


Dental pain, parental SARS-CoV-2 fear and distress on quality of life of 2 to 6 year-old children during COVID-19

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Abstract

Background: Coronavirus disease (COVID-19) has crippled life, families and oral healthcare delivery in India due to nationwide lockdown.

Aim: Through cross-sectional design, we investigated the impact of child's dental pain, caregiver's fear of SARS-CoV-2 and parental distress on oral health-related quality of life (OHRQOL) of preschoolers during the nationwide COVID-19 pandemic lockdown.

Design: Preschool children self-reported their pain using Pieces of Hurt scale; caregiver SARS-CoV-2 fear was assessed using Fear of COVID-19 scale and parental distress evaluated using 4-item scale. Child's oral health was assessed using the dmft index and OHRQOL evaluated using early childhood oral health impact scale. Bivariate, multivariate regression analysis was conducted to identify predictors; statistical significance was set at 5%.

Results: Sample mean age was 4.58 years, and about 69% were boys. Children reporting higher pain scores (OR = 1.9) due to decayed teeth and having dmft > 5 (OR = 4.25), followed by greater parental distress (OR = 4.13) and fear of SARS-CoV-2 (OR = 3.84), were significantly associated with poor OHRQOL during the COVID-19 pandemic.

Conclusions: Greater parental distress and fear of COVID-19 among caregivers, higher self-perceived dental pain among children and caries experience are associated with poor OHRQOL of preschool children during the COVID-19 pandemic.

KEYWORDS

COVID-19, ECC, fear, OHRQOL, pain, parental distress

1 | INTRODUCTION

The 2019 novel coronavirus (SARS-CoV-2) has infected 10.3 million people and has caused over 503 000 deaths worldwide as of 30 June 2020. India enforced the strictest lockdown in the world to control the COVID-19 pandemic. Tamil Nadu, the southernmost state in India, reported 86 224 confirmed cases and 1141 deaths as of 30 June 2020, and state lockdown had been extended until 31 July 2020 to control the disease.

COVID-19 severity among children and younger adults is reported to be mild,¹ but a greater number cases among infants and younger children are emerging.² COVID-19 pandemic has restricted children inside their homes which can affect them mentally,³ and in China, 3- to 6-year-olds were more likely to exhibit symptoms of behaviour, emotional disorders during this pandemic.⁴ Furthermore, caregiver's anxiety and fear of acquiring SARS-CoV-2 infection exacerbate their emotional distress and can worsen the stress of parenting during lockdown.⁵

Dental services are one of the worst hit during COVID-19 pandemic as all nonessential services were restricted and almost all practices were closed due to fear of SARS-CoV-2. Early childhood caries (ECC) is an endemic disease in India and its prevalence in Tamil Nadu is reported to be 63.4%.⁶ ECC negatively impacts the oral health-related quality of life (OHRQOL) of children and their parents,⁷ and children often need emergency management as it causes severe pain or life-threatening infections. COVID-19 pandemic is a unique situation causing severe and lasting psycho-social impact on families which can affect their child's mental health. Moreover, a child suffering from dental pain during this pandemic can impact the whole family as oral health services are unavailable during lockdown, and over-the-counter painkillers are restricted. Hence, we evaluated the impact of child's dental pain, parental distress and parental fear of SARS-CoV-2 on the OHRQOL of 2- to 6-year-old children visiting emergency care in a tertiary dental institution during the COVID-19 pandemic in Chennai, India.

2 | MATERIALS AND METHODS

This cross-sectional study was conducted among parent-child dyads who visited our dental institute from March to June 2020 to manage their child's dental pain as dental services were not available elsewhere in the city. The protocol was approved by the institutional ethical committee (SDC/SIHEC/2020/0619-0320), and only parents who provided consent were included in the study. Positive travel history, contact with COVID-19 patients, from containment zones, symptoms of fever and not willing to consent were excluded from the study.

Convenience sampling was employed, and all parent-child dyads visiting the centre were invited to participate. Among those who agreed to participate, demographic characteristics (age, gender of child, annual family income and gender of caregiver accompanying child) were recorded. Children were asked to assess their dental pain using Pieces of Hurt scale,⁸ following which caregivers reported the impact of child's oral health on their child (child impact-9 item) and family (family impact-4 item) using early childhood oral health impact scale (ECOHIS-13^a item).⁹ Parental distress^a was assessed using a four-item questionnaire described here.¹⁰ Each item was graded from 1 (Never) to 4 (Always), and the scores were added to have an aggregate parenting stress score and higher scores indicated greater stress. The fear of SARS-CoV-2 infection was assessed using fear of COVID-19 scale (FCV-19S^a).¹¹ It is a seven-item questionnaire with response rated on a five-item Likert scale ranging from strongly disagree to strongly agree and the score ranges from 7 to 35, higher scores indicating greater fear of COVID-19. The questionnaires were administered in Tamil, and validity was assessed

Why this paper is important to paediatric dentists

- Pain from odontogenic origin in preschool children during a pandemic can negatively impact the child's OHRQOL
- Greater fear of SARS-CoV-2 among parents negatively affects the OHRQOL of their child, and it might affect how parents seek dental care during the pandemic increasing the unmet dental needs in the child
- Child suffering from pain during a pandemic can impact a whole family as they are confined in their homes, which can adversely affect the OHRQOL of the child.

using back translation from Tamil to English and was found to be satisfactory. Reliability of the questionnaires was assessed among 20 caregivers randomly using test-retest, and intraclass correlation was found to be greater than 0.80 for all three scales (a-scales are attached in Appendix 1).

Oral examinations were performed by two trained paediatric dentists who diagnosed dental caries experience based on dmft index for primary dentition and the interexaminer reliability was 0.96. Based on the initial diagnosis and distance travelled for treatment, extraction and single/multivisit pulpectomy were performed to alleviate the pain symptoms. Data were analysed using SPSS V 23 (IBM, IL, CH). Crude associations of independent variables with OHRQOL were assessed using chi-square and independent t test, and only those variables found to be significantly associated were included in the regression model. Adjusted associations were estimated using multivariable logistic regression; ECOHIS and dmft were dichotomized into high/low based on median scores for regression analysis.

3 | RESULTS

A total of 3799 parent-child dyad visited our institution from March to June 2020, and only 222 fulfilled the inclusion and exclusion criteria (331 caregivers declined consent, 1534 were from containment zones/travel restrictions, 1301 had symptoms/contact with COVID-19 case, 411 were incompletely filled questionnaires). Sample baseline characteristics are presented in Table 1. Mean age of children was 4.58 years, 69.2% were males and mean dmft was 6.45 (3.6). Almost 45% of the caregivers reported annual family income of less than four lakh rupees (5555.5 USD), 64% had high fear of SARS-CoV-2 infection and 36% reported greater parental

TABLE 1 Baseline characteristics of the sample

Variables (scores)	Mean (SD)	Minimum	Maximum
Child's age	4.58 (1.18)	2	6
Parental distress (4-16)	10.65 (1.75)	7	15
FCV-19S (7-35)	27.93 (3.11)	21	34
Pain score (1-4)	3.11 (0.77)	2	4
OHRQOL (0-52)	29.72 (6.48)	18	42
Child impact (0-36)	20.25 (4.28)	13	29
Family impact (0-16)	9.47 (2.48)	4	16

distress. Tooth extraction (92), single-visit pulpectomy (110) and pre-fabricated stainless-steel crowns (SSC) were placed in 89 children. Multiple visit pulpectomy with SSC was performed in 20 cases. All the variables except child's age and gender were significantly associated with OHRQOL at the bivariate level (Table 2), and only significant variables were

TABLE 2 Crude association of risk factors with child's OHRQOL

Variables	OHRQOL		P value
	Low impact	High impact	
Child's age	4.66 (1.12)	4.49 (1.23)	.297 ^a
dmft score	3.99 (1.27)	9.41 (3.25)	<.001 ^{a,*}
Pain score	2.62 (0.63)	3.69 (0.48)	<.001 ^{a,*}
Fear of COVID-19	25.76 (2.11)	30.54 (1.88)	<.001 ^{a,*}
Parental distress	9.58 (1.18)	11.94 (1.44)	<.001 ^{a,*}
Gender			
Male	69 (56.1%)	54 (43.9%)	.595 ^{b,*}
Female	52 (52.5%)	47 (47.5%)	
Treatment provided			
Extraction	61 (66.3%)	31 (33.7%)	.005 ^{b,*}
Single-visit pulpectomy	48 (43.6%)	62 (56.4%)	
Multiple visit pulpectomy	12 (60.0%)	8 (40.0%)	
Accompanying caregiver			
Male	80 (67.2%)	39 (32.8%)	.001 ^{b,*}
Female	41 (39.8%)	62 (60.2%)	
Annual family income			
<2.5 lakhs	6 (11.1%)	48 (88.9%)	.001 ^{b,*}
2.4-4 lakhs	14 (30.4%)	32 (69.6%)	
4-7 lakhs	80 (85.1%)	14 (14.0.9%)	
>7 lakhs	21 (75%)	7 (25%)	

^aIndependent *t* test.

^bChi-square test.

**P* < .05 is significant.

included in the regression model. Higher pain scores reported by the child increased the risk of poorer OHRQOL by almost two times (OR, 1.9; 95% CI 2.6-16.8); dmft score > 5 increased the odds by four times (OR, 4.2; 95% CI, 1.1-13.6). Greater parental distress (OR, 4.1; 95% CI, 1.3-12.7) and fear towards COVID-19 among parents were significantly increased the risk of poor OHRQOL of the child by almost four times as compared to parents with lower distress and fear of COVID-19 (OR, 3.8; 95% CI, 1.1-13.0; Table 3).

4 | DISCUSSION

Early childhood caries is an endemic problem in India, and millions of children suffer from this debilitating disease worldwide. This cross-sectional study was conducted to assess the impact of dental pain caused by untreated decayed teeth in preschool children, parental distress, and COVID-19 fear on the OHRQOL of the child during national lockdown. Higher scores of self-reported pain and dental caries experience, greater parental fear of SARS-CoV-2 and distress during the pandemic lockdown were negatively associated OHRQOL of the child.

COVID-19 has caused unprecedented challenges towards seeking and provision of routine dental care due to fear of SARS-CoV-2. The primary route of transmission of SARS-CoV-2 is through respiratory droplets and saliva,¹² and dentists are among the most exposed to the COVID-19 infection as almost every dental procedure generates salivary bioaerosols at close proximity¹³ and SARS-CoV-2 is transmitted through aerosols.¹⁴ SARS-CoV-2 survival on surfaces like plastics, cupboards, stainless steel and masks can range from 8 hours to 7 days depending on environmental conditions, risks the entire dental team.¹⁴ Routine dental and oral surgery procedures generating aerosol have been suspended in several countries and Indian government posed restriction on all elective dental procedures during COVID-19 national lockdown.

Paediatric cases pose unique threat as majority children are secondary cases due to confinement and show no symptoms of COVID-19, but can transmit the disease.¹ World Health Organization and United Nations children education fund have provided recommendations to caregivers regarding reduction of parental stress while dealing with their healthy children. COVID-19 has disrupted the child's routine by closing preschools, playgrounds and they are not able to meet their friends which can lead to distress and confusion.¹⁵ Further, a child suffering from pain during this pandemic can become more demanding, impatient and hostile, and distressed parents can further exacerbate the fragile situation and cause child distress.³ Parental distress is further exacerbated by lack of access to care and their inability to alleviate child's pain during this COVID-19 pandemic. To the best of

TABLE 3 Adjusted associations of potential risk factors for child's OHRQOL

Variables	AOR	95% CI		P value
		Lower	Upper	
Pain score	1.90	2.66	11.84	<.001*
FCV-19S	3.84	1.03	13.02	.021*
Parental distress	4.13	1.33	9.76	.014*
dmft score				
<5 (R)				.015*
>5	4.25	1.13	13.69	

Abbreviations: AOR, adjusted odds ratio.

* $P < .05$ is significant.

our knowledge, only one protocol has reported studying the parental stress during COVID-19 and their association with depression and anxiety (<https://clinicaltrials.gov/ct2/show/NCT04377074>).

Early childhood caries is a chronic infectious disease affecting children below six years and causes acute phases of pain. Parents of children suffering from asthma, diabetes, cancer, juvenile rheumatoid arthritis report greater distress,¹⁶ and ECC is no exception. Caregivers who reported higher distress score negatively impacted their child's OHRQOL and we believe we may be the first to report an association between parental distress and child OHRQOL. Fear of COVID-19, termed as 'coronaphobia' caused by the unpredictable nature of the disease, uncertainty and fear of getting infected leads to mental distress and behaviour change in common people.¹⁷ Caregivers who expressed greater fear towards COVID-19 could have delayed the care required for their child thus negatively impacting their OHRQOL. Further, lack access to care close to home can be a significant predictor as majority caregivers had travelled at least 10 miles for oral care.

Poor oral health, decayed teeth and dental pain are established risk factors for poor OHRQOL in preschool children, and the same was found in our cohort.^{7,18} A strength of our study includes the assessment of COVID-19 fear, parental distress and child's self-report of pain. The usual predictors such as economic status (annual family income), gender, and age of the child were not significant in the multivariate analysis; this finding helps us comprehend the impact of COVID-19 upon families and child's oral health, highlighting the need for prospective studies to establish the causality. Limitations include the lack of elaborate data on demographics, psychological assessment such as depression/anxiety among the caregivers and comprehensive behaviour assessment of the child. Lastly, the cross-sectional nature of the study prevents us from establishing causal associations. COVID-19 has universal impact and we believe our results can be generalized globally as schools are still closed, and majority of countries are enforcing new lockdowns and travel restrictions.

In conclusion, greater parental distress and fear of COVID-19 among caregivers, higher self-perceived dental pain among children and caries experience was associated with poor OHRQOL of preschool children during the COVID-19 pandemic lockdown in South India.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

SRS designed the study, prepared the protocol, collected and analysed the data, prepared the manuscript and critically revised the manuscript. SK analysed data and prepared manuscript draft. AMBK and MAS performed literature search and critically revised the article. A.E and SRV prepared the manuscript draft, critically revised prior to submission.

ETHICAL APPROVAL

The study was approved by IEC (SDC/SIHEC/2020/0619-0320) and informed consent was obtained from the parent before enrolling in the study.

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APPENDIX 1

Early childhood oral health impact scale (ECOHIS)

Citation: Pahel BT, Rozier RG, Slade GD. Parental perceptions of children's oral health: the Early Childhood Oral Health Impact Scale (ECOHIS). *Health Qual Life Outcomes*. 2007;5:6. Published 2007 Jan 30. <https://doi.org/10.1186/1477-7525-5-6>

‘Problems with the teeth, mouth or jaws and their treatment can affect the well-being and everyday lives of children and their families. For each of the following questions please circle the number next to the response that best describes your child's experiences or your own. Consider the child's entire life from birth until now when answering each question. If a question does not apply, check “Never”’

Response options: 1. Never, 2. Hardly ever, 3. Occasionally, 4. Often, 5. Very often and 6. Don't know.

1. How often has your child had pain in the teeth, mouth or jaws? (*Child symptoms domain*)

How often has your child.....because of dental problems or dental treatments? (*Child function domain*)

2. had difficulty drinking hot or cold beverages

3. had difficulty eating some foods

4. had difficulty pronouncing any words

5. missed preschool, daycare or school

How often has your child.....because of dental problems or dental treatments? (*Child psychological domain*)

6. had trouble sleeping

7. been irritable or frustrated

How often as your child.....because of dental problems or dental treatments? (*Child self-image/social interaction domain*)

8. avoided smiling or laughing when around other children

9. avoided talking with other children

How often have you or another family member.....because of your child's dental problems or dental treatments? (*Parent distress domain*)

10. been upset

11. felt guilty

How often.... (*Family function domain*)

12. have you or another family member taken time off from work...because of your child's dental problems or dental treatments

13. has your child had dental problems or dental treatments that had a financial impact on your family?

Fear of coronavirus-19 scale

Citation: Ahorsu DK, Lin CY, Imani V, Saffari M, Griffiths MD, Pakpour AH. The Fear of COVID-19 Scale: Development and Initial Validation [published online ahead of print, 2020 Mar 27]. *Int J Ment Health Addict*. 2020;1-9. <https://doi.org/10.1007/s11469-020-00270-8>

The participants indicate their level of agreement with the statements using a five-item Likert-type scale. Answers included 'strongly disagree', 'disagree', 'neither agree nor disagree', 'agree', and 'strongly agree'. The minimum score possible for each question is 1, and the maximum is 5. A total score is calculated by adding up each item score (ranging from 7 to 35). The higher the score, the greater the fear of coronavirus-19.

1. I am most afraid of coronavirus-19.
2. It makes me uncomfortable to think about coronavirus-19.
3. My hands become clammy when I think about coronavirus-19.
4. I am afraid of losing my life because of coronavirus-19.
5. When watching news and stories about coronavirus-19 on social media, I become nervous or anxious.
6. I cannot sleep because I'm worrying about getting coronavirus-19.
7. My heart races or palpitates when I think about getting coronavirus-19.

Parental stress scale

Citation: Streisand R, Mackey ER, Herge W. Associations of parent coping, stress, and well-being in mothers of children with diabetes: examination of data from a national sample. *Matern Child Health J*. 2010;14(4):612-617. <https://doi.org/10.1007/s10995-009-0497-7>

Parent stress was assessed with four items. Each item was rated by the respondent on a scale from 1 (Never) to 4 (Always). Item ratings were then summed together to create a total parenting stress score, with a possible range of scores from 4 to 16.

The items were:

1. During the past month, how often have you felt [CHILD] is much harder to care for than most children [his/her] age?
2. During the past month, how often have you felt [he/she] does things that really bother you a lot?
3. During the past month, how often have you felt you are giving up more of your life to meet[CHILD]'s needs than you ever expected?
4. During the past month, how often have you felt angry with [him/her]?