Dental caries in children participating in a Dentistry for infants Program

Experiência de cárie dentária em crianças atendidas em um Programa de Odontologia para bebês

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ABSTRACT

Objective: To assess the impact of the "Dentistry for Infants" early dental care program run by Jacareí County (SP) by comparing the caries of individuals participating and not participating in this program. **Methods:** In total, 300 children between 0 and 48 months old were assessed in the following two groups: infants not participating in the program (G1, n = 100) and infants participating in the program (G2, n = 200). Each group was further divided according to age in subgroups of 0 to 24 months and 25 to 48 months. All children were clinically assessed for carious lesions using the visual-tactile method. The data were statistically analyzed using a paired Student's *t*-test, Mann-Whitney test, and χ^2 test at a 5% significance level. **Results:** There was a significant difference in the prevalence (P) and mean index of deciduous teeth (deft) (C) that were decayed, indicated for extraction and filled, and the highest values were observed in G1 ($p < 0.0001$). The values were as follows: PG1, 73%; PG2, 22%; CG1, 3.45 ± 3.84; and CG2, 0.66 ± 1.57. **Conclusion:** Participating in the program positively impacted the infants' oral health.

Keywords: Pediatric dentistry; Dental caries/epidemiology; Dental caries/prevention & control; Oral health; Infant; Child

RESUMO

Objetivo: Avaliar o impacto na saúde bucal de crianças atendidas em um programa de atenção precoce "Odontologia para Bebês" da prefeitura do município de Jacareí (SP), por meio da comparação da experiência de cárie entre indivíduos participantes e não participantes do programa. **Métodos:** Foram avaliadas 300 crianças de 0 e 48 meses de idade, as quais foram divididas em 2 grupos: G1"Bebês não participantes do Programa" (n = 100) e G2 "Bebês do Programa" (n = 200). Cada grupo foi subdividido em dois, o primeiro com crianças de 0 a 24 meses, e o segundo de 25 a 48 meses. Todas as crianças receberam avaliação clínica quanto à presença de lesões de cárie (método táctil e visual). Os dados foram tabulados e analisados estatisticamente pelos testes *t* de Student pareado, Mann-Whitney e χ^2, com nível de significância de 5%. **Resultados:** Houve diferença estatística para a prevalência (P) e o índice índice médio de dentes decíduos cariados, com extração indicada e obturados (ceod) (C), sendo os maiores valores observados para G1($p < 0,0001$). Os valores foram: PG1 (73%), PG2 (22%), CG1 (3,45 ± 3,84), CG2 (0,66 ± 1,57). **Conclusão:** Concluiu-se que participar do programa interferiu positivamente na saúde bucal dos bebês.

Descritores: Odontopediatria; Cárie dentária/epidemiologia; Cárie dentária/prevenção & controle; Saúde bucal; Lactente; Criança

INTRODUCTION

Dental care in early infancy has been practiced for several decades. In the book Dental education of children in 1929, Pereira[1] stressed the need for educating parents about early dental care. The same author noted the importance of collaborating with pediatricians to reinforce the idea that children should not go to bed without completing proper dental hygiene. Although this practice has been applied since the beginning of the last century in Brazil and other countries, dentists have only recently started to closely examine infant dental care because of the high prevalence of dental caries observed in small children[2].

Early childhood caries (ECC) are defined as any form of dental caries occurring in infants and preschool children[3] and associated with food intake before retiring to bed, sugar consumption, and insufficient

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hygiene[4]. The development of dental caries is a dynamic process[5], and thus, risk must be re-assessed at each dental appointment[6].

According to Walter and Nakama[7], the highest dental caries prevalence in early infancy occurs between the ages of 13 and 24 months. Therefore, the ideal age to start dental care and prevent ECC is before the child is 12 months old so that intervention begins before the decay process. If the decay process has already begun, intervention may stop its progression and revert it to its initial stage[7].

Therefore, the prevention provided by the "Dentistry for Infants" program must aim to prevent the development of caries and limit the damage if the disease has already been established[2]. Despite the preventive strategies routinely used in clinical practice, early dental caries remains a common problem affecting the primary teeth[8].

According to an epidemiological survey performed by the Brazilian Health Ministry[9], approximately 27% of children between 18 and 36 months old have at least one carious tooth. By the age of five years, this rate increases to 60%.

Currently, there are early dental care programs in several countries[10,11] and in several Brazilian areas[8,12,13].

Jacareí County (SP) launched a dental care program (Baby-Clinic) in 1996 that targeted infants to decrease the rate of early childhood caries.

The focus of the Baby-Clinic operation is to promote health. The program instructs the population to seek dental care during the first year of life. Additionally, the program educates parents and relatives by using lectures and individual consultations about preventive measures as well as clinical and home preventive treatment.

This study is justified by the need to assess the impact of early dental care programs. The hypothesis underlying this study is that participation in an early dental care program for infants will positively influence the oral health of individuals between the ages of 0 and 48 months.

OBJECTIVE

To analyze the impact of the "Dentistry for Infants" early dental care program run by Jacareí County (SP) by comparing the caries of individuals participating and not participating in this program.

METHODS

This cross-sectional observational study was performed within the public health network of Jacareí County (SP) and approved by the Ethics and Research Committee of the School of Dentistry of São José dos Campos of São Paulo State University "Júlio de Mesquita Filho" (Universidade Estadual Paulista "Júlio de Mesquita Filho - UNESP), protocol no 088/2007-PH/CEP. The county Baby-Clinic program is for children between 0 and 48 months old.

A total of 300 children between 0 and 48 months of age, independent of gender and race and in good health, participated in this study[14]. The sample calculation followed the recommendations of Antunes and Peres[14]. The children were randomly divided into two groups. Group G1 included infants not participating in the program (n = 100), i.e., children who never attended any preventive dental care program. Group G2 included the infants in the program (n = 200), i.e., children who obtained early dental care in the preventive program for infants. Both groups (G1 and G2) were divided into the following two subgroups: 0 to 24 months old and 25 to 48 months old (Table 1). At each routine appointment, the children in group G2 were provided with an orientation about oral hygiene and education about dietary habits. In addition, a professional cleaning was performed with pumice paste and water using a rubber cup rotating at a low speed and a topical application of 2% sodium fluoride gel according to each child's needs[15]. All caretakers signed an informed consent form to allow the children to participate in this study.

Table 1. The dental caries prevalence, deft indices, and modified deft indices in all groups

Groups	Number of individuals	Prevalence of dental caries	Deft index	Modified deft index (mean)
G1 (total n)	100	63	3.45	6.53
G1 (total n) 0 to 24 months	58	60.24	1.65	4.31
G1 (total n) 25 to 48 months	42	90.67	5.92	9.59
G2 (total n)	200	22	0.66	2.01
G2 (total n) 0 to 24 months	97	11.34	0.32	1.25
G2 (total n) 25 to 48 months	103	32.03	0.98	2.72

The inclusion criteria were as follows: age of 0 to 48 months independent of gender and race (in G1 and G2), no participation in any oral health program whatsoever (in G1), and participation in the program for at least three months and presence of at least of the upper and lower central incisors in the oral cavity (in G2). The exclusion criteria were as follows for the G1 and G2 groups: children of 0 to 48 months of age exhibiting systemic diseases or syndromes associated with stains in the dental enamel.

The eligible children were randomly selected using a coin-flipping method.

The dental evaluations were performed by a single trained and calibrated operator (k = 0.90). The clinical examination was performed using the visual-tactile

method with a blunt probe and flat mirror. Children up to 24 months of age were assessed on a Macri (a dental bed brand specific for children)[2]. Children between 25 and 48 months of age were examined on a dental chair. All examinations were performed under an artificial light (reflector). Any necessary therapeutic treatment was performed at the Baby-Clinic or the Health Basic Units (HBUs) of Jacareí County (SP).

The dental caries were assessed in this study by the prevalence and deft indices (decayed, indicated for extraction and filled deciduous teeth) and modified deft (an index including active white spots, which indicate incipient caries without cavitation). The data were statistically evaluated using a parametric paired Student's t-test, Mann-Whitney test, and χ^2 test with the statistical software Bioestatic 5.0 version 2008. The significance level was set at 5%.

A paired Student's t-test was used to analyze the variables for the paired and correlated samples, including the intragroup deft and modified deft indices. For independent samples, a Mann-Whitney test was applied to the deft and modified deft indices in different groups, and a χ^2 test was used to analyze the prevalence.

RESULTS

The prevalence of dental caries was significantly different between the populations aged 0 to 48 months with and without early dental care ($p < 0.0001 < 0.05$) (Figure 1). Groups G1 and G2 were significantly different, and in both cases, the highest values were observed in the G1 group (deftG1, 3.45 ± 3.84; deftG2, 0.66 ± 1.57). Intragroup differences in the deft and modified deft indices were detected using a parametric paired Student's t-test (G1, $p < 0.0001$; G2, $p < 0.0001$).

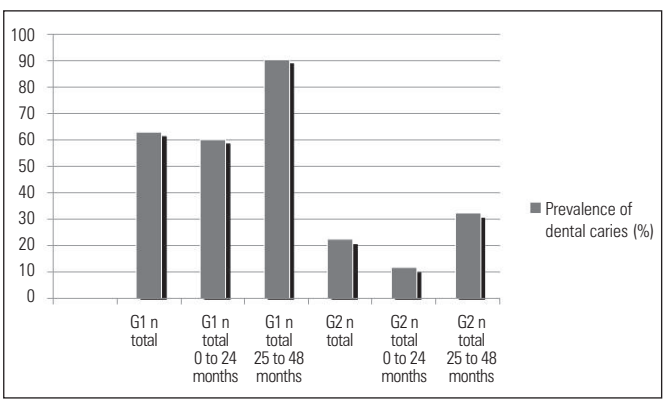

Figure 1. A graph showing the prevalence of dental caries in all children aged 0 to 48 months

The data were first correlated according to the presence or absence of dental caries (caries prevalence and deft index) and the presence or absence of dental caries plus white spots, i.e., caries activity (modified deft). These results were then correlated to compare G1 and G2.

The data obtained in this study confirm the null hypothesis that participation in an early dental care program for infants had a positive influence on the oral health of children aged 0 to 48 months.

DISCUSSION

We initially chose to analyze the prevalence of dental caries. The population not participating in the program, G1, and the population participating in the program, G2, were divided into two subgroups according to age. One group included children 0 to 24 months old, and the other included children 25 to 48 months old. This division took into account the time needed for deciduous teeth to erupt, as there is a direct relationship between age and the exposure of the teeth to cariogenic challenge[2]. Moreover, the initial acquisition of *Streptococcus mutans* by children occurs in a well-defined age range (between 19 and 31 months old) known as the "window of infectivity"[16]. However, vertical (mother-to-child) and horizontal (daycare centers) transmission were recently found to begin earlier, in the first year of life, which suggests that the "window of infectivity" might appear earlier in some children[17,18]. The presence of *Streptococus mutans* in infants younger than six months of age is associated with factors such as the habit of sucking fingers that might be contaminated, contact with saliva, sharing objects such as bottle nipples and spoons, and caretakers that test the infants' food or cool the food by blowing on it. With these factors, children might already be contaminated with Streptococus mutans by the age of 13 months[17,18].

Among the children not participating in the program, i.e., group G1, a high prevalence of dental caries was found (including active white spot lesions). This group was also analyzed in two parts according to age: 0 to 24 months and 25 to 48 months. The results agree with the literature[6,19-21] and indicate the need for early dental care actions for improved health and disease prevention[8]. These findings are grounded on a national survey performed in 2003[9] showing that children aged 18 to 36 months exhibit an average of 1.0 carious teeth per child (not including white spot lesions).

Moreover, the population participating in the program, i.e., G2, showed lower caries prevalence rates. This significantly lower rate suggests that the preventative action of the program has a positive influence, which agrees with the study by Fracasso et al.,[12] which concluded that a preventive child care program was more effective than spontaneous assistance. This finding was confirmed by Plutzer et al.,[22] who observed

that an oral health promotion program based on the periodic reinforcement of preventive education starting in pregnancy and lasting throughout the first year of life succeeded in reducing the incidence of ECC[22].

The deft and modified deft (including white spot lesions) indices in groups G1 and G2 support the effectiveness of the Baby-Clinic Dentistry for Infants program of Jacareí County. This program was based on the Baby-Clinic at the State University of Londrina (UEL), whose efficacy has already been established[2,21].

Our results show that the manifestation of caries was significantly different between the populations not participating (G1) and participating (G2) in the program. Thus, as confirmed by Morinushi et al.[10], it is inferred that the appearance of caries in small children is directly related to the lack of education of the mothers, who require reinforcement for the prevention to be effective[10]. Because the health and well-being of infants and small children depend on the practices and beliefs of the caretakers, several psychosocial and behavioral factors involved in ECC differ from the risk factors for caries in older children and adults[3,23].

In this study, an increase in the rate of caries was correlated with an increase in age, which agrees with the literature[19,20,21,24]. These results confirm that the highest susceptibility to dental caries occurs within the first three years of life[2,19,21]. These results suggest that preventive and control measures against dental caries must be emphasized in this program, especially in children aged between one and three years[25].

Caries in primary teeth are considered to be normal by some mothers who do not realize that this condition represents a transmissible disease that can be prevented by avoiding transmission between mothers and children[17,18].

Early education of the parents to eliminate risk factors at an early age is one of the most important measures to prevent caries[2,26]. Access to programs from birth might minimize the disparities in this population, but efforts must consider the socioeconomic, behavioral, and community-related determinants of oral health[6]. Some reports in the literature show that low-income communities, especially those with a low maternal schooling level, exhibit the highest rates of caries[25].

Given the differences in the dental caries between G1 and G2 in this study, we encourage the development of educational programs targeting parents and preventive programs targeting infants to establish healthy habits to avoid contamination of the oral cavity of children and promote health[17,18].

We also recommend infant dental care through education to improve their health before disease prevention is attempted. Pediatric dental care must rely on practical, low-cost, and efficacious public health programs because most parents are not aware that small children can develop diseases such as dental caries. The parents must be told how to prevent the development of these diseases because the final outcome is more effective if preventative care is provided earlier[27]. Pregnancy is recognized as being the most opportune time to enact health education[6]. Support is provided by pediatricians, family doctors, gynecologists, and other health care providers who frequently work with infants and small children. These providers are the ideal professionals to inform children and their caretakers about the risk of caries and to refer them for preventive assistance and dental treatment when needed[28].

The American Academy of Pediatric Dentistry[5] and the Brazilian Pediatric Society[29] recommend dental visits at the first (including an assessment for anomalies and nursing abilities), fourth, eighth, and twelfth months during the first year of life. During the second year of life, four visits are recommended, at the ages of 15, 18, 21, and 24 months. During the third year of life, four visits are also recommended. From the ages of 36 months (three years old) to five years, visits are recommended twice a year. It is further recommended that the child's risk for caries be assessed at each visit. In addition to the family interview and oral examination[2,30], an individualized preventive plan should be designed when needed.

CONCLUSION

Participating in the "Dentistry for Infants" early dental care program positively influenced the oral health of children. This program introduced healthy dietary and oral health habits into the routine of these children and their family; therefore, an early dental care program is essential for improving the health of children.

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