



Factors associated with Oral Health Related Quality of Life of children with severe -Early Childhood Caries

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ARTICLE INFO

Keywords:

Early Childhood Caries

s-ECC

Hi-ECOHIS

Oral health related quality of life

India

ABSTRACT

Background: Early Childhood Caries (ECC) is a chronic childhood disease affecting children worldwide. Severe cases of ECC can significantly affect child's Oral Health Related Quality of Life (OHRQoL) owing to its consequences. The purpose of present study was to find out association between severe early childhood caries (s-ECC) and OHRQoL of children and their parents/care-givers visiting a Government dental hospital in Delhi, India.

Methods: Data was collected from a hospital - based sample of 454 child-parent pair. OHRQoL of the child and parent was assessed using the Hindi version of Early Childhood Oral Health Impact Scale (Hi-ECOHIS). Children with s-ECC were identified as per definition given by American Academy of Paediatric Dentistry. Chi square test and Binary regression analysis were used to evaluate the effect of s-ECC on OHRQoL and to study role of various socio demographic factors.

Results: The prevalence of s-ECC was 77.1% (n = 350). The mean dmft index score was 5.67 (± 3.72) and dmfs was 11.21 (± 11.03). The mean overall ECOHIS score was 7.02 (± 5.47). Child impact items such as Pain, fever, caries associated swelling along with difficulty in eating food, halitosis, disturbed sleep, frequent absenteeism from school were found to be more significantly more frequent in children with s-ECC than ECC. Children with bottle-feeding habit of more than one year, having fewer siblings, and whose parents belong to upper socio economic class were at higher odds of suffering from s-ECC.

Conclusion: s-ECC has significantly more detrimental impact on the OHRQoL of children and their parents in comparison to ECC.

1. Introduction

The concept of assessing the OHRQoL has become popular over the years because the standard clinical indicators are unable to capture all the traits of oral health.¹ It has been reported that the presence of dental diseases and related disorders may have negative impact on the physical and psychological health of child and their parents thereby leading to poor OHRQoL in them.² “Early childhood caries” (ECC) is one such common dental health condition seen in infants and toddlers around the world. It has been defined as “the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of six years”.³ The aetiology of ECC is complex and multifactorial. Children with high frequency of breast and/or bottle feeding demonstrates increased risk for ECC.^{4,5} Other than feeding habits, factors such as

socioeconomic status of parents and oral health behaviour of child are found to be modifying factors in occurrence of ECC.^{6,7} ECC can lead to pain, infection, difficulty in eating and speaking as well as psychological effects such as lower self esteem and poor communication ability in a child.⁸ Data from systematic reviews reported global prevalence of ECC in range of 23.8%–57.3%⁹ and 49.6% in Indian children.¹⁰

Impact of ECC on OHRQoL is assessed using standardized OHRQoL scales such as Early Childhood Oral Health Impact Scale (ECOHIS).¹¹ This scale has been validated in various languages around the world and a Hindi version of ECOHIS (Hi-ECOHIS) is available.¹² There is plenty of literature available where impact of ECC on child's and parents OHRQoL is assessed using ECOHIS but the data is scarce on comparing simple ECC cases with s-ECC one. We feel comparative studies conducted on children with different level of severity of ECC can contribute in prioritizing resources in oral health care for the high risk

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<https://doi.org/10.1016/j.jobcr.2019.05.005>

Received 21 January 2019; Received in revised form 27 March 2019; Accepted 17 May 2019

Available online 21 May 2019

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groups. Therefore a cross-sectional study was designed to compare impact of ECC and s-ECC on OHRQoL of the affected children and their parents using Hi-ECOHIS.

2. Methods

The study participants were 460 child - parent pair visiting Department of Paediatric Dentistry, Faculty of Dentistry, Jamia Millia Islamia between 1st March to 30th June 2018. Permission for conducting this study was obtained from ethics Committee of Jamia Millia Islamia University, New Delhi (Letter no.5/12/155/JMI/IEC/2017). Written consent from parent/s was obtained prior to oral examination and interview. Convenience sampling method was utilized for enrolment of participants into the study. Based on results from a systematic review¹⁰ on prevalence of ECC in Indian population the approximate prevalence of ECC is around 50%. The sample size required at 95% confidence interval and 80% power was calculated to be 414. We examined 46 more participants to give approximately equal representation to confounding variables such as age, gender and socioeconomic status.

2.1. Eligibility criteria

The children under the age of 6 years of age of either gender who were suffering from ECC were included in the study. They must be accompanied with Hindi speaking parent/guardian who is living with the child for at least 12 h per day. The Children undergoing orthodontic treatment, suffering from systemic diseases or physical/learning disabilities and Children/accompanying parents who were not willing to participate or unwell were excluded.

2.2. Study proforma and data collection

The data was collected using a proforma which was divided under two main sections – interview of the parent/s and clinical examination of the child. The first part of the interview was questions pertaining to recording demographic information, feeding history, oral hygiene habits and socio-demographic characteristics of the child and parent. Socioeconomic status of the parent was assessed using modified Prasad BG scale for Indian families.¹³ Second part of interview included 13 questions from Hi-ECOHIS. Responses to these questions were recorded as “never”, “occasionally” and “often” options and were given score of 0, 1 and 2 respectively. These responses are suggested by the authors who validated Hi-ECOHIS and are different from 5 point likert scale used in original ECOHIS.¹²

A previously trained examiner (SM) examined and interviewed all the study participants under the guidance of one main researcher (AM). Pilot study was conducted by examining 20 children. The training and calibration of the examiner in recording caries indices was done on pilot sample. The intra examiner kappa value was 0.8. A clinical examination of the child was performed using mouth mirror and CPI probe on dental chair under artificial light. Dental caries was recorded using dmf and dmfs indices.¹⁴

Cases of s-ECC were identified on the basis of definition given by American Academy of Paediatric Dentistry i.e. “any sign of smooth-surface caries in a child younger than three years of age, and from ages three through five, one or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled score of greater than or equal to four (age 3), greater than or equal to five (age 4), or greater than or equal to six (age 5)”.³

2.3. Statistical analysis

Statistical Package for Social Sciences (SPSS for Windows, version 21) was utilized for data analysis. Descriptive analysis and Frequency distribution was done for caries indices and ECOHIS scores. Statistical

differences in ECOHIS scores between s-ECC and ECC group were assessed using chi square test. Value of $p < 0.05$ was considered a statistically significant difference between the two groups. Binary regression models were used to evaluate the effect of various socio demographic factors on severity of ECC.

3. Results

In total, 460 children –parent pair participated but six pairs were excluded from the study because they answered 2 or more questions of Hi-ECOHIS in “Don't Know” category. The mean age of 454 participating children was 4.21 years ($SD = 0.91$). Males ($n = 260$) were more in number as compared to females (194) but the difference was not statistically significant. Majority of parents belong to upper middle class strata (58.1%) and were in a conjugal relationship (91.2%) with their spouse. Most of the mothers interviewed were of age less than 30 years (56.6%) and had two or less children (84.6%). As the mean age of children was on the higher side for recording ECC, most of children had received more than a year of bottle (47.6%) and breast feeding (57.3%).

The level of education obtained by the parents was almost equally distributed in primary, secondary and higher secondary or above. Majority of the parents started brushing teeth of their child after one year of age (79.7%) and frequency was mostly once in a day (66.7%). Approximately half (47.1%) of the children had visited dentist before in their life. Subjective evaluation of their child's oral health revealed that most parents consider it to be poor (28.4%) or just fair (41%). The mean dmft index score was $5.67 (\pm 3.72)$ and dmfs was $11.21 (\pm 11.03)$. The dt component contributed maximum to the dmft values (Table 1). The prevalence of s-ECC was 77.1% ($n = 350$).

Mother (64.3%) answered most of the questionnaires. The mean ECOHIS score was $7.02 (\pm 5.47)$ and 90.3% parents reported ECOHIS score > 0 with score ranging up to 23. Parents of children who were suffering from s- ECC responded positively (occasionally and often category) for Hi-ECOHIS questions as compared to ECC group. This difference was statistically significant across all the child and family impact questions except for financial implications, as shown in Table 2.

The binary logistic regression analysis was done to analyse the effect of various socio-demographic factors on the presence of s-ECC. The children studying in the private school ($OR = 0.517$), having 3 or more siblings ($OR = 0.504$), baby bottle feeding for 6 months or less ($OR = 0.424$) and started brushing at less than 1 year of age ($OR = 0.103$) had lesser odds of having s- ECC. The parents belonging to middle class ($OR = 3.878$) and Upper class ($OR = 4.851$) socioeconomic status were associated with higher odds of having s- ECC (Table 3).

4. Discussion

Results of the present study showed that OHRQoL of children with s-ECC was poorer than children with only ECC. It was observed that the frequency of positive responses for child impact items of Hi-ECOHIS such as pain, difficulty in eating or cleaning teeth, food lodgement, bad breath, trouble in sleeping, fever and missed school were significantly higher in s-ECC group. Pain due to caries was the common complaint among the study participants. Toothache not only affects the oral function but it disrupts overall routine of a child such as sleep, going to

Table-1
Mean caries indices (dmf and dmfs) scores of the study participants.

Caries indices	Mean	Standard deviation
Decayed (dt)	5.35	3.62
Missing (mt)	0.13	0.65
Filled (ft)	0.23	0.77
dmf index	5.67	3.72
dmfs index	11.21	11.03

Table 2
Frequency distribution of Hi-ECOHIS scores for children with s-ECC and only ECC.

Child Impact Items*	ECC			S-ECC		
	Never n (%)	Occasionally n (%)	Often n (%)	Never n (%)	Occasionally n (%)	Often n (%)
Pain	65 (62.5)	31 (29.8)	8 (7.6)	102 (28.8)	190 (53.6)	58 (16.3)
Swelling	84 (80.7)	19 (18.2)	1 (0.9)	223 (62.9)	108 (30.5)	19 (5.3)
Difficulty in eating	58 (55.7)	48 (46.1)	6 (5.7)	117 (33)	181 (51.1)	52 (14.6)
Food caught in- between teeth	44 (42.3)	54 (51.9)	6 (5.7)	70 (19.7)	216 (61)	64 (18)
Sensitivity to hot/cold food/drink	66 (63.4)	32 (30.7)	6 (5.7)	101 (28.5)	195 (55)	54 (15.2)
Bad breath	80 (76.9)	20 (19.2)	4 (3.8)	191 (53.9)	131 (37)	28 (7.9)
Difficulty in cleaning teeth	79 (75.9)	22 (21.1)	3 (2.8)	156 (44)	147 (41.5)	47 (13.2)
Trouble sleeping	86 (82.6)	12 (11.5)	6 (5.7)	190 (53.6)	125 (35.3)	35 (9.8)
Irritable, crying	82 (78.8)	15 (14.4)	7 (6.7)	156 (44)	155 (43.7)	39 (11)
Missed school/play etc	82 (78.8)	19 (18.2)	3 (2.8)	209 (59)	129 (36.4)	12 (3.3)
Fever	91 (87.5)	12 (11.5)	1 (0.9)	246 (69.4)	95 (26.8)	9 (2.5)
Family Impact Items						
Missed work*	77 (74)	25 (24)	2 (1.9)	204 (57.6)	130 (36.7)	16 (4.5)
Financial impact	87 (83.6)	15 (14.4)	2 (1.9)	270 (76.2)	69 (19.4)	11 (3.1)

*Statistically significant difference ($P < 0.05$); chi square test was applied.

Table 3
Binary logistic regression analysis of effect of sociodemographic variables among participants with or without s-ECC.

Factors	Categories of response	Odds ratio (CI)	p-value
School type	No schooling	Ref	
	Public	0.824 (0.436–1.558)	0.55
	Private	0.517 (0.347–0.770)	0.001*
Number of siblings	Upto 2	Ref	
	3 or more	0.504 (0.291–0.876)	0.01*
Socioeconomic status	Lower class	Ref	
	Lower middle class	3.750 (0.881–15.955)	0.07
	Middle class	3.878 (1.046–14.371)	0.04*
	Upper middle class	2.308 (0.593–8.988)	0.22
	Upper class	4.851 (1.372–17.150)	0.01*
Baby bottle feeding	Never	Ref	
	6 months or less	0.424 (0.183–0.982)	0.04*
	6 months to 1 year	0.770 (0.400–1.485)	0.43
	More than 1 year	1.490 (0.889–2.500)	0.13
when brushing of teeth started	Never	Ref	
	First erupted tooth	0.769 (0.063–9.371)	0.83
	≤ 1 year	0.103 (0.013–0.839)	0.03*
	> 1 year	0.285 (0.037–2.210)	0.23

*p < 0.05- statistically significant.

school, relaxing etc.^{15,16} Difficulty in eating food can affect growth and development of a child and bad breath can create a hindrance in his/her social interaction with peer group leading to lower self esteem. Frequent absenteeism from school due to various reasons can affect academic development of the child. Responses to family impact items indicated that parents of children with s-ECC were not paying proper attention to their child's teeth, as these parents didn't feel need to miss work to get dental treatment of their child or felt any financial impact of ECC treatment.

The prevalence of s-ECC in our study was high (77.1%) probably due to the reason that sample for current study was obtained from a dental hospital where parents usually bring their children when he/she complains of pain or develop aesthetic problems or find difficulty in eating due to multiple carious lesions.

The present study showed that the parents belonging to upper middle and upper class SES had proportionately higher number of children with s-ECC than other SES classes. This finding is in contrast to previous studies where lower SES of parents was associated with ECC.^{17,18} Chaffee BW et al.⁷ in their study reported that children from

higher social class had more impact on their QoL due to ECC as compared to lower class. The children attending private school had less cases of s-ECC as compared to the children attending government schools. The difference in economic and educational background of parents could be the possible reason for this finding. Children who were bottle fed for more than 6 months were at higher odds of having s-ECC. Bottle-feeding has been found to be associated with increased risk of ECC.¹⁹

4.1. Strength and limitations

Before discussing implications of results, we want to point out the limitations and strength of our study. As this study is cross sectional in nature, we cannot establish direct cause and effect relationship with its results. Second limitation is utilization of hospital –based convenience sample that effect generalizability of findings of the study to the general population. The strength of this study is that it is a first attempt where direct comparison is done between children with ECC to those with S-ECC.

5. Conclusion

The findings of this study suggests that factors such as socio-economic status of parents, type of school, bottle feeding habits, number of siblings as well as starting age of tooth brushing has an impact on child's ECC risk and OHRQoL. Our study has added to the evidence on effect of ECC especially its severe form on OHRQoL of a child.

Conflict of interest

The authors declare that they have no conflict of interest.

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