



## Brief Report: The Impact of COVID-19 on Parental Stress and Learning Challenges for Chinese Children with SpLD

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### Abstract

The pandemic induced a radical shift to online learning with increased parental involvement. This study investigates the challenges that students with specific learning difficulties (SpLD) encountered during the pandemic and the mediating role of parental stress. A total of 294 parents of children with SpLD (mean age = 10.6;  $SD = 1.5$ ) were recruited. Parents reported concerns over their children's difficulties maintaining learning routines, lack of suitable environment for online classes, and ineffective remote learning. Results of mediation analysis showed that online learning challenges, SpLD symptoms, and emotional and behavioral difficulties positively predicted parental stress. In turn, parental stress negatively predicted children's self-esteem and family quality of life. The study implies that parents of children with SpLD need both psychological and technical support under suspension of face-to-face teaching.

**Keywords** COVID-19 pandemic · Parenting · Specific learning difficulties · Special educational needs

### Introduction

Specific Learning Difficulties (SpLD) in reading and writing impact 9.7–12.6% of elementary and secondary students in Hong Kong (HK) (Chan et al., 2007). Studies showed that students with SpLD have lower self-concepts, self-esteem, and reading motivation than their typically developing (TD) peers (Glazzard, 2010; Humphrey & Mullins, 2002; Soriano-Ferrer & Morte-Soriano, 2017). During the COVID-19 pandemic, regular teaching and learning were not maintained for many students around the world (Bozkurt et al., 2020), let alone the frequent, intense, individualized instruction students with SpLD require to address their specific learning needs (Tam & Leung, 2019). Disrupted school routines and multiple stressors (e.g., online learning, isolation) posed extra challenges for children with SpLD in

terms of both learning and psychological well-being (Parmigiani et al., 2021; Soriano-Ferrer et al., 2021).

Children's characteristics play a role in parental stress, which contributes to parenting practice and influences child's development (Abidin, 1990; Belsky, 1984). The challenges students with SpLD face have a negative impact on their parents (Matteucci et al., 2019), who have long reported higher parental stress (Craig et al., 2016) and lower quality of life (Ginieri-Coccossis et al., 2013) than those with TD children, even before the pandemic. During the pandemic, parents experienced increased stress related to jobs, lockdowns, and child-rearing (Babore et al., 2021; Hiraoka & Tomoda, 2020). School closures caused an immediate shift from face-to-face learning to remote learning, placing more responsibility on parents or caregivers. The stay-at-home orders increased parental stress and negatively affected parent-child relationships, even leading to child-maltreatment (Chung et al., 2020; Griffith, 2020). Many parents struggled to balance their responsibilities while motivating their children's learning (Garbe et al., 2020). Mothers of children with SpLD experienced more negative emotions, influencing their children's self-esteem and family life (Benassi et al., 2022), worsening pre-existing challenges, and introducing negative outcomes.

This study empirically documents the difficulties students with SpLD encountered during the pandemic in HK

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and investigates the mediating role of parental stress within their families. It was hypothesized that SpLD symptom severity, emotional and behavioral difficulties, and online learning challenges would significantly predict parental stress. This in turn, would predict children's self-esteem and family quality of life. The findings supplement existing literature with information on supporting the learning needs of students with SpLD and their parents' well-being during and after the pandemic.

## Methods

### Participants

Two hundred and ninety-four parents of children with SpLD aged between 6 and 12 years ( $M=10.6$ ;  $SD=1.5$ ) participated in this study, recruited from mainstream schools in HK. The majority of the parents were female ( $n=240$ , 81.6%) and were married (68.7%). Around 76% of the mothers and 73.5% of the fathers left education after secondary school (67.7%). The children with SpLD were predominantly male (67%). The government has set the household poverty line for a 4-person household at HK\$20,800 (Census and Statistics Department, 2022). The average number of family members in households was 4.27, with an average income of HK\$20,001–\$25,000 per month, indicating that 65% live below the poverty line.

### Procedures

Institutional ethics approval was obtained for this study. Letters describing the research and confidentiality of personal information were sent with the informed consent forms to schoolteachers, who were asked, in privacy, to pass the project invitation letters to parents of children with SpLD. The identification of students was based on comprehensive psychological reports completed by clinical or educational psychologists, containing the results of standardized psychological tests of students' abilities in reading and writing (i.e., The Hong Kong Test of Specific Learning Difficulties in Reading and Writing for Primary School Students — Third Edition [HKT-P(III)]) (Ho et al., 2016). Following parental consent, the authors obtained the relevant information from teachers. The students were all clinically diagnosed with SpLD and their participation was voluntary. Data were collected during the third and fourth waves of COVID pandemic in 2020 and 2021.

### Instruments

In addition to the demographic background information, a survey with three items of COVID-related questions (e.g., “how has the COVID pandemic impacted your child's learning?”, “how has the COVID pandemic impacted your relationship with your child?”, and “how has the COVID pandemic impacted your child's learning-related stress?”) was collected. Questionnaires were used to measure the variables: (a) parental stress; (b) emotional and behavioral difficulties; (c) family quality of life; (d) self-esteem; and (e) online learning challenges.

**Parental Stress** The Parental Stress Scale (PSS; Cheung, 2000) has 18 items using a 6-point Likert scale from 1 (*strongly disagree*) to 6 (*strongly agree*). A composite score was calculated by adding all items (after the 7 items were reversed). A higher PSS score indicates higher stress levels. The PSS scale has good Cronbach's alpha reliability coefficients of 0.89 in previous research (Cheung, 2000) and 0.90 in this study.

**SpLD Symptoms** The 36-item Hong Kong Behaviour Checklist for Primary Students (HKBCL; Chan et al., 2012) is a checklist of students' reading-related behavioral characteristics which teachers observe in the classroom, grouped into eight areas: memory, dictation, reading, writing, language, concentration, general performance, and sequencing ability. Teachers indicated a frequency of each behavioral occurrence on a scale from 1 (*being never observed*) to 5 (*being often observed*). The Cronbach's alpha scores of the HKBCL were estimated to be 0.92 in Chan et al.'s (2012) study and 0.96 in this study.

**Emotional and Behavioral Difficulties** The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) was administered to parents using a 3-point Likert scale: 0 (*not true*), 1 (*somewhat true*), and 2 (*certainly true*). It consists of 15 items that measure emotional and conduct problems, based on the child's behavior over the last six months. Higher scores reflect more severe difficulties. The Chinese version of the SDQ is validated and demonstrates excellent test-retest reliability (emotional subscale:  $\alpha=0.66$ ; conduct problem:  $\alpha=0.71$ ) (Lai et al., 2010; Liu et al., 2013). In this study, the reliability estimate of emotional and behavioral difficulties was 0.77.

**Family Quality of Life** The Chinese version of the Beach Center Family Quality of Life Scale (BCFQOL; Beach Center on Disability, 2015) was administered to parents of children with SpLD, using a 5-point Likert scale from 1 (*dissatisfied*) to 5 (*very satisfied*). Although the BCFQOL

**Table 1** Parents' ratings of the survey on COVID-related questions and online learning challenges ( $N=294$ )

	<i>n</i>	%
Parent-reported impacts of COVID-19 on their child's learning		
Not at all	16	5.4
Minor impact	51	17.3
Moderate impact	87	29.6
Significant impact	87	29.6
Severe impact	39	13.3
Parent-reported impacts of COVID-19 on their child's relationship		
No impact	139	47.3
Positive impact	57	19.4
Negative impact	84	28.5
Parent-reported impacts of COVID-19 on their child's learning-related stress		
Not all stressed	28	9.5
Slightly stressed	46	15.6
Somewhat stressed	85	28.9
Very stressed	88	29.9
Extremely stressed	33	11.2
Lack of IT skills in e-learning		
Strongly disagree	28	9.5
Disagree	32	10.9
Neutral	119	40.5
Agree	67	22.8
Strongly agree	34	11.6
Difficulty of maintaining fixed learning routines		
Strongly disagree	15	5.1
Disagree	32	10.9
Neutral	42	14.3
Agree	111	37.8
Strongly agree	80	27.2
Ineffective learning at home		
Strongly disagree	34	11.6
Disagree	51	17.3
Neutral	66	22.4
Agree	79	26.9
Strongly agree	47	16.0
Lack of a suitable environment to attend online classes		
Strongly disagree	38	12.9
Disagree	42	14.3
Neutral	67	22.8
Agree	62	21.1
Strongly agree	71	24.1
Lack of IT support (e.g., hardware)		
Strongly disagree	119	40.5
Disagree	58	19.7
Neutral	43	14.6
Agree	30	10.2
Strongly agree	29	9.9

covers five domains, this study focuses on family outcomes (i.e., quality of life) with family support. Thus, the four disability-related service items are removed. The 21-item BCFQOL, in a factor analysis of 333 parents of children with disabilities in Taiwan, indicated adequate fit of the four-factor structure (Chiu et al., 2013). The Cronbach's alpha scores were 0.86–0.92 in Chiu et al.'s (2013) study and 0.88 in this study, showing good reliability.

**Self-Esteem** The Children Rosenberg Self-Esteem Scale (Wood et al., 2021) comprises five positive and five negative statements, rated on a scale from 1 (*strongly disagree*) to 4 (*strongly agree*). Higher scores indicate higher overall self-esteem. The CRSES has respectable reliability with a Cronbach's alpha coefficient of 0.79 in past research (Wood et al., 2021) and  $\alpha=0.70$  in this study.

**Online Learning Challenges** Parents in HK are concerned about the heavy reliance on online learning, especially during the COVID pandemic (Lau & Lee, 2020; Sun, 2020). Five items ("Your child has encountered difficulty of maintaining fixed learning routines", "Your child has encountered difficulty in maintaining fixed learning routines", "Online learning is not effective for your child because of interruptions", "Your child does not have a suitable home-learning environment to attend online classes", and "Your child has insufficient IT support such as a wireless device or web camera") were rated from 1 (*strongly disagree*) to 5 (*strongly agree*) to examine parental concerns about online learning. The survey has been employed in local organizations and institutions (Carver & Rowe, 2021; St. James Settlement, 2020). The scale is valid and reliable, with a Cronbach's alpha of 0.74, and displays good model fit in confirmatory factor analysis ( $\chi^2_{(5)}=3.23$ , NNFI=0.96, CFI=0.97, root mean square error of approximation (RMSEA)=0.07, 90% CI=0.04–0.12). The factor loadings of the five items ranged from 0.44 to 0.78, indicating acceptable loadings (Matsunaga, 2010).

## Results

The data were analyzed using SPSS and AMOS software (Version 28.0; IBM Corp., 2021).

### Results of the COVID-related Survey and Online Learning Challenges

A summary of the results is given in Table 1. Two hundred and thirteen parents (73%) reported moderate to severe impacts on their child's learning during the pandemic. Most

thought that their child felt somewhat stressed (28.9%) or very stressed (29.9%) in learning during the pandemic. However, 139 parents (47.3%) reported no impact on the parent-child relationship. Parents of children with SpLD expressed several concerns regarding remote learning, with most agreeing on the difficulty of maintaining fixed learning routines (65%), the lack of a suitable environment to attend online classes (45.2), ineffective learning at home (42.9%). There were 34.4% of parents agreeing on a lack of IT skills for e-learning, while 20.1% found a lack of IT support (e.g., hardware).

### Results of One-Way Between-Groups Analysis of Variance (ANOVA)

A one-way between-groups ANOVA revealed no significant differences in the parental stress scores by marital status [ $F(1, 248)=0.82, p=.37, \eta_p^2=0.00$ ], the gender of the child [ $F(1, 258)=2.90, p=.09, \eta_p^2=0.01$ ], paternal education level [ $F(3, 230)=0.22, p=.88, \eta_p^2=0.00$ ], or maternal education level [ $F(3, 236)=2.03, p=.11, \eta_p^2=0.03$ ]. In terms of self-esteem, no differences were found across marital status [ $F(1, 247)=0.81, p=.37, \eta_p^2=0.00$ ], the gender of the child [ $F(1, 261)=0.08, p=.78, \eta_p^2=0.00$ ], paternal education level [ $F(3, 222)=0.04, p=.99, \eta_p^2=0.00$ ], or maternal education level [ $F(3, 234)=0.37, p=.78, \eta_p^2=0.01$ ]. As for family quality of life, there were no significant differences based on marital status [ $F(1, 186)=0.01, p=.92, \eta_p^2=0.00$ ], paternal education level [ $F(3, 172)=2.23, p=.09, \eta_p^2=0.04$ ], or maternal education level [ $F(3, 181)=2.14, p=.10, \eta_p^2=0.03$ ]. Only one significant difference was found in family quality of life scores for the

gender of the child [ $F(1, 197)=5.85, p<.05, \eta_p^2=0.03$ ] (see Table 2).

Table 3 shows the bivariate correlations between parental stress, SpLD symptoms, emotional and behavioral difficulties, family quality of life, children's self-esteem, impacts of COVID-19, and online learning challenges. Parental stress was positively correlated with SpLD symptoms ( $r=.35$ ), emotional and behavioral difficulties ( $r=.35$ ), impact of COVID-19 on children's learning ( $r=.39$ ), parent-child relationship ( $r=.31$ ), children's learning-related stress ( $r=.38$ ), and online learning challenges ( $r=.36$ ), but negatively correlated with family quality of life ( $r=-.35$ ) and self-esteem ( $r=-.15$ ).

### Results of Mediation

A causal steps approach (Holmbeck, 2002) was used for mediation analysis. Given the significant difference in family quality of life across gender, the gender of the child was used as a covariate. Model A (with direct paths only) revealed that online learning challenges and quality of life ( $\beta = -0.36, p<.001$ ) was significant. No significant direct paths were found between online learning challenges and self-esteem ( $\beta = -0.02, p>.05$ ), SpLD symptoms and self-esteem ( $\beta = -0.14, p>.05$ ), emotional and behavioral difficulties and self-esteem ( $\beta = -0.05, p>.05$ ), SpLD symptoms and family quality of life ( $\beta = -0.01, p>.05$ ), as well as emotional and behavioral difficulties and family quality of life ( $\beta = -0.09, p>.05$ ). Model B (both the direct and indirect pathways) and Model C (indirect pathways only) fitted well to the data, the chi-square difference test indicates that the inclusion of a direct path between online

**Table 2** Means and standard deviations for the effects of marital status, the child's gender and education level on parental stress, self-esteem, and family quality of life ( $N=294$ )

	Parental stress		Self-Esteem		Family Quality of Life	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Marital status						
Married	2.92	0.81	1.64	0.45	3.70	0.56
Not married	3.02	0.71	1.58	0.41	3.72	0.77
Child's gender						
Male	3.00	0.77	1.63	0.43	3.66	0.60
Female	2.83	0.79	1.62	0.44	3.89	0.64
Paternal education level						
Master's degree or above	2.70	0.96	1.60	0.32	4.14	0.78
College or university	2.95	0.77	1.65	0.52	3.74	0.49
Secondary school	2.97	0.78	1.62	0.43	3.73	0.62
Primary school or below	3.01	0.67	1.61	0.46	3.36	0.57
Maternal education level						
Master's degree or above	1.28	—	1.80	—	5.00	—
College or university	3.08	0.74	1.62	0.40	3.76	0.64
Secondary school	2.95	0.79	1.65	0.45	3.73	0.60
Primary school or below	3.08	0.64	1.54	0.45	3.54	0.51

**Table 3** Descriptive statistics and bivariate correlations for all study variables

	1	2	3	4	5	6	7	8	9	<i>M</i>	<i>SD</i>
1. Parental stress	–									2.95	0.78
2. SpLD symptoms	0.35***	–								3.86	0.66
3. Emotional and behavioral difficulties	0.35***	0.32***	–							0.62	0.36
4. Family quality of life	–0.35***	–0.13	–0.18*	–						3.74	0.62
5. Self-esteem	–0.15*	–0.15*	–0.10	0.09	–					1.62	0.44
6. Impact of COVID-19 on children's learning	0.39***	0.35***	0.16**	–0.31***	–0.03	–				3.29	1.09
7. Impact of COVID-19 on parent-child relationship	0.31***	0.25***	0.18**	–0.18*	–0.01	0.45***	–			3.09	0.93
8. Impact of COVID-19 on children's learning-related stress	0.38***	0.32**	0.24**	–0.25**	–0.14*	0.60***	0.43***	–		3.19	1.15
9. Overall online learning challenges	0.36***	0.28***	0.27***	–0.36***	–0.07	0.42***	0.25***	0.49***	–	3.13	0.88

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

**Table 4** Analysis of mediation

	$\chi^2$	<i>df</i>	$\chi^2/df$	NNFI	CFI	RMSEA	SRMR	$\Delta\chi^2(df)$
Model A: No mediation	2.96	4	0.74	0.97	1.00	0.00	0.04	
Model B: Partial mediation	7.68	10	0.77	0.96	1.00	0.00	0.05	
Model C: Full mediation	19.71	11	1.79	0.90	0.94	0.05	0.05	Model B vs. Model C = 12.03, $\Delta df = 1$

*Note.* Conventional cut-off criteria were adopted to check adequate fit of the model (Non-Normed Fit Index (NNFI)  $\geq 0.90$ ; Comparative Fit Index [CFI]  $\geq 0.90$ ; Standardized Root Mean Square Residual (SRMR) and Root Mean Square Error of Approximation (RMSEA) with 90% confidence intervals  $\leq 0.08$ ; Hu & Bentler 1999)

learning challenges and family quality of life contributes significantly to the model ( $\Delta df_{(1)} = 12.03$ ,  $p < .001$ ). Thus, the partial mediation model was supported (see Table 4).

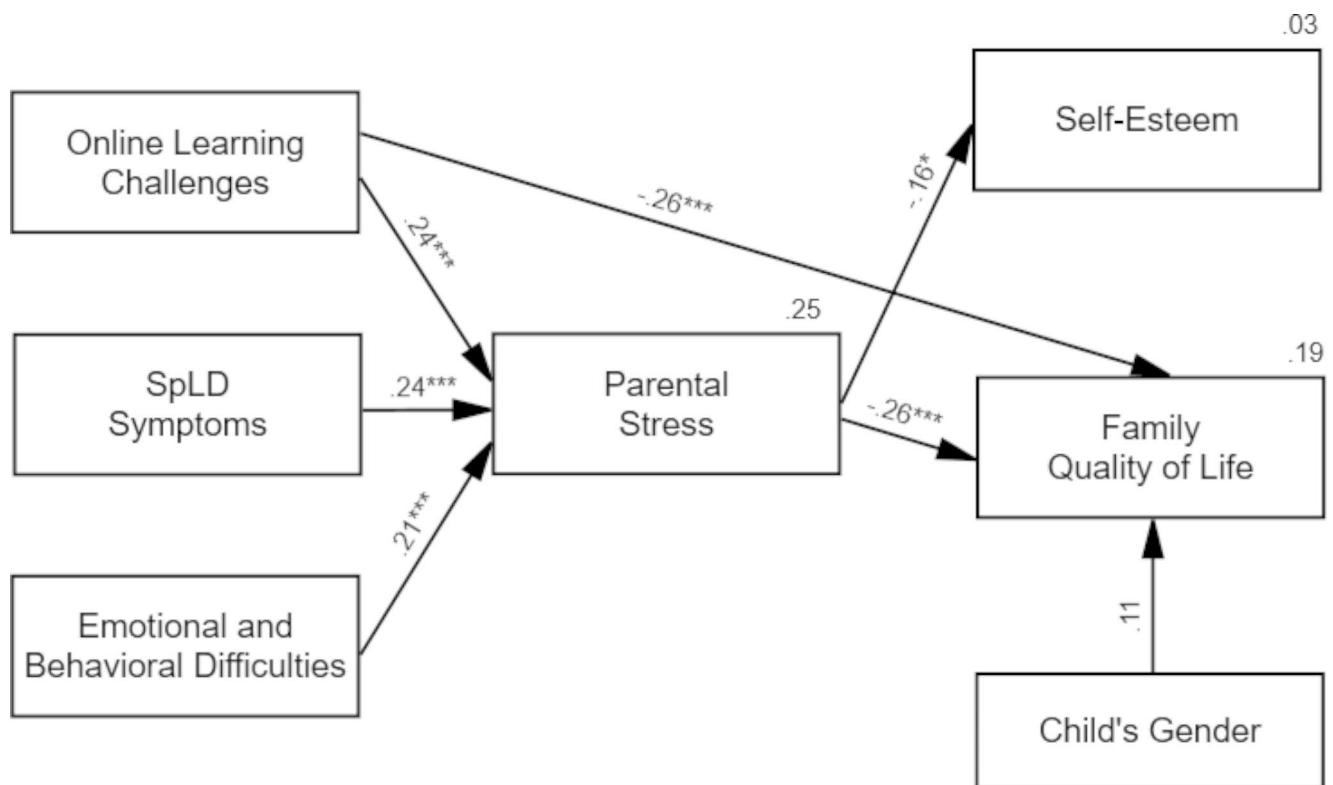
The model shows that online learning challenges ( $\beta = 0.24$ ,  $p < .001$ ), SpLD symptoms ( $\beta = 0.24$ ,  $p < .001$ ), and emotional and behavioral difficulties ( $\beta = 0.21$ ,  $p < .001$ ) positively predicted parental stress. In turn, parental stress negatively predicted self-esteem ( $\beta = -0.16$ ,  $p < .05$ ) and family quality of life ( $\beta = -0.26$ ,  $p < .001$ ). The path coefficient between online learning challenges and family quality of life was significant ( $\beta = -0.26$ ,  $p < .001$ ). The final model accounted for 25%, 3%, and 19% of the variances in parental stress, self-esteem, and family quality of life, respectively (see Fig. 1). The total effect of the three external factors on psychological outcomes was 29%. MacKinnon and colleagues (MacKinnon, 2000; MacKinnon et al., 2002) suggested that indirect effects can be tested when independent variables and mediators have significant associations, and mediators are significantly associated with dependent variables. The robustness of this result was further tested using a bootstrapping method, with 95% bias-corrected confidence intervals (BC CIs) and 1000 bootstrapped resamples (Efron, 1988). The indirect effects were all statistically significant (see Table 5).

## Discussion

### Learning Problems of Students with SpLD During the Pandemic

Children with SpLD usually exhibit difficulties acquiring reading and writing skills with only exposure to routine classroom teaching methods (Yuen et al., 2005). It is not difficult to imagine the challenges they experienced during the face-to-face teaching suspensions of the past three years when even routine teaching was not fully provided. The majority of parents in the study agreed that the pandemic had a moderate to severe impact on their child's learning. The parents reported several concerns about remote learning, including difficulties maintaining fixed routines, a lack of a suitable environment to attend online classes, and ineffective learning at home. More than half perceived their children as feeling stressed. In a sample of Spanish children with dyslexia, parents reported increased emotional and behavioral problems, disrupted learning routines, an overall negative influence on learning, and insufficient help from teachers (Soriano-Ferrer et al., 2021).





**Fig. 1** Final mediation model; the gender of the child was used a controlling variable

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

**Table 5** The final model to explain the standard indirect effects of indices

Indirect effects	Indirectly estimated	95% CI
Online learning challenges → parental stress → self-esteem	−0.02*	−0.20 −0.17
Online learning challenges → parental stress → family quality of life	−0.04*	−0.29 −0.20
SpLD symptoms → parental stress → self-esteem	−0.03*	−0.24 −0.19
SpLD symptoms → parental stress → family quality of life	−0.06*	−0.35 −0.23
Emotional and behavioral difficulties → parental stress → self-esteem	−0.04*	−0.32 −0.23
Emotional and behavioral difficulties → parental stress → family quality of life	−0.09*	−0.47 −0.28

\*significant indirect effects

Parents' reports of a lack of hardware (20.1%) and IT skills (34.4%) raise concerns for educators forced into remote teaching, which could increase the unequal learning opportunities for students from poorer socio-economic backgrounds and with special educational needs (SENs). Parmigiani et al. (2021) reported that many families of children with SENs felt overwhelmed during lockdown, especially those with younger children or those with severe disabilities. Studies prior to the pandemic, however,

suggested that the use of information and communication technology (ICTs) could improve learning for students with SpLD (Benmarrakchi et al., 2015; Cano et al., 2022), implying that they could benefit from distance learning given sufficient preparation and support for parents.

Our results showed that more than half of the parents (58.8%) perceived their children as feeling somewhat or very stressed during the pandemic, and the severity of SpLD symptoms is shown to predict self-esteem. Existing evidence suggested an increased risk of mental health problems in students with SpLD, even before the pandemic (Francis et al., 2019; Nelson & Harwood, 2011). Nelson and Harwood's (2011) meta-analysis found that around 70% of students with learning disabilities experienced significantly greater anxiety symptoms than their nonaffected peers, which was consistently reported by parents. Our study also indicated that the psychological needs of students with SpLD should be addressed alongside their learning needs during the pandemic.

### The Mediating Role of Parental Stress

Our mediation analysis results are in line with the previous theories about the role of children's characteristics on parental stress and child development (Abidin, 1990, 1992).

Several studies reported an increase in parental stress in caregivers of children with neural developmental disorders (including SpLD) (Bentenuto et al., 2021; De Giacomo et al., 2021). Our results suggested that emotional and behavioral difficulties predicted parental stress, which is in line with previous findings (Craig et al., 2016), while further suggesting the role of symptom severity and online learning challenges in parental stress. Parents of children with SpLD experience extra challenges meeting the demands of their children's learning and psychosocial needs during the shift to remote learning. Our data also confirmed that parental stress contributes to the feelings of self-esteem in children with SpLD and this impacts on family quality of life, corroborating previous research (Ajilchi et al., 2013) that higher levels of parental stress were associated with lower levels of self-esteem among mothers of elementary children. Similarly, Hsiao et al. (2017) also traced the relationship between parental stress and family quality of life among children with SENs.

## Conclusion

This study highlights the important role of stress experienced by parents of children with SpLD whose learning and psychological needs were compromised during the pandemic. Based on our findings, parents of children with SpLD may need more psychological and technical support from schools or the government, especially to manage the remote learning challenges their children face. Detailed and informed attention should be paid to the parents of children with more severe SpLD symptoms, who, as carers, experience more emotional and behavioral problems in their daily lives.

**Author Contributions** JX was responsible for the conception of the research questions, data interpretation, and writing. KP was responsible for the study design, review, and paper editing. MH was responsible for data analysis and providing input on this paper. All authors have agreed the final version of the manuscript.

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## Declarations

**Conflict of Interests** The authors declare that they have no conflicts of interest to disclose.

**Ethical Approval** This study was approved by the Human Research Ethics Committee at The Education University of Hong Kong.

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