Research Article

An Audit on the Impact of Singapore's COVID-19 Circuit Breaker Measures on Children with Developmental Delays and Their Families

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Introduction: COVID-19 has affected every aspect of life. However, the impact on different population groups has not been widely explored. We aimed to evaluate the impact of the Singapore COVID-19 Circuit Breaker (CB) measures on children with special needs and their families.

Methods: Eighty-four parents of children aged 2 to 16 years attending a regular follow-up consultation at a tertiary child development clinic completed an anonymous online survey.

Results: Majority of the children were in preschool/lower primary and the most common diagnosis was autism spectrum disorder (ASD). 63% of caregivers reported their child having no difficulties with the CB measures. Approximately one fifth of children had deterioration in their behavior, and a third of their caregivers struggled to manage this. Sleep was minimally affected, but there was a significant increase in screen use, especially in children with ASD. Sixty percent of the children were able to get some intervention. The majority of children received home-based learning but many encountered challenges with this. Despite challenges posed by the CB measures, more than half the parents reported that, it either enabled them to spend more quality time, or improved their relationships, with their children.

Conclusion: While many families coped with the CB measures, some were more vulnerable or less adept, and need to be identified early for future support. Telehealth is emerging but there is still much to be improved upon to cater to this group of children and families.

Keywords: COVID-19, Children, Developmental delay, Pediatrics

INTRODUCTION

The year 2020 has seen the spread of a new global pandemic, caused by a novel virus known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV2), and now known as the COVID-19 pandemic.[1] Countries worldwide have had to impose intermittent lockdown periods of various methods and durations to attempt to limit the disease outbreak.[2]

As a part of timely precautionary measures, Singapore raised its Disease Outbreak Response System Condition (DORSCON) level to Orange on 7 February 2020. However, local transmission continued and clusters began to form, resulting in the introduction of a 'Circuit Breaker' (CB) period from 7 April to 1 June 2020.[3] The CB has been the most drastic national infection control measure ever implemented in Singapore. Almost all workplaces were closed, except for those providing essential services, and staff were mandated to work from home (WFH). All schools, educational institutes, student care centers, and preschools were also closed, resulting in a shift to online home-based learning (HBL). Restrictions on movement and gatherings were enforced, religious activities

were suspended, dining-in at food establishments was banned, and the wearing of face masks was made compulsory.

The CB measures also impacted therapy providers, centers that provided Early Intervention Programs for Infants and Children (EIPIC) and special educational (SPED) schools that are attended regularly by children with special needs such as those with autism spectrum disorder (ASD), global developmental delay (GDD), intellectual disability (ID), speech-language delay (SLD), etc. While the majority of these centers were closed, some continued to support their children remotely, and provided in-person intervention for selected children with higher needs. As consistent intervention is crucial for these children to help them develop to their maximum potential, the closure of these services not only caused barriers to accessing potentially vital therapy and risk developmental deterioration, but also imposed a loss of routines that are important for many such children. Many therapy providers, EIPIC centers, and SPED schools therefore took to telehealth channels via video or phone consultations with the children and/or parents, in order to maintain some continuity of care.[4]

Parents of children with special needs were suddenly in a situation where their children were unable to obtain their usual intervention or education, and hence had to step up to take on the multiple roles of parent, teacher, therapist and caregiver. Additionally, there was concern that these various nationwide restrictions and new measures would cause stress and difficulties in adaptation in these families. Lim et al surveyed caregivers in Singapore with the Depression, Anxiety, and Stress Scales (DASS-21) during the pandemic, and found significantly higher scores compared to non-pandemic times.[5] Higher DASS-21 scores were associated with difficulties coping with infection control measures, challenges accessing early intervention services, as well as caring for a child with autism.

There is little known about the impact of lockdown measures, such as the CB, on children with special needs. Children were faced with weeks of having to stay indoors at home, with limited activity options, and possibly engaging in prolonged screen use as a result.[6,7,8,9] Kreysa et al found that both children with autism and their neuro-typical siblings showed comparable decreases in emotional and social functioning, with increased anxiety, but decreases in adaptability were significantly more pronounced in autistic children.[10] Another survey in India by Kaku SM *et al* revealed that pandemic disrupted routines, affected behavior in children with ASD and impacted the coping skills and mental well-being of the both children and family.[11] 54% of autistic individuals had increased screen use and a third had new-onset behavioral changes, while only about 40% received online therapy. However, Alsem *et al* published data from a survey in the Netherlands showing that although telehealth strategies were implemented quickly, there remained concerns for possible inadequate service provision to certain vulnerable subgroups of children, and those with progressive conditions.[12]

One of the first papers reporting directly on the experiences of autistic persons and their families during COVID-19 was published by Pellicano *et al* from Australia.[13] One hundred and thirty-one people were interviewed of which there were 35 autistic adults, 80 parents of autistic children and 16 young adults aged between 12 and 18 years of age. Whilst many were relieved that they did not have to struggle with the pressures of conformity to everyday life, persons with ASD also missed the social aspects of life and reported a decline in

mental health and overall wellbeing. The move to telehealth and online therapy support was unsatisfactory and individualized support for schooling from home was lacking. The World Health Organization (WHO) cautioned that certain populations, such as those with disability, may be impacted more significantly by COVID-19.[14]

In May 2020, the United Nations (UN) held a Policy Brief on Persons with Disabilities and COVID-19, concluded that one billion people with disabilities, have been impacted. They emphasized the need to ensure that people with disabilities continue to have access to essential services, including immediate health and social protection services, to tide over the crisis. Locally, Lim *et al* published a commentary on helping caregivers of children with ASD manage during the pandemic.[15]

This survey was conducted to evaluate the challenges faced by children with developmental delays/disorders, and their caregivers, during Singapore's pandemic CB period. The survey results will inform service providers on improvements in management strategies should the pandemic or CB situation arise again.

METHODS

After the CB period ended, all caregivers of children attending a regular face-to-face pre-planned follow-up consultation at a tertiary child development unit in July 2020 were requested to complete a survey. In order to capture the impact of the CB on children with various developmental conditions, there were no restrictions as to which parents could participate. The online survey using FormSG was fully anonymised. Caregivers used their own mobile devices to access the survey via a QR code link. Information was sought on demographics, diagnosis, access to services, and the impact of CB measures on the child and family. (Table I-IV). The questions were derived from initial informal feedback from some caregivers to clinicians about difficulties encountered during the CB. As the survey was anonymised and conducted for service improvement, approval from a research ethics board was not required. Data was analysed using SPSS Statistics 21, and only limited post-hoc analyses were conducted due to relatively small numbers and the use of survey data.

RESULTS

A total of 84 caregivers completed the survey, out of 623 face-to-face follow up cases (13.5%). The racial distribution of respondents reflects fewer Chinese and more Malays than Singapore's racial demographic profile (Chinese 74%, Malay 13%, Indians 9%: https://www.statista.com/topics/5763/demographics-of-singapore/) (Table I). The children's ages ranged between 2 and 16 years with a mean of 6.5 years, with more males than females. The majority of children were in preschool, primary school or attending special schools. The commonest diagnoses were ASD and SLD, albeit a higher percentage of ASD in the survey cohort compared to departmental follow-up clinic figures (ASD 38%, SLD 25-27 %).

Almost two-thirds of caregivers reported working from home during the CB period (Table II). The majority indicated that their children had no difficulties coping with the restrictions in place during the CB period, although 36.9% experienced difficulties with their children refusing to wear masks, not being able to go out of the house, or having to practise social distancing. Sixteen (19%) of respondents reported a deterioration in their

child's behaviour. There was no significant difference in proportion of children experiencing significant upset by diagnostic group [X^2 (d.f.=6, N=84) =5.7, p=0.47]. A third of these 22 caregivers reported that they could not successfully manage the children's behaviour most of the time.

Table I: Demographic profile of children and parents (Survey Respondents) (N=84)

Variables	
Child's Age (years)	**Mean (SD)**
2 to 16	6.5 (2.9)
Child's Gender	**n (%)**
Male	66 (78.6)
Female	18 (21.4)
Race	
Chinese	55 (65.5)
Malay	21 (25.0)
Indian	7 (8.3)
Others	1 (1.2)
Were your child attending schooling	
Yes	80 (95.2)
No	4(4.8)
Child's Diagnosis	
Autism Spectrum Disorder	39 (46.4)
Speech or Language Delay	20 (23.8)
Learning Difficulties (including Dyslexia)	8 (9.5)
Attention Deficit Hyperactivity Disorder	2 (2.4)
Global Developmental Delay	2 (2.4)
Behavioral Difficulties	1 (1.2)
No Diagnosis	5 (6.0)
'I do not know my child's diagnosis'	7 (8.3)
EIPIC or Any Therapy	
Attending	54(64.2)
Not attending	30(35.7)

EIPIC-Early Intervention Program for Infants and Children

Sleep was minimally affected by the CB, but two thirds of the children had increased exposure to screen use. A third of these children had increased exposure by 4 hours or more. Increased exposure to screen use was reported in more children with ASD (89.5%) when compared with children with SLD and other diagnoses (60-85%) [(X^2 (d.f.=3, N=82) =4.2, p=0.037]

The majority of children received HBL and most managed to complete (Table III). Approximately 40% of respondents reported being unable to get help from either EIPIC or their usual therapy provider.

Table- IV, reports the degree of impact of the CB on caregivers. 27/84 (32%) had to juggle HBL for more than one child and 54% reported an increase in stress (Likert Scale 4 and 5). Sixty percent reported being able to spend more quality time with their child (Likert Scale 4 and 5), and 53% reported an improvement in their relationship with their child (Likert Scale 4 and 5). Overall, the majority of respondents felt their child's development and behaviour stayed the same or improved, with only 19% reported a deterioration during this

period. There was no significant difference in proportion of children having development or behaviour regression by diagnostic group (X^2 (d.f.=6, N=84) =6.5, p=0.38).

Table II: Impact of COVID-19 precautions and Circuit Breaker (CB) on child and family (N=84)

Survey Questions	n (%)
Have you had to WFH during the CB?	
Yes	53 (63.1)
No	18 (21.4)
NA, I am a homemaker or I previously worked from home anyway	13 (15.5)
Did your child have any difficulty with the precautions that needed to be taken? (multi-select)	
a. My child did not have any difficulties following any of the precautions	53 (63.1)
b. Wearing a mask	20 (23.8)
c. Staying home/not being able to go out	19 (22.6)
d. Social distancing	17 (20.2)
e. Frequent handwashing or using hand sanitizer	9 (10.7)
Could you successfully manage your child's behavior most of the time? (n=22)	
Yes	14 (63.6)
No	8 (36.4)
During the CB period, did your child sleep less than usual number of hours per day?	
Yes	9 (10.7)
No	75 (89.3)
During the CB period, was your child exposed to more screen use than usual?	
Yes	68 (81.0)
No	14 (16.7)
Not applicable	2 (2.4)
If yes, during this period, how many hours of screen time per day did your child screen use increase by?	
a. > 6 hrs	9 (10.7)
b. 4-6 hrs	18 (21.4)
c. 2-4 hrs	27 (32.1)
d. 1-2 hrs	14 (16.7)

WFH-Work from home

DISCUSSION

The survey provides local data on the various challenges that children with special needs and their families face due to restrictive lockdown measures put in place due to a pandemic situation.

Although there was significant disruption to education due to the pandemic, most children continued to receive HBL through preschools and schools, and the numbers who participated in HBL is much higher in Singapore than reported elsewhere.[16] The high HBL participation rate could also be due to the strong cultural emphasis on education in Singapore, hence ensuring that children continue to receive some form of learning throughout the CB period. Participation rate aside, there is clear evidence from this survey that HBL is not without its own

challenges. Children with special needs are often unable to complete HBL and this could be due to a lack of close supervision or teaching from a caregiver, other computer distractions or difficulties following a HBL schedule. This in turn places stress upon caregivers to juggle their own WFH requirements, HBL for their children, and any additional house chores. It is therefore of little surprise that over half of respondents reported increased stress during this period, with about a half reporting increased mood lability or having insufficient rest. Despite the difficulties faced, only 7/84 (8.3%) requested for their children to return to school because they could not cope. Nevertheless, employers and educators may need to provide increased support for caregivers of children with special needs during such times, such as reduced WFH hours or work output expected, preparing more online resources for caregivers ahead of time, or providing direct training for caregivers on how to best manage HBL for their child with visual schedules, structured timetables, and reward charts.

Table III: Continuity of educational and intervention services during Circuit Breaker (CB)

Preschool/School Curriculum	**n (%)**
Did your child have HBL? (n=80)	
Yes	68 (85.0)
No	12 (15.0)
Was your child able to complete most of the HBL activities? (n=68)	
Yes	50 (73.5)
No	18 (26.5)
EIPIC /Any therapy	
Although all EIPIC services were disrupted during the CB, were you able to get some help from your usual EIPIC professionals? (n=54)	
Yes	32 (60.3)
No	22 (39.6)

HBL-Home-Based Learning; EIPIC-Early Intervention Program for Infants and Children

Continuation of EIPIC and other therapy did not fare so well, with only about 60 % of caregivers being able to get some help from their usual therapy professionals during this period. The CB caught healthcare providers by surprise, and forced many medical and allied health professionals into a sudden steep learning curve on feasibility and limitations of telehealth. Although the CB facilitated the use of telehealth, which is now an established mode of consultation both via video and phone calls, and which has clear advantages for selected families, further efforts are required to extend more services into the telehealth domain, such as remote ASD assessments. Berard et al highlighted in their caregiver survey of 239 children and young people with ASD, that intervention continuity was an important protective factor against challenging behaviours.[17] Keesara et al reported that there has been an ongoing quest to adopt digital technologies to improve the quality and reduce the cost of health care services. It will also be important to understand whether these new approaches help to increase clinical productivity during pandemic lockdowns.[18]

Although we expected many children to have behavioural and developmental deteriorations due to lack of access to therapy, disruption to routines, and the restrictive infection control measures required, this survey

found that approximately half of the respondents reported no changes in their child's behaviour, with another one third in fact reporting an improvement. This is possibly due to caregivers having an opportunity to spend more quality time with their children and support them. However, there were some parents who could not successfully manage their child's behavioural deterioration and hence need to be identified quickly and actively supported intensively should a similar situation arise again.

Table IV: Overall impact of circuit breaker on caregivers (N=84)

Survey Questions	
Did the CB cause significant stress to you due to changes in routine? (1=Less stress than usual to 5=More stress than usual)	**n (%)**
1	3 (3.6)
2	4 (4.8)
3	31 (36.9)
4	28 (33.3)
5	18 (21.4)
How much did CB affect your quality time with your child? (1=Less time than usual to 5=More time than usual)	
1	5 (6.0)
2	0 (0.0)
3	28 (33.3)
4	20 (23.8)
5	31 (36.9)
Did the CB affect your relationship with your child? (1=Relationship worsened to 5=Relationship improved)	
1	1 (1.2)
2	2 (2.4)
3	36(42.9)
4	15(17.9)
5	30(35.7)
How did you feel your child's development and behavior changed during the CB?	
My child's development and behaviour improved	26 (31.0)
My child's development and behaviour worsened	16 (19.0)
No change from usual	42 (50.0)

CB: Circuit Breaker; WFH: Work from home; HBL: Home-Based Learning

Although there were other anecdotal reports indicating an impact on sleep,[19] the majority of the children in this survey were not reported to have any sleep-related difficulties. It is possible that as a significant proportion of the children are pre-schoolers, or primary school age and undergoing HBL, parents would have tried to ensure that the children continued to follow a regular sleep routine. On the other hand, exposure to screen use in our survey was reported to be significantly increased from usual, and more so for children with ASD. While it is possible that HBL screen time might have been included by caregivers while responding to the question, it is also likely that leisure screen use simultaneously increased. Caregivers of children with ASD may also be more likely to resort to using a screen device to engage their children, as the children may be more challenging to manage by other means. While increased screen use might be warranted, it nevertheless still needs to be balanced as there is evidence that screen use can adversely affect children with developmental disorders.[20]

Finally, despite the challenges of WFH, supporting children for HBL and managing other chores, some caregivers have reported that they have been able to spend more quality time with their child, and that their

relationship with their child had improved over the CB. If better support can be provided to caregivers who had the opposite experience, less of them would experience significant stress in future pandemic lockdowns, which is an imminent threat given the current resurgence of the COVID-19 infection globally.

LIMITATIONS

The survey was entirely caregiver-reported and anonymised, hence there was no opportunity to corroborate clinically with more formal measures (such as sleep diaries, screen use timers, or behavioural/mental health questionnaires). As the survey was conducted online, those who did not have access to the internet would not have had the opportunity to complete this survey, hence more vulnerable population might have been excluded. (Although it could be completed on a mobile phone). The survey would typically take 10-15 minutes to complete, hence it is likely that those caregivers struggling to manage their children's behaviours the most may not find the time to complete the survey, therefore excluding children presenting with more severe delays/disorders. Multiple developmental diagnoses were also not collected; hence it is not known how many had co-morbid disorders or disabilities. Response bias could also have been limited by surveying caregivers across multiple child development centres or early intervention centres. There was also no comparison group of caregivers of children without developmental delays, and it is possible that these findings were similar in all Singaporean parents at the time.

CONCLUSION

The COVID-19 pandemic and subsequent CB measures, called 'lockdown' elsewhere, caught everyone unawares. This survey shows encouraging data that many children with special needs and their caregivers coped with the restrictive measures, including WFH and HBL, with many caregivers reporting improved quality time with their children. However, there are some who struggled to manage, and faced substantial challenges, with resultant behavioural, emotional, and mental health deterioration. Unfortunately, we know very little from the survey data about the causes of such stress, which are likely to be multifactorial. While this survey sought to gauge the immediate impact upon a vulnerable subgroup of the population, it remains necessary to do further research to delineate these underlying causes of stress, together with elucidating factors that protected those families who were better able to cope during the pandemic. In the meantime, ongoing efforts should go into expanding the telehealth services that have sprouted as a result of the CB, so that healthcare services can continue to be provided should further lockdowns occur.

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