhaps child neglect stimulates stress sensitization, and individuals experiencing family neglect may become more vulnerable to subsequent stressful events and suffer more intense traumatic feelings (McLaughlin et al., 2010).

### 5 Limitations and Implication

To our knowledge, this study is the first comprehensive investigation of the independent and interactive influences of COVID-19 exposure, parental conflict, and parental harshness on the mental health of children aged 0–10 years. Several limitations should be noted. First, there might be potential bias in parent reports related to their children’s experiences of maltreatment, which could inflate or confound the association of child maltreatment and mental health. Although we have tried to reduce bias by employing a well-validated measurement (CTSPC), multiple methods (e.g., clinical and judicial records) and multiple informants (e.g., children, therapists and judicial agencies) should be designed in future research. Second, the fact that maltreatment, parental conflict, and mental health were all reported by parents should be acknowledged. Such parental reports

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### Table 4  Multiple linear regressions for interaction effects of COVID-19 exposure, child maltreatment, and parental conflict predicting child mental health in the number of children subgroup

|             | Model 1: One-child family | Model 2: multi-children family | Model 3: One-child family | Model 4: multi-children family |
|-------------|---------------------------|-------------------------------|---------------------------|-------------------------------|
|             | B | Std. Error | Beta | B | Std. Error | Beta | B | Std. Error | Beta | B | Std. Error | Beta |
| COVID-19 exposure | 0.293 | 0.203 | 0.048 | 0.164 | 0.427 | 0.014 | 0.281 | 0.203 | 0.046 | 0.064 | 0.418 | 0.006 |
| Parental conflict | 1.465 | 0.248 | 0.213*** | 1.072 | 0.310 | 0.133*** | 1.413 | 0.256 | 0.205*** | 1.049 | 0.334 | 0.130*** |
| Child maltreatment | 4.179 | 0.271 | 0.569*** | 2.891 | 0.317 | 0.390*** | 4.268 | 0.266 | 0.581*** | 3.032 | 0.289 | 0.409*** |
| COVID-19 exposure × Child maltreatment | 0.446 | 0.199 | **0.077*** | 0.314 | 0.180 | 0.060 |
| COVID-19 exposure × Parental conflict | -0.468 | 0.427 | -0.045 | -0.113 | 0.452 | -0.010 |

Notes: B: coefficient, Std. Error: standard error; Control variables: Child gender, child age, province, family income level, parental education level. All the models were adjusted for confounding

* p < 0.05, ** p < 0.01, *** p < 0.001

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### Table 5  Multiple linear regression for interaction effects of COVID-19 exposure and four scales of child maltreatment predicting child mental health

|             | Model 1 | Model 2 | Model 3 | Model 4 |
|-------------|---------|---------|---------|---------|
|             | B | Std. Error | Beta | B | Std. Error | Beta | B | Std. Error | Beta | B | Std. Error | Beta |
| COVID-19 exposure | 0.190 | 0.191 | 0.025 | 0.192 | 0.190 | 0.026 | 0.185 | 0.189 | 0.025 | 0.149 | 0.189 | 0.020 |
| Parental conflict | 1.201 | 0.198 | 0.161*** | 1.200 | 0.198 | 0.161*** | 1.185 | 0.197 | 0.159*** | 1.159 | 0.196 | 0.155*** |
| Nonviolent discipline | 1.016 | 0.222 | 0.136*** | 1.017 | 0.222 | 0.136*** | 1.026 | 0.221 | 0.138*** | 1.046 | 0.221 | 0.140*** |
| Psychological aggression | 2.328 | 0.223 | 0.322*** | 2.327 | 0.224 | 0.321*** | 2.258 | 0.224 | 0.312*** | 2.203 | 0.225 | 0.304*** |
| Physical assault | 0.416 | 0.276 | 0.056 | 0.418 | 0.276 | 0.056 | 0.414 | 0.275 | 0.056 | 0.393 | 0.274 | 0.053 |
| Neglect | 1.074 | 0.291 | 0.143*** | 1.073 | 0.291 | 0.143*** | 1.122 | 0.290 | 0.150*** | 1.128 | 0.290 | 0.151*** |
| COVID-19 exposure × nonviolent discipline | 0.018 | 0.186 | 0.002 | 0.038 | 0.187 | 0.005 |
| COVID-19 exposure × psychological aggression |                          |                          |                          |
| COVID-19 exposure × physical assault | 0.515 | 0.180 | **0.070*** |
| COVID-19 exposure × neglect |                          |                          | 0.567 | 0.157 | **0.091*** |

Notes: B: coefficient, Std. Error: standard error; Control variables: Child gender, child age, province, family income level, parental education level. All the models were adjusted for confounding

** p < 0.01, *** p < 0.001
Conclusion

This study provides evidence for both direct and interactive influences of COVID-19 exposure, parental conflict, and child maltreatment on younger children's mental health problems. Both child maltreatment and parental conflict act as powerful predictors of mental health symptoms, with these relationships being moderated by COVID-19 exposure. Nevertheless, the effect of child maltreatment was reduced after controlling for parental conflict, suggesting that future research examining the consequence of parental harshness should account for parental conflict. These findings highlight the need for community social workers to identify parental conflict and parental harshness as potential risk factors for mental health problems among young children during and after the pandemic. Tailored programs that focus on a healthy family environment and strategic parental support services may be particularly effective in reducing children's mental health problems in the pandemic context.

Authors' Contributions

Yashuang Bai and Jing Guo drafted the manuscript, and analysis the data. MingQi Fu, XiaoHua Wang, Danxia Liu, Bo Zhang, Yanjun Zhang and Chengbin Liu was involved in revising the manuscript. All authors were involved in writing the manuscript and approve of its final version.

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Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.
Declarations

Ethics Approval The study was approved by the local ethics committees of the Peking University Medical Ethics Board. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Competing Interests The authors declare that they have no conflict of interest.

References

Achenbach, T. M. (1991a). Integrative Guide to the 1991 CBCL/4–18 YSR, and TRF Profiles. University of Vermont, Department of Psychology Pediatrics (108 vol.). Department of Psychiatry University of Vermont
Achenbach, T. M. (1991b). Manual for the child behavior checklist/4–18 and 1991 profile. University of Vermont, Department of Psychiatry

Braun-Lewensohn, O., Celestin-Westreich, S., Celestin, L. P., Verté, D., & Ponjaert-Kristoffersen, I. (2009). Adolescents’ mental health outcomes according to different types of exposure to ongoing terror attacks. Journal of Youth and Adolescence, 38(6), 850–862. https://doi.org/10.1007/s10964-008-9305-8

Cabrera, O. A., Hoge, C. W., Bliese, P. D., Castro, C. A., & Messer, S. C. (2007). Childhood Adversity and Combat as Predictors of Depression and Post-Traumatic Stress in Deployed Troops. American Journal of Preventive Medicine, 33(2), 77–82. https://doi.org/10.1016/j.amepre.2007.03.019

Carmody, K. A., Haskett, M. E., Loehman, J., & Rose, R. A. (2015). Physically Abused Children’s Adjustment at the Transition to School: Child, Parent, and Family Factors. Journal of Child and Family Studies, 24(4), 957–969. https://doi.org/10.1007/s10826-014-9906-7

Cicchetti, D., & Lynch, M. (1995). Failures in the expectable environment and their impact on individual development: The case of child maltreatment. Developmental Psychopathology, Vol. 2: Risk, Disorder, and Adaptation., 2, 32–71. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=1995-97697-002&site=host-live&scope=site

Cicchetti, D., & Toth, S. L. (2005). Child maltreatment. Annual Review of Clinical Psychology, 1, 409–438. https://doi.org/10.1146/annurev.clinpsy.1.102803.144029

Cohn, K. L., Jordan, S. S., & Mercer, S. H. (2013). A unified model exploring parenting practices as mediators of marital conflict and children’s adjustment. Child Psychiatry and Human Development, 44(3), 419–429. https://doi.org/10.1007/s10578-012-0336-8

Duan, L., Shao, X., Wang, Y., Huang, Y., Miao, J., Yang, X., & Zhe, G. (2020). An investigation of mental health status of children and adolescents in China during the outbreak of COVID-19. Journal of Affective Disorders, 275, 112–118. https://doi.org/10.1016/j.jad.2020.06.029

Engfer, A. (1988). The interrelatedness of marriage and the mother-child relationship. Relationships within Families: Mutual Influences, 7, 104

Evans, G. W., Li, D., & Whipple, S. S. (2013). Cumulative risk and child development. Psychological Bulletin, 139(6), 1342–1396. https://doi.org/10.1037/a0031808

Fegert, J. M., Vitiello, B., Plener, P. L., & Clemens, V. (2020). Challenges and burden of the Coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: A narrative review to highlight clinical and research needs in the acute phase and the long return to normality. Child and Adolescent Psychiatry and Mental Health, 14(1), 1–11. https://doi.org/10.1186/s13033-020-00329-3

Fritch, A. M., Mishkind, M., Reger, M. A., & Gahm, G. A. (2010). The impact of childhood abuse and combat-related trauma on postdeployment adjustment. Journal of Traumatic Stress, 23(2), 248–254. https://doi.org/10.1002/jts.20520

Guo, J., Fu, M., Liu, D., Zhang, B., Wang, X., & van IJzendoorn, M. H. (2020). Is the psychological impact of exposure to COVID-19 stronger in adolescents with pre-pandemic maltreatment experiences? A survey of rural Chinese adolescents. Child Abuse and Neglect, 110(Pt 2), 104667. https://doi.org/10.1016/j.chiabu.2020.104667

Hosokawa, R., & Katsura, T. (2017). A longitudinal study of socioeconomic status, family processes, and child adjustment from preschool until early elementary school: The role of social competence. Child and Adolescent Psychiatry and Mental Health, 11(1), 62. https://doi.org/10.1186/s13034-017-0206-z

Hu, Y., & Qian, Y. (2021). COVID-19 and Adolescent Mental Health in the United Kingdom. The Journal of adolescent health: official publication of the Society for Adolescent Medicine, 69(1), 26–32. https://doi.org/10.1016/j.jadohealth.2021.04.005

Inoue, Y., Stickley, A., Yazawa, A., Aida, J., Kawachi, I., Kondo, K., & Fujiwara, T. (2019). Adverse childhood experiences, exposure to a natural disaster and posttraumatic stress disorder among survivors of the 2011 Great East Japan earthquake and tsunami. Epidemiology and Psychiatric Sciences, 28(1), 45–53. https://doi.org/10.1017/S2045796017000233

Kim, J., & Cicchetti, D. (2010). Longitudinal pathways linking child maltreatment, emotion regulation, peer relations, and psychopathology. Journal of Child Psychology and Psychiatry and Allied Disciplines, 51(6), 706–716. https://doi.org/10.1111/j.1469-7610.2009.02202.x

Krishnan, V. (2010). Early Child Development: A Conceptual Model. Childhood Council Annual Conference, 7–9

Lawson, M., Piehl, M. H., & Simon, M. (2020). Child Maltreatment during the COVID-19 Pandemic: Consequences of Parental Job Loss on Psychological and Physical Abuse Towards Children. Child Abuse and Neglect, 110(Pt 2), 104709. https://doi.org/10.1016/j.chiabu.2020.104709

McLaughlin, K. A., Conron, K. J., Koenen, K. C., & Gilman, S. E. (2010). Childhood adversity, adult stressful life events, and risk of past-yr psychiatric disorder: A test of the stress sensitization hypothesis in a population-based sample of adults. Psychological Medicine, 40(10), 1647–1658. https://doi.org/10.1017/S0033291709992121

Nelson, J. A., O’Brien, M., Blankson, A. N., Calkins, S. D., & Keane, S. P. (2009). Family Stress and Parental Responses to Children’s Negative Emotions: Tests of the Spillover, Crossover, and Compensatory Hypotheses. Journal of Family Psychology, 23(5), 671–679. https://doi.org/10.1037/a0015977

Norman, R. E., Byambaa, M., De, R., Butchart, A., Scott, J., & Vos, T. (2012). The Long-Term Health Consequences of Child Physical Abuse, Emotional Abuse, and Neglect: A Systematic Review and Meta-Analysis. PLoS Medicine, 9(11), e1001349. https://doi.org/10.1371/journal.pmed.1001349

Osofsky, J. D., & Lieberman, A. F. (2011). A call for integrating a mental health perspective into systems of care for abused and neglected infants and young children. The American Psychologist, 66(2), 120–128. https://doi.org/10.1037/a0021630

Prime, H., Wade, M., & Browne, D. T. (2020). Risk and resilience in family well-being during the COVID-19 pandemic.

Springer
American Psychologist, 75(5), 631–643. https://doi.org/10.1037/amp0000066

Pruett, M. K., Pruett, K., Cowan, C. P., & Cowan, P. A. (2017). Enhancing father involvement in Low-Income families: A couples approach to preventive intervention. Child Development, 88(2), 398–407. https://doi.org/10.1111/cdev.12744

Rosen, Z., Weinberger-Litman, S., Rosenzweig, C., Rosmarin, D., Muenning, P., Carmody, E., & Litman, L. (2020). Anxiety and distress among the first community quarantined in the U.S due to COVID-19: Psychological implications for the unfolding crisis. PsyArXiv. https://doi.org/10.31234/osf.io/7eq8c

Rudenstine, S., Cohen, G., Prescott, M., Sampson, L., Liberzon, I., Tamburrino, M., & Galea, S. (2015). Adverse childhood events and the risk for new-onset depression and post-traumatic stress disorder among U.S. national guard soldiers. Military Medicine, 180(9), 972–978. https://doi.org/10.7205/MILMED-D-14-00626

Russell, B. S., Hutchison, M., Tamblying, R., Tomkunas, A. J., & Horton, A. L. (2020). Initial Challenges of Caregiving During COVID-19: Caregiver Burden, Mental Health, and the Parent–Child Relationship. Child Psychiatry and Human Development, 51(5), 671–682. https://doi.org/10.1007/s10578-020-01037-x

Schalinski, I., Teicher, M. H., Nischl, D., Hinderer, E., Müller, O., & Rockstroh, B. (2016). Type and timing of adverse childhood experiences differentially affect severity of PTSD, dissociative and depressive symptoms in adult inpatients. BMC Psychiatry, 16(1), 295. https://doi.org/10.1186/s12888-016-1004-5

Scott, J., Varghese, D., & McGraith, J. (2010). As the twig is bent, the tree inclines: Adult mental health consequences of childhood adversity. Archives of General Psychiatry, 67(2), 111–112. https://doi.org/10.1001/archgenpsychiatry.2009.188

Shen, K., Yang, Y., Wang, T., Zhao, D., Jiang, Y., Jin, R., & Gao, L. (2020). Diagnosis, treatment, and prevention of 2019 novel coronavirus infection in children: experts’ consensus statement. World Journal of Pediatrics: WJP, 16(3), 223–231. https://doi.org/10.1007/s12888-016-00343-7

Singh, S., Roy, D., Sinha, K., Parveen, S., Sharma, G., & Joshi, G. (2020). Impact of COVID-19 and lockdown on mental health of children and adolescents: A narrative review with recommendations. Psychiatry Research, 293, 113429. https://doi.org/10.1016/j.psychres.2020.113429

Sonuga-Barke, E. J. S., Kennedy, M., Kumsta, R., Knights, N., Golm, D., Rutter, M., & Kreppner, J. (2017). Child-to-adult neurodevelopmental and mental health trajectories after early life deprivation: the young adult follow-up of the longitudinal English and Romanian Adoptees study. The Lancet, 389(10078), 1539–1548. https://doi.org/10.1016/S0140-6736(17)30045-4

Stein, A. L., Tran, G. Q., Lund, L. M., Haji, U., Dashdevsky, B. A., & Baker, D. G. (2005). Correlates for posttraumatic stress disorder in Gulf War veterans: A retrospective study of main and moderating effects. Journal of Anxiety Disorders, 19(8), 861–876. https://doi.org/10.1016/j.janxdis.2004.09.006

Straus, M. A., Hamby, S. L., Finkelhor, D., Moore, D. W., & Runyan, D. (1998). Identification of child maltreatment with the parent-child Conflict Tacties Scales: Development and psychometric data for a national sample of American parents. Child Abuse and Neglect, 22(4), 249–270. https://doi.org/10.1016/S0145-2134(97)00174-9

Sturge-Apple, M. L., Davies, P. T., & Cummings, E. M. (2006). Impact of hostility and withdrawal in interparental conflict on parental emotional unavailability and children’s adjustment difficulties. Child Development, 77(6), 1623–1641. https://doi.org/10.1111/j.1467-8624.2006.00963.x

Tanaka, M., Wekerle, C., Schmuck, M., Lou, & Paglia-Boak, A. (2011). The linkages among childhood maltreatment, adolescent mental health, and self-compassion in child welfare adolescents. Child Abuse and Neglect, 35(10), 887–898. https://doi.org/10.1016/j.chiabu.2011.07.003

Tang, S., Xiang, M., Cheung, T., & Xiang, Y. T. (2021). Mental health and its correlates among children and adolescents during COVID-19 school closure: The importance of parent-child discussion. Journal of Affective Disorders, 279, 353–360. https://doi.org/10.1016/j.jad.2020.10.016

Toth, S. L., & Cicchetti, D. (1996). Patterns of relatedness, depressive symptomatology, and perceived competence in maltreated children. Journal of Consulting and Clinical Psychology, 64(1), 32–41. https://doi.org/10.1037/0022-006X.64.1.32

World Health Organizing (2020). Mental Health and Psychosocial Considerations During COVID-19 Outbreak

Wu, J., & Sun, L. (2020). Social support networks and adaptive behaviour choice: a social adaptation model for migrant children in China based on grounded theory. Children and Youth Services Review, 113, 104940. https://doi.org/10.1016/j.childyouth.2020.104940

Xie, X., Xue, Q., Zhou, Y., Zhu, K., Liu, Q., Zhang, J., & Song, R. (2020). Mental health status among children in home confinement during the coronavirus disease 2019 outbreak in Hubei Province, China. JAMA Pediatrics, 174, 898–900. https://doi.org/10.1001/jamapediatrics.2020.1619

Xuan, X., Chen, F., Yuan, C., Zhang, X., Luo, Y., Xue, Y., & Wang, Y. (2018). The relationship between parental conflict and preschool children’s behavior problems: A moderated mediation model of parenting stress and child emotionality. Children and Youth Services Review, 95, 209–216. https://doi.org/10.1016/j.childyouth.2018.10.021

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