

Prevalence of Early Childhood Caries in IVF Children - A Pilot Study

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Abstract

Context: Early Childhood Caries (ECC) is one of the major problems affecting the tooth structure in childhood before 71 months of age. It may affect both *in vitro* fertilization (IVF) and spontaneously conceived children.

Aims: This study was aimed to evaluate, identify, and compare the prevalence of ECC in deciduous dentition of IVF and spontaneously conceived children before 71 months of age.

Settings and Design: In a cross-sectional case control study ECC status of 24 -71 Months of aged children were assessed. The studied case group consisted of term, singleton babies who were the outcome of IVF in the studied area.

Subjects and Methods: The control group consisted of term, first child, singleton and spontaneously conceived 24-71 months old children who were also resident of the studied area. A sample of 103 IVF and 162 spontaneously conceived children was examined utilizing caries assessment spectrum and treatment (CAST).

Statistical Analysis Used: Statistical analysis was done using Chi-square tests (χ^2) or Z test.

Results: Statistically significant difference found in some aspects among studied i.e. IVF children and control group i.e. spontaneously conceived children.

Conclusions: IVF children are considered better than spontaneously conceived children in some aspects when studied in relation to ECC status evaluated through CAST.

Keywords: ECC, Deciduous dentition, *in vitro* fertilization, children, prevalence.

Introduction

The birth of first ever IVF child occurred in Oldham, England on July 25, 1978. This birth was the result of the collaborative work of two innovative personality - Dr. Patrick Step toe and Dr. Robert Edwards.[1] In the same year, on 3rd October the birth of world's 2nd test tube baby 'Durga' was born as a result of untiring effort advocated by Dr. Saroj Bhattacharya and Dr. Subhas Mukherjee[2] in Kolkata, West Bengal. According to The American Academy of Pediatric Dentistry (AAPD) Early

Childhood Caries(ECC) is 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 preschool age child between birth and 71 months of age.” In children who are younger than 3 years of age, any sign of smooth-surface caries is indicative of severe early childhood caries (S-ECC). For children aged 3 to 5; 1 or more cavitated lesion, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled with score of ≥ 4 (age 3), ≥ 5 (age 4), or ≥ 6 (age 5) surfaces constitutes S-ECC.[3-4] ECC is regarded as the most widespread dental disease affecting young children.[5] Though it is not posing any life threatening effect, but it implies considerable effect on chewing efficacy, growth rate as well as quality of life of children. Researchers of University of Brasília, Brazil and Radboud University Nijmegen Medical Centre of The Netherlands had designed the “caries assessment spectrum and treatment”(CAST)[6] was done by incorporating benefits of PUFA,[8] ICDAS,[7] and the DMF index in a simple but effective manner. Since, there has been no study on ECC status in deciduous dentition of IVF children of the studied area it was decided to conduct a cross-sectional study in that area to investigate the prevalence and severity of ECC among IVF children of the studied area, in order to evaluate the changes in the oral health due to IVF and compare the data with spontaneously conceived children of the same age group to provide a baseline data aiding for future larger studies.

Materials and Methods

The present study was a descriptive, cross-sectional study, approved by the Ethical Committee of JIS University, Kolkata. ECC status of 24-71 months old children were evaluated thoroughly. The children in both case (IVF) and control (spontaneously conceived)

groups based on the route of pregnancy were enrolled for the study. Specific inclusion criteria of sample selection for the present study were (a) baby must be of 37–42 weeks gestational age, (b) singleton babies were preferred, (c) only first children were selected for the present study, (d) family should have medium and high socioeconomic condition.

Exclusion criteria were – (a) congenitally malformed children, (b) parent having a history of multiple pregnancy, (c) children having severe asphyxia, (d) children having genetic syndromes and chromosomal abnormalities, were excluded from the present study. Confounding variables of this study were social upbringing of the children, different food habits, different behavioral pattern of individual and variation in parental care. The case group consisted of term (gestational age of the babies were 37–42 weeks), singleton babies whom were end result of IVF of the studied area and were chosen by a computer generated random number list. The control group constitutes of term, first child, singleton, and spontaneously conceived 24-71 months old children whom were referred to the Department of Pedodontics and Preventive Dentistry for the purpose of initial dental health checkup. Case and control studied individual were matched for the, maternal weight, maternal age, socioeconomic status area of residence gestational age and year of birth. The study was conducted after informed consent was procured from the concerned authorities and respective guardians of children. A total of 453 parents of studied samples were approached to participate in our present study. Out of the above total sample, the parents of 103 IVF and 162 spontaneously agreed to participate in this study [Tables 1 and 2].

To exclude inter observer error all examination and documentation were made by a trained single examiner who was not informed about the birth status of our studied

samples. After informed consents were collected from the parents, all children were examined for dental caries using sterile mouth mirror and probe under adequate illumination. All subjects were examined in the supine position. A well structured and validated history sheet was applied for proper documentation, but the caries assessment was not graded before the study. Before examination, each tooth was wiped with a sterile cotton roll to get a dry surface for proper evaluation. Chisquare test or Z tests were used for statistical analysis.

Results

During comparison of sound tooth structure category, the value of z is 2.9544. The value of p is .00318. The result is significant at $p < .05$. During comparison of carious involvement, the value of z is -2.9544. The value of p is .00318. The result is significant at $p < .05$. During the comparison of sealed tooth category, the value of z is 0.9787. The value of p is .32708.

The result is not significant at $p < .05$. During comparison of restored tooth category, the value of z is 0.6559. The value of p is .50926. The result is not significant at $p < .05$. During comparison of distinct visual change in enamel category, the value of z is -1.1285. The value of p is .25848. The result is not significant at $p < .05$. During comparison of internal caries related discoloration in dentine category, the value of z is -0.5733. The value of p is .56868. The result is not significant at $p < .05$. During comparison of distinct cavitation into dentine category, the value of z is -1.6069. The value of p is .1074. The result is not significant at $p < .05$. During comparison of Involvement of pulp chamber, category, the value of z is -1.9756. The value of p is .0477. The result is significant at $p < .05$. During comparison of abscess/fistula category, the value of z is -2.2901. The value of p is .02202. The result is significant at $p < .05$. During comparison of lost (due to

caries) category, the value of z is -1.8. The value of p is .07186. The result is not significant at $p < .05$. [Tables 1-5].

Discussion

This study was probably the first study on ECC applying a new caries detection tool - CAST, which demonstrates early childhood caries prevalence in IVF children of West Bengal. In our present study, 91.26% and 77.16% cases of sound teeth were found in IVF and spontaneously conceived children respectively, and the result is statistically significant (Z-score is 2.9544). 8.73% of caries affected IVF children found in this study instead of 22.83% in spontaneously conceived children, and the result is also statistically significant. These interpretations reflect the positive attitude of the parents of IVF children regarding the oral health maintenance of their beloved children. Moreover, as all the IVF families of the present study were from above average strata both socioeconomically and educationally, they are probably more concerned in respect to their baby's general and oral health status. During comparison of Involvement of pulp chamber category, the value of z is -1.9756. The value of p is .0477. The result is significant at $p < .05$. During comparison of abscess/fistula category, the value of z is -2.2901. The value of p is .02202. The result is significant at $p < .05$. These results also reflect that parents of IVF children are more concerned about their beloved children and provide necessary dental treatment at the earliest, preventing further progression of dental caries as observed in spontaneously conceived children. Statistically

insignificant results are observed in rest of the categories. No previous study is found involving IVF children in this new field of research. Hence, no comparison is presently possible with the previous study.

Conclusion

In the present study, IVF children exhibiting dissimilar kind of early childhood caries pattern than spontaneously conceived children. IVF children are considered better than spontaneously conceived children when studied in relation to early childhood caries status. This study invites further scope for cross sectional and longitudinal study with larger sample size.

Table 1 : Distribution of IVF Children and spontaneously conceived children according to sex.

Type of Delivery	Male		Female		Total	
	No.	%	No.	%	No.	%
IVF Children	61	59.23	42	40.77	103	100
Spontaneously Conceived Children	103	63.58	59	36.41	162	100
Total	164	61.88	101	38.11	265	100

Table 2 : Distribution of ECC among IVF Children and spontaneously conceived children.

ECC Status	IVF Children		Spontaneously Conceived Children		Total	
	No.	%	No.	%	No.	%
Found	9	8.73	37	22.83	46	20.75
Not Found	94	91.26	125	77.16	219	82.64

Table 3 : Distribution of ECC among IVF Children and spontaneously conceived children according to sex.

ECC Status	IVF Children				Spontaneously Conceived Children				Total	
	Male		Female		Male		Female		No.	%
	No.	%	No.	%	No.	%	No.	%		
Found	6	66.66	3	33.33	21	56.75	16	43.24	46	17.35
Not Found	55	58.51	39	41.48	82	65.60	43	34.40	219	82.64

Table 4 : Prevalence of total spectrum of dental caries of IVF Children

Code	Area Involved	Descriptive features	
		No.	%
0	Sound	94	91.26
1	Sealed	3	2.91
2	Restored	4	3.88
3	Distinct visual change in enamel	1	0.97
4	Internal caries-related discoloration in dentine	1	0.97
5	Distinct cavitations into dentine	0	0
6	Involvement of pulp chamber	0	0
7	Abscess/Fistula	0	0
8	Lost (due to caries)	0	0
9	Does not match with any of the other categories	0	0
A	Absent	0	0

Table 5 : Prevalence of total spectrum of dental caries of Spontaneously Conceived Children

Code	Area Involved	Descriptive features	
		No.	%
0	Sound	125	77.16
1	Sealed	2	1.23
2	Restored	4	2.46
3	Distinct visual change in enamel	5	3.08
4	Internal caries-related discoloration in dentine	3	1.85
5	Distinct cavitations into dentine	4	2.46
6	Involvement of pulp chamber	6	3.70
7	Abscess/Fistula	8	4.93
8	Lost (due to caries)	5	3.08
9	Does not match with any of the other categories	0	0
A	Absent	0	0

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