A Study of Psychological Challenges Faced by Children With Dyslexia and Their Parents' Stress During the COVID-19 Pandemic

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Abstract

Around 10% of school children have some degree of dyslexia. In developed countries and the West in particular dyslexia is recognized as a major educational and Psychological problem, but has not received sufficient attention in developing countries. Elementary school teachers could play a crucial role in identifying dyslexia early and in creating awareness about learning disorders in the community. There are very few studies on the knowledge of school teachers about learning disorders and hardly any involving dyslexia. The purpose of this study is to assess the knowledge of dyslexia in elementary Parents' and the variables influencing the knowledge.

The main objective of this paper is to examine the psychological impact of the required COVID-19 quarantine in among children with dyslexia and their families. A sample of 32 children with dyslexia and their mothers participated in this study. Children and adolescents with dyslexia and their mother completed several measures before the required national quarantine in Gujarat and again during the quarantine. Children completed measures of depression, state anxiety, reading activity, and reading motivation. Mothers provided demographic information and completed measures related to students' emotional and behavioural difficulties as well as parenting stress, parental distress, and a questionnaire about educational problems during quarantine. This study offers a preliminary investigation into this topic and elucidates several psycho educational challenges that children with dyslexia and their families have experienced during the quarantine in Gujarat. A study finding highlight the need to provide immediate support for children with dyslexia and emphasizes the importance of developing prevention programs to mitigate any future negative impacts of COVID-19 on children with dyslexia and their parents.

Keywords: Dyslexia, COVID-19, Psycho Educational impact, Parent stress, Quarantine

Introduction:

Dyslexia is the most common learning disorder in children but it has not received adequate attention in developing countries such as India. Resources are more focused on alleviating other priorities like infections and nutritional disorders. However a flourishing economy and rapidly rising literacy rates have resulted in increasing recognition of this debilitating educational and social disability. Prevalence of dyslexia is estimated to be between 5% and 17% of school aged children. The British Dyslexia Association defines dyslexia as a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling. A Cochrane review revealed that around 5% of English speakers have significant problems with learning to read words.

Dyslexia is a neuro developmental disorder of neurological origin and characterized by impaired reading acquisition despite the presence of adequate intelligence, education, and socioeconomic background to learn to read (American Psychiatric Association [APA], Dyslexia impacts approximately 6% of elementary and secondary students in India and an estimated 5– 15% of the global population (American Psychiatric Association [APA], 2014). The first decades of research in dyslexia were mainly devoted to the cognitive and biological underpinning of the disorder Compared to students with average to above average reading skills, accumulated evidence suggests that students with dyslexia can show a range of reading-related (e.g., pseudo word reading, spelling, vocabulary) and cognitive (e.g., rapid naming, verbal, working memory) difficulties.

Objective:

- The main objective of this paper is to examine To Study the psychological impact of the required COVID-19 quarantine in Gujarat among children with dyslexia and their families.
- To Study the research was to find out the adjustment problems of children with dyslexia during Corona period.COVID-19
- To Study the research was to identify behavioural problems in children with dyslexia during the Corona period.
- To Study the research was to find out the level of stress due to lockdown in parents of children with dyslexia during Corona period.
- To Study the research is to measure the effect of Stress on children of parents of children with dyslexia during the Corona period.

Methods:

Participants included 40 children with dyslexia as well as the mother of each child participant. Like each mother, fathers of the child participants were also asked to participate by completing measures used in the study; however, as will be described later, in only a small number of instances did the father collaboratively complete a measure with the child participant's mother. For brevity, we refer to the school-aged participants as "child" or "children" even though some participants' ages could be classified as early adolescence.

Additional details about all study participants are provided below in the respective sub-sections. prior to commencing any study procedures, parents' informed consent was obtained.

All 40 child participants were Gujarat, lived in fore districts Bhavnagar, amreli, botad and junagadh in saurastra regon at the time of the study, and spoke Gujarati or Hindi as their primary language. Moreover, children were attending 21 schools (8 primary schools and 13 secondary schools). They ranged from 9 to 14 years old (mean age = 10 years and 11 months, SD = 1 year and 5 months. Twenty identified as male and twenty as female). These participants were recruited from referrals to a multiyear investigation that began several years before the COVID- 19 pandemic. Preliminary selection of potentially eligible child participants was consistent with past studies such that potential dyslexia participants in the present study were recommended by their teachers based on students' low reading achievement in the classroom.

The actual presence of dyslexia for child participants was then determined by using the DSM-5 (American Psychiatric Association [APA], 2014) criteria specified for identifying students with a specific LD:
(a) scores of 80 or above on an intelligence test (Cattell and Cattell, 2006), in order to exclude students with cognitive impairments.
(b) no evidence or history of neurological damage, significant economic disadvantage, emotional disturbance, hearing or vision abnormalities, or any other major handicapping condition.
(c) a reading achievement score at or below the 25th percentile on the word-reading and/or pseudoword-reading skill subtests (accuracy and/or speed) from the Standardized Reading Skills Battery (PROLEC-R, Cuetos et al., 2002; PROLEC-SE, Ramos and Cuetos, 2003).

Three participants (9.4%) had been retained in a grade, 46.9% had received services in the school's resource room prior to this study, and 87.5% were reported by the teacher as needing with homework. Eleven (34.4%) of the children had no siblings, 53.1% had a sibling, and 12.5% had two or more siblings. **Table 1** shows the characteristics of all child participants.

Parents/Caregivers of Children With Dyslexia:

Each mother of the 40 aforementioned children participated in this study. Like the child participants, these caregivers (henceforth referred to as parents) had also participated in past components of this multi-year investigation. includes parents' demographic information and includes fathers' information to provide a clearer picture of child participants' parents. Mothers' age ranged from 30 to 52 years (mean age = 42 years, 1 month, SD = 4 years, 1 month), and fathers' age ranged from 38 to 60 years (mean age = 44 years, 2 months, SD = 4 years, 8 months). Most parents' highest level of education (53.1% of mothers and 65.5% of fathers) was a diploma from Secondary School. Approximately 22–24% of mothers and fathers had a degree from a university. All fathers and 69% of mothers reported having a paid job. In accordance with the International Standard Classification of Occupations (International Labour Organization [ILO], 2012), the occupations of fathers and mothers were distributed into occupations with four levels of skills. Due to the COVID-19 pandemic,

some parent participants lost their jobs (9.4% of mothers and 3.4% of fathers), and others had their working hours reduced (18.7% of mothers and 34.5% of fathers). Additionally, 68.7% (n = 22) of the parents were married or living together, 9.4% (n = 3) reported being single or widowed, and 21.9% were separated (n = 7).

Twelve total measures were used for purposes of this study, most of which were administered both before and during Gujarat's 2020 national quarantine. For clarity in our method, each section specifies if the respective measure was completed before quarantine, during quarantine, or both.

TABLE 1 | Characteristics of child participants.

Age	10:96	1.49
IQ	106.78	10.64
Word reading accuracy	34.16	5.32
Pseudoword reading speed	95:69	33:28
Word reading fluency	49:95	19:64
Pseudoword reading accuracy	28:84	7:26
Pseudoword reading speed	95:69	33:28
Pseudoword reading fluency	34:03	15:07
Sex	N	%
Male	17	53.1
Female	15	46.9
Academic Qs N %	N	%
Grade retention	3	9:4
Resource room	46	9
Homework Help	28	87:7
Siblings	N	%
No of siblings	11	34.04
1 Sibings	17	53.01
>2	4	12:5%

Tools:

The tools and tests used in this research are as follows.

(1) Measures Completed by Each Child Participant Factor "g" intelligence test

This intelligence test (Cattell and Cattell, 2006) was administered to child participants prior to the quarantine to assess general mental capacity without the interference of verbal stimuli.

(2) Standardized reading skills battery

Prior to the quarantine, each child's word and pseudoword reading skills were measured with the Standardized Reading Skills Battery (PROLEC-R, Cuetos et al., 2002;

(3) Children's depression inventory-short form

Before and during quarantine, depressive symptoms were measured using the Children's Depression Inventory-Short Form (CDI-S) (Kovacs, 1992), which is a self-assessment screening tool of 10 items.

(4) State-trait anxiety inventory for children

Before and during quarantine, children completed the state anxiety subscale of the Gujarati adaptation of the State-Trait Anxiety Inventory for Children (STAIC) (Dr S. N Dubey, 2014).

(5) Motivation to read profile-revised

Before and during quarantine, children responded to the Motivation to Read Profile-Revised (MRP) (Malloy et al., 2013),

(6) Task-value scale for children

Before and during quarantine, children's task motivation was measured in an interview using the Task-value Scale for Children (TVS-C) (Nurmi and Aunola, 2005; Aunola et al., 2006).

(7) Reading activity inventory

Before and during quarantine, the Reading Activity Inventory (RAI) was used to measure the breadth (genres read) and frequency (how often a genre was read) of students' reading (Guthrie et al., 1994).

Measures Completed by a Parent of Each Child Participant Demographic information questionnaire

At the very beginning of the study, parents supplied information about their sex, level of education, occupation (based on the International Standard Classification of Occupations), and marital status. They also responded to items about the number of children being raised in the child participant's home and the child participant's past and current schooling (e.g., number of grade retentions, whether they received homework help.

Procedure:

Parents provided informed consent during the initial evaluation of each child's Factor "g" Intelligence Test, Standardized Reading Skills Battery, and demographic information questionnaire which occurred between November 1, 2019 and January 23, 2019. An experienced and licensed clinical psychologist (an author of this paper) administered the intelligence and reading assessments in random order and in a setting free from noise and distractions. Test sessions varied in length depending on the participant being assessed. Following these assessments, between February 2 and 11, 2020, the additional child measures were administered by the same clinical psychologist in random order through an interview. Mothers completed the measurements while their son was being interviewed.

In May 2020, each evaluation administered during the quarantine was carried out in two or three sessions by means of telephone interviews or by videoconference (with Blackboard Collaborate) with the children and their parents. This assessment corresponded to approximately 1.5 months (i.e., 45–47 days) after the national quarantine began in Gujarat. Parent participants who had multiple children in the household were specifically asked to respond to all questions and surveys for the specific child participant in the study. Measures intended for parents (i.e., the SDQ, PSI-SF, GHQ-12, and QQE) were mainly completed only by the child participant's mother (81.2%; n = 26); however, for 18.7% (n = 6) of the child participants, the SDQ was completed collaboratively by both parents.

Data Analysis

We analyzed data using SPSS version 24. First, descriptive statistics were used to describe the participants' characteristics before quarantine (see **Tables 1**, **2**) and to analyze educational data regarding to our RQ 5. Thus, descriptive statistics were provided as a mean and SD for continuous variables; frequencies and percentages were used for categorical variables. Regarding analysis for our RQs 1, 2, and 3 we used paired t tests to evaluate the significance of changes (before and during quarantine) in children with dyslexia and their parents. To control for multiple comparisons, the level of significance was established after applying the Bonferroni correction (0.05/15 = 0.003). We report effect sizes using the Cohen's d, with values between 0.00 and 0.20 considered small effect sizes, values between 0.20 and 0.50 considered medium, and values above 0.80 considered large effect sizes. Finally, in order to analyze data regarding RQ 4, based on previous studies. we carried out different multiple linear regression analyses to find out if any pre quarantine variables influenced children's emotional problems (e.g., anxiety) or parents' stress during quarantine.

RESULTS:

Psychological and Reading-Related Impacts of Quarantine as Reported by Children With Dyslexia (RQ 1) As measured by the CDI-S and STAIC respectively, children with dyslexia showed significantly higher levels of depression (t.31/ = □8.1, p = 0.001, d = □1.4) and state anxiety (t.31/ = □6.6, p = 0.001, d = □1.2) during the quarantine compared to before the quarantine period, with large effects sizes in both cases (see **Table 3**). Note that t-scores and Cohen's d are negative when a variable increased during quarantine and are positive when is the score is lower during quarantine. As measured by the MRP, children with dyslexia also had significantly lower scores during the quarantine on the Value of Reading subscale (t.31/ = 6.9, p = 0.001, d = 1.2) and Reading Motivation total score (t.31/ = 7.7, p = 0.001, d = 1.4). Similarly, children's task-value motivation, as measured by the TVS-C, also decreased at significant levels during quarantine (t.31/ = 10.1, p = 0.001, d = 1.8).With each of these changes, we observed large effect sizes (d range = 1.2–1.8). Regarding reading activity, children on average reported through the RAI that they significantly decreased their breadth of reading during quarantine (t.31/ = 6.6, p = 0.001, d = 1.2) and most children decreased the types of books they read. In the before quarantine period, 18.8% (n = 6) of child participants indicated they did not read any type of book last week, and 81.3% (n = 26) read between one and three types of books. In contrast, during the quarantine, 50% (n = 16) reported they did not read any books last week. However, there were no statistically significant differences in children's reported frequency of reading.

Specifically, before the quarantine, 90.6% of the children with dyslexia reported they "almost never" read for fun and then 100% reported this during the quarantine. The restricted variability may have influenced a lack of statistically significant findings (i.e., even before quarantine, 90% of the children almost never read for fun)

TABLE 3 | Psychological and motivational impact of Gujarat's National Quarantine on children with dyslexia

Before quarantine During quarantine					**t.31/**	**p**	**d**
Measure	**Mean**	**SD**	**Mean**	**SD**			
Depression (CDI-S)	3.0	2.5	5.3	1.9	-8.10	001	1.4
anxiety (STAIC)	42.7	7.6	47.5	6.56	6.6	0.001	-1.2
Reading motivation (MRP)							
Reading Self Concept Subscale	21.9	3.3	21.6	2.8	1.7	0.09 6	-0.3
Value of Reading Subscale	25.	1 4.	3 22.	7 5.	2 6.	9 0.	001 1.2
Total Score o n MRP	47.0	5.5	44.3	6.1	7.7	0.00 1	1.4
Task-Value (TVS-C)	9.1	2.7	5.9	2.1	10.1	0.00 1	1.8
Reading activity (RAI)							
Breadth of Reading	1.5	1.0	0.7	0.9	6.6	0.001	1.2
Frequency of Reading	1.1	0.4	1.0	00	1.6	0.129	0.3

t-scores and Cohen's d are negative when a variable increased during quarantine, and are positive when is the score is lower during quarantine.

Parent Perspectives of Emotional and Behavioural States for Children With Dyslexia (RQ 2)

Overall, parents reported some significant changes in children's emotional and behavioural symptoms (rated using the SDQ scale) before and during the quarantine (see **Table 4**). According to parents' ratings, children with dyslexia scored significantly higher during the quarantine than before the quarantine on all three subscales: Emotional Symptoms (t.31/ = □4.5, p = 0.001, d = □0.8), Conduct problems (t.31/ = □5.1, p = 0.001, d = □0.9), and Hyperactivity-Inattention (t.31/ = □7.0, p = 0.001, d = □1.2), with large effect sizes in all cases. **Table 4** also shows that the percentage of participants rated above the clinically significant range on the SDQ was higher during the quarantine period than before the quarantine. Before the quarantine, the percentage of children with clinical scores ranged from 3.1% for Hyperactivity-Inattention to 15.5% for Emotional Symptoms; however, during the quarantine, the percentage of children rated with clinically significant scores ranged from

18.8% (for Hyperactivity-Inattention) to 53.1% (for Emotional Symptoms. Mental Health Impacts of Quarantine on the Parents Who Have a Child With Dyslexia (RQ 3) Using the PSI-SF, parent participants reported significant changes in parenting stress during the quarantine (see **Table 5**). For example, during quarantine parents reported higher scores on the subscale areas of Parental Distress (t.31/ = □14.4, p = 0.001, d = □2.4), Parent-Child Dysfunctional Interaction (t.31/ = □10.2

Predictors of Negative Impacts of Quarantine on Children's Emotional Difficulties and Parents' Stress (RQ 4)

Finally, in order to determine if any pre-quarantine variables influenced children's emotional problems (e.g., anxiety) or parents' stress during quarantine different models of multiple linear regression have been run. In the case of children, we used different pre-quarantine variables as independent variables (e.g., marital status, number of siblings, parent-child interaction,: : :) and level of anxiety and depression during quarantine as dependent variables. In the case of the parents, different pre quarantine variables (e.g., marital status, number of children, child's behavioural problems,: : :) were used as independent variables and the total stress score during quarantine was the dependent variable. When predicting children's emotional problems during confinement, the model that was significant (F.2;29/ = 10.773, p < 0.001) explained 38% (adjusted R2 _ 100) of the state anxiety experienced by the children during quarantine. The pre quarantine predictors that were significant were parent-child dysfunctional interaction (b = 0.405, t = 2.69, p < 0.05) and the marital status [1 = married or cohabitating; 0 = living alone] of their parents (b = □0.434, t = □2.94, p < 0.01). In the case of parents, the model that was significant (F.3;28/ = 17.170, p<0.001) explained 61% (adjusted R2 _100) of parental stress during quarantine. The pre-quarantine variables that were significant were the number of children (b = 0.256, t = 1.67, p < 0.05), marital status (b = □0.677, t = □4.82, p < 0.001), and the child's behaviour problems (b = 0.312, t = 2.07, p < 0.05).

Educational Conditions and Impact of Quarantine on Children With Dyslexia, as Reported by Parents (RQ5)

Frequencies and percentages of the educational conditions and challenges are shown in **Table 6**. As shown, approximately 90% of parents reported having electronic devices for remote learning, although 71.9% also reported that such electronic devices were shared by other family members, such as siblings and parents. In relation to remote learning, 100% of teachers used online tasks through software such as Moodle, but only 21.9% occasionally attended their classes online with a teacher present. Parents reported that 56.2% of children spent less than 4 h per day on learning and 43.8% spent between 4 and 7 h. Further, 56.3% of children with dyslexia used audio books and/or readers for completing the school reading activities.

DISCUSSION

The COVID-19 outbreak was a new and unexpected situation that quickly became a large-scale pandemic. Within India, and likely other countries, many have argued that the

consequences of school closures and keeping children locked at home to prevent the spread of COVID-19 did not fully consider other important aspects of families' and children's wellbeing–including but not limited to their psychological and educational wellbeing (Smith, 2020; United Nations Educational, Scientific, and Cultural Organization [UNESCO], 2020). Recently published studies have begun to demonstrate several negative impacts of quarantine on students' mental health and schooling but to our knowledge, our study is the first to specifically examine the psychological and educational impact of the COVID-19 pandemic on students with dyslexia as well as the parents of students with dyslexia. It is also one of only a small number of studies with data collected about participants' wellbeing shortly before and then again during the quarantine.

First and foremost, our findings highlight several negative psychological and educational impacts that national quarantine conditions can have on students with dyslexia and in their parents. Using self-report measures, our participants with dyslexia showed significantly increased symptoms of depression and state anxiety during the quarantine. This finding is generally consistent with other recent studies that included children and adolescents without learning disabilities but our study helps to evidence participants' degree of mental health changes from before to during quarantine conditions.

This research also bolstered data from children's self-reports about mental health by including parental reporting. Specifically, during the quarantine compared to before, we found that parents rated their child with dyslexia to have significantly more emotional difficulties, conduct problems, and hyperactivity-inattention (as measured with the SDQ). We also found that during the quarantine, the percentage of students with dyslexia who were above the clinical cut-off range was 53.1% for Emotional Symptoms, 21.9% for Conduct Problems, and 18.8% for Hyperactivity-Inattention. Our results are the first to document such changes from before to during quarantine conditions, but children's presence of difficulty during the quarantine correspond well with the findings in research In their study, which evaluated a wide range of individuals during the quarantine between 3 and 18 years old (all living in Gujarat), they found similar percentages of students with clinically elevated scores on the SDQ: 48.6% for Emotional Symptoms, 24.2% for Conduct Problems, and 20.3% for Hyperactivity-Inattention. Conditions of COVID-19 and India's national quarantine also had a negative influence on our participants' reading motivation and reading activity. For instance, during quarantine, children reported significantly less motivation for reading on measures of the MRP and TVS-C and significantly less breadth of reading on the RAI.

These findings are important because they clearly highlight a critical need to support students with dyslexia during atypical schooling conditions, just as it is well understood that such students should be well supported under more typical school conditions. These findings are also important because one cannot assume that most students will have less reading motivation during quarantine conditions. For instance, studies of adults and children without learning disabilities suggest that many such individuals have spent even more time reading, and read with greater breadth, during quarantine conditions.

Another goal of our study was to explore the predictive power of different pre-quarantine variables to potentially explain emotional problems in children with dyslexia during quarantine. Thus, pre-existing conditions like difficult interaction between parent-child, and living with a divorced / separated or single parent, seem to have a great impact on

the state anxiety of children with dyslexia. Previous research has shown that parental status (e.g., divorced or single) seems to comprise a risk factor for fear and anxiety, and health risks and fear connected to COVID- 19 influence parents' levels of stress both at the individual level (e.g., being over-reactive, feeling nervous, irritable) and at the dyadic level (e.g., parent-child dysfunctional interactions, finding it difficult to enjoy interactions with the child, and child behavioral and emotional expressions); and, as a consequence, children's psychological problems are impacted found a relationship between parents' stress and their children's emotional state.

In other words, these studies show that anxiety and depression symptoms were more likely in children whose parents reported a higher level of stress. In fact, primary caregivers' level of stress was related to 25 of 31 child symptoms (Orgilés et al., 2020). As Marchetti et al. (2020b) point out, parents experiencing high psychological distress may be less attentive to and warm with their children, and they may also transfer the burden of their emotional distress to their children, which could affect their children's adjustment. Our study also highlighted the impacts of quarantine conditions and the relative wellbeing of parents who have a child with dyslexia. Findings showed that compared to pre-quarantine conditions, mothers reported significantly greater stress and undesired interactions with their child during quarantine. These findings are new and important to report in the context of evaluating parents of students with dyslexia, but the data appear consistent with what might be expected during a quarantine.

The present results also revealed some predictors of parents' stress during quarantine, such as number of children, marital status (e.g., divorced or single), and the child's behavior problems. This finding is in line with previous studies (Mikolajczak et al., 2018; Marchetti et al., 2020a,b; Spinelli et al., 2020) that have highlighted risk factors for parenting stress, relating to socio-demographic characteristics (e.g., having a larger number of children, lacking a domestic partner) or child features (e.g., special needs, externalizing symptoms, ADHD, behaviour problems). However, further studies should examine this issue in even greater depth.

Consistent with parental reports of distress, most if not all the parents in our study reported, for example (a) their child having difficulty with establishing study routines and completing school-related tasks on time, (b) spending on average three or more hours each day assisting children with learning, (c) negative overall impacts on their child's learning and less attention from the child's teacher to support reading skills, and (d) not getting sufficient support from the child's teacher. Obviously, facing such circumstances during more than a month of quarantine is likely to significantly increase parents' risk of stress, including parents of children without learning disabilities.

Study Limitations, Implications, and Future Research Directions

As an initial evaluation of quarantine conditions on students with dyslexia and their parents, our study should be understood while considering its limitations. For example, this study used child and parent wellness reports; however, only mothers completed all measures. Mothers' and fathers' ratings should be considered in future studies in an attempt to

determine whether mothers or fathers perceive wellbeing similarly. Also, future research should attempt to add observational measures.

This is indeed a challenging task during quarantine, but with significant resources, video recording could be used as a possible means of direct observation. Also, our sample is not representative of all students in Gujarat (or students globally) with dyslexia and future research is needed over time to gather data from a larger and even more representative sample. Similarly, future research should aim to broaden our understanding of how quarantine conditions impact children's educational and psychological wellbeing by including additional measures (e.g., direct assessments of reading during quarantine, more comprehensive assessments of depression or anxiety) and exploring possible mediators or moderators among variables. Components of time (e.g., for how long has the child or parent been experiencing quarantine) and specific behavior (e.g., to what degree has "typical" educational conditions, such as in-personv schooling, changed during quarantine) must also be examined to understand short-term and long-term impacts of quarantine.

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