



Impact of COVID-19-related Stress on Preschool Children's Internalizing and Externalizing Problem Behaviors: The Indirect Effect of Mother's Depression and Parenting Behavior

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Abstract

The COVID-19 pandemic is affecting families and children worldwide. Experiencing the pandemic leads to stress in families resulting from fear of infection and social isolation derived from social distancing. For families raising preschoolers, the prolonged closure of childcare centers puts additional childcare burden on family members, especially mothers. Due to the limited research exploring the impact of COVID-19 on preschool children's problem behaviors, this study examines the association between stress due to COVID-19 and preschool children's internalizing and externalizing problem behaviors related to mother's depression and parenting behavior. The study sample included data collected from 316 South Korean mothers raising preschool-aged children aged 3 to 5. The study findings suggest that mother's COVID-19 stress was indirectly associated with preschool children's internalizing and externalizing problem behaviors resulting from the mother's depression and parenting behaviors, although the direct effect of COVID-19 stress on preschool children's outcomes was not statistically significant. Increase in mother's COVID-19 stress was associated with increase in depression, and sequentially decreased positive parenting behaviors, which in turn resulted in preschool children's internalizing and externalizing problem behaviors. The study findings highlight the need to focus on enhancing mental health of mothers and preschool children's adjustment by implementing supportive interventions to reduce the adverse impacts of the prolonged COVID-19 pandemic.

Keywords COVID-19 mother · Depression · Parenting behavior · Internalizing problem behavior · Externalizing problem behavior

1 Introduction

For over a year the COVID-19 pandemic has affected families worldwide. In South Korea, after the first confirmed COVID-19 case in January 2020, the government decreed social distancing to minimize the physical contact between people, recommended that people stay at home, and enforced wearing masks in public places. In accordance with the government's recommended guidelines to prevent the spread of COVID-19, families and children's daily lives changed drastically. Although social distancing has provided more opportunities for families to spend time together, it also created challenges such as increased family stress and conflict (Lebow, 2020). In addition, many child care centers closed, which placed the additional burden of child care on families (Korea Institute of Child Care and Education [KICCE], 2020; Ministry of Health and Welfare, 2021a; Power, 2020). According to the Ministry of Health and Welfare (2021a), child care facilities closure rate increased rapidly from 4.0% in November 2020 to 92.9% in January 2021.

With the prolonged pandemic, its impact on children has been noted worldwide (de Figueiredo et al., 2021; Lee, 2021). Spending more time at home and parenting at home may have a positive effect, such as increasing the bond with a child; however, it can also have a negative effect on children due to increased levels of stress and strain on primary caregivers resulting from the added burden of childcare (Chin et al., 2020). Because of the lower incidence of infection among young children than adults, little emphasis has been placed on examining the impact of the COVID-19 pandemic on preschool children. Further, compared to concerns about the pandemic's potential detrimental effects on children's education, less attention has been paid to preschool children's psychological adjustment during the pandemic (Phelps & Sperry, 2020). Understanding the association between the pandemic and preschool children's problem behaviors is important, as maladjustment in early childhood can cause adjustment problems persisting throughout their adulthood. Extant literature suggests that skill and behavioral problems in early childhood are associated with later educational attainment such as high school graduation and college attendance (Ansari, 2018; Duncan & Magnuson, 2011; Duncan et al., 2010; Magnuson & Duncan, 2016; Sylva et al., 2010).

Preschool children's behavioral, emotional, and social problems are often measured according to two broad dimensions, namely, internalizing and externalizing problem behaviors (Achenbach et al., 2016; Duncan & Magnuson, 2011). Internalizing problem behaviors refer to depression, anxiety, withdrawal, and somatic complaints. Externalizing problem behaviors refer to aggressive and rule-breaking behavior (Achenbach, 1999). Internalizing and externalizing problem behaviors are common among preschool children and are significant as both problem behaviors are persistent through adulthood affecting life outcomes (Duncan & Magnuson, 2011). Therefore, this study focused on mothers raising preschool children and aimed to understand the mechanisms of the impact of mother's COVID-19 stress on preschool children's behavioral problems.

1.1 Impact of COVID-19 Pandemic on Families and Preschool Children

Previous studies have found that individuals have been experiencing adverse psychological effects, such as depression, anxiety, and stress, due to the COVID-19 pandemic (Brooks et al., 2020; Qiu et al., 2020; Zhang et al., 2020). The negative psychological impacts may have been driven by fear of infection, frustration from quarantine or social isolation, and social distancing. Specifically, the well-being of parents and children has significantly decreased since the pandemic (Patrick et al., 2020). Especially for preschool children, drastic disruptions in their daily routines, such as changes in childcare arrangements and limited outdoor activities, are indicated as potential stressors of children that can be associated with behavioral problems (de Figueiredo et al., 2021; Lee, 2021). Children are likely to be more vulnerable in a crisis situation, such as the COVID-19 pandemic. This is because they may not be able to adequately express their emotions and feelings like adults, and may lack sufficient abilities to cope with difficult situations (Imran et al., 2020). Past studies have suggested the significant impact of COVID-19 on children's mental health, including fear, anxiety, and depression, as the COVID-19 pandemic brought major changes to their daily routines (Jiao et al., 2020).

However, a few recent studies support COVID-19's indirect effects on preschool children's behavioral problems through parents' emotional and behavioral characteristics. For example, in the context of lockdown due to COVID-19, parents' financial stress caused by the pandemic, including loss of income and employment, was indirectly associated with an increase in children's anxiety through an increase in parental mental health difficulties such as anxiety and depression (Adegbeye et al., 2021). Similarly, parents' perceived difficulties related to the COVID-19 pandemic were associated with higher levels of parenting stress, which in turn increased children's emotional and behavioral difficulties (Spinelli et al., 2020). These studies indicate that parents' mental health and parenting behaviors are strong predictors of children's outcomes, as parent-child interactions that occur on a regular basis over extended periods are important mechanisms through which development proceeds (Abidin, 1990; Bronfenbrenner & Morris, 2006).

Extensive research has found high levels of parental stress and family conflicts due to the COVID-19 pandemic (Center for the Study of Traumatic Stress, 2020; Chin et al., 2020; Lebow, 2020; Spinelli et al., 2020), and parents' sudden overload and experiences of multiple stressors caused by COVID-19 are indicated as potential risk factors that affect children's behavioral problems (Crescentini et al., 2020). Particularly for families with preschool children, the COVID-19 pandemic placed a particularly large childcare burden on mothers. Past studies have found that mothers have tended to bear a disproportionately larger portion of the childcare burden compared to fathers since the COVID-19 pandemic (Hamel & Salganicoff, 2020; Johnston et al., 2020; Power, 2020; Wenham et al., 2020). The United Nations (2020) also confirmed that childcare was not accessible due to the lockdown, putting additional strain and demand on mothers. In particular, in South Korea, most of the responsibility for taking care of children tends to be placed on mothers, and employed mothers have the dual burden of not only taking care of the children and housework but also taking care of children's educational needs due to the COVID-19 pandemic (Kim,

2020). During the pandemic, approximately 73.3% of children were staying at home and unable to attend childcare services due to COVID-19 (Choi et al., 2020), placing a huge childcare burden on mothers (Kerr et al., 2021). Therefore, by examining the mechanisms of how mothers' mental health outcomes and parenting behaviors are associated with the COVID-19 pandemic, it may be significant that it can affect preschool children's behavioral outcomes.

1.2 Mother's Depression and Parenting Behaviors

Although the size of the relation varies widely and is often modest (Dix & Moed, 2019), a number of studies have consistently reported a significant association between mothers' depression and negative parenting behaviors (e.g., Korja et al., 2008; Lovejoy et al., 2000). Parents' warmth (also referred to as responsiveness and supportiveness) and demandingness are two elements that are part of authoritative parenting, which are essential components to meet children's developmental needs and are closely associated with positive socioemotional development (Baumrind, 2013). Previous studies indicate that mothers' depression is related to their decreased ability to be affectionate and to demonstrate appropriate discipline toward their children.

Mothers' depression was associated with lower levels of sensitivity (Murray et al., 1996), warmth (Downey & Coyne, 1990), nurturance (Letourneau et al., 2010), and communication with children (Kaplan et al., 2014; Rigetti-Veltema et al., 2002). Depressed mothers were also less effective in disciplining children showing less firm, consistent parenting and effective limit setting (Letourneau et al., 2010; Middleton et al., 2009), lower level of cognitive guidance such as explanation of goals and strategies (Gartstein & Fagot, 2003), and higher levels of coercion and criticism (Hails et al., 2018; Lovejoy et al., 2000).

To explain the relationship between depression and less effective parenting behaviors, a few mechanisms have been suggested. For example, the depletion of energy that occurs with depression can be an explanation (Downey & Coyne, 1990). Parents' lack of interest and energy may lead to less engagement in parent-child interactions and less supportive behaviors toward children. Specifically, low levels of emotional availability for children is indicated as an important characteristic of depressed mothers (Trapolini et al., 2008). In addition, depressed mothers' low levels of positive emotions and high levels of negative emotions are important factors that lead to less empathy, negative emotional communication, low levels of supportive parenting, and higher levels of hostile and coercive parenting (Dix et al., 2004; Snyder et al., 2003). For instance, mothers with depression symptoms show significantly lower levels of positive affect and involvement in play with children and less positive communication during free play compared to non-depression mothers (Korja et al., 2008). Moreover, depressed mothers' low level of self-regulation may undermine their ability to guide children with reasonable explanations (Vasta, 1982).

1.3 Impact of Mother's Depression and Parenting Behaviors on Children's Behavioral Problems

Numerous studies have indicated that mothers' depression is associated with children's internalizing and externalizing problem behaviors (Bagner et al., 2010; Cummings, Keller, & Davis, 2005; Dietz et al., 2009; Middleton et al., 2009). More concretely, mothers' higher depression levels are significantly associated with children's diverse problems including lower positive affect for self (Cicchetti et al., 1997) and higher sadness and less expression of interest (Pickens & Field, 1993). They are also associated with higher levels of internalizing problems including separation anxiety symptoms, social withdrawal (Herba et al., 2013), and higher levels of externalizing problems including conflict with others and violation of social norms (Gartstein & Fagot, 2003). Specifically, it is suggested that children of an early age are especially vulnerable to mothers' depression, as they are more dependent on adults and spend more time with their mothers compared to school-age children and adolescents (Bagner et al., 2010; Goodman & Garber, 2017).

Specifically, depressed mothers' ineffective parenting behaviors that do not meet children's developmental needs are indicated as important elements that can explain the relationship between mothers' depression and children's behavioral problems (Downey & Coyne, 1990; Elgar et al., 2004; Goodman & Gotlib, 1999). Above all, previous studies have indicated that parenting characteristics such as warmth, sensitivity, and emotional supportiveness are associated with preschool-age children's ability to manage emotions and behaviors (Blair et al., 2011; Eisenberg et al., 2010; Gustafsson et al., 2012). A positive parent-child relationship is important for children to learn skills for emotional and behavioral self-regulation (Carlson & Sroufe, 1995; Hoffman et al., 2006). However, depressed mothers' lower emotional unavailability, emotional support, and responsiveness to children can be associated with children's lower levels of regulating emotions and behaviors (Pachter et al., 2006; Sutton et al., 1999).

Parenting behaviors, such as discipline methods, are also associated with children's problem behaviors (Williams et al., 2009). Clear communication of expectations, reasoning, and consistency in discipline are important elements of authoritative parenting (Robinson et al., 1995). Numerous studies have indicated that children demonstrate lower internalizing and externalizing problem behaviors when their parents exhibit appropriate behavioral control and authoritative parenting (Aunola & Nurmi, 2005; Pinquart, 2017; Querido et al., 2002; Williams et al., 2009). In contrast, parents' harsh and coercive parenting or lax and inconsistent parenting were significantly associated with children's higher levels of internalizing and externalizing problems behaviors (Hails et al., 2018; Williams et al., 2009; Zhang et al., 2020). That is, depressed parents' ineffective discipline is an important mediating factor in the relationship between mothers' depression and children's internalizing and externalizing problem behaviors (Lovejoy et al., 2000; McRae et al., 2020; Wolford et al., 2019).

In spite of the wealth of studies that suggest parenting behaviors mediate between mothers' depression and preschool children's problem behaviors, some studies also suggest the possibility of a direct link between mothers' depression and preschool

children's behavioral problems. Partial mediation of harsh parenting has been reported between mothers' depression and preschool children's internalizing and externalizing problems (Wolford et al., 2019). In a study that examined different racial groups, the effect of mothers' depression on children's behavioral problems was partially mediated by parenting in the White and Latino samples, and an unmediated direct effect was detected in the Black sample (Pachter et al., 2006). To explain the direct effect of mothers' depression on children's behavioral problems, mechanisms such as the intergenerational transmission of genetic vulnerability and neuroregulatory systems, children's learning of mothers' cognitive processes, marital conflict associated with mothers' depression and environmental stress are being suggested (Cummings & Davis, 1994; Elgar et al., 2004; Goodman & Gotlib, 1999).

1.4 Current Study

Despite the vast literature examining the associations between mother's depression, parenting behaviors, and children's adjustment, little attention has been given to the effect of the COVID-19 pandemic on preschool children's mental health outcomes in relation to mother's depression and parenting behaviors. Therefore, this study explores a possible mechanism of the impact of stress due to the COVID-19 pandemic on preschool children's internalizing and externalizing problem behaviors. Specifically, it tests the following hypotheses: (1) Mother's COVID-19 stress is directly associated with preschool children's internalizing and externalizing problem behaviors; (2) COVID-19 stress is indirectly associated with preschool children's internalizing and externalizing problem behaviors mediated through parenting behavior; (3) COVID-19 stress is indirectly associated with preschool children's internalizing and externalizing problem behaviors mediated through mother's depression; and (4) COVID-19 stress is indirectly associated with preschool children's internalizing and externalizing problem behaviors sequentially mediated through mother's depression and parenting behavior. Figure 1 displays the analytical model of this study.

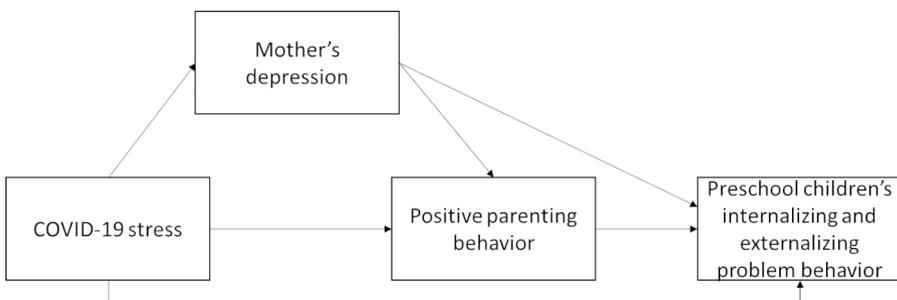


Fig. 1 Analytical Model

2 Method

2.1 Study Participants

An online survey was distributed to mothers who raise preschool children between age three and five in SouthKorea. Following the approval of all study procedures by the relevant Institutional Review Board (IRB), an online-survey company that has more than 1.4 million panels distributed the notice of survey to mothers living in 17 cities and provinces in South Korea. The subjects of our study was recruited by using convenient sampling strategy collected from the panel participants affiliated with an online company. Guidelines that included the purposes and procedures of the survey were provided, and mothers who agreed upon research participation responded to the survey. The data was gathered between January 25 and 26, 2021, when the Korean government was implementing the Social Distancing Policy Stage 2.5. (the fourth out of five stages, i.e., stage 1, 1.5, 2, 2.5, 3, where a higher stage indicated a stricter level of social distancing). In the stage 2.5, individuals were encouraged to stay at home and avoid going out, meeting others, and using places where people can gather (Ministry of Health and Welfare, 2021b)¹.

A total of 316 mothers participated in the study. Table 1 presents the sociodemographic characteristics of the analytic sample. Of the mothers in the analytic sample, the average age was 36.56 years ($SD=3.95$, range 26–49); 97% were married, 49%

Table 1 Summary Statistics (N=316)

Variables	M/%	SD	Min	Max
COVID-19 stress	64.23	12.48	13	91
Mother's depression	18.03	5.21	6	30
Positive parenting behavior	56.79	7.24	22	76
Preschool children's internalizing problem behavior	10.39	9.22	0	55
Preschool children's externalizing problem behavior	9.20	6.77	0	36
Covariates				
Mother's age (years)	36.56	3.95	26	49
Mother married	97%			
Mother employed	49%			
Mother graduated from college	59%			
Number of children	1.81	0.73	1	5
Family income	444.70	175.16	80	1200
Log family income	6.02	0.39	4	7
Mother's health status	3.37	0.77	1	5
Child is female	48%			
Child's age (years)	3.95	0.79	3	5
Child's health status	4.12	0.64	2	5

¹ As of July 1, 2021, a new four-stage social distancing policy has been implemented.

were employed, and 59% had graduated from college. Their average number of children was 1.81 (SD=0.73, range 1–5), and the average family monthly income was 444.70 thousand Won (SD=175.16, range 80–1,200), which is approximately US \$ 4,043.00 when the exchange rate is 1,100 Won per 1 US \$. The average score of mother's health status was 3.37 (SD=0.77, range 1–5), which was little above the mean. Regarding preschool children's demographic characteristics, 48% were female, the average age was 3.95 years (SD=0.79, range 3–5), and the average score of children's health status was 4.12 (SD=0.64, range 2–5).

2.2 Measures

2.2.1 COVID-19 Stress

Mothers' COVID-19 stress levels were investigated using Spinelli et al.'s (2020) Quarantine Parent Risk Index, translated in Korean. Mothers were asked to rate on the 7-point scale (from *Not difficult at all* (1) to *Very difficult* (7)) the diverse aspects of difficulty caused by staying at home due to COVID-19. Sample items included how difficult it was "to find space to stay alone" and "to find time for my partner." Among the 13-item original questionnaire, one item that deals with difficulty of balancing family and work was deleted, as this study targeted both employed and non-employed mothers. Higher scores indicated mothers' perception of higher levels of COVID-19 stress. Cronbach's α for the present sample was 0.87.

2.2.2 Depression

Mothers' depression was measured using Kessler et al.'s (2002) short-form psychological distress scale (K6) translated in Korean by Shin et al., (2008). Mothers reported their emotional experiences on the six item, 5-point scale (from *None of the time* (1) to *All of the time* (5)). The sample items include "During the past 30 days, how often did you feel hopeless/worthless?" Higher scores reflected higher levels of depression. Cronbach's α for the present sample was 0.89.

2.2.3 Positive Parenting Behavior

Mothers' positive parenting behaviors were investigated using two subscales (i.e., warmth and reasoning) of Parenting Behavior Scale developed and validated by Rhee (2012) and revised by Nah (2012). Warmth and reasoning represent the two axes of authoritative parenting suggested by Baumrind (1966; 2013) and Maccoby and Martin (1983). The warmth subscale consists of items that measure mothers' affection, interest, and encouragement toward their children. The reasoning subscale measures the extent to which mothers provide clear rules with reasons when they encounter children's misbehaviors. Instead of coercive power-assertive control of children's behavior, reasoning promotes children's compliance through the provision of reasons that match children's levels of understanding (Baumrind, 2013). Mothers were asked to rate the items on the 5-point scale (from *Never* (1) to *Extremely close* (5)). The sample items of warmth and reasoning included "I oftentimes tell my child that

I am proud of her/him” and “I explain the reasons of following rules for my child,” respectively. Higher scores indicated mothers' more positive parenting behaviors. Cronbach's α for this sample was 0.92.

2.2.4 Preschool Children's Internalizing and Externalizing Problem Behaviors

Preschool children's internalizing and externalizing problem behaviors were examined using Child Behavior Checklist for ages 1.5–5 (CBCL 1.5–5; Achenbach & Rescorla 2000), which is the standardized Korean version (Kim et al., 2009). Internalizing behaviors are those considered to be emotionally sensitive, anxious/depressed, somatic, and withdrawn. Externalizing behaviors are problems with attention and being aggressive. The items were rated *Not true* (0), *Sometimes true* (1), *Often true* (2). Higher scores indicated mothers' perception of their children's more severe emotional and behavioral problems.

2.2.5 Covariates

Control variables were chosen based on their potential to influence mothers' COVID-19 stress, depression, parenting behaviors, and preschool children's behavioral problems (Aunola & Nurmi, 2005; Dooley et al., 2000; Evenson & Simon, 2005; Hoffman et al., 2006; Milgrom et al., 2006). Mother and family characteristics included mothers' age, marital status (unmarried=0, married=1), employment status (unemployed=0, employed=1), education level (did not graduate from college=0, graduated from college=1), mother's health status (5 point Likert-type scale from *Very poor* (1) to *Very good* (5)), the number of children, and log-transformed family income. Children's characteristics included, gender (male=0, female=1), age (year) and health status (5-point Likert scale ranging from *Very poor* (1) to *Very good* (5)).

2.3 Analytic Strategies

All analyses were conducted using Stata 14.0 (StataCorp, 2015, College Station, TX). First, the Pearson correlation was used to examine the associations between the COVID-19 stress, mothers' depression, positive parenting behavior, and preschool children's internalizing and externalizing problem behaviors. Second, path analysis through a structural equation modeling (SEM) was conducted. Bootstrapping was used to compute the bias-corrected standard errors and to decompose direct, indirect, and total effects. Specifically, the *sem* and *nlcom* commands were used to calculate coefficient estimates of each path, calculate standard errors using the delta methods and decompose the direct, indirect, and total effects of COVID-19 stress on preschool children's internalizing and externalizing problem behaviors due to the mother's depression and parenting behavior (Preacher & Hayes, 2008). There was no missing case in the study variables.

3 Results

3.1 Descriptive Statistics and Correlations

Table 1 presents the summary statistics of the primary variables. The average score of COVID-19 stress was 64.23 (SD=12.48, range 13–91), mother's depression was 18.03 (SD=5.21, range 6–30), positive parenting behavior was 56.79 (SD=7.24, range 22–76), preschool children's internalizing problem behavior was 10.39 (SD=9.22, range 0–55), and preschool children's externalizing problem behavior was 9.20 (SD=6.77, range 0–36).

Table 2 displays the Pearson correlations between the primary variables. COVID-19 stress was correlated with mother's depression ($r=.20, p<.001$) and positive parenting behavior ($r=-.11, p<.05$). Mother's depression, positive parenting behavior, and preschool children's internalizing and externalizing problem behaviors all had statistically significant correlations, ranging from -0.33 to 0.77 . However, COVID-19 stress was not correlated with preschool children's internalizing and externalizing problem behaviors.

3.2 Direct, Indirect, and Total Effects on Young Children's Internalizing and Externalizing Problem Behaviors

The decomposition of the direct, indirect, and total effects of stress due to COVID-19 on preschool children's internalizing and externalizing problem behaviors are displayed in Table 3. As hypothesized, COVID-19 stress was indirectly associated with preschool children's internalizing and externalizing problem behaviors mediated through mother's depression (Hypothesis 3) (indirect effect on internalizing problem behaviors: $b=0.04, p<.01$; indirect effect on externalizing problem behaviors: $b=0.02, p<.01$), although the direct effect of COVID-19 stress on preschool children's internalizing and externalizing problem behaviors (Hypothesis 1) and indirect effect through parenting behavior (Hypothesis 2) were not statistically significant. In addition, as expected, stress due to COVID-19 was indirectly associated with preschool children's internalizing and externalizing problem behaviors sequentially mediated through mother's depression and parenting behavior (Hypothesis 4) (indirect effect on internalizing problem behaviors: $b=0.07, p<.01$; indirect effect on externalizing problem behaviors: $b=0.05, p<.01$).

Table 2 Correlations of Primary Variables (N=316)

Correlations	1	2	3	4	5			
1 COVID-19 stress	1.00							
2 Mother's depression	0.20	***	1.00					
3 Positive parenting behavior	-0.11	*	-0.24	***	1.00			
4 Preschool children's internalizing problem behavior	0.08	0.31	***	-0.24	***	1.00		
5 Preschool children's externalizing problem behavior	0.10	0.31	***	-0.33	***	0.77	***	1.00

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

Table 3 Decomposition of Direct, Indirect and Total Effects (N=316)

Predictors	Direct effect							
	Mother's depression		Parenting behavior		Children's internalizing problem behavior		Children's externalizing problem behavior	
	b	SE	b	SE	b	SE	b	SE
COVID-19 stress	0.18**	0.05	-0.09	0.06	0.00	0.05	0.02	0.05
Mother's depression			-0.14*	0.06	0.28***	0.06	0.25***	0.06
Positive parenting behavior					-0.17**	0.06	-0.28***	0.06
Covariates								
Mother's age (years)	-0.03	0.06	0.08	0.06	0.02	0.06	0.03	0.05
Mother married	0.07	0.06	0.01	0.11	-0.01	0.04	0.00	0.04
Mother employed	-0.08	0.06	0.08	0.06	0.10	0.06	0.09	0.06
Mother graduated from college	0.04	0.05	0.07	0.06	0.08+	0.05	0.04	0.05
Number of children	0.14*	0.06	0.02	0.05	-0.04	0.06	-0.02	0.06
Log family income	0.05	0.08	-0.02	0.07	0.03	0.06	-0.04	0.07
Mother's health status	-0.31***	0.06	0.14*	0.06	0.08	0.06	0.04	0.06
Child is female	-0.02	0.06	0.00	0.06	0.06	0.05	0.01	0.05
Child's age (years)	-0.02	0.05	0.04	0.05	-0.03	0.05	-0.07	0.06
Child's health status	-0.08	0.06	0.21**	0.07	-0.14**	0.05	-0.04	0.06

* $p < .05$, ** $p < .01$, *** $p < .001$; Results are based on 200 bootstrapped estimates. All covariates are included in the analyses

Table 4; Fig. 2 show the coefficient estimates from the path analyses. COVID-19 stress was positively associated with mother’s depression ($b=0.18, p<.01$), although the associations with parenting behavior and preschool children’s internalizing and externalizing problem behaviors were not statistically significant. Mother’s depres-

Table 4 Standardized SEM Coefficient Estimates (N=316)

	Direct		Indirect		Total	
	Coef	SE	Coef	SE	Coef	SE
Hypothesis 1						
COVID-19 stress → Internalizing problem behavior	-0.00	0.04	-	-	-0.00	0.04
COVID-19 stress → Externalizing problem behavior	0.01	0.02	-	-	0.01	0.02
Hypothesis 2						
COVID-19 stress → Parenting behavior → Internalizing problem behavior	-0.00	0.04	0.01	0.01	0.01	0.04
COVID-19 stress → Parenting behavior → Externalizing problem behavior	0.01	0.02	0.01	0.01	0.02	0.03
Hypothesis 3						
COVID-19 stress → Mother’s depression → Internalizing problem behavior	-0.00	0.04	0.04	**	0.01	0.04
COVID-19 stress → Mother’s depression → Externalizing problem behavior	0.01	0.02	0.02	**	0.01	0.03
Hypothesis 4						
COVID-19 stress → Mother’s depression → Parenting behavior → Internalizing problem behavior	-0.00	0.04	0.07	**	0.03	0.04
COVID-19 stress → Mother’s depression → Parenting behavior → Externalizing problem behavior	0.01	0.02	0.05	**	0.02	0.06

* $p<.05$, ** $p<.01$, *** $p<.001$; Results are based on 200 bootstrapped estimates

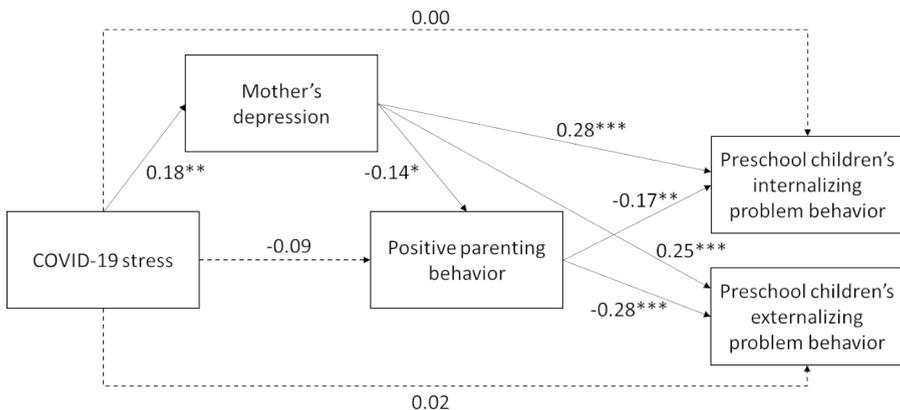


Fig. 2 Structural Equation Models (standardized estimates including all covariates) N=316. * $p<.05$, ** $p<.01$, *** $p<.001$; Results are based on 200 bootstrapped estimates

sion was associated with parenting behavior ($b = -0.14, p < .05$), and preschool children's internalizing ($b = 0.28, p < .001$) and externalizing problem behaviors ($b = 0.25, p < .001$). Parenting behavior was associated with preschool children's internalizing ($b = -0.17, p < .01$) and externalizing problem behaviors ($b = -0.28, p < .001$).

In sum, the study findings revealed that stress due to the COVID-19 pandemic was indirectly associated with preschool children's internalizing and externalizing problem behaviors mediated through mother's depression (Hypothesis 3), and sequentially mediated through mother's depression and parenting behavior (Hypothesis 4). COVID-19 stress was positively associated with mother's depression, which in turn increased preschool children's internalizing and externalizing problem behaviors. In addition, stress due to COVID-19 was sequentially associated with parenting behavior and mother's depression, which in turn was associated with a decrease in preschool children's internalizing and externalizing problem behaviors.

In terms of the study covariates, the number of children and mother's health status were associated with mother's depression. Mother's and children's health statuses were positively associated with parenting behavior. Mother's educational attainment and children's health status were associated with children's internalizing problem behaviors.

4 Discussion

The January 2020 COVID-19 outbreak drastically changed the lives of families and children in South Korea for over a year. Families and children were advised to stay at home for safety precautions, and childcare centers, kindergartens, and schools were closed. Consequently, families experienced challenges such as conflicts and stress from the increased time spent together within the family unit, and increased child care burden. Mothers raising preschool children were faced with the heavy burden of child care (Hamel & Salganicoff, 2020; Johnston et al., 2020; Power, 2020; United Nations, 2020; Wenham et al., 2020). With data collected a year after COVID-19 outbreak in South Korea, the current study focused on mothers raising preschool children aged 3 to 5 and aimed to explore whether mother's stress due to COVID-19 pandemic was associated with preschool children's internalizing and externalizing problem behaviors, mediated through mother's depression and parenting behavior.

As hypothesized, the study findings revealed that COVID-19 stress was indirectly associated with preschool children's internalizing and externalizing problem behaviors due to mother's depression and parenting behavior, although the direct effect of COVID-19 stress on internalizing and externalizing problem behaviors were not statistically significant. Mother's COVID-19 stress was also associated with an increase in mother's depression and a decrease in positive parenting behavior, which in turn led to an increase in preschool children's internalizing and externalizing problem behaviors. This result is consistent with that of previous research showing the adverse mental health outcomes among parents and their children (Patrick et al., 2020), and the significant association between parenting stress and parent's perceived difficulties due to COVID-19 (Spinelli et al., 2020). Stress caused by the COVID-19 pandemic, along with the large childcare burden imposed on mothers, negatively affected their

mental health and parenting outcomes. Accordingly, mothers' depression and parenting behaviors may have indirectly worsened their preschool children's adjustment problems, such as internalizing and externalizing problem behaviors. Specifically, we incorporated both mothers' warmth and reasoning to conceptualize positive parenting behaviors. Considering that the two elements are important aspects of authoritative parenting that lead to children's increased socioemotional competence and better self-regulatory behaviors (Baumrind, 2013), the role of a positive emotional climate at home and demanding appropriate behavior from children need to be persistently emphasized, even during the pandemic when increased stressors are distressing family members. In terms of the insignificant direct effect of COVID-19 stress on internalizing and externalizing problem behaviors, it may be possible that, as preschool children are in their early stages, they can be indirectly negatively affected by the COVID-19 pandemic through their mothers during their daily routines and interactions.

In addition, in line with our hypothesis, mothers' COVID-19 stress was indirectly associated with parenting behavior. This result is consistent with recently published studies that reported on parents' distress during COVID-19 and its significant association with negative parenting behaviors (Marchetti et al., 2020). Previous studies have also suggested that mental health can play a significant mediating role between mothers' diverse stress (e.g., parenting stress, work stress, economic stress) and parenting practices (Conger et al., 2010; Newland, Crnic, Cox, Mills-Koonce, & Family Life Project Key Investigators, 2013). That is, like other types of stress which affect depression, stress caused by staying at home due to COVID-19 can be significantly associated with depression, which leads to less optimal parenting behavior. It is indicated that staying indoors for a long time and disruption of normal daily activities due to COVID-19 can be a serious risk factor for mental health (Ansari & Ahmadi Yousefabad, 2020). Specifically, considering that depression is known as an important factor that can negatively affect wide-ranging interpersonal relations including parent-child relationships and parenting practices (Downey & Coyne, 1990; Letourneau et al., 2010), mothers' depression can be one important target for family intervention in the COVID-19 pandemic.

However, mothers' COVID-19 stress was not directly associated with their own perception of their positive parenting behaviors. This result is consistent with a prior study that reported no significant relationship between parents' negative affect during the COVID-19 pandemic and parenting behaviors (Janssen et al., 2020). This result is also in line with previous studies that indicate mothers' mental health as one of the major risks for young children's behavioral outcomes and the strong mediating roles of mothers' parenting behaviors in the relationship between mothers' stress and children's outcomes (Abidin, 1992; Goodman & Gotlib, 1999). In addition, although more empirical studies are required to examine the relationship between the stress caused by COVID-19 and parenting behaviors, one explanation of this insignificant relationship may come from individuals' different reactions to COVID-19 stress. Individuals' emotional and behavioral responses toward stress varies significantly (Hammen, 2005). Although mothers' depression is an important mediating mechanism that explains the relationship between COVID-19 stress and parenting behaviors shown in this study, parents' varied coping strategies during the COVID-

19 pandemic (Archenebrg et al., 2021) should also be considered. The moderating roles of resilience factors at the individual, family, and community levels may also be considered in prospective studies.

This study has important implications. As expected, the present study indicated that mothers' stress due to the COVID-19 pandemic is significantly associated with mothers' depression. Considering that mothers' mental health is a well-known risk factor for parenting and child development, promoting intervention strategies that focus on parents' stress management can be one of the important strategies for enhancing healthy family functioning during the pandemic. Specifically, this study showed COVID-19 stress's indirect association with preschool children's behavioral problems connected to mothers' depression and parenting behaviors. As previous studies indicate significant effectiveness of stress and depression awareness programs (Iida et al., 2018; Minor et al., 2006; Strunk et al., 2014), implementing multifaceted interventions that can help mothers' awareness of their emotional and behavioral characteristics due to COVID-19 stress and their self-care may be considered for better child and parent adjustment during the pandemic.

4.1 Study Limitations

This study is not without limitations. First, although this study found that COVID-19 stress was indirectly associated with preschool children's internalizing and externalizing problem behaviors through mother's depression and parenting behavior, the cross-sectional design of this study does not allow inferring causality. Second, all measures used in this study were self-reported measures that could have been affected by measurement errors. Third, the relatively new scale used to measure stress due to COVID-19 was developed in Italy and may not be reliable for the South Korean population. Future researchers need to test the reliability of the measures based on South Korean parents. In addition, because the South Korean government adjusts the stage of social distancing biweekly, people's emotions and behaviors may change depending on the different stages and the length of social distancing. Thus, the findings of this study may not be consistent based on the social distancing policy, which have varied effect on people's behaviors and daily lives. Moreover, this study only examined mothers' stress, depression, and parenting because of the evidence suggesting a heavier childcare burden on mothers during the COVID-19 pandemic (Hamel & Salganicoff, 2020; Johnston et al., 2020; Power, 2020; Wenham et al., 2020; United Nations, 2020). However, future studies may need to focus on how fathers' mental health and parenting behaviors are related with COVID-19, as the father-child relationship is also known to be associated with children's behavioral outcomes (Amato & Gilbreth, 1999; Carlson 2006; Opondo et al., 2016). Last, the data used in this study may not be a nationally representative sample of the South Korean population; thus, the study findings may not be generalizable.

4.2 Conclusions

Despite the study limitations, this study is the first empirical study that explored the mechanisms of the impact of stress due to COVID-19 on preschool children's

behavioral outcomes particularly focusing on mothers raising preschool children in South Korea. Because preschool children are predominantly at home due to the fear of infection and closure of child care centers, studies focusing on how COVID-19 can affect preschool children are limited at present. Thus, the findings of this study are promising as they provide the first empirical evidence that mother's stress due to the COVID-19 pandemic can negatively affect their preschool children's adjustment problems through mother's depression and parenting behavior within the South Korean context. The impact of the problem behaviors of preschool children due to COVID-19 may persist throughout their adulthood. Therefore, it is necessary to pay attention to the adjustment problems of preschool children caused by the COVID-19 pandemic, and various support systems are needed to promote their well-being. Difficulty in childcare due to the COVID-19 pandemic is a social problem worldwide. Thus, multifaceted efforts may be needed to enhance the mental health outcomes of preschool children and their families.

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Declarations

Disclosure of Potential Conflicts of Interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Research Involving Human Participants and/or Animals The research procedure followed for this manuscript were in accordance with ethical standards of Myongji University Institutional Review Board.

Informed Consents We obtained on-line informed consent from all individual participants.

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