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Impact of Developmental enamel defects on quality of life in 5-year-old children

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Background: Developmental enamel defects (DDE) represent one of the prevalent oral problems in childhood; however, few studies have evaluated its impact on quality of life in the children's own perception.

Aim: To evaluate the DDE impact on quality of life of 5-year-old children.

Methods: This cross-sectional observational study assessed 566 children aged 5 years old, in Teresina, Piauí, Brazil, according to their self-perceptions. Children answered the *Pediatric Quality of Life Inventory™ Version 4.0* and *Oral Health Scale*. The dmft index, modified DDE index and Foster and Hamilton criteria were used to diagnose dental caries, DDE and malocclusion, respectively. A single examiner performed the clinical examination. Descriptive analyses and Poisson regression with robust variance were performed.

Results: The prevalence of DDE was 33.7%. For children's self-reports, the presence of DDE had a negative association with oral health-related quality of life (OHRQoL; PR 1.09, 95% CI 1.02-1.15). Enamel hypoplasia had a negative impact on the physical function (PR 1.05; 95% CI 1.01-1.10) and oral health (PR 1.06, 95% CI 1.01-1.11) domains. Diffuse opacity had a negative impact on the social aspect (PR 1.09, 95% CI 1.02-1.18).

Conclusions: Enamel defects had a negative impact on OHRQoL according to the self-reports of the children.

KEYWORDS
enamel defects, preschool children, quality of life

1 | INTRODUCTION

Developmental enamel defects (DDE) represent one of the most prevalent oral conditions in childhood and consist of abnormalities resulting from disorders in the formation of the matrix or the enamel mineralization process.[1,2] Reported prevalence estimates for enamel defect in the primary dentition, using modified DDE index, range from 5.3% to 78.9%.[3,4] These defects are clinically classified as quantitative defects (enamel hypoplasia) or qualitative ones (demarcated or diffuse opacities).[1]

Developmental enamel defects predispose the teeth to an increased risk of developing dental caries and tooth wear.[5,6] In primary teeth, the affected enamel has a lower mineral content and may predispose to plaque accumulation and subsequent carious activity.[7] Consequently, these teeth are highly

susceptible to loss of enamel for masticatory forces and erosion from acids present in food and drinks. Furthermore, teeth affected by DDE can result in compromised aesthetics due to staining and morphological alterations. In affected children, there is increased dental sensitivity caused by enamel hypomineralization and exposed dentine.[2,8] Thus, children with DDE teeth may experience anxiety and social embarrassment regarding their dental appearance. These patients represent challenges in dental care in terms of analgesia, patient anxiety control and successful treatment.[2,8,9] Faced with such implications for oral health, approaches relating DDE to the quality of life are geared towards improving traditional dental clinical assessment to meet the needs of affected individuals.[10,11]

The oral health-related quality-of-life (OHRQoL) questionnaires found in the literature are specific, and they do not evaluate general health domains. Thus, generic measures offer an opportunity to describe and compare the impact of different health status and thereby provide a better understanding of the importance of oral health to quality of life. To fill this gap in the literature, the oral health scale of the *Pediatric Quality of Life Inventory* (PedsQL) was developed and designed for use with general health domains.[12] This questionnaire has been used to evaluate the impact of certain conditions on the quality of life of children and their families. The Brazilian version was tested and validated.[13,14]

Few studies have evaluated the impact of DDE on the OHRQoL of pre-schoolers.[15-18] These studies did not use questionnaires about general aspects of health, nor did they assess the perception of children. Knowledge of DDE epidemiology and the impact on quality of life can be used to take a preventive action to minimize damage, control associated factors, determine treatment needs and evaluate the results of implemented strategies.[10,19] Children, 5 years of age, are starting their school experiences and developing cognitive and social interactions with new peers, so they could capture their perceptions of oral health with an appropriate questionnaire for this age group. Thus, the aim of this study was to evaluate the impact of developmental enamel defects on the quality of life of pre-schoolers.

WHY THIS PAPER IS IMPORTANT TO PAEDIATRIC DENTISTS?

- This study demonstrates the negative impact of DDE in the quality of life and highlights the need for DDE being seen as a public health problem in pre-school children, emphasizing the importance of the institution of preventive and therapeutic measures in order to minimize the damage.

2 | METHODS

The Research Ethics Committee of the Federal University of Piauí (UFPI) approved this cross-sectional observational study (Opinion: 817 193). All caregivers and children signed a written informed consent to participate in this study, in accordance with the Declaration of Helsinki.

2.1 | Population and sample

The study population consisted of 7792 pre-school children, 5 years of age, enrolled in public and private pre-schools in the city of Teresina, Piauí, Brazil. The sample was a stratified type of simple probabilistic and random sample, calculated using the equation $n = z^2.p.(1 - p)/e^2$, where "z" is the quartile of the normal distribution (for a 95% confidence interval, $z = 1.96$), "p" is the estimated variance for DDE (50%), and "e" is considered the margin of error (5%). Then, the result was then applied to the correction Cochran for finite populations, $n = n_0/(1 + n_0/N)$, where n_0 is the initial sample size and N is the size of the population (7792 pre-schoolers). The ideal sample for the development of the study was 365 children. Because the sampling was done in multiple stages, the effect of the study design (design effect) was corrected by a factor of 1.5 ($365 \times 1.5 = 547$).[20] To minimize possible losses, the sample size was increased by 10%, obtaining an ideal sample of 602 ($547 + 55 = 602$) pre-schoolers.

The sample group was proportionally stratified by the type of pre-school (private and public) and the district of the city (north, south, southeast and east). Five pre-schools were selected randomly for each district. Children were randomly selected from the lists of pre-school attendance.

2.2 | Inclusion and exclusion criteria

Participants in the sample were children who were 5 years old at the time of the clinical examination and had complete primary dentition. The research criteria excluded individuals with disabilities who could not answer the quality-of-life questionnaire. In addition, children who did not cooperate during the clinical examination were excluded.

2.3 | Collection and data analysis

Data collection was carried out between October and December 2014. First, the pre-schools were visited and the directors were asked to consent to the study. Next, parents or guardians received a letter through the pre-schools informing them that their children had been randomly selected to participate in the study which outlined the objectives of the project. The letter also informed them that the questionnaire had been sent and that they should sign the consent form as well as answer the sociodemographic

questionnaire. The questionnaire and consent form were gathered, and the pre-school children whose parents authorized the study answered the quality-of-life instrument (*Pediatric Quality of Life Inventory*—PedsQL) and were examined (Figure 1). The researchers read the questionnaire for the children who pointed to the answer using the analogue facial scale.

2.4 | Sociodemographic characteristics

The sociodemographic characteristics were assessed through a questionnaire answered by a parent or guardian, which contained gender information, family income (in minimum wages), level of both the mother's and the father's education (in years of formal schooling), type of pre-school (public or private) and report of dental trauma history. Family income was categorized based on the Brazilian monthly minimum wage in 2014 (about US $246.40) and the average income of Brazilians (twice the minimum wage). Education of the parent or guardian was categorized based on the cut-off of 8 years, the primary level of education in Brazil.

2.5 | Quality-of-life Questionnaire (PedsQL)

The general quality of life and the quality of life related to oral health were assessed using the validated Brazilian version of the PedsQL.[13,14] The PedsQL *4.0 Generic Core Scales* comprises 23 items divided into four domains: physical functioning (eight items), emotional aspects (five items), social aspects (five items) and school activities (five items). The PedsQL *Oral Health Scale* consists of five items. For the children survey, we facilitated the application of the questionnaire, using a simplified facial hedonic scale. The scale contained three replies, corresponding to: 100 = is never a problem, 50 = is sometimes a problem, 0 = almost always a problem. Quality of life was measured using the average score for each area and for the total questionnaire. Higher scores indicate better levels of quality of life.[12]

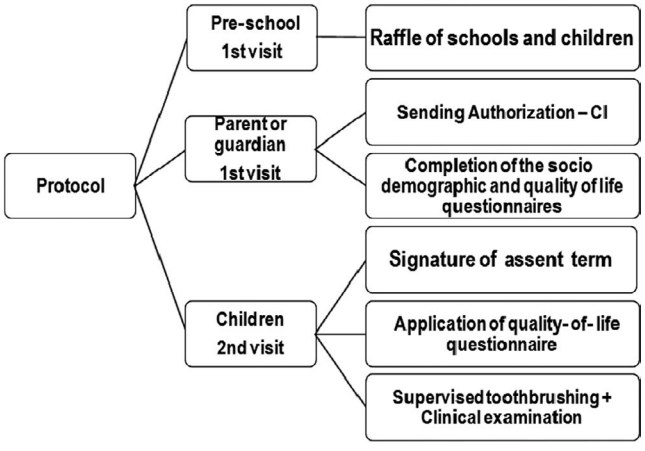

FIGURE 1 Flow chart of the study

2.6 | Dental clinical examination

Before the dental clinical examination, the children's teeth were cleaned using a toothbrush and fluoride toothpaste. This clinical evaluation was performed in the classroom of the educational institution in which the child was enrolled by a single examiner under an artificial light (desk lamp, Pelicano® model—Startec with 127V, São Paulo, Brazil). Each child sat in a chair, and his/her head was positioned on the legs of the researcher. Drying of the teeth was done using packs of sterile gauze, and the tests were performed with a dental mirror (Golgran®, São Paulo, Brazil), explorer #5 (Golgran®, São Paulo, Brazil) and a periodontal probe recommended by the WHO (Trinity®, São Paulo Brazil).

The clinical examination included the diagnosis of dental caries using the dmft index, as recommended by the WHO.[21] A diagnosis of malocclusion was made using the Foster and Hamilton criteria (1969) for the primary dentition, which evaluates the relationship of canines (class I, class II or class III), overbite (normal, low, open or deep), overjet (standard, enhanced, butt or previous cross) and the posterior crossbite (presence or absence).[21] Dental caries and malocclusion were dichotomized as absent or present and evaluated as possible confounding variables in assessing the quality of life.[15,16] The modified DDE index recommended by the Federation Dental International (FDI) (1992) was used for the diagnosis of enamel defects.[1] The presence of demarcated opacity, diffuse opacity, enamel hypoplasia or combinations was assessed. According to the index, teeth with extensive carious lesions were excluded from evaluation.

2.7 | Calibration

The calibration exercise was conducted in two phases. The theoretical and practical phase involved the discussion of the diagnostic criteria for DDE, malocclusion and tooth decay, according to selected indexes. At this stage, photo analysis, obtained at the paediatric dentistry clinic of UFPI, of teeth with and without DDE, malocclusion and dental caries was performed. The theoretical-practical phase of calibration was coordinated by a specialist in paediatric dentistry, considered a gold standard for the evaluation. When the examiner (a dentist) and expert agreed in 80.0% of the evaluations, the second phase of the calibration was initiated. The clinical stage was conducted during the pilot study in which intra-rater agreement was assessed (Kappa = 0.93 for DDE index, 0.82 for malocclusion and 0.86 for decay) on two occasions, with minimal intervals of 15 days between the clinical examinations.

2.8 | Pilot study

The pilot study was conducted in three pre-schools (two public and one private), corresponding to 10.0% of the sample (60 children). These children were not included in the final survey sample. The objectives of the pilot study were the appropriateness of the research methodology (the approach using children and parents) and the evaluation of reliability and validity of the quality-of-life questionnaire used in this study. The results of the pilot study indicated that there was no need for changes in the methodology proposed for this study. Reliability and validity of the PedsQL answers by the children were calculated (Cronbach's Alpha test = 0.724; test-retest = 0.726, 95% CI 0.541 to 0.836).

2.9 | Statistical analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS® for Windows, version 20.0, Armonk, NY, USA: IBM Corp.). A descriptive data analysis was performed using the frequency, mean, standard deviation, median, maximum and minimum value. The hypothesis of distribution of data to the overall result and PedsQL domains followed the Poisson distribution. In the present study, a bivariate analysis was used to compare two distributions and to evaluate the mean differences in scores of quality-of-life questionnaires and independent variables using the Poisson test. In the multivariate analysis, the variables that presented a value of $P \leq 0.20$ in the bivariate analysis were included. Poisson regression with robust variance was used to determine the relationship between quality of life and independent variables, as was done in previous studies.[22,23] The results were expressed by rate ratio (RR) and 95% confidence interval (95% CI), and the associations that reached $P < 0.05$ remained in the model. In all analyses, the level of significance was set at $\alpha = 5\%$.

3 | RESULTS

The final sample consisted of 566 children (94.0%). On the day of the examination, 17 (2.8%) children were absent, four (0.7%) had a diagnosis of autism spectrum disorder that did not allow for a cooperative examination, and 15 (2.5%) were older than 5 years. Table 1 shows the sociodemographic and clinical characteristics of the sample. Of the children screened, 191 were diagnosed with DDE, resulting in a prevalence of 33.7%. In addition, approximately half of the children had experience with caries (dmft > 0) and malocclusion.

Demarcated opacity was the most frequent type of DDE (9.5%), followed by hypoplasia (8.3%) and diffuse opacity (8.1%). The most affected teeth were the second molars (12.0%). In the upper incisors, the most common DDE was diffuse opacity (44 teeth).

TABLE 1 Sociodemographic characteristics and oral clinical conditions of the sample

Variables	n (%)
Sex	
Female	265 (46.8)
Male	301 (53.2)
Family income (minimum wages)	
≤2	382 (67.5)
>2	184 (32.5)
Maternal education (years of formal study)	
≤8	150 (26.5)
>8	416 (73.5)
Paternal education (years of formal study)	
≤8	203 (35.9)
>8	363 (64.1)
Type of pre-school	
Public	380 (67.1)
Private	186 (32.9)
History of dental trauma	
Yes	95 (16.8)
No	471 (83.2)
Malocclusion	
Yes	290 (51.2)
No	276 (48.8)
Caries experience	
dmft > 0	284 (50.2)
dmft = 0	282 (49.8)
Developmental enamel defects	
Yes	191 (33.7)
No	375 (66.3)
Total	566 (100.0)

The descriptive data of the scores in the domains and total score of the *PedsQL™ 4.0 Generic Core Scale* e *PedsQL™ Oral Health Scale* questionnaires for children are presented in Table 2.

The association between health-related quality of life (HRQoL) and oral health-related quality of life (OHRQoL) with clinical and socioeconomic variables according to the children's report are shown in Table 3. Table 4 presents the final regression model of children's perception on HRQOL and OHRQoL with independent variables.

Children with DDE had 7% lower probability of positive impact in OHRQoL questionnaire (95% CI = 0.88-0.99). Furthermore, children with enamel hypoplasia presented 13% and 29% lower probability of positive impact on the

TABLE 2 Descriptive analysis of the overall score and domains of PedsQL applied for children

	Mean (SD)	Median	Minimum	Maximum	Percentiles	
					25% Q1	75% Q3
PedsQL—Children						
Generic Core						
Physical functioning	68.3 (18.0)	68.7	12	100	56	81
Emotional aspects	63.6 (25.2)	60.0	0	100	50	80
Social aspects	70.6 (21.2)	70.0	20	100	60	90
School activities	71.1 (21.3)	70.0	0	100	60	90
Overall score	68.4 (15.7)	69.5	22	100	56	80
Oral health aspects	74.3 (24.1)	80.0	0	100	60	100

SD, Standard deviation; Q1, Q3, Interquartile range; *PedsQL™ 4.0 Generic Core Scale* e *PedsQL™ Oral Health Scale*.

social aspect (95% CI = 0.78-0.98) and overall score (95% CI = 0.60-0.84) of the PedsQL™ Generic Core Scale than children without DDE, respectively. Male children are 1.15 and 1.13 times more likely to report positive impact on physical functioning (95% CI = 1.07-1.25) and emotional aspect (95% CI = 1.05-1.20) compared with females, respectively. In addition, dental caries present 13% lower positive impact in OHRQoL questionnaire and malocclusion had a positive impact on physical functioning ($P < 0.05$). Higher family income had a significant association with a positive impact in the domains of physical functioning and emotional aspect ($P < 0.05$). There was a lower positive impact on the social aspects and school activity domains of HRQOL and OHRQoL in children belonging to families with lower family income ($P < 0.05$; Table 4).

4 | DISCUSSION

This study evaluated the impact of DDE on the quality of life of 5-year-old Brazilian children according to the self-perception of the children. This is the first study that evaluated the impact of different types of DDE on the quality of life according to the children's perception. PedsQL questionnaire was selected because it allows the longitudinal assessment of quality of life related to general and oral health domains. Furthermore, we believe in a broader concept of quality of life that may not be verified with specific questionnaires.[12]

In the present study, although other factors were evaluated, the presence of DDE, especially enamel hypoplasia, had a lower positive impact on quality of life on the OHRQoL questionnaire, according to the perception of the children themselves. In the analysis of DDE's impact on quality of life, one should consider that variations may be related to individual perceptions associated with sociodemographic, beliefs and values of everyone.[15,24]

The presence of DDE can cause aesthetic and occlusal changes, tooth sensitivity, tooth wear, erosion and increased risk of tooth decay,[2] all of which can affect the physical, social and psychological well-being of children. Few studies have evaluated DDE's impact on the quality of life of pre-schoolers.[15-18,25] Methodological differences related to the quality-of-life instruments used, the teeth evaluated, and the type of analyses makes it difficult to compare the results of previous studies with the present investigation. The results of these studies on the impact of DDE in OHRQoL are divergent, and they only show the perception from parents or guardians using specific questionnaires that do not show the impact on quality of life related to general health.[15,16,26]

Results of the study of Babu and cols showed that children with DDE had 1.50 and 1.01 times more likelihood of negatively impacting the child and family sections of ECOHIS, respectively.[18] Other study with children of the Uganda and Tanzania showed 1.7 and 1.8 more times negative impact of the enamel hypoplasia on OHRQoL, respectively.[17] Furthermore, the negative impact of the presence of DDE on the OHRQoL, according to the self-report, has been observed in studies assessing school-age individuals.[10,24]

In assessing the impact of the types of DDE on the quality of life of pre-schoolers, enamel hypoplasia was associated with worsened quality of life according to the children's reports in social aspect and overall score. Enamel hypoplasia is the type of DDE most often associated with oral problems.[10,27] The enamel of teeth with hypoplasia is thin, retains more dental biofilm and is less resistant to dissolution by acids, predisposing them to dentin exposure and the development of carious lesions.[2] The signs, symptoms and clinical consequences caused by enamel hypoplasia justify the worsened quality of life reported by the children in the areas of social aspects and overall score in general health, represented by questions about the bulling, fear, sadness and absence at school.

TABLE 3 Bivariate analysis for associations between PedsQL and independent variables according to the children's reports

	PedsQL™ Generic Core Scale					PedsQL™ Oral Health Scale
	Physical Functioning	Emotional Aspects	Social Aspects	School Activities	Overall Score	
Variables	Unadjusted RR (95% CI)	Unadjusted RR (95% CI)	Unadjusted RR (95% CI)	Unadjusted RR (95% CI)	Unadjusted RR (95% CI)	Unadjusted RR (95% CI)
DDE						
Yes	0.93 (0.85–1.02)[a]	0.97 (0.91–1.04)	0.97 (0.91–1.02)	1.02 (0.97–1.07)	0.89 (0.68–1.17)	0.92 (0.87–0.98)[a]
No	1	1	1	1	1	1
Type of DDE						
Diffuse opacity	0.87 (0.77–0.98)[a]	0.97 (0.88–1.07)	0.96 (0.89–1.04)	0.99 (0.92–1.06)	0.87 (0.58–1.29)	0.89 (0.81–0.96)[a]
Opacity demarcated	0.97 (0.84–1.11)	1.01 (0.92–1.11)	1.03 (0.96–1.11)	1.05 (0.98–1.13)[a]	1.18 (0.82–1.69)	0.94 (0.86–1.02)[a]
Hypoplasia enamel	1.01 (0.88–1.16)	0.91 (0.80–1.05)[a]	0.87 (0.77–0.98)[a]	0.99 (0.91–1.10)	0.71 (0.60–0.84)[a]	0.95 (0.85–1.06)
Without DDE	1	1	1	1	1	1
Caries experience						
dmft > 0	1.05 (0.97–1.14)	0.99 (0.93–1.06)	1.01 (0.96–1.06)	1.00 (0.96–1.05)	1.21 (0.93–1.58)[a]	0.85 (0.80–0.89)[a]
dmft = 0	1	1	1	1	1	1
Malocclusion						
Yes	1.10 (1.01–1.20)[a]	0.98 (0.93–1.06)	1.01 (0.96–1.06)	1.00 (0.96–1.06)	1.03 (0.79–1.34)	0.98 (0.93–1.04)
No	1	1	1	1	1	1
History of dental trauma						
Yes	0.97 (0.87–1.07)	0.99 (0.91–1.09)	0.98 (0.91–1.05)	0.98 (0.91–1.05)	1.07 (0.80–1.45)	0.95 (0.89–1.02)[a]
No	1	1	1	1	1	1
Sex						
Male	1.15 (1.06–1.25)[a]	1.13 (1.05–1.20)[a]	0.97 (0.92–1.01)[a]	0.98 (0.94–1.03)	1.12 (0.85–1.46)	1.00 (0.95–1.06)
Female	1	1	1	1	1	1
Family income (minimum wages)						
≤2	0.91 (0.83–0.99)[a]	0.89 (0.84–0.95)[a]	0.96 (0.91–1.01)[a]	0.95 (0.90–0.99)[a]	0.87 (0.62–1.27)	0.92 (0.87–0.97)[a]
>2	1	1	1	1	1	1
Maternal education (years of formal study)						
≤8	0.92 (0.83–1.02)[a]	0.90 (0.83–0.98)[a]	0.92 (0.87–0.97)[a]	0.90 (0.85–0.95)[a]	0.85 (0.65–1.12)	0.85 (0.80–0.92)[a]
>8	1	1	1	1	1	1

Poisson regression. 95% CI, confidence interval of 95%; DDE, developmental enamel defects; Unadjusted RR, unadjusted rate ratio.
[a]Variables with a value of $P \leq 0.20$.

Despite the unidentified aetiology, DDE are caused by disturbances during dental enamel development. High prevalence of DDE in the primary dentition shows vulnerability to changes in the pre-, peri- and post-natal environment.[2] Prevention of DDE should be initiated during prenatal care by systematically monitoring the pregnancy-puerperal cycle by a multidisciplinary team with frequent attendances to minimize health problems in both mother and child.[27]

TABLE 4 Final multivariate Poisson regression model for overall scores and domains of the PedsQL and oral clinical conditions and sociodemographic aspects considering the children's report

	Generic Core Scale					Oral Health Scale
	Physical Functioning	Emotional Aspects	Social Aspects	School Activities	Overall Score	
Variables	Adjusted RR (95% CI)	Adjusted RR (95% CI)	Adjusted RR (95% CI)	Adjusted RR (95% CI)	Adjusted RR (95% CI)	Adjusted RR (95% CI)
DDE						
Yes	–					0.93 (0.88–0.99)
No						1
Type of DDE						
Diffuse opacity	–	–	0.96 (0.88-1.04)	–	0.87 (0.58-1.29)	–
Opacity demarcated			1.03 (0.96-1.11)		1.18 (0.82-1.69)	
Hypoplasia enamel			0.87 (0.78-0.98)		0.71 (0.60-0.84)	
Without DDE			1		1	
Caries experience						
dmft > 0	–				–	0.87 (0.83-0.92)
dmft = 0						1
Malocclusion						
Yes	1.10 (1.02-1.19)					
No	1					
History of dental trauma						
Yes						–
No						
Sex						
Male	1.15 (1.07-1.25)	1.13 (1.05-1.20)	–			
Female	1	1				
Family income (minimum wages)						
≤2	0.89 (0.82-0.96)	0.89 (0.84-0.95)	–	–		–
>2	1	1				
Maternal education (years of formal study)						
≤8	–	–	0.92 (0.87-0.97)	0.90 (0.85-0.95)		0.89 (0.83-0.95)
>8			1	1		1

Poisson regression. Adjusted RR, adjusted rate ratio; 95% CI, confidence interval of 95%; DDE, developmental enamel defects; values in bold type indicate $P < 0.05$.

Children with some types of enamel defects require more complex treatments.[11] Therefore, dentists should be sensitive towards the clinical and emotional needs of patients with this change so that they can institute appropriate treatment.[26,28] Management of patients in the primary dentition should be focused on early diagnosis and secondary prevention. This way, parents should be advised to avoid cariogenic snacks, to have their children brush twice daily and to use fluoride products.[9] To reduce sensitivity from brushing, a very soft toothbrush may be suggested. Aesthetic restorations in anterior teeth and the use of stainless steel crowns on posterior teeth are done with the aim of restoring aesthetics and function, avoiding insecurity and self-esteem problems and improving the quality of life of affected children.[9,19]

Because the formation of the enamel of permanent molars and incisors occurs during the same period as the formation of the enamel in the primary molars, the presence of DDE in the primary dentition is a predictive factor for DDE in the permanent dentition.[9] Thus, it is recommended that the child is examined before 12 months of age for the early detection of DDE and then undergoes periodic returns for reassessment and treatment of adverse oral conditions.[9,26,28]

Dental caries, teething symptoms, dental trauma and DDE can have a negative impact on functional, psychological and social well-being. If they are left untreated, oral conditions affect quality of life and might lead to dental pain and avoidance of certain types of foods, and might interfere adversely with nutritional status, socializing, self-esteem and learning abilities.[17]

Previous studies have shown that tooth decay has a negative impact on pre-school OHRQoL, whereas malocclusions do not affect the quality of life,[15,16,29,30] corroborating the results of this study. We decided to register dental trauma by using the parents' report as the literature has shown that reports of dental trauma have been clinically confirmed. In addition, most children with a clinical diagnosis of dental trauma and without any reported history of the event had mild trauma, as enamel fractures.[31] Scientific evidence shows that only complicated dental trauma affects quality of life of pre-schoolers.[32] Therefore, in this study, we have included the report of dental trauma by parents in the analysis. These clinical variables were included to allow the construction of adjusted models for determining the actual DDE impact on quality of life for pre-schoolers.

Unfavourable sociodemographic conditions, such as family income less than twice the minimum wage and low levels of parental education, were associated with worsened quality of life in individual domains and overall score on the PedsQL. Previous studies with school-age children reported that different sociodemographic factors have a negative impact on OHRQoL,[33,34] but the real effect of these conditions in preschool children remains controversial.[15,16,29] This was one reason for the inclusion of these variables in the regression models of this study. In developing countries, such as Brazil, children living in unfavourable sociodemographic conditions are more vulnerable to developing oral health problems.[15,27] Thus, social inequalities can have a negative impact on quality of life, also affecting the overall and oral health of children.

Studies using this type of design are subject to recall bias by the participants, as the perceptions of the children may have been influenced by an awareness of the presence or absence of oral alterations. Because the results of the sociodemographic questionnaire and PedsQL were based on reports from parents and children, information bias may also have occurred. Another limitation of this study was that most parents do not realize the occurrence of dental trauma in primary dentition. Also, one examiner performed all dental examinations. In addition, the cross-sectional design does not allow for determining cause and effect between the evaluated conditions and quality of life in children. Therefore, it is suggested that longitudinal studies be performed to clarify this association. This study reinforces the importance of evaluating the impact of problems/oral conditions in OHRQoL, making it possible to determine treatment demands and needs, establish public health policies and allocate financial resources towards reducing the occurrence of these diseases.

5 | CONCLUSIONS

The following conclusions can be drawn based on the findings of this investigation:

- Enamel defects had a negative impact on oral health-related quality of life according to the self-reports of the children.
- Enamel hypoplasia had a negative impact on social aspect and overall score on general health-related quality of life according to children's report.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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