



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

## Child Abuse &amp; Neglect

journal homepage: [www.elsevier.com/locate/chiabuneg](https://www.elsevier.com/locate/chiabuneg)

## Mental health &amp; maltreatment risk of children with special educational needs during COVID-19

Winnie W.Y. Tso<sup>a,c</sup>, Ko Ling Chan<sup>b,\*</sup>, Tatia M.C. Lee<sup>c,d</sup>, Nirmala Rao<sup>e</sup>, S.L. Lee<sup>a</sup>, Fan Jiang<sup>f</sup>, Sophelia H.S. Chan<sup>a</sup>, Wilfred H.S. Wong<sup>a</sup>, Rosa S. Wong<sup>a</sup>, Keith T. S. Tung<sup>a</sup>, Jason C. Yam<sup>g</sup>, Anthony P.Y. Liu<sup>a</sup>, Gilbert T. Chua<sup>a</sup>, Jaime S. Rosa Duque<sup>a</sup>, Almen L.N. Lam<sup>a</sup>, K.M. Yip<sup>a</sup>, L.K. Leung<sup>a</sup>, Yuliang Wang<sup>a</sup>, Jin Sun<sup>h</sup>, Guanghai Wang<sup>f</sup>, Godfrey C.F. Chan<sup>a</sup>, Ian C.K. Wong<sup>i,j</sup>, Patrick Ip<sup>a,\*\*</sup>

<sup>a</sup> Department of Paediatrics and Adolescent Medicine, LKS Faculty of Medicine, The University of Hong Kong, Pokfulam, Hong Kong

<sup>b</sup> Department of Applied Social Sciences, The Hong Kong Polytechnic University, Hong Kong

<sup>c</sup> State Key Laboratory of Brain and Cognitive Sciences, The University of Hong Kong, Pokfulam, Hong Kong

<sup>d</sup> Laboratory of Neuropsychology, The University of Hong Kong, Pokfulam, Hong Kong

<sup>e</sup> Faculty of Education, The University of Hong Kong, Pokfulam, Hong Kong

<sup>f</sup> Department of Developmental and Behavioral Pediatrics, Pediatric Translational Medicine Institute, National Children's Medical Center-Shanghai Children's Medical Center, Shanghai Jiao Tong University School of Medicine, Shanghai, China

<sup>g</sup> Department of Ophthalmology and Visual Sciences, The Chinese University of Hong Kong, Hong Kong

<sup>h</sup> Department of Early Childhood Education, The Education University of Hong Kong, Hong Kong

<sup>i</sup> Centre for Safe Medication Practice and Research, Department of Pharmacology and Pharmacy, LKS Faculty of Medicine, The University of Hong Kong, Pokfulam, Hong Kong

<sup>j</sup> Research Department of Practice and Policy, University College London School of Pharmacy, London, United Kingdom

## ARTICLE INFO

## Keywords:

COVID-19

Child maltreatment

Mental health

Special educational needs

## ABSTRACT

**Background:** Children with special educational needs (SEN) are more vulnerable during the COVID-19 pandemic with risk of poor mental wellbeing and child maltreatment.

**Objective:** To examine the impact of COVID-19 on the mental health of children with SEN and their maltreatment risk.

**Participants and setting:** 417 children with SEN studying at special schools and 25,427 children with typical development (TD) studying at mainstream schools completed an online survey in April 2020 in Hong Kong during school closures due to COVID-19.

**Method:** Emotional/behavioural difficulties, quality of life and parental stress of children with SEN were compared with typically developed children using mixed effect model. Linear regression analyses were performed to explore factors associated with child emotional/behavioural difficulties and parental stress during the pandemic. Chi-square test was performed to detect the differences in maltreatment risk before and during COVID-19.

**Abbreviations:** COVID-19, Coronavirus disease 2019; SEN, Special Educational Needs; TD, Typical Development; SDQ, The Strength and Difficulties Questionnaire; PedsQL, Paediatric Quality of Life Inventory Generic Core 4.0 Scales; PSS, Parental Stress Scale; CTSPC, The Conflict Tactics Scales: Parent-child Version; SES, Socioeconomic status.

\* Corresponding author.

\*\* Correspondence to: Patrick Ip, Department of Paediatrics and Adolescent Medicine, The University of Hong Kong, Room 115, 1/F, New Clinical Building, 102 Pokfulam Road, Queen Mary Hospital, Hong Kong.

E-mail addresses: [koling.chan@polyu.edu.hk](mailto:koling.chan@polyu.edu.hk) (K.L. Chan), [patrick@hku.hk](mailto:patrick@hku.hk) (P. Ip).

<https://doi.org/10.1016/j.chiabu.2021.105457>

Received 19 July 2021; Received in revised form 15 December 2021; Accepted 20 December 2021

Available online 10 January 2022

0145-2134/© 2021 Published by Elsevier Ltd.

**Results:** Children with SEN had significantly poorer overall quality of life (68.05 vs 80.65,  $p < 0.01$ ). 23.5% of children had at least one episode of severe physical assault and 1.9% experienced very severe physical assault during COVID-19. Rates of physical assault increased significantly (59.8% vs. 71.2%  $p < 0.001$ ) while children with mental disorders had increased risk of severe physical assault comparing to those without mental disorders (RR = 1.58,  $\chi^2 = 5.19$   $p = 0.023$ ). **Conclusion:** Children with SEN had poorer mental health than typically developed children during the COVID-19 pandemic. Maltreatment risk for children with SEN is higher in comparison to pre-COVID-19 era. Surveillance of child maltreatment, continuity of medical and rehabilitation care to support children with SEN are essential during a disease pandemic.

## 1. Introduction

The coronavirus disease 2019 (COVID-19) pandemic is having a profound effect on all aspects of children's lives ([The Lancet Child and Adolescent Health, 2020](#)). Preventive measures involving social distancing, closures of schools, and child-friendly venues such as libraries and playgrounds have led to significant changes in children's routines ([Wang et al., 2020](#)). For a child with developmental or intellectual disabilities with weak social and communication skills, disruptions to their daily schedules and routines can lead to much anxiety, frustration, and negative behaviors ([Fegert et al., 2020](#); [Kong & Thompson, 2020](#)).

Previous studies have shown that children with special educational needs (SEN) may be more vulnerable to the consequences of the COVID-19 pandemic ([Colizzi et al., 2020](#); [Tso et al., 2020](#)). A child is commonly recognised as having SEN if he or she is not able to benefit from the school education made generally available for children of the same age without additional support or adaptations in the content of studies. SEN can cover a range of needs including physical, mental, intellectual disabilities, and/or educational impairments ([OECD, 2012](#)). However, it has also been suggested that children with mental health conditions may benefit from positive aspects of home-schooling ([Hoekstra, 2020](#); [Thorell et al., 2021](#)). As children with different types of disabilities have different needs, it is important to explore the impact of COVID-19 on the mental health of children with SEN.

In addition, there have been widespread concerns that public health emergencies might significantly increase the risk for domestic violence, child abuse and neglect, due to increased stress and loss of financial and social support ([Brown et al., 2020](#)). According to the statistics published in December 2020 by the United States Centre for Disease Control and Prevention, the total number of emergency department visits relating to child abuse and neglect decreased during the COVID-19 pandemic, but the percentage of such visits resulting in hospitalization increased compared with 2019 ([Rapoport et al., 2020](#); [Swedo et al., 2020](#)). Thus, the pandemic has likely affected healthcare seeking patterns for child abuse and neglect, raising concerns that many victims may not have received care, leading to the possibility of under-reporting or unreported severe injuries in child maltreatment victims. Furthermore, our team has conducted study prior to the pandemic and has demonstrated that children with disability were more likely to report victimization than those without disability, disability increased the risk of lifetime physical maltreatment by 1.6 times ([Chan et al., 2016](#)). Families of children with SEN face more stressors than families of children with normal development. These families face greater care giving demands and parents may struggle to manage their child's health and their own emotions, contributing to poorer health outcomes for the family ([Bradshaw et al., 2019](#)). Parents of children with neurodevelopmental disabilities were found to have poorer health with more psychiatric problems such as anxiety and depression ([Dykens et al., 2014](#); [Scherer et al., 2019](#); [Singer, 2006](#)). These stresses and burdens are expected to increase significantly during the pandemic due to the reduced social support network from schools or from rehabilitation centers ([McFayden et al., 2021](#); [Westrupp et al., 2021](#)). These stressors can influence the quality of family relationships and lead to significantly more conflicts at home ([Fegert et al., 2020](#)). Studies during economic recessions have shown a notable increase in violence against children ([Schneider et al., 2017](#)). We hypothesize that the social distancing policies and economic shutdowns as a result of the COVID-19 pandemic might lead to increased domestic violence and maltreatment against children. The maltreatment risk of children with disability during the pandemic will be compared with data obtained by our group prior to the COVID-19 outbreak ([Chan et al., 2016](#)).

Hong Kong was one of the first cities to mandate school closures during the COVID-19 outbreak. All special schools and rehabilitation training centres for children with disabilities were also ordered to close at the end of January 2020 by the Government of the Hong Kong Special Administrative Region (HKSAR). Although remote learning and online schooling have been widely implemented in Hong Kong, remote learning might be particularly difficult for children with mental health conditions and neurodevelopmental problems ([Becker et al., 2020](#); [Reicher, 2020](#)). Understanding the impact of social distancing policies, particularly the effects of prolonged school closures on children with SEN during the pandemic has been identified as a public health priority.

As the COVID-19 pandemic affects all aspects of children's lives from the child as an individual to their family functioning, our study aimed to investigate the mental health as well as the risk of child maltreatment in children with SEN. We also aimed to investigate how closure of special schools and lack of access to medical and rehabilitation care in children with SEN during the COVID-19 pandemic affects the mental health of children with SEN.

## 2. Method

### 2.1. Study design and participants

This cross-sectional study was conducted during the first wave of the pandemic with territory-wide school closures in April 2020. Parents of children with SEN aged 2 to 12 years studying at special schools and special childcare centers throughout Hong Kong participated in this study through their corresponding institutions, whereas parents of children with typical development (TD) at kindergartens and primary schools in Hong Kong joined the study via principals' invitation and parent groups. All parents completed an online questionnaire through an invitation link after obtaining their informed consent.

In Hong Kong, preschoolers attend nurseries at 2 years old and kindergartens from 3 to 5 years old. Children then study primary schools from 6 to 12 years of age. Meanwhile, children with SEN with global developmental delay and moderate to severe disabilities (developmental quotient of <70) diagnosed by a pediatrician or clinical psychologist will attend special childcare centers from 2 to 6 years of age and then attend special schools from 6 years of age. School is compulsory for children from between ages 6 to 18 in Hong Kong. Children outside the target age range or who had not yet started school were excluded from the analyses while duplicate data due to multiple entries of the same parent was also removed.

Parents of 417 children with SEN and 25,427 parents of children with TD were recruited into the study. The mean age of children with SEN was 6.13 years and 71.2% were males. The mean age of children with TD was 6.37 years and 49% were males. Participants' demographics and their characteristics were shown in [Table 1](#).

### 2.2. Ethical considerations

The current study was based on an online survey completed by parents/ caregivers, to minimize reporting bias, parents/ caregivers and children remained anonymous. Informed consent was obtained from the parents/ caregivers of children. The research team ensured the anonymity and confidentiality of participants with no identifiable information retained. The overall maltreatment risk will be communicated to the participating schools. The study was approved by the ethics committee of the Institutional Review Board of Hong Kong University/Hospital Authority Hong Kong West Cluster (Reference UW 20–177 & UW 20–178).

### 2.3. Measuring instruments

Locally validated scales were used to examine functioning and behaviour of children and parents during the COVID-19 pandemic. The Strength and Difficulties Questionnaire (SDQ) ([Lai et al., 2010](#)) was adopted to assess children's emotional/ behavioural difficulties. Children's wellbeing was measured with the Pediatric Quality of Life Inventory 4.0 Generic Core Scales (PedsQL) ([Chan et al., 2005](#)). Parental stress was assessed using the Parental Stress Scale (PSS) ([Leung & Tsang, 2010](#)). Regarding children's lifestyle habits, parents were asked to estimate the amount of time children spent on sleeping, performing physical activities, and using technology.

**Table 1**  
Subject characteristics.

	TD (n = 25,427) n (%) / mean (SD)	SEN (n = 417) n (%) / mean (SD)	p-value
Basic Demographics			
Age	6.37 (2.85)	6.13 (2.53)	0.088
Gender			< 0.01
Male	12,314 (0.49)	296 (71.2)	
Female	13,040 (0.51)	120 (28.8)	
Living with someone having direct contact with confirmed COVID-19 cases	69 (0.27)	3 (0.72)	0.085
Either father or mother having mental disorder	934 (3.7)	39 (9.5)	< 0.01
Family socioeconomic status index (SES)	0.02 (1.53)	-0.77 (1.63)	< 0.01
Receiving Comprehensive Social Security Assistance (CSSA)	348 (1.37)	29 (6.95)	< 0.01
Daily activities			
Daily sleep duration (hour)	10.56 (2.27)	10.16 (1.08)	< 0.01
Daily physical activity duration (hour)	1.52 (2.89)	1.35 (1.24)	0.23
Frequency on Teaching activities (per week)	1.88 (0.78)	1.99 (0.94)	0.02
Frequency on Recreational activities (per week)	1.66 (0.69)	1.69 (0.82)	0.505
Electronic device usage (hour)			
Before school closure			
Weekday time spent on electronic devices for learning (hour)	1.09 (2.19)	0.52 (0.97)	< 0.01
Weekday time spent on electronic devices for gaming (hour)	0.64 (1.87)	0.62 (1.23)	0.827
Weekday time spent on electronic devices (hour)	1.72 (3.66)	1.07 (1.66)	< 0.01
After school closure			
Weekday time spent on electronic devices for learning (hour)	1.86 (2.43)	1.1 (1.34)	< 0.01
Weekday time spent on electronic devices for gaming (hour)	1.1 (2.21)	1.34 (1.88)	< 0.01
Weekday time spent on electronic devices (hour)	2.96 (4.04)	2.38 (2.6)	< 0.01

The Conflict Tactics Scales: Parent-child Version (CTSPC) was used to assess any abusive behaviors by parents (Straus et al., 1998). Family demographics such as children's basic information and family socioeconomic status (SES) were also collected for data analyses. Details of the scale items and scoring methods are provided in Supplementary File 1, available online.

### 3. Data analysis

All analyses were performed using R Statistical Software version 3.6.3. All variables were examined for their distribution, outliers, and missing data before analysis. The characteristics of the respondents and the measured variables were examined by descriptive statistics. A combined socioeconomic status (SES) index was created using principal component analysis with household income per capita, parents' educations and occupations. Mixed effects method was used to compare the SDQ, PedsQL and PSS scores of children with SEN vs typically developed children, adjusting for children's age, gender, socioeconomic status and the diagnosis of mental disorders in either parent. An independent two-sample *t*-test was used to compare children with SEN on different types and numbers of disabilities, and the effects of disrupted rehabilitation training and medical care. Pearson correlation was used to evaluate the interrelationship between sleep duration, SDQ, and other measured variables. Linear regression models with SDQ, PSS, and PedsQL scores as dependent variables, and lifestyle factors as the independent variables were built to identify factors associated with SDQ, PSS, and PedsQL scores during school closures, with adjustments on children's gender, age, and socioeconomic status. Effect sizes were computed in various forms depending on the statistical tests according to the guidelines by Cohen.

Chi-square test was performed to determine the difference in the risk of child maltreatment before and during the COVID-19 pandemic, the pre-COVID-19 data was obtained from a study conducted by our team involving 373 children with SEN age 9 to 18 years old in Hong Kong (Chan et al., 2016). In this previous study, three aspects of child maltreatment were assessed based on self-reporting by the child with SEN. We have compared the risk of physical assaults and psychological aggression only as these questions were identical to the ones used in the current study within the Conflict Tactics Scales: Parent-child Version (CTSPC). Risk of child maltreatment had also compared among children with SEN based on the number of disabilities. All tests were two-tailed and conducted with 5% alpha levels.

## 4. Results

### 4.1. Descriptive statistics

Among the children with SEN, 19.18% had physical disabilities, 20.38% had intellectual disabilities (ID), 7.91% had visual impairments, 5.76% had hearing impairments, and 45.8% had mental disorders (e.g. autism spectrum disorder, attention-deficit hyperactivity disorder), whereas 24.22% had other disabilities including global developmental delay, isolated significant delay in motor/language skills, or syndromal/genetic disorders (Fig. 1). Overall, 19.42% of children had more than one type of disability, whereas 6.23% did not report their type of disability.

In comparison, families of children with SEN had significantly lower socioeconomic status ( $-0.77$  vs  $0.02$ ,  $p < 0.01$ ) and had a higher proportion receiving social security benefits ( $1.37\%$  vs.  $6.96\%$ ,  $p < 0.01$ ) compared to families of children with TD.

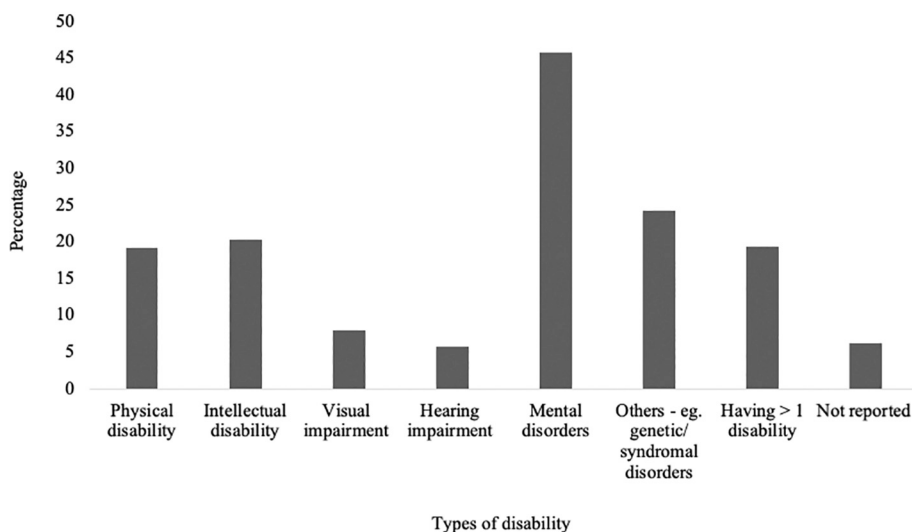


Fig. 1. Percentage of different types of disabilities among the children with SEN.

#### 4.2. Comparison of daily activities between children with SEN and children with TD

Regarding children's daily activities during the pandemic, children with SEN spent significantly less hours on electronic devices for learning (1.10 vs. 1.86,  $p < 0.01$ ) but longer time on gaming (1.34 vs. 1.10,  $p < 0.01$ ) during weekdays compared to children with TD. They also slept significantly less than children with TD (10.16 vs 10.56,  $p < 0.01$ ), whereas children with ID or mental disorders slept less than those without such disorders. On the other hand, parents of children with SEN spent significantly more time on teaching activities than parents of children with TD (1.99 vs 1.88,  $p < 0.02$ ).

#### 4.3. Comparison of mental health of children with SEN vs. children with TD

Based on the scores of SDQ, PedsQL, and PSS, children with SEN had significantly more emotional and behavioural difficulties across all aspects than the children with TD ( $p < 0.01$ ). They also had significantly poorer overall quality of life (68.05 vs 80.65,  $p < 0.01$ ), and physical (71.07 vs 82.63,  $p < 0.01$ ), emotional (73.92 vs 77.98,  $p < 0.01$ ), social (57.24 vs 80.14,  $p < 0.01$ ), and psychosocial functioning (65.57 vs 79.06,  $p < 0.01$ ) (Table 2). Parents of children with SEN reported significantly higher parental stress (46.41 vs 43.36,  $p < 0.01$ ).

Among the children with SEN, those with ID or mental disorders had significantly more emotional and behavioural difficulties and poorer quality of life compared to children with other disabilities. Children with ID were reported to have more peer relationship problems (4.93 vs 3.92,  $p < 0.01$ ), less sleeping hours (9.93 vs 10.22,  $p = 0.039$ ), poorer physical (64.16 vs 72.82,  $p = 0.011$ ) and psychosocial functioning (58.88 vs 67.27,  $p < 0.01$ ). Whereas children with mental disorders were reported to have more behavioural/emotional difficulties (SDQ: 16.26 vs 13.30,  $p < 0.01$ ), less sleeping hours (10.03 vs 10.27,  $p = 0.03$ ) and poorer psychosocial functioning (61.51 vs 69.03,  $p < 0.01$ ) in comparison to children with other disabilities. Parents with children with mental disorders were reported to have higher parental stress in comparison (47.47 vs 45.49,  $p = 0.02$ ) to parents of children with other disabilities. Children with multiple disabilities (i.e. > 1 disability) were reported to have significantly poorer quality in life, both in terms of their physical (60.12 vs 73.68,  $p < 0.01$ ) and psychosocial functioning (57.86 vs 67.41,  $p < 0.01$ ). Parents with children with multiple disabilities were reported to have significantly higher parental stress (48.67 vs 45.87,  $p = 0.008$ ).

After adjusting for family SES, children's gender and age and the diagnosis of mental disorders in either parent, the emotional and behavioural difficulties among children with SEN were associated with the child's shorter sleep duration ( $\beta = -1.513$ ,  $p = 0.026$ ) and poorer quality of life ( $\beta = -0.135$ ,  $p = 0.002$ ). Parental stress was associated with the children's poorer quality of life ( $\beta = -0.180$ ,  $p < 0.001$ ), shorter time on physical activities ( $\beta = -1.111$ ,  $p = 0.03$ ), and longer time spent on electronic devices ( $\beta = 0.812$ ,  $p = 0.013$ ) (Table 3).

#### 4.4. Impact of disrupted services on the mental health of children with SEN

During the pandemic, 66% of children with SEN had interrupted rehabilitation training. 52% were affected by changes or cancellations of their medical appointments. Table 3 also shows that children with disrupted training had significantly more emotional symptoms ( $p < 0.01$ ) and hyperactivity/inattention problems ( $p = 0.034$ ); while disrupted medical appointments were found to have more emotional symptoms and hyperactivity/inattention problems ( $p < 0.01$ ) and their parents had higher parental stress ( $p < 0.01$ ).

#### 4.5. Child maltreatment in children with SEN and risk factors

Regarding the risk of child maltreatment during the COVID-19 outbreak, 23.5% of children with SEN had at least one episode of severe physical assault (SPA), 1.9% experienced very severe physical assault. 80.5% were victims of psychological aggression (PSA),

**Table 2**

Comparison of SDQ, PedsQL, and PSS scale scores between children with TD and children with SEN

	TD (n = 25,427) Mean (SD)	SEN (n = 417) Mean (SD)	Estimated effect ( $\beta$ ) <sup>a</sup>	Standard deviation (SD)	p-value
<b>SDQ</b>					
Emotional symptoms	1.98 (1.7)	2.63 (2.12)	0.62	0.11	< 0.01
Hyperactivity/inattention	4.61 (2.13)	6.15 (2.35)	1.33	0.13	< 0.01
Conduct problems	2.17 (1.51)	2.35 (1.69)	0.08	0.10	0.174
Peer relationship problems	2.75 (1.66)	4.08 (2.08)	1.35	0.10	< 0.01
Prosocial behaviour	6.47 (1.95)	5.73 (2.02)	-0.73	0.14	< 0.01
Total difficulties	11.5 (5.12)	14.79 (6.12)	3.04	0.37	< 0.01
<b>PedsQL</b>					
Physical functioning	82.63 (13.41)	71.07 (25.05)	-10.81	0.71	< 0.01
Emotional functioning	77.98 (16.18)	73.92 (18.39)	-3.07	0.84	< 0.01
Social functioning	80.14 (15.23)	57.24 (23.66)	-22.58	0.80	< 0.01
Psychosocial functioning	79.06 (14.67)	65.57 (17.72)	-12.9	0.76	< 0.01
Overall wellbeing	80.65 (12.82)	68.05 (17.35)	-11.93	0.67	< 0.01
PSS parental stress	43.36 (7.75)	46.41 (8.55)	2.52	0.40	< 0.01

<sup>a</sup> Adjusted for age, sex, SES and CSSA and whether either parent has mental disorder.

**Table 3**

Correlations between child maltreatment and children's quality of life (PedsQL) among children with SEN during the COVID-19 pandemic.

	Physical functioning	Emotional functioning	Social functioning	Psychosocial functioning	General Quality of Life	Parental Stress
Physical Assault	-0.017	-0.084	<b>-0.158**</b>	<b>-0.170**</b>	-0.097	<b>0.237*</b>
Severe Physical Assault	0.065	-0.034	-0.093	<b>-0.113*</b>	-0.011	<b>0.195*</b>
Very Severe Physical Assault						
Assault	-0.053	<b>-0.175**</b>	<b>-0.128*</b>	-0.056	-0.104	0.016
Psychological Aggression	0.027	<b>-0.218**</b>	<b>-0.258**</b>	<b>-0.216**</b>	<b>-0.126*</b>	<b>0.363**</b>
Neglect	0.022	<b>-0.163**</b>	<b>-0.123*</b>	-0.056	-0.053	<b>0.293**</b>
Non-violent Discipline	<b>0.115*</b>	<b>-0.121*</b>	<b>-0.135*</b>	-0.106	-0.003	<b>0.195**</b>

\*\*  $p < 0.01$ .\*  $p < 0.05$ .

and 28.8% suffered from neglect (NL). Among these children, those who suffered from mental disorders had increased risk of being maltreated when compared to children without mental disorders (Physical assault:  $RR = 1.21$ ,  $\chi^2 = 6.77$ ,  $p < 0.01$ ; SPA:  $RR = 1.58$ ,  $\chi^2 = 5.19$ ,  $p = 0.023$ ; PSA:  $RR = 1.24$ ,  $\chi^2 = 15.29$ ,  $p < 0.01$ ). When comparing the maltreatment risks based on the number of disabilities, we found that parents would adopt more non-violent disciplinary measures on children with multiple disabilities compared to children with one disability ( $RR = 0.853$ ,  $p = 0.04$ ), there were no significant differences in the risks of other aggressive disciplinary acts. As shown in Table 3, increased parental stress was associated with the increased likelihood of various child maltreatment in terms of physical assault ( $r = 0.237$ ,  $p < 0.05$ ), severe physical assault ( $r = 0.195$ ,  $p < 0.05$ ), psychological aggression ( $r = 0.363$ ,  $p < 0.01$ ), and neglect ( $r = 0.293$ ,  $p < 0.01$ ). Children with SEN experiencing very severe physical assault, psychological aggression, and neglect were associated with poorer quality of life in emotional (SPA:  $r = -0.175$ ,  $p < 0.01$ ; PSA:  $r = -0.218$ ,  $p < 0.01$ ; NL:  $r = -0.163$ ,  $p < 0.01$ ) and social functioning (SPA:  $r = -0.128$ ,  $p < 0.05$ ; PSA:  $r = -0.258$ ,  $p < 0.01$ ; NL:  $r = -0.123$ ,  $p < 0.05$ ).

#### 4.6. Comparison of maltreatment rates in children with SEN before and during the COVID-19 pandemic

Comparing maltreatment rates in SEN children prior to the COVID-19 outbreak (Chan et al., 2016), there were significant increases in the rates of physical assault (59.8% vs. 71.2%  $p < 0.01$ ) and psychological aggression (53.7% vs 80.5%,  $p < 0.01$ ) during the COVID-19 pandemic (Table 4).

## 5. Discussion

This is one of the first studies to provide empirical evidence on the increased risk of maltreatment in children with SEN during the COVID-19 pandemic. Compared to pre-COVID-19 data, we found significant elevated rates of psychological aggression and physical assault among children with SEN (Chan et al., 2016). Our study showed that over 80% of SEN children were victims of psychological aggression, with over 20% having at least one episode of severe physical assault and nearly 30% suffering from child neglect. In the US, 20% of reports of abuse and neglect to child protection services are made by educational personnel. Hence, our group is deeply concerned that the closure of schools and rehabilitation facilities will lead to unreported child maltreatment (Rapoport et al., 2020). As child abuse and neglect can lead to detrimental long-term physical and health consequences (Thomas et al., 2020), these long-term impacts underscore the urgent need to address the high rate of child maltreatment in the most vulnerable groups of children. Our study found that children with mental disorders and intellectual disabilities were most vulnerable to maltreatment, as they have reduced ability to seek help or to notify others of abuse events. Educators, childcare workers, and social service professionals are unable to monitor and safe-guard children from child maltreatment, as these support networks are greatly diminished during a pandemic due to prolonged closures of schools and rehabilitation centres, and reduced home visits. In view of our study findings, we

**Table 4**

Comparison of child maltreatment before and during the COVID pandemic.

	Before the COVID pandemic	During the COVID pandemic			
	( $n = 373$ ) <sup>a</sup> n (%)	SEN ( $n = 323$ ) n (%)	Relative Risk	$\chi^2$	p-value
Types of Child maltreatment					
Physical Assault	223 (59.8)	230 (71.2)	1.19	9.938	< 0.01
Severe Physical Assault		76 (23.5)			
Very Severe Physical Assault		6 (1.9)			
Psychological Aggression	200 (53.7)	260 (80.5)	1.50	54.604	< 0.01
Neglect		93 (28.8)			
Non-violent Discipline		269 (83.3)			

<sup>a</sup> Based on a study of 373 children with SEN age 9 to 18 years old in Hong Kong (Chan et al., 2016). Children's experiences of three aspects of child maltreatment were assessed based on reports from children. Specific types of child maltreatment were created with reference to the concepts used in the Conflict Tactics Scales: Parent-child Version (CTSPC). The items under corporal punishment are equivalent to items listed under 'Physical Assault' whereas items under psychological aggression are items listed under the same name in the scale.

advocate continuation of monitoring and surveillance of child maltreatment during a disease pandemic for at risk families with children with mental disorders and intellectual disabilities, such as those children on the child protection registry.

In addition, consistent to findings from previous studies (Asbury et al., 2020; Chan and Fung, 2021; Thorell et al., 2021), our study showed that children with SEN had poorer mental health in comparison to typically developed children. Children with ID or mental disorders had significantly more emotional and behavioural difficulties and poorer quality of life than children with other disabilities. Children with ID have lower coping ability as they have poorer understanding and greater difficulty in expressing their needs, queries, and frustrations; whereas children with mental disorders such as autism spectrum disorders have difficulty in coping with abrupt changes to their routines. Due to the greater negative impact on children with SEN, school closure should not be universal. Limited opening should be maintained, with precautionary measure of preventing COVID-19.

It is important for educators and childcare workers to assess and monitor children's emotions as they adapt to new routines such as changing from face-to-face to online learning. Regular communication between educators and carers/parents of children with special needs is essential to monitor the progress of children's learning and their training needs, and to provide support for parents. Keeping a similar daily schedule can facilitate children adapting to new routines. Our study showed that sleep deprivation and overuse of electronic devices for gaming could exacerbate emotional and behavioural difficulties in children with SEN. Therefore, parents should set specific times for meals, online lessons, play, physical exercises, daily activities, and sleeping and waking. Special assistance from schools or support from social workers are essential for families with children with SEN during a disease pandemic as sole reliance on parental supervision for the learning of children with SEN can significantly increase parental stress and eventually impact on parents' mental health which might lead to child maltreatment.

Disrupted rehabilitation and medical care were shown to have detrimental effects on the mental health of both the children and their carers/parents. This is especially relevant to children with mental disorders, such as attention-deficit hyperactivity disorder (ADHD) who rely on medications to help manage their behaviour (Cortese, Coghill, Santosh, Hollis, & Simonoff, 2020). Thus, the cancellation/disruption of medical follow-up with the child psychiatrist could lead to worsening of ADHD symptoms due to the inadequacy of drug titration or under-dosing of medications. During the COVID-19 pandemic, many countries suspended non-urgent services, which also included rehabilitation services for children with needs (Dan, 2020). Our study findings highlight the importance of the continuation of medical and rehabilitation care for children with SEN. If face-to-face consultation is not possible during the pandemic, then consultation in alternative formats such as via telehealth programs are vital to maintain continuity of medical and rehabilitation services for children with disabilities.

Our study findings need to be interpreted with the following caveats. First, the outcome measures were based on parents' reported data without direct assessment. This may be subject to recall and reporting bias. Nevertheless, as the study was done during territory-wide school closures and social distancing due to the COVID-19 pandemic, an electronic survey method was considered to be the safest and most effective way to collect data from a large number of subjects. Furthermore, this study collected parent-reported data as young children or children with intellectual disabilities may be unable to complete the questionnaire. Despite the likely under-reporting of child maltreatment episodes, our study showed an alarmingly high rate of child maltreatment in children with SEN during the COVID-19 pandemic. Second, the study required parents to complete an online survey using an electronic device. Parents from low-income families might not have access to an internet connection or appropriate devices. Nevertheless, our study samples contained a significant proportion of children from under-privileged families with about 7% of families receiving the comprehensive social security assistance, which is provided by the government to support the unemployed and those in need. Third, because this is a cross-sectional survey, we cannot draw any conclusion on the causative relationship. Furthermore, we cannot be certain that our results reflect the effects of the pandemic rather than existing inequalities. However, comparison with pre-pandemic data suggests the increased prevalence of child maltreatment in young children with SEN during the pandemic which might lead to poorer mental wellbeing. Lastly, regarding the comparison of maltreatment risk before and during the pandemic; the pre-COVID-19 data involved children with SEN up to 18 years old and was based on children rather than parents' reports. Nevertheless, both cohorts (pre-COVID-19 era and current cohort during the pandemic) were recruited from the special schools in Hong Kong. Despite the differences between children's and parents' reports, identical questions were used to assess the risks of physical assault and psychological aggression. Due to the higher possibility of under-reporting by parents in our current cohort, the risk of child maltreatment during the pandemic might be far higher than the risk during pre-COVID-19 era.

In conclusion, children with SEN had poorer mental health than typically developed children during the COVID-19 pandemic. Substantially higher risk of child maltreatment was found in children with SEN during the pandemic compared to pre-COVID-19 era. Policies should be enacted to ensure continuity of medical and rehabilitation care for children with SEN during a disease pandemic. Flexible access to healthcare and social services should be enhanced and in-person consultation should be considered for children with SEN. Continued surveillance of child abuse and neglect during the pandemic is essential. Implementation of strategies to prevent child abuse and neglect, such as online support, continuation of the home visitation program, or consultation by telecommunication is crucial (Jones et al., 2020). The COVID-19 pandemic is predicted to have lasting consequences for society, especially in shaping the future of our young generation including their health, development, and opportunities. Additional and integrated health, social, and educational support should be offered to children with disabilities and their families to safeguard vulnerable children as well as reduce the long-term consequences of deepening social, economic, and health inequalities.

## Funding

This study was funded by the Hong Kong Research Grants Council Collaborative Research Fund (Grant No. C7149-20G) and the Research Grants Council General Research Fund (Grant No. 17620919). Both funders had no role in the design and conduct of this



study.

## Declaration of competing interest

None.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chiabu.2021.105457>.

## References

- Asbury, K., Fox, L., Deniz, E., Code, A., & Toseeb, U. (2021). How is COVID-19 affecting the mental health of children with special educational needs and disabilities and their families? *Journal of Autism and Developmental Disorders*, 51(5), 1772–1780. <https://doi.org/10.1007/s10803-020-04577-2>
- Becker, S. P., Breaux, R., Cusick, C. N., Dvorsky, M. R., Marsh, N. P., Sciberras, E., & Langberg, J. M. (2020). Remote Learning During COVID-19: Examining School Practices, Service Continuation, and Difficulties for Adolescents With and Without Attention-Deficit/Hyperactivity Disorder. *Journal of Adolescent Health*, 67(6), 769–777. <https://doi.org/10.1016/j.jadohealth.2020.09.002>
- Bradshaw, S., Bem, D., Shaw, K., Taylor, B., Chiswell, C., Salama, M., & Cummins, C. (2019). Improving health, wellbeing and parenting skills in parents of children with special health care needs and medical complexity – a scoping review. *BMC Pediatrics*, 19(1), 1–11. <https://doi.org/10.1186/s12887-019-1648-7>
- 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, Article 104699.
- Chan, K. L., Emery, C. R., & Ip, P. (2016). Children with disability are more at risk of violence victimization: Evidence from a study of school-aged Chinese children. *Journal of Interpersonal Violence*, 31(6), 1026–1046. <https://doi.org/10.1177/0886260514564066>
- Chan, L. F. P., Chow, S. M. K., & Lo, S. K. (2005). Preliminary validation of the chinese version of the pediatric quality of life inventory. *International Journal of Rehabilitation Research*, 28(3), 219–227.
- Chan, R. C. H., & Fung, S. C. (2021). Elevated levels of COVID-19-related stress and mental health problems among parents of children with developmental disorders during the pandemic. *Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s10803-021-05004-w>
- Colizzi, M., Sironi, E., Antonini, F., Ciceri, M. L., Bovo, C., & Zocante, L. (2020). Psychosocial and behavioral impact of COVID-19 in autism Spectrum disorder: An online parent survey. *Brain Sciences*, 10(6), 341. <https://doi.org/10.3390/brainsci10060341>
- Cortese, S., Coghill, D., Santosh, P., Hollis, C., & Simonoff, E. (2020). Starting ADHD medications during the COVID-19 pandemic: recommendations from the European ADHD Guidelines Group. *The Lancet Child and Adolescent Health*, 4(6), e15. [https://doi.org/10.1016/S2352-4642\(20\)30144-9](https://doi.org/10.1016/S2352-4642(20)30144-9)
- Dan, B. (2020). Long-term impact of COVID-19 on disabled children. *Developmental Medicine & Child Neurology*, 62(9). <https://doi.org/10.1111/dmnc.14603>, 1004–1004.
- Dykens, E. M., Fisher, M. H., Taylor, J. L., Lambert, W., & Miodrag, N. (2014). Reducing distress in mothers of children with autism and other disabilities: A randomized trial. *Pediatrics*, 134(2), e454–e463. <https://doi.org/10.1542/peds.2013-3164>
- Fegert, J. M., Vitiello, B., Plener, P. L., & Clemens, V. (2020). Challenges and burden of the coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: A narrative review to highlight clinical and research needs in the acute phase and the long return to normality. *Child and Adolescent Psychiatry and Mental Health*, 14, 1–11.
- Hoekstra, P. J. (2020). Suicidality in children and adolescents: lessons to be learned from the COVID-19 crisis. *European Child & Adolescent Psychiatry*, 29(6), 737–738. <https://doi.org/10.1007/s00787-020-01570-z>
- Jones, B., Woolfenden, S., Pengilly, S., Breen, C., Cohn, R., Biviano, L., & Zwi, K. (2020). COVID-19 pandemic: The impact on vulnerable children and young people in Australia. *Journal of Paediatrics and Child Health*, 56(12), 1851–1855. <https://doi.org/10.1111/jpc.15169>
- Kong, M., & Thompson, L. A. (2020). Considerations for young children and those with special needs as COVID-19 continues. *JAMA Pediatrics*, 174(10), 1012–1012.
- Lai, K. Y., Luk, E. S., Leung, P. W., Wong, A. S., Law, L., & Ho, K. (2010). Validation of the Chinese version of the strengths and difficulties questionnaire in Hong Kong. *Social Psychiatry and Psychiatric Epidemiology*, 45(12), 1179–1186.
- Leung, C., & Tsang, S. K. (2010). The chinese parental stress scale: Psychometric evidence using Rasch modeling on clinical and nonclinical samples. *Journal of Personality Assessment*, 92(1), 26–34.
- McFayden, T. C., Breaux, R., Bertollo, J. R., Cummings, K., & Ollendick, T. H. (2021). COVID-19 remote learning experiences of youth with neurodevelopmental disorders in rural Appalachia. *Journal of Rural Mental Health*, 45(2), 72.
- Organisation for Economic Co-operation and Development (OECD). (2012). *CX3.1 special educational needs*. Retrieved 9 December 2021, from <https://www.oecd.org/els/family/50325299.pdf>.
- Rapoport, E., Reisert, H., Schoeman, E., & Adesman, A. (2020). Reporting of child maltreatment during the SARS-CoV-2 pandemic in New York City from march to may 2020. *Child Abuse & Neglect*, 116, Article 104719. <https://doi.org/10.1016/j.chiabu.2020.104719>
- Reicher, D. (2020). Debate: Remote learning during COVID-19 for children with high functioning autism spectrum disorder. *Nov. 25(4)*, 263–264. <https://doi.org/10.1111/camh.12425>.
- Scherer, N., Verhey, I., & Kuper, H. (2019). Depression and anxiety in parents of children with intellectual and developmental disabilities: A systematic review and meta-analysis. *PLoS One*, 14(7), Article e0219888. <https://doi.org/10.1371/journal.pone.0219888>
- Schneider, W., Waldfogel, J., & Brooks-Gunn, J. (2017). The great recession and risk for child abuse and neglect. *Jan Children and Youth Services Review*, 72, 71–81. <https://doi.org/10.1016/j.chiayouth.2016.10.016>.
- Singer, G. H. (2006). Meta-analysis of comparative studies of depression in mothers of children with and without developmental disabilities. *American Journal of Mental Retardation*, 111(3), 155–169.
- Straus, M. A., Hamby, S. L., Finkelhor, D., Moore, D. W., & Runyan, D. (1998). Identification of child maltreatment with the parent-child conflict tactics scales: Development and psychometric data for a national sample of American parents. *Child Abuse & Neglect*, 22(4), 249–270.
- Swedo, E., Iidaikkadar, N., Leemis, R., Dias, T., Radhakrishnan, L., Stein, Z., & Holland, K. (2020). Trends in U.S. Emergency Department Visits Related to Suspected or Confirmed Child Abuse and Neglect Among Children and Adolescents Aged <18 Years Before and During the COVID-19 Pandemic — United States, January 2019–September 2020. *Morbidity and Mortality Weekly Report*, 69(49), 1841–1847. <https://doi.org/10.15585/mmwr.mm6949a1>
- The Lancet Child and Adolescent Health. (2020). Growing up in the shadow of COVID-19. *The Lancet Child and Adolescent Health*, 4(12), 853. [https://doi.org/10.1016/S2352-4642\(20\)30349-7](https://doi.org/10.1016/S2352-4642(20)30349-7)
- Thomas, E. Y., Anurudran, A., Robb, K., & Burke, T. F. (2020). Spotlight on child abuse and neglect response in the time of COVID-19. *The Lancet Public Health*, 5(7), e371. [https://doi.org/10.1016/S2468-2667\(20\)30143-2](https://doi.org/10.1016/S2468-2667(20)30143-2)
- Thorell, L. B., . . . Skoglund, C., de la Peña, A. G., Baeyens, D., Fuermaier, A. B., Groom, M. J., & Christiansen, H. (2021). Parental experiences of homeschooling during the COVID-19 pandemic: Differences between seven European countries and between children with and without mental health conditions. *European Child & Adolescent Psychiatry*, 1–13.

- Tso, W. W. Y., Wong, R. S., Tung, K. T., Rao, N., Fu, K. W., Yam, J. C., Wong, I. C. K., ... Ip, P. (2020). Vulnerability and resilience in children during the COVID-19 pandemic. *European Child & Adolescent Psychiatry*, 1–16.
- Wang, G., Zhang, Y., Zhao, J., Zhang, J., & Jiang, F. (2020). Mitigate the effects of home confinement on children during the COVID-19 outbreak. *The Lancet*, 395 (10228), 945–947.
- Westrupp, E. M., Stokes, M. A., Fuller-Tyszkiewicz, M., Berkowitz, T. S., Capic, T., Khor, S., & Youssef, G. J. (2021). Subjective wellbeing in parents during the COVID-19 pandemic in Australia. *Journal of Psychosomatic Research*, 145, Article 110482. <https://doi.org/10.1016/j.jpsychores.2021.110482>