

## **Life Impact of Children with Developmental Coordination Disorder during Pandemic Outbreak: Online Parenting Telerehabilitation Program**

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### **ABSTRACT**

In response to Corona virus disease 2019 (COVID 19) outbreak, the Indian government issued an order on school closure to prevent and safeguard the children from the novel corona virus infection. There is no specified sample size, till the point of data saturation, we continued with the online parenting telerehabilitation programme using ZOOM app, GoToWebinar, Skype, Click Meeting, Webinatio, Live storm, Webinars On Air. As the parenting programme began from March 2020 and we have conducted weekly 2 sessions and after 30 sessions of parenting programme the analysis was done. The findings indicate that it is feasible to implement online parenting telerehabilitation programme for children with developmental coordination disorder. 30 weeks programme was completed by 100% of participants who were enrolled at the baseline. Every parent requested to continue the programme until the eradication of COVID-19. This online parenting programme is free of cost and it was found to be beneficial for parents and children in rural villages confined at home. During COVID-19, further of the children with developmental disabilities are in uncertainty and every children is facing physical mental impacts of the COVID-19.

### **Keyword**

COVID-19, Online parenting programme, Developmental coordination disorder, Life impact, Government policy

### **Introduction**

Corona Virus 2019 (COVID 19) is impacting every family financially as well as emotionally. There is a panic situation existed throughout the world. Due to the presence of Novel Corona Virus, there are innumerable defects and changes existed in everybody's routine activities of daily living and other recreational tasks<sup>1</sup>. For low income country like India, financial crisis had troubled the lives of everybody. There is a fear of death as well as fear of saving the lives of their loved one. Adapting to this new normal life is a real challenge for people in middle and low economic zone like India. Many thanks to the Indian government for declaring closure for schools and implementing the emergency home-school plan and online education system in March 2020 and this closure of schools will have an impact on the routine of children. Many parents were concerned about their child's educational progress and this home-schooling system and virtual interaction class room will alleviate the confusions and concerns of the parent on their child's educational status<sup>2</sup>. Childs educational standards and learning will never alter as due to the presence of COVID-19. However what really affects a child due to closure of schools is the physical and emotional wellbeing. As parents were very curious on the child's educations but fails to note down the child's physical activity and mental health. Prolonged School closure and home containment will have a negative impact on the child's mental as well as physical health. Researchers suggested that prolonged school closure will make the child physically inactive and for their online classes and assignments they have to look longer and focus more on the laptops, mobiles and computers screen. Thus they have irregular sleep patterns and poor eating habits that ultimately resulting in weight gain and a loss of cardio respiratory fitness. These negative effects will worsen out if those children are locked at their homes without any activities and they feel isolated and fearful if not allowed to interact with their school friends during the COVID-19 outbreak<sup>3</sup>. Perhaps handling a typically developing child is troublesome, imaging what happens to a child with developmental disability and special needs. It is a more neglected issue and least bothered research area during this COVID-19 pandemic. However the parents of the children with developmental coordination disorder will have psychological fear and burden on their missed out therapy sessions they used to attend to enhance their child's motor function and abilities. COVID-19 is enhancing the psychological impact on parents as well as children with DCD<sup>4</sup>. Stressors like prolonged duration of lockdown and closing of schools, fears of virus spread, depression and boredom, inadequate information on the vaccine and eradication methods, lack of in-person contact with classmates, friends,

and teachers, lack of personal space at home, and family financial loss can have even more problematic and enduring effects on children and parents. Researchers have highlighted that stress percentage was higher among children who had been quarantined. Home confinement will aggravate the symptoms and there is a visible detrimental effect on child physical and mental health, which will continue as a vicious circle<sup>5</sup>. When children with developmental coordination disorder are analyzed, they have a characteristic feature of clumsiness and difficulty in executing the motor task. They had trouble in organizing, sequencing and performing motor tasks and majority of the parents and teachers were not aware of the condition, as these children had trouble in learning, especially in writing, they were noted by their teachers often for their illegible and poor handwriting skill and parents were worried of their children with DCD, due to frequent academic failure. They tend to be isolated from the peer group children at school and also in house they tend to be isolated and when not adequately assessed by their parents and teachers, these children will develop psychological complications. There is a need for early identification and intervention to rehabilitate children with DCD. Imagine what happens to a child with DCD, when he/she missed out their regular occupational therapy sessions and tends to follow home containment procedures. If they left without the therapy sessions, there is deterioration in the skills they have achieved before the COVID-19 crisis<sup>6</sup>. Telerehabilitation address the children and parents to cope up with their parenting skill and we deliver the set of scheduled exercises for the children and parents were educated to follow the advice of the primary researcher, who is qualified in pediatric occupational therapy with 20 years of experience in handling a child with Developmental coordination disorder and he is the first doctorate person in India on pediatric occupational therapy. Children who were under the regular therapy sessions under the care of primary researcher in Kids therapy center at Kattupakkam were on regular follow up in telephone and the parents reported that they experience stress to take care of their children as well as the family issues during this COVID-19 breakthrough, they requested for online telerehabilitation programme to deliver the regular therapy sessions in free of cost<sup>7</sup>. Thus we had taken imitative to address every child who was under regular therapy programmes under various occupational therapy centers, physiotherapy centers and special schools in rural villages around Kancheepuram. Children with Developmental coordination disorder will be frequently denoted as clumsy by their parents and teachers, during this closure of therapeutic clinics, schools, hospitals and other learning centers makes the child with DCD, turns much more clumsier and they confined to home without engaging in any physical activity. There are innumerable way in which a child with DCD affected mentally as well as physically.

### **Methodology**

This study was initiated, when our government of India announced nationwide lockdown and home containment procedures to avoid the spread the COVID-19. There is a closure of schools and every parent and children were struggling to adapt to online classes and this new life saving measures. In low income country like Tamilnadu, where we have high population and low sanitization procedures, children and older adults were prone to be less immune and easily affected by COVID-19. More than the fear of COVID-19 pandemic and its infestation and elevated death rate, parents of children with developmental coordination disorder who were following a regularized therapy sessions under the guidance of the primary author were having a fear of the deteriorating effects their child is about to face due to the closure of therapy centers as because of COVID-19 pandemic, our primary researcher is expert in the field of pediatric occupational therapy and he runs the kids therapy and learning center for more than 20 years and he is the first doctorate degree holder in Occupational therapy in India with 25 years of expertise in counselling parents and treating children with developmental disabilities. Parents who were under his regular therapy sessions requested him to continue their therapy sessions, so we initiated the study and we planned to have online parenting telerehabilitation programme with parents of children with DCD and also we mailed various special schools and therapy centers in and around Kancheepuram to include the parents who were interested in joining our online telerehabilitation programme. At the baseline we conducted in-depth telephonic interviews to obtain introspective, experiential, and personal data from the parents of children with DCD. Majority of the parents revealed that they experience stress in handling their children during this home containment and lockdown period issued by our government of Tamilnadu. we initiated online parenting programme for parents of children with developmental coordination disorder and included all the mothers and there is no specified sample size, till the point of data saturation, we continued with the online parenting telerehabilitation programme using ZOOM app, GoToWebinar, Skype, Click Meeting, Webinatio, Live storm, Webinars On Air and for the parents from rural villages in Mudichur without internet access were contacted with telephone and educated. As the parenting programme began from March 2020 and we have conducted weekly 2 sessions and after 30 sessions of parenting programme, parents were asked to screen the Childs behavior and progression in performing activities of daily living skill. (Kaminski et al., 2008) An online survey was administered to the parents of all the children participated in the study and the survey comprised of demographic details, Eyberg Child Behaviour Inventory, child health questionnaire and Parenting Stress Index

(Table 2) to document the efficacy of their Childs performance. In total 1000 questionnaires were returned with the detailed data on the children with DCD from 1000 families and the response rate recorded in the current study is 100% and the primary reason for this is because of secondary researcher as she is familiar to every parent of children with DCD and she was engaged with regular telephonic interview with the parents to review the status of the telerehabilitation program and to document its success rate

Table 1: Protocol for online parenting programme

Videos of parent-child motor training program and encouraging interactions	Parents were instructed to slowly bring their child towards engagement in motor training program and instructed to tune the child with positive reinforcement and encouragement to perform the training programme as mentioned in the recorded video.
Group discussion	By home containment procedure and with providing long standing care for their children with DCD, parents exposed their stress levels in telephonic interview with us. Group discussion aimed to target every parent and they were allowed to interact with other parents to get a positive attitude to face COVID-19 pandemic.
Rehearsal of parenting techniques and home practice.	We played the video recording of the individual Childs therapy session and we helped parents to practice the same with confidence and keeping the idea in mind, they were instructed to share the video recordings or mail back the sessions performed in their home with us.
Positive interaction with the child	Parents were instructed to make their child physically active and advised to have outdoor play activities in their home garden or terrace. Advised to practice ball catching and throwing in green land with positive comments. Even if the child fails to catch and throw, parents were advised to motivate them with positive comments.
clear commands	Instructed to use commands as practiced by the therapist during their therapy sessions with our primary researcher. Commands should be clear and it should be in English rather than in Tamil or in any other language. For example, during ball catching task, parents should use clear commands like “CATCH” “THROW”. Commands and activities were videotaped and sent to parents – watsup or email group
Recording undesirable behavior	Parents were instructed to record the difficulties faced by their children in a logbook as provided by the therapist before the COVID-19 pandemic and needs to be presented and discussed with the primary researcher during group discussion classes.
Rewarding desirable behavior	Parents were instructed to record the achievements of their child with video recording and documenting it in logbook and they need to present as well as discussed it with us

COVID-19 safety education	Participants were instructed to follow hand hygiene measures and advised to follow COVID-19 safety measure and home containment procedure. By not allowing their child to play with the neighboring children.
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TABLE- 2: Mean scores of children with DCD at baseline and at 30<sup>th</sup> week

S.NO	OUTCOME MEASURES	PRE TEST	POST TEST	T VALUE	P VALUE
		MEAN	MEAN		
1	Eyberg intensity score	135	100.34	-9.332	.000
2.	Eyberg problem score	9	5	-3.123	.000
3.	Parenting stress index(PSI)	82.1	72.3	-2.111	.000
4	TOTAL (PSI) Parent domain	24.1	20.1	2.146	.000
5	(PSI) Difficult child	34.6	30.12	3.244	.000
6	(PSI) Parent child interaction	22.34	20.334	3.245	.000
7	Child health questionnaire (CHQ)	5.23	2.11	-2.345	.000
8	TOTAL (CHQ) Anxiety	1.23	1.11	-2.547	.000
9	(CHQ) Somatic	1.45	1.23	-2.344	.000
10	(CHQ) Depression	0.48	0.12	-3.245	.000
11	(CHQ) Social dysfunction	1.38	1.23	-1.246	.000

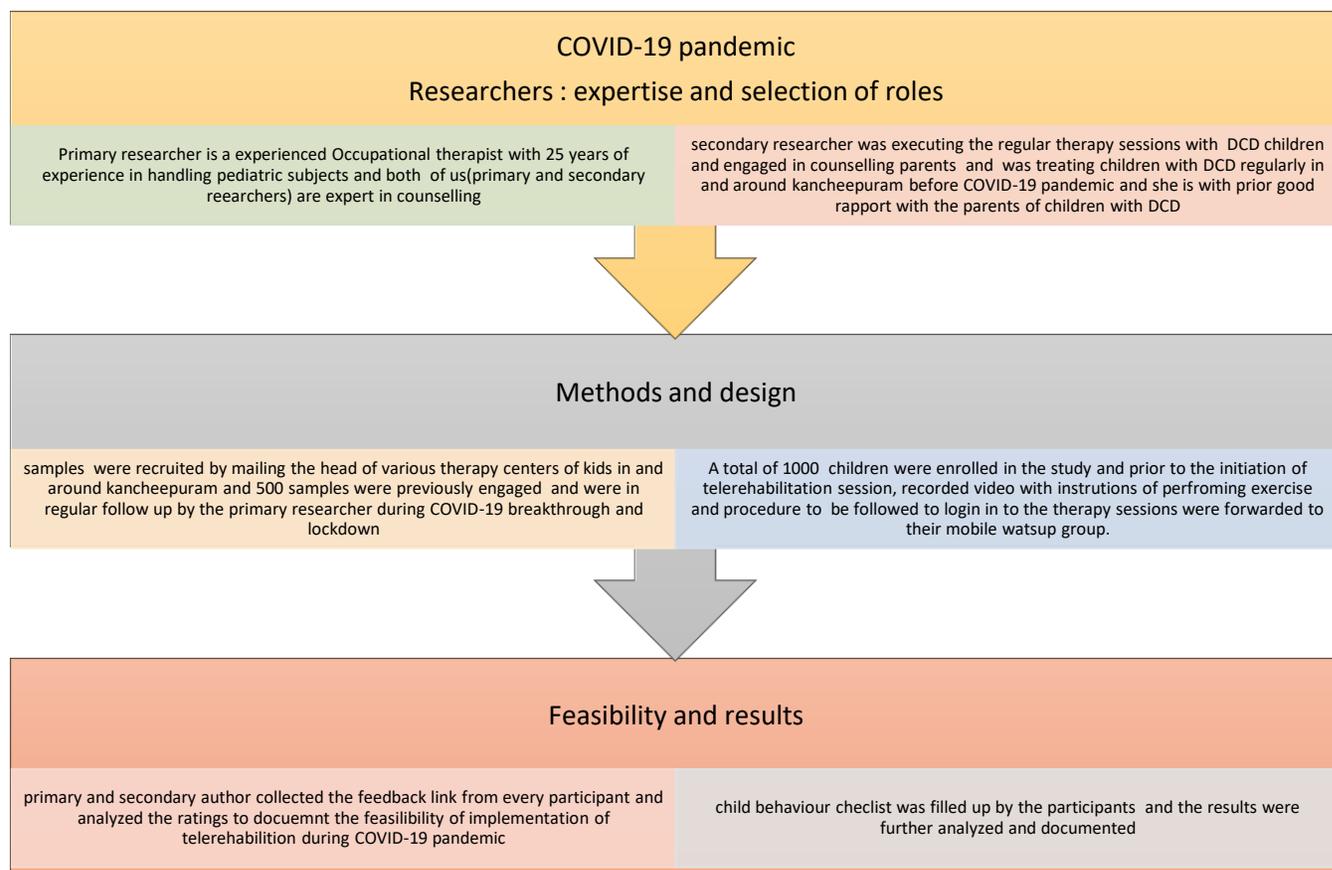


Figure 1: Study methods elaborated using COREQ criteria

## Results

This Online telerehabilitation programme (Table 1) comprised sessions which last for about 1 hour and we continued it for weekly two times, for 30 weeks in total. The home programme and activities designed for children with DCD were listed down by our primary researcher in the individual logbook of parents. They have to see the day wise protocol needs to be delivered for their children with Developmental Coordination Disorder. We conducted this online parenting and telerehabilitation programme sessions by online platforms, with ZOOM app in the evening time (6.00 to 7.00PM- IST). As we have selected the slot time 6 to 7pm in IST by allowing the patients to select the slot in relation to their convenience as majority of the mothers were engaged in other occupational measures and household work. Thus they have to select the slot time to enhance their full fledged participation and attendance to our online parenting telerehabilitation program.

## Discussion

As the swell of corona virus disease 2019 (COVID-19) in India is accelerating, there is a urge to understand the specific and the non-specific symptoms at early stages of COVID-19 and in low economic country like India, there is a absence of clear links that demonstrate broadcast rate links and detailed report on Covid-19 Cases and thus we are about to follow the conventional containment rules and strategies like case isolation and home quarantine procedures<sup>8</sup>. Our government of India announced closure of schools and compulsory social distancing, assisted to follow hand hygiene measures and made compulsory to wear mask from March 2020. In Tamilnadu, the measures announced by our government appear to be successful and everybody follows the same till date. Innumerable efforts were initiated by our government and private schools and teachers to initiate online classes and tried their best to

deliver uninterrupted education through recorded class lectures or through TV shows<sup>9</sup>. Government initiated steps to create new semester which is virtual in nature. Courses are offered online as per the syllabus and timetable which is previously scheduled by the school administration. In a well organized manner, education continuous to be delivered in this pandemic situation. These actions enhanced the anxiety and stress levels of parents of children with developmental coordination disorder, where other children continuous to deliver education, but they fear about their child's mental and physical health<sup>10</sup>. Majority of the parents were concerned about their children's therapy classes and physical activities scheduled by the occupational therapists. Parents were stressed by ensuring that therapy classes were missed and motor skill acquisition training as well as attainment is largely disrupted. Their concern about the child with DCD is highly commendable and there are reasons to be alarmed because prolonged closure of rehabilitation and kids therapy centers and home confinement during this COVID-19 outbreak might have negative impact on the physical and mental health of children with DCD<sup>11</sup>. Children with DCD were marked with their hallmark characteristic feature "Clumsiness". Evidence suggests that the lockdown and home containment strategies make the child physically less active and they sleep for longer period of time and they tends to be more clumsier and parents reported that their children behave like a couch potato and also gained excess weight. Evidence documented by previous researcher that children with DCD have poor cardio respiratory fitness and they have high risk for cardiovascular problems. These negative effects will be predominant if these children with developmental coordination disorder confined to their houses without any outdoor activities and interaction with their peer group during the outbreak of COVID -19 for more than 6 months. Home confinement measures will worsen the mental and physical health of children with DCD<sup>12</sup>. Thus we initiated this study; we focused on parents and children with DCD through online telerehabilitation and parenting programme. We initiated the study as our parents who were under regular rehabilitation program before the pandemic requested to initiate or reopen the therapy/rehabilitation center during this pandemic. As our government issued complete lockdown over Tamilnadu, we were unable to grant access for the parents and children to walk down and get rehabilitation done in person, thus we initiated this telerehabilitation programme through ZOOM app and other applications to enhance the physical and mental health of parents and children with developmental coordination disorder. These actions are helping to alleviate many parents' concerns about their children's motor coordination difficulties. Perhaps a more imperative issue is the stress and the psychological impact on children with DCD. Stressors which is predominant among children during this outbreak of pandemic is closure of rehabilitation/kids therapy and learning centers, boredom, lack of communication with therapist will also have impact over the child's ADL. As the child in rehabilitation center will communicate with the therapist, who keeps motivating the child to perform well in his tasks that facilitates his motor coordination skill. Previous researchers documented that post-traumatic stress scores were four times higher in children who had been quarantined than in those who were not quarantined. To effectively address the child's physical and mental health and to break the vicious cycle of fear and stress elicited among parents of children with DCD, telerehabilitation programme that address online parenting skill was the best choice. We recommend therapist all over India to initiate tele-health programmes to break the vicious cycle of stress inculcated among parents of children with special needs. To mitigate the consequences of home confinement, we aimed at using online parenting programme to deliver the telerehabilitation to alleviate the fear and depression from COVID-19 and to enhance the motor coordination skill for children with DCD. family members were not paid attention towards the physical activity of children and not given importance to the green land play<sup>13</sup>. Thus we motivated the parents to engage their children in ball catching and throwing skill in their garden, as these activities were previously trained by our primary researcher and thus parents needs to play along with their children to maintain or enhance the acquisition of skill. As COVID-19 is financially and physically affecting the families and this telerehabilitation will be cost free and it addresses all the needs of the children with DCD during this pandemic. Physical function or activity is an important element for DCD children. Telerehabilitation provides and motivate the children for active involvement in their environment<sup>14,15</sup>. The exercise program has more beneficial effect in children and parents, especially differences documented in pre and post test recordings of (Table 2) Child health questionnaire, parental stress index and eyberg problem score. In addition, the protocol followed by us, had COVID-19 safety tips, thus we had an opportunity to educate the parents to maintain home containment procedure and to maintain hygiene as well as sanitization procedures. We insisted on washing hands and sanitize tools used by children on the daily basis and we insisted the parents to have a record of videos on child's success as well as failures/difficulties in engaging towards the task in the diary and logbook provided by the therapist. Parents in their feedback link reported that "I experience confusion and stress during this COVID-19 Pandemic but after engaging in telerehabilitation program, therapist boosted me with enough energy to care for my children and family" another parents reported that " I am aware of the hand hygiene methods announced by the government, but therapist in telerehabilitation programme demonstrated me with the live video streaming , it was very useful for me and I downloaded the video to share with my friends and family". Thus these feedback links

documented by 1000 parents were lead the pathway of success for us, but we want the society to benefit from our programme and also we insist occupational therapist worldwide to track over on their parents and children with disability and special needs during this COVID-19 pandemic outbreak.

### **Conclusion**

Video conferencing / joining a meeting with apps and other technology (e.g., Skype) is easily downloaded into computers and android mobiles of clinicians and parents of children with DCD and the applications for initiating the video conferencing were available and can be downloaded for free ( with zero cost) and for parents in a village and low economic zone can easily utilize the rehabilitation facility and wireless headsets to join the conferences are relatively in expensive .We suggest that online parenting programme and telerehabilitation have the ability to provide care and treatment for children with Developmental coordination disorder across low income country like India and for children living far from specialty care.

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### **Author Contribution**

GS developed the protocol and conducted the interviews. MR contributed towards analysis of data, drafted the Manuscript and edited the manuscript. All authors approve the final submitted version of the manuscript and accept personal accountability to the findings of the study.

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We haven't received funding for this study

### **Availability of data and other materials**

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request. Please mail and reach us in [dreamsfuture000@gmail.com](mailto:dreamsfuture000@gmail.com)

### **Ethics approval and consent to participation**

The study was approved by the Institutional Ethics Committee (Human Studies) of the Sri Ramaswamy Memorial Institute of Science and Technology, Kattankulathur with Approval No. 1755/IEC/2019, dated 22.08.2019. Written informed consent for interviews was obtained from all participants. The privacy and confidentiality of all the participants was strictly maintained.

### **Competing interests**

Authors declare no conflict of interest

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