

COMPREHENSIVE ATTENTION TO ORAL HEALTH IN EARLY CHILDHOOD: A LONGITUDINAL EVALUATION OF THE INFANT CLINIC PROGRAM OF THE FEDERAL UNIVERSITY OF RIO GRANDE DO SUL, BRAZIL

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ABSTRACT

The Infant Clinic Program believes that oral care should begin within the first days of life in order to guarantee good oral health throughout life; however, it has been observed that many dental professionals are not trained attend to this segment of the population. Objectives: The purpose of the Infant Clinic course is to offer the theoretical and practical knowledge that dentists need to know in order to offer education, prevention and curative treatments, providing comprehensive attention to infants and young children. Methods: To evaluate the effectiveness of this Program, a longitudinal study was conducted with the children who participated in the Program during 2004 and 2005. The analysis was performed by first defining the profiles of 303 children before they came to the Infant Clinic, and comparing their oral status in 2004 and at the end of 2005 (12 months, Chi-square test, $p < 0.01$). Results: Of the 303 children observed in 2004, 72.87% came to the clinic for maintenance of oral health, compared to 14.83% who had caries lesions. Dur-

ing the first clinical examination (2004), it was observed that 57% of the children had good plaque control, while 33% of children had poor or very bad plaque control. After 12 months (2005), an increase in good plaque control was observed in the children (77.28% with good plaque control, and 22.72% poor or very bad plaque control) ($p < 0.01$). Through the treatment of active lesions, we verified a decrease in active lesions (from 82% to 32%) ($p < 0.01$). These results show the effectiveness of the program's education, preventive and curative procedures. Conclusions: In addition to the positive experience of the Infant Clinic program, it was concluded that, with the support of treatment and parental education regarding healthy diet and oral hygiene for children, preventive procedures and curative treatment of existing lesions, oral health promotion for very young children was in fact achieved.

Key words: dental care, infant clinic program, Community Oral Health.

ATENÇÃO INTEGRAL PARA A SAÚDE ORAL NA PRIMEIRA INFÂNCIA: AVALIAÇÃO LONGITUDINAL DO PROGRAMA BEBÊ CLÍNICA DA UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL, BRASIL

RESUMO

O Programa Bebê Clínica acredita que os cuidados bucais devem começar logo ao nascimento, a fim de garantir a saúde bucal ao longo da vida, contudo tem sido observado que a maioria dos profissionais da Odontologia não está preparada para atender este segmento da população. Objetivos: A proposta do Programa Bebê Clínica é oferecer o conhecimento teórico e prático de que os cirurgiões-dentistas necessitam para promover educação, prevenção e realizar tratamentos curativos, dando atenção integral à saúde bucal de bebês e crianças na primeira infância. Métodos: Com a finalidade de avaliar a efetividade deste programa, foi conduzido um estudo longitudinal com crianças que participaram do programa durante os anos de 2004 e 2005. Foi realizada análise inicial para definir o perfil de cada uma das 303 crianças incluídas na pesquisa antes de elas serem inseridas no programa Bebê Clínica, comparando as condições bucais dos mesmos em 2004 e no final de 2005 (12 meses, teste Qui-quadrado, $p < 0.01$). Resultados: Das 303 crianças observadas em 2004, 72,87%

procuraram a Bebê Clínica para prevenção, comparadas com 14,83%, as quais já possuíam lesões de cárie. Durante o exame inicial (2004), foi observado que 57% das crianças possuíam bom controle de placa, enquanto que 33% apresentavam controle de placa péssimo, com presença de placa e sangramento. Após 12 meses (2005), foi observado um aumento no grupo de crianças com bom controle de placa (77,28% com bom controle de placa e 22,72% com controle de placa péssimo) ($p < 0.01$) Esses resultados mostram a efetividade das manobras educativas, preventivas e curativas do Programa. Conclusões: Através da experiência positiva do Programa Bebê Clínica pode-se concluir que, com tratamento suporte e educação dos pais sobre dieta saudável e higiene oral para as crianças, procedimentos educativo-preventivos aliados ao tratamento curativo de lesões quando necessário, a promoção de saúde bucal para bebês foi de fato alcançada.

Palavras chave: atenção odontológica, programa de atenção infantil, Saúde Bucal Coletiva.

INTRODUCTION

Due to concern about the oral situation of very young children and the fact that there was no odontological program for them, a program focusing on patients in the 0-5 year age group was started in 1990 at Federal University of Rio Grande do Sul, Brazil (UFRGS), at the Faculty of Odontology. The Infant Clinic program began its activities with the main aim of dealing with the prevention of odontological problems and the treatment alternatives when there was already disease, focusing specifically on young children. The idea of founding a clinic for infants arose from studies that prove the importance of implementing preventive programs before the first year of life^{1,2} and further highlighted by the success of the "Infant Clinic" at the State University of Londrina, a pioneer in Brazil. The odontological programs that attend to early childhood have developed significantly, seeking to identify biological and behavioral interference related to oral health dynamics³.

Education is the basis of infant odontological assistance, and requires the active participation of pediatric dentists and the child's parents. Once the factors that cause oral disease are known, appropriate measures to prevent and/or avoid it can be adopted. In addition, procedures conducted during the early stages of disease reduce the complexity of the treatment; however, used in isolation they do not guarantee immunity against further oral problems⁴.

On seeking viability and strategies for infant odontological treatment, some essential concepts need to be considered in order to define each patient's characteristics. Thus, regarding caries, we need to know the etiology and the development pattern of the disease. Caulfield, Cutter and Dasanayake (1993)⁵, carried out a study on the acquisition period of mutans streptococci in children aged 0-3 years, observing that it was transmitted in certain period, between 19 and 33 months of age. This period was called the "window of infectivity" and was observed in 75% of the children studied. Other studies have proved that microorganisms are transmitted to the infant through the mother's saliva^{3,5-7}. Based on this information, the authors concluded that an approach performed with the mothers as soon as the children are born, or before the window of infectivity is established, could produce more favorable results in terms of microorganism transmission. Fraiz and Issao (1995)⁸, in research on the characteristics of sugar intake in chil-

dren taking part in oral health programs in the city of Curitiba, Brazil, noted that the first contact with sugar occurred before the first year of life in 61.7% of the children. The number of occurrences of sugar intake from the baby-bottle varied from 0 to 8 times a day, with an average 4.4 times a day per child.

In a seminar sponsored by the Disease Control and Prevention Center in the USA in 1994, a term to designate dental caries in infants and young children was suggested. The term Early Childhood Caries (ECC) was adopted in 1997, and refers to a severe kind of caries, which affects deciduous teeth and has specific features. Smith et al. (2002)⁹, observed that the lesions develop quickly, often immediately after the eruption of teeth, on low risk surfaces such as the vestibular surface of upper incisors and the lingual surface of upper and lower molars⁴. Recognizing the complex etiology of this kind of caries will guide the development of strategies for the program¹⁰. The Academy of Pediatric Dentistry (2004)¹¹ recognizes early childhood caries (ECC) as a significant public health problem.

In addition to caries disease, there are other reasons that lead parents to seek odontological service, such as traumatism, dental or facial anomalies and diseases that attack the infant's oral cavity^{7,12} such as traumatism¹³, anomaly and deleterious oral habits¹⁴. One of the most important strategies for the control of caries or other oral diseases that affect infants is oral health education. Work should focus on providing guidelines to parents regarding the transmission of cariogenic microorganisms, host susceptibility, oral hygiene and dietary guidelines^{9,10}.

According to Figueiredo et al. (1998)¹², the aim of dentistry for infants is to contribute towards a generation having fewer dental problems, with better health quality and greater awareness of the importance of prevention. In agreement with these findings, Walter, Ferelle e Issao (1998)², concluded that when children receive timely assistance, caries lesions and occlusal problems are less likely to appear, providing them with better life quality.

Many preventive programs have been set up, so there is a need to evaluate their effectiveness in reducing the prevalence and incidence of caries, as well as their capacity to maintain the health acquired by their users¹⁵.

The aim of the current work is to evaluate the effectiveness of the program proposed by Infant Clinic of the Faculty of Odontology UFRGS, during the years

Table 1: Infant clinic treatment protocol

Healthy	With caries activity, gingivitis or others*		With caries inactivity, past gingivitis or others*	
Health promotion**	With White spot	With White spot +Active lesions	With need of restoration	Without need of restoration
****Health maintenance	Health promotion** + #Fluoride therapy ****Health maintenance	Health promotion** + #Fluoride therapy + Functional and aesthetics rehabilitation*** Health maintenance	Health promotion** Functional and aesthetic rehabilitation*** ****Health maintenance	Health promotion** ****Health maintenance

(*) *Others*: Treatment according to need at the examinations: dental alveolus traumatism, affections and development anomalies.

(**) *Health promotion*: Guidance regarding diet, oral hygiene, transmission of caries and periodontal disease, training of the person responsible concerning the practice of oral hygiene and the recognition of bacterial plaque.

(***) *Functional and aesthetics rehabilitation*: Extractions, endodontics, cavities seal, application of anti-caries products, atraumatic restorative treatment. Professional plaque control, coronary rasping, dental polish and smoothing.

(#) *Fluoride therapy*: Treatment based on a weekly topical application of fluoride (3% NaF), during one month to inactivate the lesions. After three months, oral examinations were conducted to observe the lesions and, if necessary, return to fluoride therapy.

(****) *Health maintenance*: Recall of patients according of their age to conduct oral examinations and provide information on ways to ensure oral health maintenance.

2004 and 2005, by defining the profile of the patients who attended it and comparing their oral situation at their first examination (2004) and after twelve months, at the end of 2005. Three aspects were used to analyze the effectiveness of the program:

- Dietary habits (diet type).
- Oral hygiene habits (plaque control).
- Caries activity.

MATERIALS AND METHODS

328 children (whose parents had signed an informed consent form) aged 0-5 years, who began to participate in the Infant Clinic program in 2004, were selected at random through their forms. These forms were completed by the five students on the course (DDS) during the first meeting and recorded information about the family, dietary habits, oral hygiene habits and the child's oral condition, assessed by clinical examination. Before the clinical examinations, the professionals participated in training and standardization to attain an acceptable level of concordance ($\kappa = 0.74$) based on three aspects (type of diet, plaque control and caries activity). The research has the acceptance of Ethical Committee for Research at Humans of Federal University of Rio Grande do Sul.

The Infant Clinic program has a treatment protocol to guide the activities according to the oral conditions of each patient (Table 1).

Patients were grouped according to age, and tables and graphs were prepared in order to compare the data obtained before and after twelve months. The data obtained through tests were analyzed according to the following:

1. Number of children per age group.
2. Initial and final assessment of the type of diet. The data referring to the type of diet, obtained from the clinical records of the patients who were observed, were compared according to each age group and classified into two types: Non-cariogenic Diet (up to six meals a day containing sucrose) and Cariogenic Diet (more than six meals a day containing sucrose, or Ad libitum nocturnal nursing or breast-feeding²).
3. Initial and final plaque control assessment. The patient's plaque control was classified into three types: Good, Poor and Very bad: GOOD (visible or invisible plaque and absence of marginal bleeding), POOR (visible or invisible plaque with presence of local marginal bleeding) VERY BAD (visible or invisible plaque with generalized marginal bleeding¹²).

Table 2: Reference values for patients' diet type, according to age group, during initial and final assessment of the treatment.

	0 to 1 year old		1 to 2 years old		2 to 3 years old		3 to 5 years old	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Cariogenic	20	15	72	25	68	20	30	14
Non-cariogenic	59	64	22	69	14	62	18	34
Total	79	79	94	94	82	82	48	48
P	P>0,01	P>0,01	P<0,01	P<0,01	P<0,01	P<0,01	P<0,01	P<0,01

Table 3: Reference values for patients' plaque control quality, during initial and final assessment of the treatment, according to age group.

	0 to 1 year old		1 to 2 years old		2 to 3 years old		3 to 5 years old	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Good	65	66	68	72	58	59	23	27
Poor	10	11	20	19	17	18	15	18
Very Bad	4	2	6	3	7	5	10	3
Total	79	79	94	94	82	82	48	48
P	P>0,01		P<0,01		P<0,01		P<0,01	

Table 4: Reference values for the patients' caries activity, according to age group, during initial and final assessment of the treatment.

	0 to 1 year old		1 to 2 years old		2 to 3 years old		3 to 5 years old	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Activity	12	2	33	21	39	18	15	9
Inactivity	0	10	20	32	0	27	13	19
Healthy	67	67	41	41	43	37	20	20
Total	79	79	94	94	82	82	48	48
P	P<0,01		P<0,01		P<0,01		P<0,01	

4. Initial and final assessment of caries activity.

Caries activity was determined from the oral status of patients at the beginning and at the end of the clinical examinations.

With activity: Patients with active lesions from dental caries (white spots or cavities).

With inactivity: Patients with inactive lesions from dental caries (spots or cavities), or that concluded a restorative-curative treatment.

Healthy: Patients without dental caries since the beginning of treatment¹².

At the end of twelve months (2005), all the children should have returned to the same clinical examinations, but only 303 (92.37%) children returned. The children that did not attend the final examination were excluded from the study. The same aspects (type of diet, plaque control and assessment of caries activity) were observed. For the statistical analysis of the data obtained in the initial and final assessments, the Chi-square test was used, where p values were considered statistically significant when lower than 1% (p<0.01).

mostly of dental biofilm or plaque control, counseling on diet and the use of the fluoride, according to the patient's need. A preventive philosophy is essential in guiding professional attitude, geared to the patient and parent's motivation. The Academy of Pediatric Dentistry¹¹ says that the sooner preventive methods in dentistry are started, the more effective they are.

Table 3 show initial data on the plaque control of some children who attended the program. compared to the results obtained immediately after the completion of education and prevention lessons.

In relation to caries activity the initial data (which were obtained through clinical examinations) were compared to the data obtained during the final examination and grouped according to age group (Table 4).

DISCUSSION

The initial data collected from the 303 children who took part in the Infant Clinic program showed that most of them belonged to the 1-2 year age group.

RESULTS

From the information obtained during the assessment of 303 children who attended the Infant Clinic, it was verified that most children belong to the 1-2 year age group (31%), followed by 2-3 year (27%), 0-1 year (26%) and 3-5 years (16%) age groups.

The data recorded at the Infant Clinic regarding children's diet according to age group, comparing the results obtained at the beginning of the study to those obtained after twelve months of program application, are shown in Table 2.

The education and caries preventive action carried out at the Infant Clinic consists

This was not the result we had expected regarding the largest age group (less than one year of age), nevertheless, it was better than the data from a similar study¹² done in 1998, where the largest age group was 2-3 years. The philosophy of the Infant Clinic believes that the oral program would be more effective if could be offered at an appropriate age. According to the American Academy of Pediatric Dentistry¹¹, the best age is before twelve months, when the most babies are breast fed by mothers and the information about healthy oral habits will be more acceptable to parents. In agreement with Caulfield et al.⁵, an important factor in the development of children's oral environment is the appearance of the first window of infectivity that begins with the eruption of the first deciduous molar teeth, at around 18 months of age. Therefore, preventive guidance must be given to parents or responsible persons before this stage, in order to minimize the possibility of caries.

Caries disease is undoubtedly the main cause of children's visits to the dentist and in addition to affecting their quality of life, it can lead to unpleasant experiences and become the cause of trauma during odontological treatment.

In the age groups studied at the Infant Clinic, caries appeared rapidly and destructively in a great number of teeth. Most research on this "type" of caries agrees unanimously that its cause is linked to a diet rich in fermentable carbohydrate^{3,13,16}. According to Figueiredo and Falster (1997)⁷, in a review of literature on the factors that cause caries, it was concluded that it is a multifactor disease and that the type of diet is among the primary factors responsible for the development of lesions. The authors pointed out that a diet rich in fermentable carbohydrates offered in high frequency acts as a substrate for cariogenic microorganism operation during the production of organic acids, which will act on dental surface with higher or lower intensity, depending on the susceptibility of the host analyzed. Smith et al. (2002),⁹ also suggest in their study that maternal sugar consumption is a strong risk indicator for children's caries, although it has been associated to maternal levels of mutans streptococci and maternal active decay.

In this study, after the implementation of the Infant Clinic protocol, it was noticed in all age groups that there was a change from cariogenic to non-cariogenic diet. However, better results were observed in the 2-3 year age group, where 58.54% of the patients with cari-

ogenic diet changed to a non-cariogenic one. The same happened in the others age groups; 1-2 years (50%), 3-5 years (25%) and 0-1 year (6.33%). These results were statistically significant for all age groups, except 0-1 year. This might be explained by the fact that during the first year of life, diet does not undergo great changes. Nevertheless, Volschan and Soares (2003)¹⁰, analyzing the diet of children 0-36 months old, verified that as children grow, their diet will be changed and, every variation in the diet changes the risk of caries disease, which is associated to the diet and to the environment. Thus, constant analyses and dietary orientation should be conducted according to child's development. Another reason is that children aged 0-1 year and the persons in charge of them had little contact with the dentist and therefore their eating habits were less influenced. In other age groups it was found during the assessment performed at the end of the treatment that there was a decreasing percentage of patients with cariogenic diet, thus demonstrating the effectiveness of the guidance provided by the dentists to the person responsible for the child, concerning the reasonable use of sugary food and fermentable carbohydrates during intervals between meals, as well as regarding the damage of breast-feeding or providing baby-bottle ad libitum, especially during nocturnal nursing.

The relationship between caries and plaque control has been shown in literature and is an important point in an oral health promotion program. According to Fraiz¹⁶, most caries lesions are associated to the presence of visible plaque, and its control is therefore essential to the reduction of the prevalence of caries in early childhood.

After receiving treatment, it was observed that all patients presented improvement in the quality of plaque control. These results were statistically significant for the 1-2, 2-3 and 3-5 year age groups ($p < 0.01$). However, in the 0-1 year age group the results were not statistically significant ($p > 0.01$) (Table 3). The "VERY BAD" index was reduced in all age groups. This reduction was greater in the 3-5 year age group (14.58%), followed by 3.19% reduction in the 1-2 year age group, 2.53% the 0-1 year age group and 2.44% in the 2-3 year of age group. The "GOOD" index increased by 8.33% in the 2-3 year age group, 4.25% for the 1-2 year age group, 1.26% for the 0-1 year age group and 1.22% for 3-5 year age group after twelve months.

In agreement with Volschan e Soares (2003)¹⁰, children 0-3 years old cannot practice their oral hygiene by themselves due to the lack of motor coordination and low

comprehension of its importance. Therefore, during odontological assistance provided at the Infant Clinic, children's parents or the people responsible for them were the targets of teaching and motivation, and the results were satisfactory, because an improvement in oral hygiene was shown by all age groups. In the 0-1 year age group this improvement was not statistically significant, since some of the patients were still edentate and most of them already showed good oral hygiene at the initial assessment, probably due to the presence of few retentive sites. The best results were found in the 2-3 year age group. We believe this was so due to the children's collaboration, since they already had some psychic-emotional maturity, and the parents understood the importance of their participation in their children's oral health promotion and maintenance process.

Controlling the causes of dental caries by means of education and preventive action supported by appropriate strategies for carious lesions will probably be successful in reducing caries activity, and this was observed in this study.

The comparison of the oral conditions evaluated by means of clinical examinations at the beginning and at the end of twelve months, shows that caries activity was reduced for all age groups, as shown by the decrease of patients with dental caries activity in all age groups and the consequent increase of patients without caries activity. This confirms the success of the treatment philosophy proposed by the Infant Clinic (Table 01), as endorsed by the significant results obtained. This success rate was first obtained by means of oral health education, which offers the parents information about healthy diet and prevention of oral diseases. After that, preventive action based on fluo-

ride treatment and training parents to provide efficient oral hygiene for their children reduced caries activity in infants. The Minimal Interventions approach was used for children in need of restorative treatment. Because the patients were so young, atraumatic restorative treatment (ART) was used in most cases, as it is a painless technique whose greatest benefits are the preservation of dental structure and the capacity of the dentin-pulp complex¹¹ to react.

In a study on caries predictor factors in preschool children, Fadel and Kozłowski³ found that good oral hygiene, associated to healthy eating practices, has a great impact on oral health. According to the authors, the people responsible for the children should be encouraged to take care of their children's teeth. Moreover, they stated that the reduction in the number of patients with caries lesions would be more effective with previous identification of children susceptible to the disease, followed by the implementation of an efficient clinical protocol of oral health promotion.

CONCLUSIONS

1. Through the treatment philosophy proposed by the Infant Clinic of FO-UFGRS it was possible to reach a statistically significant improvement in the type of diet, greater oral hygiene quality and, consequently, a reduction in caries activity in the patients in most age groups.
2. The procedures to promote oral health are more effective when applied during the infant's first year of life, since at this time is easy to change the determinant, modulator and influential factors of oral disease, especially by changing parents' behavior regarding their children's oral health.

CORRESPONDENCE

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