Dyadic associations between COVID-19-related stress and mental well-being among parents and children in Hong Kong: An actor–partner interdependence model approach

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Abstract
The spread of COVID-19 and its subsequent social distancing policies have profoundly impacted the lives of parents and children. Prolonged exposure to parenting-related responsibilities and heightened levels of family conflict under stay-at-home orders coupled with reduced access to support systems and resources have rendered parents and children more prone to stress and mental health difficulties. Drawing on a transactional model of parent–child interactions, the present study applied an actor–partner interdependence model approach to examine the transactional relationship between COVID-19-related stress and mental well-being among parents and children. Data from 109 Chinese parent–child dyads in Hong Kong were included in the study. Parents and their 8- to 10-year-old children completed a questionnaire on COVID-19-related stress, parent–child relationships, and mental well-being. The results showed that 53.2% and 30.3% of the parents and children, respectively, showed poor mental well-being, indicating possible emotional problems. Both actor and partner effects of parent COVID-19-related stress were found. Parent COVID-19-related stress was indirectly related to lower levels of parent and child mental well-being, through the mediation of parent–child conflict. To facilitate psychological adjustment following the COVID-19 outbreak, effective family-based mental health and parenting interventions...
FAMILY PROCESS

INTRODUCTION

Coronavirus disease 2019 (COVID-19) has been recognized as a global health emergency, threatening the health of billions of people around the world (Prime et al., 2020; Torales et al., 2020). As of December 2021, it was estimated that more than 280 million people had COVID-19 and about 5.4 million people had died from the disease worldwide (Ritchie et al., 2020). In response to the uncontrollable pandemic, governments across the world adopted different social distancing measures, such as national lockdowns, closures of restaurants and entertainment venues, bans on public gathering, and shelter-in-place orders. The COVID-19 pandemic and its subsequent policy responses have created a significant disturbance in different domains of people's lives (Russell et al., 2020). Due to the seemingly endless extension of social distancing measures, people are obliged to stay at home for long periods of time, and the resulting disruption in their daily activities and social life is therefore unavoidable (Tso et al., 2020).

Parents and children are particularly vulnerable to the adversity caused by the COVID-19 crisis (Brown et al., 2020; Marques de Miranda et al., 2020). During the period of class suspension and school closures, children not only are confined to their home and lack opportunities to receive education but also fail to maintain contact and interaction with peers, reducing the social resources available to them (Wong et al., 2021). Moreover, the loss of structure and routine can be psychologically overwhelming for children (Prime et al., 2020). Parents need to manage the competing demands of work, household, and childcare responsibilities, which may contribute to elevated levels of stress and burnout (Cluver et al., 2020; Griffith, 2020). The stress is particularly relevant to mothers who are often assumed to take on the role of primary caregiver of their children (Almeida et al., 2020; Guo et al., 2021). To understand the impact of the COVID-19 pandemic on family life, the present study examined the association and interaction between COVID-19-related stress, parent–child relationships, and mental well-being among parents and children.

Effects of COVID-19 on mental health

Accumulating evidence shows that the aggregation of COVID-19-related stress, such as health worries, social isolation, and financial hardship, may precipitate mental health problems (Prime et al., 2020; Torales et al., 2020). Choi et al. (2020) examined the stress experienced by people in Hong Kong during the pandemic and showed that being worried about COVID-19 infection and being bothered by not being able to work from home were linked to depressive symptoms. Even in the time of social distancing, telepsychotherapy and other online non-psychotherapeutic interventions can serve as a valid alternative for parents and children who experience excessive distress. Implications for psychological services, family-friendly policies, and social protection measures are also discussed.

KEYWORDS
actor–partner interdependence model, COVID-19, mental well-being, parent–child relationships, transactional model
and anxiety symptoms, indicating that the detrimental effects of the pandemic on mental health cannot be neglected. A handful of recent studies has also begun to examine how the COVID-19 pandemic affected the mental health of parents and children (Faulkner et al., 2021; Spinelli et al., 2021). It was found that parents were highly burdened by lockdown, social distancing, and homeschooling measures, and experienced poorer mental health problems than before the pandemic (Almeida et al., 2020; Brown et al., 2020). Working parents also have to resolve role conflicts that may arise from full-time parenting and work commitments (Cluver et al., 2020; Griffith, 2020). A study of Chinese mothers by Guo et al. (2021) found that daily life changes and work stress were the major dimensions of stress caused by the COVID-19 pandemic and were negatively related to mental health. Similarly, a recent review revealed heightened rates of depression, anxiety, and post-traumatic stress symptoms among children from all development phases (Marques de Miranda et al., 2020).

Nevertheless, the unit of analysis in these studies is the individual (either parents or children) (Chung et al., 2020; Marques de Miranda et al., 2020; Wu et al., 2020). Such an approach might neglect the family context that influences psychological adjustment following exposure to the COVID-19 outbreak. As shown in previous research on children affected by traumatic events (Juth et al., 2015; Shi et al., 2018), children's experiences and responses may be best understood in light of their interactions with their parents. In particular, studies have indicated that children exposed to natural and human-made disasters do not experience stress and mental health problems in isolation as their parents are also influenced by the disasters (Black et al., 2021; Griffith, 2020; Li et al., 2020). The findings are particularly relevant for parents and children in the time of the COVID-19 pandemic when social distancing is in place.

**Transactional model of parent–child interactions**

The transactional model of development (Sameroff, 1975) provides a conceptual framework for understanding the interactive relationships between children and their environment. Children and their environment are continuously evolving as the features of each shape those of the other over time (Sameroff, 1975). The model explicates that the underlying process of the children’s transactions with the environment is dialectical because children change the external environments while simultaneously being influenced by external changes in their environments (Sameroff & Mackenzie, 2003). Child development is, therefore, considered as a function of the interaction between individual characteristics and the raising environments.

The transactional model serves as a building block for understanding the dynamics of parent–child relationships and the mutually impacting transactions within the family (Paschall & Mastergeorge, 2016). With frequent and intense interactions, parent–child dyads often develop into highly interwoven relationships, which exert profound influences on one another (De Neve & Kawachi, 2017). In particular, early parent characteristics or behaviors may relate to child development, whereas early child characteristics or behaviors may relate to later parent characteristics or behaviors (Cherry et al., 2019). Such transactional processes have been examined in the context of parent–child relationship quality and internalizing problems (Hickey et al., 2020), parenting stress and child psychosocial functioning (Chan et al., 2020), and parents’ emotional socialization (Lunkenheimer et al., 2020). This line of research highlights the importance of considering mutual dyadic influences inherent in parent–child relationships.

The actor–partner interdependence model (Kenny, 1996) is a methodological approach to examine interdependence in dyadic relationships. The model considers the dyad as the highest unit of analysis and allows for the simultaneous estimation of how much a person is influenced by his or her prior exposure and a partner (Cook & Kenny, 2005). The two central mechanisms
underlying the model are the actor effects and the partner effects. An actor effect captures the extent to which a person's outcome variable is affected by his or her own predictor variable, whereas a partner effect reflects the extent to which a person's outcome variable is affected by his or her partner's predictor variable. In particular, the partner effects in the model estimate the reciprocal influences that may exist between members of the dyad. The actor–partner interdependence model has been applied as an analytical framework to understand the intertwining affective experiences of parents and children exposed to natural disasters (Juth et al., 2015; Shi et al., 2018). Whereas previous studies support a bidirectional relationship between parent–child mental health symptoms, there is a paucity of understanding on how the stress exposure of parents and children influences one another in the face of traumatic events (Li et al., 2020). Given the pervasiveness of COVID-19 pandemic, it is critical to examine how a shared experience of collective trauma is linked to mental health among parents and children, such that one's stress and psychological maladjustment are tied to the other's (Prime et al., 2020; Watson et al., 2020). In light of the transactional process of parent–child interactions (De Neve & Kawachi, 2017; Sameroff & Mackenzie, 2003), it is plausible that COVID-19-related stress experienced by parents and children may affect the quality of their relationships and well-being.

Parent–child relationships during the COVID-19 pandemic

Parent–child relationships may mediate the transactional association between COVID-19-related stress and mental well-being among parents and children (Cluver et al., 2020). Recent studies have found that intergenerational family conflict has been exacerbated by the COVID-19 pandemic (Russell et al., 2020; Suen et al., 2020). As children are required to stay at home with their parents constantly due to school closures and home confinement, it may increase caregiving demands and aggravate conflicts and disputes (Prime et al., 2020). This notion was supported by a study by Guo et al. (2020), who showed that 36.0% of the 2331 respondents in China reported having family conflict during the COVID-19 quarantine. Heightened levels of stress during the COVID-19 pandemic may be related to harsh parenting (Brown et al., 2020), child neglect and maltreatment (Griffith, 2020), and poor relationships between parents and children (Chung et al., 2020; Russell et al., 2020).

The increased family tension and conflict not only are linked to deteriorating parent–child relationships but also constitute a significant source of distress leading to mental health problems (Faulkner et al., 2021; Spinelli et al., 2021; Wu et al., 2020). Specifically, prolonged exposure to parenting-related expectations and responsibilities coupled with the reduced availability of and access to resources to meet those demands (e.g., absence of homeschooling and social support) make it inevitable that many parents are experiencing tremendous stress and burnout during the COVID-19 pandemic (Cluver et al., 2020; Prime et al., 2020). They may show symptoms of physical and mental exhaustion, reduction in sleep quality, and emotional distancing from their children (Griffith, 2020). As evidenced by a study of 1163 parents of children of different ages in China (Wu et al., 2020), family conflict was positively related to depressive and anxiety symptoms among parents during the pandemic.

The transactional relationship between COVID-19-related stress and mental well-being is of particular concern for parents and children in Hong Kong, which is one of the most densely populated cities in the world. Most of the people live in an extremely small and crowded environment with little personal space. This condition may potentially increase tension and conflict with family members (Suen et al., 2020). Furthermore, Hong Kong was one of the first cities in the world to mandate school closures in the beginning stage of COVID-19 pandemic. Family stress and tensions might even be more prevalent during school closures.
because children were expected to stay at home and avoid outdoor activities (Brown et al., 2020; Griffith, 2020). A recent population study of Hong Kong families with children aged 2–12 years showed that parent reports of children's delayed bedtime, inadequate exercise duration, and extended use of electronic devices were positively related to parent stress and child psychosocial problems (Tso et al., 2020). Another study of parents of children below 10 years in Hong Kong also revealed that income instability such as job loss and income reduction was a risk factor of child physical assaults during pandemic (Wong et al., 2021). Therefore, it is expected that with chronic exposure to COVID-19-related stress, conflict between parents and children would be further exacerbated (Cluver et al., 2020). This stress-induced family conflict would, in turn, contribute to worse mental health among parents and children in Hong Kong (Wu et al., 2020).

Purposes of the present study

The present study aimed to (1) investigate the prevalence of COVID-19-related stress (i.e., loss of daily routines and disruption to work or studies) and its association with mental well-being among parents and children in Hong Kong, (2) examine the mediating role of parent–child relationships (i.e., parent–child closeness and conflict) in the association between COVID-19-related stress and mental well-being, and (3) understand the transactional relationship between COVID-19-related stress and mental well-being in parent–child dyads.

Drawing on a transactional model of parent–child interactions (Sameroff, 1975), this study applied an actor–partner interdependence model approach (Cook & Kenny, 2005) to model the association between COVID-19-related stress and mental well-being in parents and children as a dynamic, transactional relationship. It was first hypothesized that, within each individual, COVID-19-related stress would be related to parent–child relationships (as reflected in lower levels of parent–child closeness and heightened levels of parent–child conflict), which, in turn, would be related to mental well-being (hypothesis 1; actor effect). In addition, it was hypothesized that parent COVID-19-related stress would be related to parent–child relationships, which, in turn, would be related to child mental well-being (hypothesis 2; partner effect), whereas child COVID-19-related stress would be related to parent–child relationships, which, in turn, would be related to parent mental well-being (hypothesis 3; partner effect).

METHODS

Sampling and procedure

This study was part of a larger study on COVID-19 and mental health among children and parents in Hong Kong. The study materials and procedures were reviewed and approved by the Human Research Ethics Committee at the corresponding author's institution. Participant recruitment was conducted in 12 primary schools in Hong Kong in May 2020 when the COVID-19 pandemic continued to escalate and schools were closed in the region. Inclusion criteria for the children included: (1) being aged 8–10 years, (2) studying in a local primary school, (3) living in Hong Kong currently, and (4) being able to read and understand Chinese. Eligible children and their parents who were the primary caregivers of the children were invited to participate in the study. As face-to-face classes were suspended, children and their parents received a school notice via post or email, informing them of the study objectives and procedures. Those who showed initial interest were asked to go to a web link that directed them to an online questionnaire hosted by the Qualtrics
survey website. First, they were asked to read the informed consent page that described the background and purpose of the study. Parents were required to provide informed consent for their and their child's participation in the study. Then, both children and parents needed to fill in the online questionnaire independently, which took around 5–10 min to complete. Specifically, only one parent from each household participated in the study, and the one who assumed the major responsibility for providing care to their child on a daily basis was instructed to fill in the parent questionnaire.

Among the 134 parent–child dyads who consented to participate in the study, 129 parents and 114 children completed the study. Data from 109 parent–child dyads were included in the study (completion rate: 81.3%), as both parents and children completed the questionnaire. Most of the parents were female (90.8%), whereas 9.2% were male. They had a mean age of 41.22 years (SD = 6.76, range = 20–71). Majority of them (91.7%) were married and 5.5% were divorced or separated. Around 60.6% of the parents were in full-time or part-time employment, whereas 34.9% were homemakers. One third of them had a monthly household income of HK$20,000 (US$2560) or below (32.1%), followed by HK$20,000–HK$50,000 (US$2560–US$6400) (48.6%), and HK$50,000 (US$6400) or above (19.3%). The median monthly household income in the second quarter of 2020 was HK$25,900 (US$3315) (Census and Statistics Department, 2020). One third of the parents (33.9%) had only one child and the remaining (66.1%) had more than one child. Around 58.7% of the children were male, whereas 41.3% were female. They had a mean age of 8.98 years (SD = 0.76, range = 8–10). The demographic characteristics of the parents and children are shown in Table 1.

**Measures**

**COVID-19-related stress**

As there were no available validated scales measuring exposure to COVID-19-related stress, two items were created to assess COVID-19-related stress among parents and children. Participants were asked to assess how often “their daily routines were disrupted” and “their work/studies were affected” due to the COVID-19 pandemic on a 5-point Likert scale ranging from 1 (never) to 5 (always). Higher scores indicated more frequent exposure to COVID-19-related stress. The items were developed and administered in Chinese. The Cronbach's alpha of the scale was 0.50 and 0.75 in parents and children, respectively.

**Parent–child relationships**

The Child–Parent Relationship Scale (CPRS) (Pianta, 1992) was used to assess the quality of the relationships between parents and children. The scale consists of 15 items assessing two dimensions of parent–child relationships: closeness (7 items) and conflict (8 items) (Simkiss et al., 2013). The parents were asked to respond to the items based on their perception of the relationships with their children using a 5-point Likert scale ranging from 1 (definitely does not apply) to 5 (definitely applies). Higher scores represented higher levels of parent–child closeness or conflict. Sample items included “I share an affectionate, warm relationship with my child” (closeness) and “My child and I always seem to be struggling with each other” (conflict). The validity of the scale was established among parents of children from different age groups: preschool, middle childhood, and adolescence (Driscoll & Pianta, 2011; Dyer et al., 2017). The scale was translated into Chinese and showed good psychometric properties in Chinese parents (Zhang et al., 2008). The Cronbach's alpha of the closeness and conflict subscales in the present study was 0.80 and 0.84, respectively.
Mental well-being

The World Health Organization Well-Being Index (WHO-5) (Psychiatric Research Unit, 1998) consists of five items for assessing positive mental health. The items were rated on a 6-point scale ranging from 0 (at no time) to 5 (all of the time), which reflects the state of mental well-being over the past 2 weeks. Sample items included “I have felt cheerful and in good spirits” and “I have felt active and vigorous.” Higher scores represented better mental well-being. A total score below 13 indicates poor mental well-being, which suggests the need to screen for major depression (Psychiatric Research Unit, 1998). The WHO-5 was shown to be a valid screening instrument for children aged 9–12 (Allgaier et al., 2012) and parents (Garland et al., 2018). The psychometric properties of the scale have been
examined and supported in a sample of the Chinese population (Kong et al., 2016). The Cronbach's alpha of the scale in the present study was 0.92 and 0.84 in parents and children, respectively.

**Data analysis**

All study variables were screened for univariate normality (i.e., skewness ≤3.0 and kurtosis ≤10.0) (Weston & Gore, 2006) before conducting the main analysis. There were no missing data for any of these variables. Descriptive statistics were used to examine the prevalence of COVID-19-related stress and mental well-being among parents and children. Independent samples t-tests, one-way analyses of variance (ANOVA), and correlation analyses were performed to examine differences in mental well-being across demographic variables. Pearson's correlation coefficients were calculated to examine the associations among COVID-19-related stress, parent–child relationships (i.e., closeness and conflict), and mental well-being. Total scores of the variables were calculated by summing the individual item scores and used for the analyses. Data were analyzed using SPSS version 25.0.

To test the hypothesized relationships between COVID-19-related stress and mental well-being among parent–child dyads, an actor–partner interdependence model was used. Actor effects (i.e., the association of parent stress with parent well-being and the association of child stress with child well-being) and partner effects (i.e., the association of parent stress with child well-being and the association of child stress with parent well-being) through the mediating role of parent–child relationships were simultaneously estimated in the same model. This approach allows for interpreting the actor effects as representing an association within a dyad member, while taking into consideration the association between members of the dyads for the partner effects, and vice versa.

Path analysis was conducted using Mplus version 7.1 with full maximum likelihood estimation. Three demographic variables were identified as covariate variables to be included in the path analysis. First, parent employment status may be related to one's role strain and burnout during the pandemic as working parents may need to balance work and caregiving demands (Cluver et al., 2020; Griffith, 2020). Second, monthly household income level may influence how people experience the pandemic, with parents and children of lower socioeconomic status being more vulnerable to the negative impact of the pandemic (Waite et al., 2021). Third, child gender may be related to their and their family's adjustment during the pandemic, with boys showing higher levels of externalizing problems, whereas girls showing higher levels of internalizing problems (Waite et al., 2021). Therefore, the potential confounding effects of parent employment status, monthly household income level, and child gender were taken into account in the path analysis. The associations of these demographic variables with parent–child relationships and mental well-being were estimated.

The goodness of fit of the model was evaluated using the $\chi^2$ statistic, the comparative fit index (CFI), the Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) (Hu & Bentler, 1999). Models showing values of 0.95 or higher for the CFI and TLI, 0.06 or lower for the RMSEA, and 0.08 or lower for the SRMR were considered to have a good fit (Hu & Bentler, 1999).

The indirect effects of COVID-19-related stress on mental well-being were examined using bootstrapping analysis. Bootstrapping is a computationally intensive method that involves randomly sampling with replacement from the observed sample and generates an empirical approximation of the sampling distribution of the indirect effects (Preacher & Hayes, 2008). Bias-corrected confidence intervals (CI) were estimated using bootstrapping procedures with 1000 resamples. If the 95% CI for the indirect effects did not contain zero, the indirect effects were considered statistically significant.
RESULTS

Prevalence of COVID-19-related stress and mental well-being

Skewness and kurtosis for all variables were within acceptable ranges (see Table 2). A substantial number of the respondents (45.9% of the parents and 37.6% of the children) indicated that their daily routine was frequently (i.e., often or always) disrupted during the COVID-19 pandemic. Whereas 38.5% of the parents reported that their work was frequently affected by the pandemic, 42.2% of the children indicated that their studies were frequently affected.

Parents’ and children’s mental well-being during the COVID-19 pandemic was also examined. The results showed that over half of the parents (53.2%) showed poor mental well-being (<13 on WHO-5 Well-Being Index), indicating possible emotional problems. Nearly one third of the children (30.3%) also reported poor mental well-being. Their levels of mental well-being did not differ significantly across demographic variables (see Table 1).

Correlations between COVID-19-related stress, parent–child relationships, and mental well-being

Parent COVID-19-related stress was positively related to parent–child conflict ($r = 0.33, p = 0.001$) and was negatively related to parent mental well-being ($r = -0.21, p = 0.03$). Child COVID-19-related stress was not related to parent–child relationships as well as parent and child well-being ($ps > 0.05$). The results showed that parent–child closeness was negatively related to parent–child conflict ($r = -0.42, p < 0.001$) and was positively related to parent mental well-being ($r = 0.40, p < 0.001$) and child mental well-being ($r = 0.20, p = 0.04$). There were also negative associations of parent–child conflict with parent mental well-being ($r = -0.40, p < 0.001$) and child mental well-being ($r = -0.28, p = 0.003$). In addition, parent mental well-being was positively related to child mental well-being ($r = 0.26, p = 0.006$). The intercorrelations between the study variables are shown in Table 2.

Dyadic associations between COVID-19-related stress and mental well-being

The results showed that the hypothesized model (see Figure 1) was a good fit to the data: $x^2 (10) = 10.59, p = 0.39$, CFI = 0.99, TLI = 0.97, RMSEA = 0.02, and SRMR = 0.04. Parent COVID-19-related stress was positively related to parent–child conflict ($\beta = 0.33, p < 0.001$). Child COVID-19-related stress was not significantly related to parent–child conflict ($ps > 0.05$). No significant direct associations between parent and child COVID-19-related stress and mental well-being were found ($ps > 0.05$). Parent–child closeness was positively related to parent mental well-being ($\beta = 0.31, p = 0.001$) but not child mental well-being ($\beta = 0.10, p > 0.05$). Parent–child conflict was negatively related to both parent mental well-being ($\beta = -0.29, p = 0.007$) and child mental well-being ($\beta = -0.34, p = 0.008$). The hypothesized model explained 26.5% and 14.9% of the variance in parent and child mental well-being, respectively. Table 3 shows the unstandardized and standardized path coefficients for the hypothesized model.

In addition, the results showed that demographic variables were significantly related to the study variables in the path analysis. Families with a monthly household income of HK$50,000 (US$6400) or above showed higher levels of parent–child closeness ($\beta = 0.30, p = 0.006$) and lower levels of parent–child conflict ($\beta = -0.24, p = 0.03$) than those with a monthly household income of HK$20,000 (US$2560) or below. Parents who were homemakers were more likely to report higher levels of parent–child conflict than those who were employed ($\beta = 0.20, p = 0.03$).
**Table 2** Descriptive statistics and correlations of study variables

|                        | Parent COVID-19-related stress | Child COVID-19-related stress | Parent–child closeness | Parent–child conflict | Parent mental well-being | Child mental well-being |
|------------------------|--------------------------------|--------------------------------|------------------------|-----------------------|-------------------------|------------------------|
| Parent COVID-19-related stress | –                              | –                              | –                      | –                     | –                       | –                      |
| Child COVID-19-related stress| 0.14                           | –                              | –0.09                  | 0.01                  | –0.42**                 | –0.42**                |
| Parent–child closeness  | –0.09                          | 0.01                           | –                      | –                     | –                       | –                     |
| Parent–child conflict   | 0.33**                         | 0.01                           | –0.42**                | –                     | –0.28**                 | 0.26**                |
| Parent well-being       | –0.21*                         | –0.06                          | 0.40***                | –0.40***              | –                       | –                     |
| Child well-being        | 0.05                           | –0.02                          | 0.20*                  | –0.28**               | 0.26**                  | –                     |
| Mean (SD)               | 6.56 (1.74)                    | 6.27 (2.38)                    | 27.13 (3.77)           | 22.21 (5.70)          | 11.77 (5.60)            | 15.37 (5.66)           |
| Scale range             | 2–10                           | 2–10                           | 7–35                   | 8–40                  | 0–25                    | 0–25                  |
| Skewness                | 0.08                           | –0.50                          | –0.49                  | 0.03                  | 0.08                    | –0.36                 |
| Kurtosis                | –0.58                          | –0.96                          | 0.78                   | –0.52                 | –1.12                   | –0.51                 |

*p < 0.05, **p < 0.01, ***p < 0.001.
Children who were male were more likely to show higher levels of parent–child conflict than their female counterparts ($\beta = 0.17, p = 0.03$).

The indirect effects of COVID-19-related stress on mental well-being were examined using bootstrapping analysis. The effect of parent COVID-19-related stress on parent mental well-being was significantly mediated by parent–child conflict ($\beta = -0.10, 95\% \text{ CI} = -0.20, -0.03$). However, the results showed that parent–child closeness and conflict did not significantly
mediate the association between child COVID-19-related stress and child mental well-being. The findings provided partial support for hypothesis 1 by demonstrating actor effects for parents, but not for children. In addition, a significant indirect effect of parent COVID-19-related stress on child mental well-being was found via the mediation of parent–child conflict ($\beta = -0.11, 95\% CI = -0.25, -0.03$), which provided evidence for a partner effect and supported hypothesis 2. Nevertheless, the indirect effects of child COVID-19-related stress on parent mental well-being were not significant. The findings did not support hypothesis 3.

DISCUSSION

Whereas theoretical and empirical work has long recognized the reciprocal influences between parents and children (Cherry et al., 2019; Paschall & Mastergeorge, 2016; Sameroff & Mackenzie, 2003), the present study is one of the first few to examine the transactional relationship between stress and mental well-being in a parent–child dyadic sample exposed to the COVID-19 pandemic (Black et al., 2021). The study design and analytic framework make timely and novel contributions to how parents and children are affected by the COVID-19 outbreak. First, using independent self-reports provides a better understanding of the subjective experiences of parents and children during the pandemic (Juth et al., 2015; Shi et al., 2018). This multi-informant approach overcomes the limitation in previous studies, which often relied on parent proxy reports of child stress and mental well-being and were, thus, subject to common method biases (Podsakoff et al., 2003). The results revealed that COVID-19-related stress (such as disruption in daily routines, work, and/or studies) was commonly observed in parents and children. It was found that over half of the parents (53.2%) showed poor mental well-being (<13 on WHO-5 Well-Being Index), which is an indication of possible depression. Nearly one third of the children (30.3%) also reported poor mental well-being. Compared with a recent study conducted among the general population in the United Kingdom, Ireland, New Zealand, and Australia during the COVID-19 outbreak (Faulkner et al., 2021), the parent respondents in Hong Kong showed even lower levels of mental well-being. This may be because most of the people in Hong Kong live in confined and overcrowded apartments and thus do not have access to personal space and privacy. As parents and children were required to stay at home due to the implementation of social distancing measures, it was extremely difficult for them to maintain their psychological wellness and functioning in a small and cramped living space (Tso et al., 2020). The findings clearly demonstrated that parents were a particularly vulnerable population during the pandemic (Brown et al., 2020; Cluver et al., 2020). They were disproportionately susceptible to mental health problems and deserved immediate attention and intervention.

Second, the present study sought to determine the association between exposure to COVID-19-related stress and mental well-being among parents and children (Chung et al., 2020; Wu et al., 2020). As shown in the results, parent reports of parent–child conflict appeared to be significant mediating variables that explained the association between COVID-19-related stress and mental well-being among parents. Consistent with the first hypothesis, actor effects were observed for parents. It was found that parent COVID-19-related stress was associated with higher levels of parent–child conflict, which were in turn related to parent mental well-being. This result might be because parents who were preoccupied with COVID-19-related stress were more likely to experience discordant interactions with their children and, subsequently, exhibited poorer mental health (Griffith, 2020). The findings were in accordance with previous studies (Prime et al., 2020; Spinelli et al., 2021; Wu et al., 2020) that family cohesion was a vital protective factor for parent and child mental health. Nonetheless, it is important to note that the escalating family conflict and poor mental well-being could be pre-existing problems prior to the COVID-19 outbreak. COVID-19-related stress experienced by parents might only be
one of the factors that intensify ongoing family strains and contribute to mental health challenges during the pandemic (Spinelli et al., 2021). Also, the findings must be interpreted with caution due to the cross-sectional nature of the study. The data only provide initial evidence about the associations between COVID-19-related stress, parent–child relationships, and well-being among parents and children, and does not allow inference of causality from the observed relationships.

Third, this study is one of the first few published work to examine the COVID-19-related stress and mental well-being of parents and children as a dyadic phenomenon using an actor–partner interdependence model approach (Black et al., 2021; Cook & Kenny, 2005). The results provided evidence for the partner effect from parents to children, showing that parent COVID-19-related stress was indirectly associated with not only their mental well-being but also their child's mental well-being through parent reports of parent–child conflict, and yet the effect of child COVID-19-related stress on parent mental well-being was not found. By adopting a dyadic approach, the study revealed transactional processes among parent–child dyads in which parent COVID-19-related stress was indirectly related to lower levels of child mental well-being. The findings provided support for the transactional model of parent–child interactions (Sameroff, 1975) in that parents' and children's stress exposure and response during the COVID-19 pandemic were linked. Such a transactional relationship between parent COVID-19-related stress and child mental well-being was also consistent with the findings in previous research on coping with traumatic events (Juth et al., 2015; Shi et al., 2018). The dyadic approach is pertinent to understanding psychological adjustment within a familial context following exposure to COVID-19-related stress.

Nevertheless, the actor and partner effects of child COVID-19-related stress were not found. Only a downward effect (from parents to children) was supported, whereas an upward effect (from children to parents) was not observed in the present study (De Neve & Kawachi, 2017). The findings were consistent with a previous study of post-disaster mental health among parent–child dyads (Juth et al., 2015) which showed that parents' post-traumatic stress was related to children's general distress, but children's post-traumatic stress was not related to parents' general distress. The non-significant associations of child COVID-19-related stress with parent and child mental well-being may be attributed to differential expression of stress as internalizing and externalizing problems among children (Kim et al., 2003). While internalizing problems are inward-directed experiences of distress (e.g., depression, anxiety, withdrawal, and loneliness) and may contribute to poor mental well-being among children, they may not necessarily lead to parent–child conflict (Luijten et al., 2021). On the other hand, externalizing problems are outward-directed expression of distress (e.g., aggression, non-compliance, hyperactivity, and conduct problems), which is more likely to trigger parent–child conflict and affect parent mental well-being (Chan et al., 2020; Cherry et al., 2019; Zhang et al., 2008). Therefore, it is plausible that the effects of child COVID-19-related stress on their and their parents' mental well-being may vary as a function of whether the stress is manifested as internalizing or externalizing problems (Kim et al., 2003; Waite et al., 2021). Future research should take into account internalizing and externalizing problems stemming from the stress experienced by children, which may provide a more nuanced understanding of the transactional relationship between stress and well-being within parent–child dyads.

It is also important to note that parent–child closeness did not significantly mediate the associations of parent and child COVID-19-related stress with their mental well-being. Parent–child closeness is expressed in different ways, such as developing an affectionate warm relationship, valuing the relationship with one's parent/child, and sharing thoughts and experiences openly with one another (Simkiss et al., 2013). The feelings of warmth and closeness are derived from long-lasting bonds between parents and children. Unlike parent–child conflict which may occur from time to time and are easily triggered by acute stress, parent–child closeness is embedded in long-term relational ties and thus less likely to be affected by recent
incidents (Driscoll & Pianta, 2011; Dyer et al., 2017; Price et al., 2010). This might explain why parent stress resulting from the COVID-19 outbreak (an intense traumatic event) was only linked to parent–child conflict, but did not affect parent–child closeness because the bonding between parents and children often endures over time.

Fourth, the findings are highly relevant to parents and children in Hong Kong. As most families reside in a small living environment, being confined to home implies the loss of personal space and leisure, which may place considerable psychological pressure on parents and children (Wong et al., 2021). In addition, Chinese parents often have high expectations of children's academic performance, and yet the class suspension created a severe disruption to their children's learning. As shown in a recent study in Hong Kong (Tso et al., 2020), children became physically less active, had longer screen time, and developed irregular sleep patterns, which partly contributed to parent stress and child psychosocial problems. Living in a crowded household, parents may be highly vigilant about their children's behavior and routine, and this also exacerbates family conflict and adds to the pre-existing tensions in parent–child relationships (Chung et al., 2020; Russell et al., 2020). Nonetheless, it is equally important to recognize that some parents might identify benefits from the pandemic, including being more aware of the health of their family members and caring more about their family (Lau et al., 2021).

Practical implications

The present study has several important implications for interventions and policies aimed at reducing stress and mental health problems among parents and children during the COVID-19 crisis (Prime et al., 2020). First, psychological services should be considered essential services and remain in operation, so that timely mental health care can be provided to individuals in need of psychological support. As shown in the results, parents and children were particularly at risk of poor mental well-being due to the stress and disruption caused by the pandemic (Marques de Miranda et al., 2020; Wu et al., 2020). Efforts to promote wellness and social connectedness are essential to attenuate stress-induced mental health problems and reduce adverse developmental outcomes. Even when there are restrictions on movement and in-person contact, telepsychotherapy and other online non-psychotherapeutic interventions (e.g., web-based psychoeducational programs and online self-help tools) may serve as a valid alternative for parents and children who experience excessive psychological distress to prevent the development of psychopathology and maladaptation in the aftermath of COVID-19 (Lee, 2020; Poletti et al., 2020). As Internet-delivered psychological services are not geographically confined, they do not require traveling and physical proximity, which can minimize concerns about exposure to COVID-19 and offer time-saving solutions, especially for working parents who struggle with time constraints to meet their emotional needs during the pandemic.

The results also highlight the importance of considering the family context in addressing mental health problems in parents and children who have suffered from COVID-19-related stress (Chung et al., 2020). In particular, the dyadic association between stress and well-being demonstrates the interdependence of experience and responses between parents and children during the pandemic (De Neve & Kawachi, 2017). As such, psychologists, therapists, and other mental health professionals should emphasize the family system as a unit of care and intervention (Chan et al., 2021). To facilitate psychological adjustment following the COVID-19 outbreak, effective family-based interventions are needed to address stress-related symptoms and equip parents and children with effective coping strategies in the face of adversity.

Given the associations of parent COVID-19-related stress with parent–child conflict as well as parent and child mental well-being, positive and responsive parenting is necessary to promote change in family relationships and adaptation to the COVID-19 crisis (Brown et al., 2020). This is especially relevant at a time of social distancing when there is an absence of
facilities such as schools and daycare centers that support parents and families (Griffith, 2020). As evidenced by the study, strong bonding between parents and children was associated with better mental health during the pandemic. To enhance parenting competency and reduce caregiving stress, Internet-based parenting interventions should be delivered. A recent systematic review indicated that online family problem-solving psychotherapy and parenting skills training demonstrate promising feasibility, acceptability, and efficacy (Wade et al., 2020). By providing proper guidance and communication with children during the pandemic, parenting interventions not only benefit the well-being of children but also lead to improved parent mental health and eventually better family cohesion (Chung et al., 2020). Systematic reviews also revealed that Internet-based peer support groups are effective in providing informational and emotional support for parents and show some effects on parenting skills and their mental well-being (Niela-Vilén et al., 2014). Online peer support groups can allow parents to connect with others experiencing similar challenges and serve as a source of support at a time when in-person encounters are limited.

Apart from delivering mental health and parenting interventions, policy makers should also consider adopting a wider range of family-friendly policies and practices during the COVID-19 emergency. For instance, flexible work arrangements (e.g., flexible working schedule, temporary remote work, and paid emergency care leave) can be set up for working parents to allow them to fulfill childcare responsibilities and minimize their work–home interference during the pandemic (UNICEF, 2020). In addition, public policy responses to child mental health during COVID-19 should move beyond individual-level approaches, to consider how parent- and family-level factors (i.e., economic insecurity during the pandemic) shape the experiences and well-being of children. Social protection measures (e.g., wage subsidies, unemployment benefits, social assistance programs, and utility waivers) are needed to support families who are struggling financially amid the COVID-19 crisis (Gentilini et al., 2020).

Limitations

Although this study provides important insights into the dynamics of stress and well-being among parents and children during the COVID-19 pandemic, a few limitations need to be acknowledged. First, this study adopts a cross-sectional design and, thus, the causal influence of COVID-19-related stress on parent–child relationships and mental well-being cannot be inferred. It is possible that parents and children who were constantly engaged in conflict prior to the pandemic were more prone to COVID-19-related stress. Longitudinal work is needed to understand the processes through which risk and vulnerability are transmitted between parents and children over time. Second, participant recruitment was hindered by school closures and other social distancing measures during the pandemic. Although the sample is sufficiently powered for the current analysis and the results generate a timely understanding of how parents and children are affected by the COVID-19, a larger sample may improve the generalizability of the findings. Third, COVID-19-related stress was measured by items developed in this study, as there is a lack of validated measures available for use at the time the study was conducted. Given the inadequate internal consistency of the measure, future work should develop and employ psychometrically sound scales for measuring COVID-19-related stress. It is also possible that parents and children are stressed by the pandemic in different ways, and thus the measures of COVID-19-related stress may vary across these populations. Fourth, the present study did not measure participants’ exposure to COVID-19 illness and death within their family and social network, which could be a tremendous stressor to parents and children. Future research should account for this factor when estimating the effects of COVID-19. Fifth, data collection was conducted online due to the implementation of social distancing measures in the
early stages of the pandemic. Although parents and children were required to respond to the questionnaire independently, it is unknown whether children completed the questionnaire on their own or whether their response would be influenced by their parents. While the wordings of the questionnaire were carefully reviewed by the research team and a pilot study was conducted to ensure that the readability of the items was appropriate for children reading at the third-grade level, it was not entirely certain whether children comprehended and interpreted the items correctly without the presence of the researchers. Sixth, considering the attention span of children, the child questionnaire was kept brief to maximize their response rate. Only parents were asked to evaluate the quality of parent–child relationships. Future work should extend the current findings by including both parent and child reports of their relationship quality.

CONCLUSIONS

In general, a dyadic approach to stress and mental health offers a better understanding of how parent–child interactions and family relationships are associated with psychological adjustment during the COVID-19 pandemic. The results provide clear evidence that the relationships between COVID-19-related stress and mental well-being are not individual problems; they have reverberating consequences for parents and children within the family (Prime et al., 2020). The findings build on the developmental literature by showing the distinct yet interrelated experiences of parents and children during the COVID-19 pandemic (Brown et al., 2020). Given the transactional associations between stress and well-being within parent–child dyads, researchers, clinicians, interventionists, and policy makers should consider the family environment as an arena for risk transmission (Wade et al., 2020). This consideration applies to not only the transmission of COVID-19 infection but also the exposure and transmission of COVID-19-related stress in families, which ultimately affect the mental well-being of parents and children.

CONFLICT OF INTEREST

The author declares that he has no conflict of interest.

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REFERENCES

Allgaier, A.-K., Pietsch, K., Frühe, B., Prast, E., Sigl-Glöckner, J., & Schulte-Körne, G. (2012). Depression in pediatric care: Is the WHO-Five Well-Being Index a valid screening instrument for children and adolescents? *General Hospital Psychiatry, 34*(3), 234–241. https://doi.org/10.1016/j.genhosppsych.2012.01.007

Almeida, M., Shrestha, A. D., Stojanac, D., & Miller, L. J. (2020). The impact of the COVID-19 pandemic on women’s mental health. *Archives of Women’s Mental Health, 23*(6), 741–748. https://doi.org/10.1007/s00737-020-01092-2

Black, S. R., Evans, M. L., Aaron, L., Brabham, D. R., & Kaplan, R. M. (2021). Covariation between parent and child symptoms before and during the COVID-19 pandemic. *Journal of Pediatric Psychology, 46*(10), 1182–1194. https://doi.org/10.1093/jpepsy/jsab086

Brown, S. M., Doom, J. R., Lechuga-Peña, S., Watamura, S. E., & Koppels, T. (2020). Stress and parenting during the global COVID-19 pandemic. *Child Abuse & Neglect, 110*, 104699. https://doi.org/10.1016/j.chiabu.2020.104699

Census and Statistics Department (2020). Quarterly report on general household survey: April to June 2020. https://www.censtatd.gov.hk/en/data/stat_report/product/B1050001/att/B10500012020QQ02B0100.pdf

Chan, A. C. Y., Piehler, T. F., & Ho, G. W. K. (2021). Resilience and mental health during the COVID-19 pandemic: Findings from Minnesota and Hong Kong. *Journal of Affective Disorders, 295*, 771–780. https://doi.org/10.1016/j.jad.2021.08.144

Chan, R. C. H., Yi, H., & Siu, Q. K. Y. (2020). Polymorbidity of developmental disabilities: Additive effects on child psychosocial functioning and parental distress. *Research in Developmental Disabilities, 99*, 103579. https://doi.org/10.1016/j.ridd.2020.103579
G. C. F., Tam, P. K. H., … Ip, P. (2020). Vulnerability and resilience in children during the COVID-19 pandemic. European Child & Adolescent Psychiatry. https://doi.org/10.1007/s00787-020-01680-8. Online ahead of print.

UNICEF (2020). Family-friendly policies and other good workplace practices in the context of COVID-19: Key steps employers can take. https://www.unicef.org/media/66351/file/

Wade, S. L., Gies, L. M., Fisher, A. P., Moscato, E. L., Adlam, A. R., Bardoni, A., Corti, C., Limond, J., Modi, A. C., & Williams, T. (2020). Telepsychotherapy with children and families: Lessons gleaned from two decades of translational research. Journal of Psychotherapy Integration, 30(2), 332–347. https://doi.org/10.1037/int0000215

Waite, P., Pearcey, S., Shum, A., Raw, J. A. L., Patalay, P., & Creswell, C. (2021). How did the mental health symptoms of children and adolescents change over early lockdown during the COVID-19 pandemic in the UK? JCPP Advances, 1, 1–10. https://doi.org/10.1111/jcva.12009

Watson, M. F., Bacigalupe, G., Daneshpour, M., Han, W.-J., & Parra-Cardona, R. (2020). COVID-19 interconnect- edness: Health inequity, the climate crisis, and collective trauma. Family Process, 59(3), 832–846. https://doi.org/10.1111/famp.12572

Weston, R., & Gore, P. A. (2006). A brief guide to structural equation modeling. The Counseling Psychologist, 34(5), 719–751. https://doi.org/10.1177/001100006286345

Wong, J.-Y.-H., Wai, A.-K.-C., Wang, M. P., Lee, J. J., Li, M., Kwok, J.-Y.-Y., Wong, C.-K.-H., & Choi, A.-W.-M. (2021). Impact of COVID-19 on child maltreatment: Income instability and parenting issues. International Journal of Environmental Research and Public Health, 18(4), 1–10. https://doi.org/10.3390/ijerph18041501

Wu, M., Xu, W., Yao, Y., Zhang, L., Guo, L., Fan, J., & Chen, J. (2020). Mental health status of students’ parents during COVID-19 pandemic and its influence factors. General Psychiatry, 33(4), e100250. https://doi.org/10.1136/gpsych-2020-100250

Zhang, X., Chen, H., Zhang, G., Zhou, B., & Wu, W. (2008). A longitudinal study of parent-child relationships and problem behaviors in early childhood: Transactional models. Acta Psychologica Sinica, 40(5), 571–582. https://doi.org/10.3724/SP.J.1041.2008.00571

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