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Original Article

Comparative Evaluation of Impact of Dental Caries, Malocclusion and Developmental Defects on Preschooler's Quality of Life

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Abstract

Introduction: From the literature, it is evident that carious lesions can compromise children's quality of life. Malocclusion and developmental defects of enamel (DDE) can be considered as a public health problem due to its high prevalence. Studies investigating the impact of malocclusion and DDE on the quality of life of preschool children have shown conflicting results. It is necessary to determine the occurrence of oral problems as early as possible to diminish the impact on children's quality of life.

Purpose: The purpose of this study is to compare the impact of dental caries and other oral diseases such as malocclusion and developmental defects on preschooler's quality of life.

Methods: A total of 300 children aged 2-6 years were included in the study from different schools of South Bangalore. The parents were interviewed to answer a questionnaire on socioeconomic status and early childhood oral health impact scale (ECOHIS). Oral examination was done by a calibrated dentist under school environment.

Results: The dental caries, malocclusion and DDE were more likely to have a negative impact on the oral health-related quality of life (OHRQoL) Brazilian version of the ECOHIS scores.

Conclusion: The parent's perception of their child's oral health is strongly influenced by the presence of dental caries, malocclusion and DDE. Patient-oriented outcomes like OHRQoL will enhance the understanding of the relationship between oral and general health which will help researchers to improve the quality of life of preschool children.

Key words: Dental caries, Developmental defects, Malocclusion, Preschoolers, Quality of life

INTRODUCTION

Oral diseases can negatively influence the quality of life of children and parents, causing harm in the development of routine activities, child development, and their well-being. The impact of oral health on one's quality of life is termed as oral health-related quality of life (OHRQoL). During childhood, oral changes may affect the health and quality of a child's systemic life. The most prevalent oral disease in primary dentition is dental caries which affects 50% of preschooler.[1] It causes a negative impact on OHRQoL, and the most frequent consequences are impaired chewing and speech, sleep disturbances, irritability, and pain.

Malocclusion is another dental disorder in primary teeth and is considered a public health problem due to its high prevalence.[2] It is observed that any deviation from the "norm" can stigmatize the person and make him less acceptable socially.[3] Dissatisfaction with missing teeth, malalignment of teeth and peer-based teasing due to the appearance of the teeth are the factors that influence the child. According to some cross-sectional studies, malocclusion is not associated with an adverse impact on the quality of life of preschool children and their families.[2]

Dental abnormalities such as developmental defects of enamel (DDE) may have a negative effect on both esthetic and psychosocial factors and may affect children's

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OHRQoL. DDE are responsible for dentofacial anomalies, dental sensitivity as well as predisposition to caries. The prevalence of DDE in children ranges from 24.4% to 81.3%.[4] In relation to preschool children there are scarce investigation into the functional, esthetic and psychosocial implications of enamel defects, even though this abnormality is common in the primary dentition.

This study was conducted to evaluate the impact of dental caries, malocclusion and DDE on the quality of life of preschoolers.

MATERIALS AND METHODS

The sample consisting of 300 children of both genders aged 2-6 years from public schools in South Bengaluru were included in the study. Signed written informed consent was taken from the school authorities and parents of the children. Parents answered the Brazilian version of the early childhood oral health impact scale (B-ECOHIS) and a questionnaire on socioeconomic indicators. OHRQoL instrument: The Brazilian version (B-ECOHIS) consists of 13 questions divided into a child impact section and a family impact section. The child impact section had four subscales: Child symptoms, child function, child psychology, and child self-image/social interaction. The family impact section has two subscales: Parental distress and family function. The response categories for the B-ECOHIS are coded as: 0 = Never, 1 = Hardly ever, 2 = Occasionally, 3 = Often, 4 = Very often, and 5 = Do not know.

The clinical examinations were performed by a calibrated dentist who was blind to the questionnaire in the school environment, using sterile mouth mirrors and under natural lighting. The dental caries were diagnosed based on the World Health Organization criteria (WHO 1997). Dental caries were dichotomized as absent or present. Malocclusion was diagnosed according to the presence or absence of at least one of the following alterations: Anterior open bite, and cross bite, crowding. DDE were classified according to the DDE Index.[5] The three types of DDE (diffuse opacity, demarcated opacity, and enamel hypoplasia) were evaluated. The recorded data were subjected to statistical analysis.

RESULTS

This study was conducted to assess the impact of dental caries, malocclusion and DDE on preschoolers quality of life. The study consists of 300 healthy children from public schools in South Bengaluru; out of 300 children, 9 children were of 2 years (3%), 69 were 3 years (23%), 125 were of 4 years (41.6%), 89 were of 5 years (29.6%), and 8 were of 6 years (2.6%) (Table 1). The children were divided into two groups based on the presence or absence of oral diseases (dental caries, malocclusion and DDE). It was observed that 58.8% children had dental caries, 43.2% children had malocclusion and 23.6% showed the presence of DDE (Table 2).

The clinical conditions associated with the total ECOHIS, the child impact scale, and family impact scale was carried out. A significant association was observed among the total ECOHIS, the child impact section, the family impact section and some independent variables, such as child's age and dental caries, DDE, and malocclusion ($P < 0.05$) (Table 3). The final multivariate adjusted models showed that children with dental caries had 0.665 and 0.137 times more likelihood of negatively impacting the child and family sections, respectively ($P < 0.05$). There was no significant association between age and negative impact in the child section. The DDE and malocclusion had a negative impact on child and it was 1.622 times and 1.545 times, respectively (Table 4). The dental caries, malocclusion and DDE were more likely to have a negative impact on the OHRQoL B-ECOHIS scores.

DISCUSSION

Oral health was always assessed based on clinical indicators in the previous years. This approach was criticized because they do not document the full impact

Table 1: Age distribution of the children

Age in years	Frequency (%)
2	9 (3.0)
3	69 (23)
4	125 (41.6)
5	89 (29.6)
6	8 (2.6)
Total	300 (100.0)

Table 2: Oral health characteristics of the children

Oral health characteristics	Frequency (%)
Dental caries	
Absent	124 (41.2)
Present	177 (58.8)
Total	300 (100)
Malocclusion	
Absent	170 (56.8)
Present	130 (43.2)
Total	300 (100)
DDE	
Absent	230 (76.4)
Present	70 (23.6)
Total	300 (100)

DDE: Developmental defects of enamel

Table 3: Association between clinical characteristics and scores of B-ECOHIS

Variables	Child impact section			Family impact section			Total B-ECOHIS		
	No, *n*	Yes, *n*	*P*	No, *n*	Yes, *n*	*P*	No, *n*	Yes, *n*	*P*
Dental caries									
Absent	124	0	0.00	123	1	0.00	124	0	0.00
Present	89	88		0	177		89	88	
Malocclusion									
Absent	83	88	0.00	51	120	0.00	83	88	0.00
Present	130	0		72	58		130	0	
DDE									0.00
Absent	142	88	0.00	88	142	0.00	142	88	
Present	71	0		35	36		71	0	
Age (years)									
2	9	0	0.00	9	0	0.00	9	0	0.00
3	67	2		67	2		67	2	
4	78	47		78	47		78	47	
5	55	34		55	34		55	34	
6	4	4		4	4		4	4	

B-ECOHIS: Brazilian version of the early childhood oral health impact scale, DDE: Developmental defects of enamel

Table 4: Univariate and multivariate models of clinical condition

Variables	Child impact section*			Family impact section*			Total B-ECOHIS		
	PR	95% CI	*P*	PR	95% CI	*P*	PR	95% CI	*P*
Age (years)									
2	0.930	0.765-1.132	0.470	0.911	0.763-1.087	0.301	0.930	0.765-1.132	0.470
3	0.930	0.760-1.138	0.481	0.939	0.828-1.064	0.323	0.930	0.760-1.138	0.481
4	0.908	0.743-1.109	0.343	1.007	0.993-1.021	0.322	0.908	0.743-1.109	0.343
5	0.948	0.774-1.162	0.607	0.997	0.989-1.004	0.386	0.948	0.774-1.162	0.607
6	1			1			1		
Dental caries									
Absent	0.665	0.627-0.706	0.000	0.137	0.115-0.165	0.000	0.665	0.627-0.706	0.000
Present	1			1			1		
Malocclusion									
Absent	1.622	1.550-1.698	0.000	0.995	0.986-1.005	0.342	1.622	1.550-1.698	0.000
Present	1			1			1		
DDE									
Absent	1.545	1.455-1.640	0.000	1.009	0.992-1.027	0.313	1.545	1.455-1.640	0.000
Present	1			1	.		1		

B-ECOHIS: Brazilian version of the early childhood oral health impact scale, DDE: Developmental defects of enamel, CI: Confidence interval, PR: Prevalence ratio. *P<0.05: Significant

of the oral disease. Thus, OHRQoL measures have been introduced in health-care research.[6] This approach helps the health-care professional to evaluate the treatment efficacy and quality of care from the patient perspective. Unhealthy lifestyle, poor nutrition, and bad oral hygiene may lead to carious lesions in primary dentition as soon as they erupt into oral cavity.[7] Oral diseases during early stages of life can have a negative impact on preschoolers quality of life.[8] Only a few studies have been performed analyzing the negative impact of oral diseases on OHRQoL of preschool children.

Thus this study was conducted to evaluate the impact of dental caries, malocclusion and DDE on OHRQoL of 2-6 years of age and their families. A large number of children had a negative impact on their quality of life, according to parent's perception. Oral/dental pain, difficulty drinking hot or cold beverages and difficulty eating were the most frequently answered items in the B-ECOHIS.

Results of this study showed dental caries were associated with the negative impact on quality of life for both children and family. Children with dental caries had 0.665 and 0.137 times more likelihood of negatively impacting the child and family sections, respectively ($P < 0.05$). This result is consistent with other studies on preschool children reported by Bönecker *et al.*[7] and Ramos-Jorge *et al.*[9] in which they stated that dental caries were associated with a negative impact on the quality of life of preschoolers and their parents/caregivers. Tooth decay causes functional changes, such as difficulty in chewing, speech impairment, and schooling factors, such as preschool absenteeism. In addition, children with carious lesions may also display impaired psychological aspects, difficulty sleeping and irritability. These changes

result in a negative impact on the quality of children's lives, showing the importance of monitoring the oral health of preschoolers.

Malocclusion is another common occurrence in childhood. It has got both functional and esthetic effects which can, in turn, affect the quality of life. In this study, malocclusion is associated with negative impact on the quality of life of child. These children had 1.6 and 0.9 times more likelihood of negatively impacting the child and family sections, respectively. Similar results were reported by Kramer *et al.*[4] and Sardenberg *et al.*[10] in which they stated a significant impact of malocclusion on the OHRQoL of young children when compared with children without malocclusion. Contrary to the above findings, studies reported by Carvalho *et al.*,[2] Abanto *et al.*,[11] and Sousa *et al.*[3] stated that there is no association between malocclusion and the quality of life of preschool children. It is said that individuals with unpleasant occlusal characteristics may attract unfavorable social responses, which may leave a bad impression in early stages of life.[3] Esthetics appearance plays an important role in social interactions and psychological well-being, malocclusion may adversely affect the esthetics which can have a negative impact on the quality of life of children.

DDE is a common occurrence in primary dentition. They are classified as enamel hypoplasia, demarcated opacities or diffused opacities.[5] The main causes for DDE are absence of breast feeding, premature birth, low birth weight, and systemic conditions in childhood.[12] Teeth with DDE have retentive areas that will lead to formation of bacterial plaque facilitating the progression of dental caries.[13] Results of this study showed children with DDE had 1.5 and 1.01 times more likelihood of negatively impacting the child and family sections, respectively. These results are similar to the findings reported by Vargas-Ferreira *et al.*[14] in which they stated that the presence of DDE may cause negative impacts on a child's perception of oral health and on their daily performance. DDE facilitates the development of caries due to structural defects of the tooth surface, which may lead to sensitivity of the teeth followed by pain and irritability which in turn may affect the quality of life of preschoolers.

In this study, it was observed that age had no impact on children's and families quality of life. These findings are contrary to the findings reported by Corrêa-Faria *et al.*[1] in which they stated that age presented a significant association with negative impact of child's quality of life. Older children tend to have a greater number of dental caries as well more severe caries, which suggests a greater impact on the quality of life. Moreover, a child's ability to communicate with parents and report the effects of oral health on the quality of life improves with the increase in age. Younger children have limitations in language and communication skills thus parents may not perceive a negative impact which can make the diagnosis more difficult.

From this study it was found that dental caries, malocclusion and DDE adversely affects the quality of life of preschoolers and their families have an impact on overall OHRQoL These findings are contrary to the study reported by Corrêa-Faria *et al.*,[1] in which they stated that only dental caries was associated with negative impact on the quality of life of preschoolers whereas malocclusion and DDE did not have an impact. The present findings should be analyzed with caution because of limitation to the cross-sectional design. Longitudinal and case-control studies are needed to confirm the results obtained.

CONCLUSION

Dental caries, malocclusion and DDE were associated with a negative impact on the quality of life of children knowledge about the association between oral problems and the quality of life among young children is an important to the early establishment of preventive and curative measures to avoid the worsening of oral problems as well as the inability to take part in routine activities and social life.

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