

# Children's Evasion in a Public Program of Early Dental Attention

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**Abstract**—In order to evaluate children's oral health related to frequency in a public program of dental attention early, this research conducted a study retrospective cohort which reached 252 assessment children, between 36 and 60 months of age, in the city of Gurupi, Legal Amazon region, Brazil. Three groups of children were analyzed: G1: effective participants of the program since birth; G2: children no longer participate for more than 24 months of the program, and a control group G3: children who never participated in prevention project. The evaluation was conducted in two stages: interview mothers and clinical examination in children for analysis of caries, gingivitis, and malocclusion. The index of caries in deciduous teeth (dmft) presented different data between groups  $G1 = 0.05$ ,  $G2 = 1.96$  and  $G3$  was 3.30. Oral diseases were statistically more common in children who have never attended an oral health program ( $p = 0.025$ ). The main reason cited by 54% of mothers who have left the program, was the oblivion of the scheduled day. Thus, children who effectively attended the oral health program showed the best results in relation to caries, gingivitis, and malocclusion, when compared to those who have left or have never participated.

**Keywords**—Pediatric Dentistry, primary prevention, oral health.

## I. INTRODUCTION

Education and access to information about preventive methods to avoid oral diseases such as dental caries, gingivitis, and malocclusion in children, should begin as soon as possible. The early dental world attention reached to be a way to prevent and control oral diseases, from guidance to pregnant women in prenatal period [1] [2]. Information on oral health care must be directed to pregnant women to increase your knowledge about the care of pregnancy, oral and General implications and to prevent problems that may occur both in their own mothers and in the future kids. [3] [4]

Several authors [5] [6] [7] agree with the implementation of preventive programs for babies since they claim that oral education parents get great benefits. A systematic review of the literature identifying risk factors during the first year of life has shown that maternal early intervention can reduce the likelihood of early caries *criança* [8]. Children from 0 to 5 years still aren't mature enough psychological and motor skills to perform all the activities and education and motivation of the nuclear family are important to promote the oral health of children, especially in the early years of life [9].

In order to verify if the evasion of scheduled consultations in public attention early dental program could present different results in relation to oral diseases when compared to the group that frequents and the other who never participated in a program of health.

## II. MATERIALS AND METHODS

This study was a retrospective cohort study conducted in the Legal Amazon, covering the northeast of the Bananal Island, within the public health network of Gurupi (TO), with an area of 1,836,091 square kilometers and a population total of 76,755 people (IBGE 2010), in which 20% are children aged 0 to 5 years of age. The study was approved by the Committee of ethics in human Research at the University of Gurupi UnirG, protocol number 455422215.8.0000.5518.

A local study [10] has shown the great demand in this municipality for dental care of children aged 2 to 5 years of age, with the presence of pain and consequences of oral diseases. Thus, the public attention early dental program called "baby's Mouth" was implemented in 2010 in the town of Gurupi, in Tocantins State, in partnership with the city Hall and University of Gurupi UnirG. This program operates from the gestation of the child up to the age of 5 years. The children are enrolled in this program from the public and the professionals carry out examinations and care in children still toothless with quarterly control. The project directs the mothers about the diet and provides a

program card with the return appointment date. The professionals followed the child's dental eruption, occlusion stabilization until five years of age, if changes are detected during this period, the team operates in accordance with the guidelines of the American Academy of Pediatric Dentistry [11]

The program works on all basic health units (BHU), featuring educational lectures on oral health for pregnant women in prenatal care, focusing on the importance of breastfeeding, sucrose consumption control, warning about habits harmful to the formation of dental arch (use of pacifier and bottle) and encourages the oral care. Children can be enrolled from 0 to 12 months in any one of the BHU. Hygiene, intraoral examinations are carried out, and often have a maximum interval of 6 months. In the visit, every child with teeth receive an oral hygiene kit with infant toothbrush and toothpaste with fluoride wire. The visits are also to monitor the development and stomatognathic growth, dental eruption, breathing, swallowing and oral correct posture.

#### Inclusion and exclusion criteria:

Ages 36 to 60 months and both sexes were accepted for all groups. The age of 3 to 5 years was selected to allow assessing the effect of activities carried out by this dental health program since 2010, therefore, it was stipulated that the study reached results of the program with a minimum of 30 months of frequency for G1 and 12 months of escape to the G2.

In 2015, of the 1,303 enrolled in the program from 0 to 6 months in the period from 2010 to 2014, there was evasion of 423 children (52%) after the first query, the second was 171 (21%), and 89 (11%) after the third consultation, absent without justification, the other quitters occurred after the fourth query. Therefore, during the study period of 2015, had 488 completed records of children from 0 to 5 years of age who participated effectively in the program.

To obtain homogeneity of the sample quantity in the groups, the basic number established was the amount of Group 1.

Group 1 (G1): of the total sample of 488 children 0 to 5 years, those who attended the program regularly, were chosen for the study of children with biannual frequency cohort and entered in the program from birth (0 to 3 months). This sample consisted of 106 children with 3 to 5 years of age, using a sample calculation with the possibility of error of 5%, 95% confidence level, resulting in 84 children. In Group 2 (G2), including children who attended the program from birth (0 to 3 months) that remained at least 18 months in the program and who have left for more than 24 months. Obtained phone records, of which 145

were randomly invited to participate in the study until the number of 84.

Group 3 (G3) was composed of a similar number of children with spontaneous demand, which sought the vaccination in UBS and never participated in any oral health promotion program (control group).

Exclusion criteria of G1 were incomplete records. The G2 was the lack of telephone contact or if the child has migrated to a different prevention program, and G3, if these children do not live in the region studied.

A total of 252 were evaluated 3 children 5 years to March 2015 period to December 2016. The G1 was attended in the routine queries, G2 with a prior schedule to attend the clinic at the date and time set, and the G3 invited for participation in the study after vaccination in BHU. Three children of the G1 were replaced, because the drawn lacked, so the number of 84 participants. In G2, 14 children did not attend the scheduled consultation and new additions were made to the number of 84. On the G3, the first 84 tests were held permits to study in ten UBS.

The responsible signed an Informed Consent Form (ICF). All examinations and interviews were carried out in an appropriate room of UBS for the attendance in the program. The survey was divided into two stages, the first consisted of an interview with mothers, containing twelve closed questions. The mother was questioned about the maternal information, such as age, household income, education, employment, marital status, number of children, habits, oral hygiene, and also related to the frequency of the program. The children of the G2 and G3 with oral amendments (caries, periodontal disease or malocclusion) detected during the study were forwarded to the public service pediatric dental of UBS.

In the second stage, the child has received a specific clinical examination of the oral cavity, by a single examiner for this study. All examinations were performed by one examiner trained and previously calibrated (Kappa intraexaminer index = 0.86). 10% of the total sample was reviewed during data collection (Kappa = 0.89). This examiner was responsible for all the tests of children in the dental office, which after brushing and in the light of the reflector, used instruments such as a periodontal probe, dental mirror, and gauze.

The index of the caries disease was (dmft), decayed teeth, with extraction indicated and closed recommended by the World Health Organization (who), in that values exceeding 6.6 have very high prevalence; between 4.5 to 6.5 show high prevalence; between 2.7 to 4.4 are indicative of a moderate level of caries; and between 1.2 to 2.6 are indicative of low prevalence; the values less than 1.1 reflect a very prevalence baixa [12].

The indicator used to measure changes in gingival mucosa was the Gingival Index Modified (GIM) proposed by Lobene et al. [13], with criteria set: 0-absence of inflammation; 1-mild inflammation: when there is slight change of color and texture changes of any portion of the marginal gingiva or the gingival papilla; 2-inflammation: criterion above, but involving completely or almost all portions of the marginal gingiva and gingival papilla; 3-moderate inflammation: marginal gingiva and gingival papillae bright, red, swollen and/or hypertrophic; 4-severe inflammation: redness, swelling, and/or gum hypertrophy marginal or gingival papillae, spontaneous hemorrhage, congestion and/or ulcerations.

Tests were carried out to detect signs of malocclusion, as Overbite, cross bite and overjet. The overjet was examined by measuring the horizontal proportion between the upper and lower incisors with the teeth in occlusion. The distance between the incisal edge of the prominent upper incisors and the lower incisor labial corresponding face was measured with the periodontal probe parallel to the occlusal plane. This distance was considered: normal for values up to 3 mm; overjet values greater than 3 mm; and anterior cross bite, when the incisors were at a distance of negative incisal edge lower occlusion of the incisal edge to top vestibular. The Overbite was obtained by measuring the vertical distance between the edges of the upper and lower central incisors with the teeth in occlusion. This distance was considered normal when the upper incisors

covering up to 3 mm from the bottom; and deep overbite for values greater than 3 mm; and open bite when there was no overlap between the upper and lower incisors with a minimum space of 1 mm between the incisal edges. The posterior crossbite was considered present when, in occlusion, the vestibular of molar cusps are displaced to the buccal cusps of the maxillary molars. Just your presence or absence was considered, regardless of the side.

The clinical data and information obtained through the questionnaires were described and the variables subject to the Chi-square test ( $p < 0.05$ ).

### III. RESULTS AND DISCUSSION

Family profile, results of these children showed family income of 1 to 2 minimum wages and the age of the evaluated groups with mean values and standard deviation corresponded to G1 ( $3.662 \pm 0.753$ ), G2 ( $3.698 \pm 0.711$ ) and G3 ( $3.714 \pm 0.743$ ). The educational level of mothers, in all groups, prevailed the completion of high school. By analyzing the percentage of program components in table 1, there was statistical significance in groups, with or without partners, and in G1 and G2 most was married. The number of children for each mother prevailed two children on the G1, a child in the G2 and three or more children in the G3, with a significant difference between the groups. Table 1: Distribution in number and percentage of the sample profile (mothers and children).

Table.1: Distribution in number and percentage of the sample profile (mothers and children).

	G1		G2		G3		Total		p value
Children									
Age	$3.66 \pm 0.75$		$3.69 \pm 0.71$		$3.71 \pm 0.74$				
	n	%	n	%	n	%	n	%	
Gender									
Female	33	39.2	41	48.8	48	57.1	122	48.4	0.06
Male	51	60.8	43	51.2	36	42.9	130	51.6	
Mothers									
Age	$29 \pm 6.26$		$22 \pm 4.06$		$20.5 \pm 3.95$				
	n	%	n	%	n	%	n	%	
Marital status									
married/	59	70.2	57	67.8	38	45.3	154	61.1	*0.001
single	25	29.8	27	32.2	46	54.7	98	38.8	
Number of children									
1	29	34.5	33	39.2	17	20.3	79	31.3	*<0.001
2	42	50	26	30.9	29	34.5	97	38.4	
>3	13	15.5	25	29.9	38	45.2	76	30.3	
Total	84	100	84	100	84	100	252	100	

\* Chi-square test with a significance level of  $p < 0.05$ .

Table 2 presents the distribution of the data collected for the information of the interview of the three groups. The women of the G1, G2 and G3 reported about "oral health guidelines during the prenatal period" in which there was a significant Association of adherence to the program and the information received ( $p = 0.0002$ ;  $X^2 = 16.8$ ). On breast feeding, the groups presented significant statistical data regarding frequency ( $p = 0.021$ ;  $X^2 = 14.9$ ). The

children of the G1 had the lowest use of bottle- feeding and nutritional habit was significant between the groups ( $p = 0.0001$ ;  $X^2 = 23.48$ ). In relation to non-nutritive sucking habits, there is evidence that belongs to groups that had a lower frequency, or lack of participation in the program, meant to increase finger sucking/pacifiers ( $p = 0.002$ ;  $X^2 = 11.69$ ).

Table.2: Distribution in number and percentage of mothers' perceptions and knowledge about oral health care in early childhood in all groups.

QUESTIONS	ANSWER	G1		G2		G3		p value
Did you have any information about oral health for your baby during the pregnancy?		N	%	N	%	N	%	
	Yes	25	30%	37	44%	14	7%	* $<0.001$
	No	58	70%	43	52%	70	83%	
Until which age have your child breastfed?	> 6 months	16	18%	4	5%	10	12%	
	6 months	5	6%	7	8%	8	9%	*0.021
	< 6 months	58	70%	73	87%	61	72%	
	Never	5	6%	0	0%	5	7%	
Does your child use a baby bottle?	Never	51	60%	25	31%	27	32%	
	>1 year and stop	21	25%	38	45%	29	34%	* $<0.001$
	Always	12	15%	20	24%	28	34%	
Does your child suck finger or pacifier?	No	78	92%	76	90%	64	76%	
	Yes: Suck finger	1	2%	1	2%	7	8%	*0.002
	Yes: Pacifier sucking	5	6%	7	8%	13	16%	
How many times per day do you brush your child's teeth?	1 time	4	5%	14	16%	20	24%	
	2 times	34	40%	40	48%	51	60%	
	>3 times	46	55%	18	36%	13	16%	9.87
	Not answer	1	2%			1	2%	
Do you use toothpaste?	Yes: fluoride tooth paste	76	90%	80	95%	68	81%	7.64
	Yes: tooth paste without fluoride	7	8%	4	5%	14	19%	

\* Chi-square test with a significance level of  $p < 0.05$ .

As for the use of fluoride toothpaste ( $p = 7.64$ ,  $X^2 = 74.21$ ) and the number of times that children received daily brushing ( $p = 9.87$ ;  $X^2 = 38.281$ ), there was no statistically significant difference in frequency between groups. Mothers G1 and G2 signed up their children in the program of prevention, while mothers of G3 intended to take them to the dentist only when the treatment of caries or pain were needed [10].

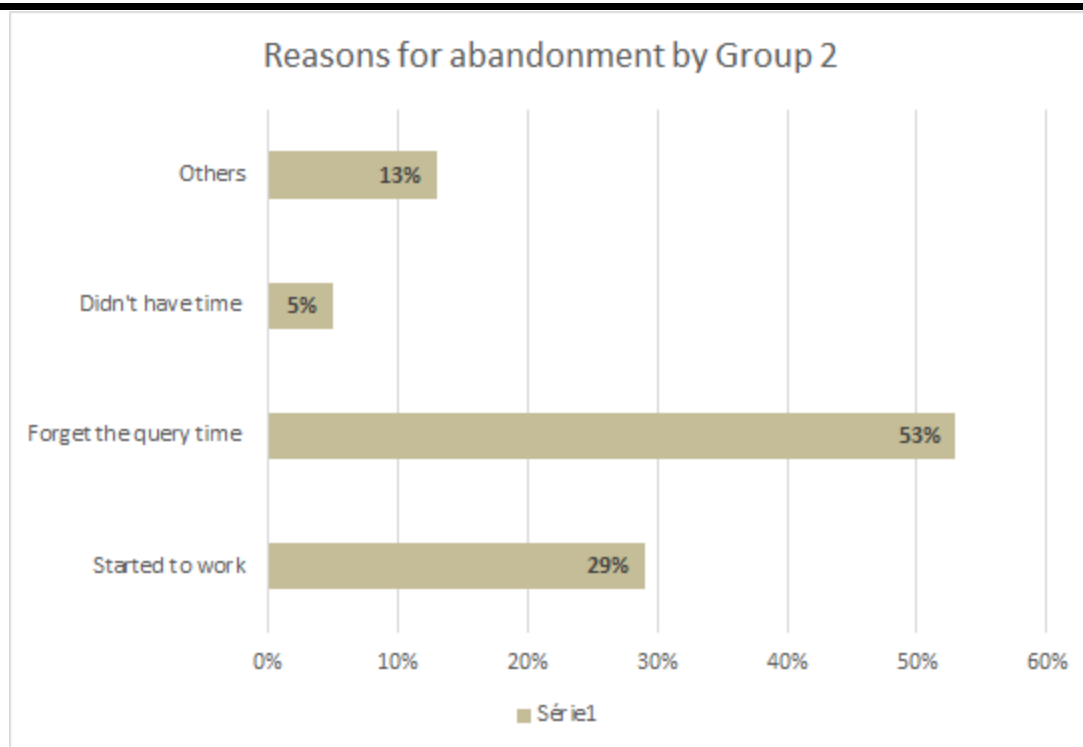


Fig. 1: Distribution in percentage of Group 2 mothers' reasons for evasion in a Public program.

The evasion of the G2 justified in your most (54%) forgot the query in UBS, 25% of mothers reported not being able to attend because they started to work, 4% because they didn't have time and 11% for other reasons. The index of caries in deciduous teeth (dmft) introduced different data groups, the G1 was equal to 0.05; the G2 was 1.96; the G3 was 3.30 of the affected children. In relation to caries disease (table 3), there was a linear relationship between the variables, in which all groups showed a significant difference. For gingivitis, there was no significant difference when comparing G1 and G2, but was extremely

significant between G1 and G3. In the occlusions, there was a statistically significant relationship between the three groups relating to circumvention of the program and the presence of child malocclusion. G2 and G3 have increased the prevalence of these changes since there were participating or partially from the program.

The most prevalent malocclusion in the groups was the open bite, followed by anterior and posterior crossbite, in which the group that never appeared on the show (G3) presented a statistical difference in this oral amendment about the G1.

Table 3: Submission of data analyzed by comparing group to group.

	Data Analyzed	N %	RR	95% CI	P Value
Carie	G1x G2	50 (30%)	0.149	0.064 , 0.346	<0.001*
	G1x G3	64 (38%)	0.102	0.044 , 0.24	<0.001*
	G2x G3	104(62%)	0.71	0.528 , 0.953	0.038*
Gingivitis	G1x G2	22(13%)	0.603	0.321 , 1.134	0.107
	G1x G3	41(24%)	0.281	0.141 , 0.561	<0.001*
	G2x G3	49(29%)	0.528	0.337 , 0.826	0.002*
Malocclusion	G1x G2	43(26%)	0.849	0.583 , 1.237	0.47
	G1x G3	61(36%)	0.512	0.342 , 0.767	<0.004*
	G2 x G3	66(39%)	0.618	0.432 , 0.884	0.007*

\*Fisher's exact test with a significance level  $p < 0.05$ ;

RR=Relative Risk; 95% CI = Confidence Interval

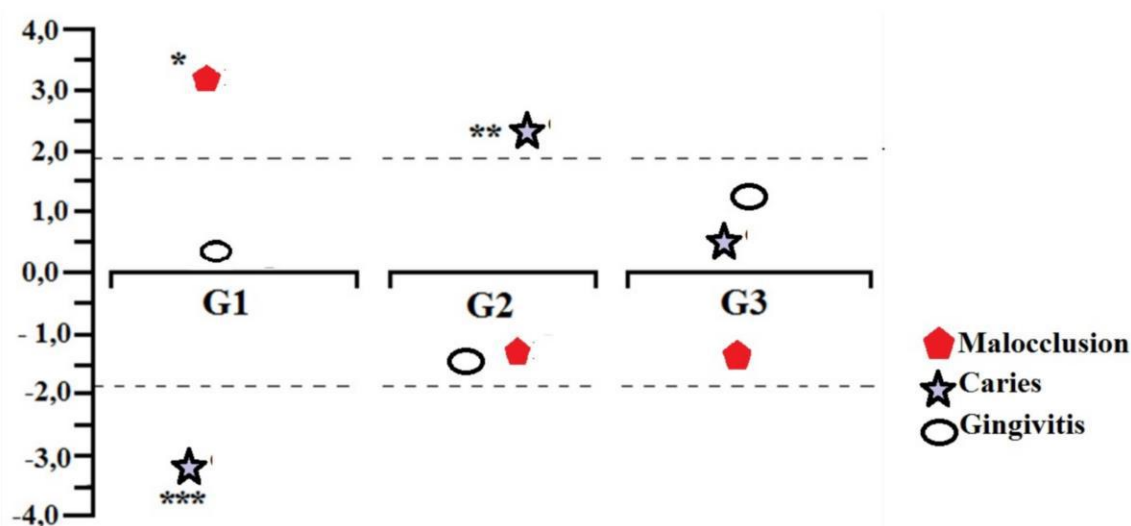
Table.4: Distribution in number and percentage according to oral diseases (caries, gingivitis and occlusion) found in all groups.

	G1		G2		G3		p value
	n	%	n	%	n	%	
Malocclusion	19	22.6%	28	28.6%	42	50%	
Gingivitis	8	8.3%	15	17.9%	34	40.5%	*0.025
Caries	5	5.9%	46	54.7%	59	70.2%	

\* Chi-square test with a significance level of  $p < 0.05$ .

Table 4 represents the percentage of oral amendments. Among the groups studied, it became apparent that the non-participation of an oral health promotion program promoted more oral diseases ( $p = 0.025$ ;  $X^2 = 16.39$ ).

To a satisfactory conclusion on the associations observed, the residue analysis technique to assist in the interpretation of data organized in Figure 1 and evaluate how the different diseases count toward significance obtained.



Residues above + 1.96 or below -1.96 indicate the significance obtained in the chi-square test and show the number of individuals with higher or lower disease levels, respectively, than would be expected if they were random.

Fig. 2: Adjusted residues (Raj) calculated from standardized data residues from the correlation between groups (G1, G2 and G3), according to oral diseases (caries, gingivitis and occlusion).

The positive residue (\*\*\*) Raj = -3.44) in G1 indicates the significance of the Chi-square test and shows a larger number of individuals under the decay that would be expected if it was casual, but the oclusopatia was higher in this group (\* Raj = 3.30). In the G2 positive residue (\*\* Raj = 2.10) shows that only the caries disease was greater than expected.

#### IV. DISCUSSION

The dental care early, through preventive education, results in better quality of the oral health of children [14]. However, the number of mothers who reported having sought assistance only after the child is high on G3 carious

lesion, seek professional assistance only after the disease manifests itself, demonstrating a curative view of dentistry that must be changed by public policies.

Health education in government projects must provide conditions for people to develop a sense of responsibility, both in relation to your own health and the health of your family and comunidade [15]. In this program were enrolled about of 1,303 children from 0 to 6 months between 2010 to 2014, when all the mothers received a card with registration and schedule the date of return, however, the number of tax evasion is still high, in which more than 800 children did not return. Although mothers G1 and G2 have received a schedule with the return date



scheduled, many still escaped the program (G2). These mothers claimed several reasons that led to losing the queries, such as: "lack of time", "return to work" and "forgot the query".

When the mothers believe that all is well in the first child visits to the dentist are and begin to look for health professionals only when the disease manifests itself, demonstrating the difficulty of accepting new paradigms in the promotion and maintenance of the health [16]. Mothers profile may affect the participation and collaboration of preventive actions, taking into account the socio-economic status, mother's age [17], the number of children and the presence of a partner [18].

An oral health promotion program based on repeated preventive guidelines cycles initiated during pregnancy the mother was successful in reducing the incidence of caries in these children [19]. The gestational period is the ideal time to start preventive and educational programs motivate the importance of infant frequency [4, 7, 14].

In the present study, several mothers of all groups reported not having received information about oral health during pregnancy in the prenatal period, which probably hindered the awareness to avoid the circumvention of the program. In this study, the marital status of the parents was significant, the mothers of the G3 had more children and were 10 years younger than the G1. According to Moimaz et al., [20] the presence of caries in children and the story of maternal caries associated with mentoring women, low economic level and family visits to the dentist. However, the marital status of the parents was not significant (0.695), but the number of children in the home in relation to dental caries was highly significant ( $p < 0.0001$ ).

There is evidence that early preventive visits may reduce costs [21]. The age of first dental appointment had a significant positive effect on preventive expenses related to dentistry and a study of early dental consultations as to the effect and cost of treatments. The average costs were lower for children who received early preventive care, with average costs per child, according to the age of the first consultation: before 1 year of age = US \$ \$262; age of 1 to 2 = \$339; age of 2 to 3 = \$449; age of 3 to 4 = US \$492 and the age of 4 to 5 = \$ \$546 (16) [22]. Therefore, the sooner the child is accompanied by a dental health education program, less public spending with restorative treatments and rehabilitation will be carried out.

The first visitors this program focuses on oral hygiene in children; dietary advice; information about oral habits and prevention of dental injuries, leading to reduction of dental costs. In this sense, it is necessary that public policy evaluate periodically their health programs, with longitudinal studies, seeking ideal samples and making them important indicators for health promotion. This will

bring a direct return to the population studied, as it allows a reduction in the costs of treatment and care of the sequelae of the main oral problems that affect children. Such actions achieve positive results, will be reflected in the improvement of the quality of life of this community.

Tooth decay is the most prevalent oral disease in the deciduous dentition, affecting approximately 50% of preschoolers, which may have a negative impact on quality of life of the child, as a result of the commitment of the chew, talk, sleep disorders and irritability due to pain, as well as psychological problems [23]. The present study showed that children who have left the program for 24 months and those that have not participated, showed a high rate of caries. The takeover and colonization of the caries disease and bacterial protection factors in children from 0 to 12 months of age showed that this colonization is mediated by eating habits and behaviors in this baby hygiene 8.

The data of this research have shown that preventive program was effective in preventing tooth decay, even those children who have not continued in the prevention program when compared to those who never participated. According to the classification of oral health by the World Health Organization (WHO), the safety index of the present study was considered too low in G1, the G2 was of low incidence and the G3 was medium. This demonstrates that the program was effective in the control of caries disease in the G1 for the first 5 years of the child.

In relation to gingivitis, all groups showed an index of bleeding, and the component free of caries of the G1 was the largest. Parents are instrumental in cleaning of the mouths of children under the age of 5, because they do not have the motor skills to fend for themselves [24]. This demonstrates that the encouragement of oral hygiene performed by the program was crucial in maintaining healthy habits, resulting in periodontal health, where children who attend preventive programs feature minor bleeding index than other children [25]. Caries and gingivitis index observed in G2 and G3 indicates that this epidemiological approach with questionnaire in table 2, in which often shows only the theoretical knowledge of these issues, not demonstrating the reality of the habits and attitudes of family.

In Brazil, an epidemiological study conducted in 2010 showed a 13.6% reduction in malocclusion to 12 years of age. Although there is a drop in the prevalence of malocclusion at that age, this change can still be considered an occlusal condition pública [26]. In the present study, the positive residue in Figure 1 shows that the free component of G1 of the malocclusion was not as low as expected, but two important factors must be considered, the genetic inheritance of the child and oral habits persisted. The

hereditary genetic factor can be mitigated by avoiding the use of harmful habits that can stimulate major deformities and sequelae of the child [27].

A major obstacle to the success of prevention programmes has been the lack of commitment of the families with the guidelines, as well as to the increasingly early insertion of inappropriate habits that lead to oral diseases, lack of attendance to queries may compromise the early approach for control [28].

Fracasso et al. [2] evaluated 100 children 2 to 5 years of age in two groups. The group consisted of 50 children served since the first year of life in an oral health program with education and prevention in bimonthly returns, and the Group B with conventional treatment (preventive and curative) and spontaneous demand in Health Center. The Group showed lower caries index, non nutritious habits and facial changes than in Group b. a reality that is in line with the present study, where the G1 obtained the lowest rates of oral diseases, indicating that the frequency and constancy in the programs help reduce diseases like cavities, gingivitis, and malocclusion.

Child care programs are more effective than the spontaneous demand, fulfilling the goal of keeping oral health in children. So, to demonstrate the success and effectiveness of a program, the results should be evaluated clinically after a given period [19]. The project was evaluated, seeking to meet the profile of the community participant, a diagnostic of results achieved, identify the main obstacles that interfere with the program and seek solutions to achieve the objective of the proposal in basic health.

Participate in a program of Early Dental Attention influenced positively on oral health of children, in addition to introduce food and correct habits in hygiene of children, promotes child health [4, 24]. Therefore, public policies are not enough to offer free programs early service, it is necessary to find ways to promote and motivate the children to an appropriate frequency.

The perception and motivation are important components in health education for mothers to assimilate and interpret information to produce actions or change inappropriate behaviors [29]. In this educational process, if these motivating forces are not enabled, the changes in behavior are unlikely to occur. This shows that the mere acquisition of knowledge by the community alone is not sufficient to promote health [30], and it is necessary to work within the range of values important in reality of each population.

## V. CONCLUSION

Children from 3 to 5 years who frequented the oral health program presented fewer individuals with caries,

gingivitis, malocclusions and habits than those who have left or have never participated in a program. To promote the oral health of children, it is essential to adhere to the program and adopt healthy habits early by those responsible.

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