Prevalence of Early Childhood Caries (ECC) in a paediatric italian population: An epidemiological study

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Abstract

Aim The present work aims to evaluate, through an epidemiological study, the prevalence of Early Childhood Caries in an Italian paediatric population, aged up to 71 months, evaluating some determinants that will be illustrated in this study in order to adopt preventive care and intervene as early as possible to limit the development of this disease.

Methods The sample consisted of 76 children aged up to 71 months who were examined at the PAediatric Dentistry Clinic of the University of l'Aquila. Parents were informed of the research that was taking place. All read the information sheet explaining the study and signed the informed consent where it was emphasised that the data collected would be treated and stored in a strictly confidential manner, pursuant to the Legislative Decree 196/2003 in force in Italy since June 30, 2003, regarding the protection of individuals with regard to the processing of personal data. At the end of this study, a standardised questionnaire administered. The questionnaire, divided into two parts, made it possible to acquire information regarding the characteristics of the population. First part: General data of the child and the medical history of the mother and father; Second part: The age and gender of the child, the type and duration of breastfeeding, the use of sugary pacifiers, oral hygiene and frequency of consumption of sugars drinks and food, identifying the starting age.

Results Evaluating the dmft of each child, 40.79% of our sample population is affected by ECC; 57.89% of the children used the pacifier and 13,16% of them have or have used it with honey with a p value of 0.001, therefore this parameter was statistically significant, together with the intake of candies, chocolates and sugar drinks. The data was collected for a period of about 12 months, consequently a descriptive statistical analysis was conducted in which the characteristics of the population under consideration were outlined. Discrete and nominal variables have been described with frequencies and percentages. The percentage differences were evaluated using the chi-square test and the Fisher test. Quantitative variables were expressed in terms of mean and standard deviation and significance was assessed by the Mann-Whitney test. The level of significance was established as $p < 0.05$. A Logistic Regression was conducted to evaluate the risk factors associated with a dmft>0 setting, dmft=0/dmft>0 as the dependent variable and the variables investigated as explanatory variables. The evaluation of the association was reported as the Odds Ratio with the 95% confidence interval. The statistical analysis was carried out using the Stata 12/1C statistical package.

Conclusions ECC is a multifactorial disease in which eating habits play a very important role. A diet that from childhood is characterised by a high consumption of sugar-rich food and drinks is highly associated with the incidence of ECC in later years..

KEYWORDS Early Childhood Caries; Eating habits; Sugar consumption.

Introduction

Early Childhood Caries (ECC) is an early manifestation of caries disease that develops in children under 6 years of age. The American Academy of Pediatric Dentistry defines Early Childhood Caries as "the presence of one or more carious surfaces, missing due to caries or filled in deciduous teeth in children up to 71 months". The main causes of the disease include the susceptibility of the subject, the early colonisation of the oral cavity by bacteria, poor oral hygiene, a high sugar diet and environmental factors including low socioeconomic status, second-hand smoke (passive smoking), premature birth or low birth weight [Law, 2006; Selwitz, 2007].

It is therefore a chronic, degenerative multifactorial pathology occurring worldwide, with the main cause being the prolonged consumption of sugar, honey, sugary drinks, and also milk, especially at night, when the salivary flow is strongly reduced. The more frequently these sugars are consumed, the more often the pH of the oral cavity drops below the threshold value, with consequent difficulty in buffering the general acidity. The prevalence of caries disease in Italy according to recent research is still very high and tends to increase significantly with age, rising from 2.9% in children from 0 to 23 months to 6.2% in children aged 24 to 47 months, to exceed 14% in children aged 48 to 71 months. At the age of twelve, the prevalence exceeds 40% [Colombo et al., 2019]. The main cariogenic bacteria involved in the ECC are S. Mutans and Lactobacillus [Berkowitz, 1975].

In the oral cavity of the newborn such bacteria are absent and it begins to be colonised with the eruption of the first tooth at about 6 months of age. Numerous studies confirm that often the transmissibility of S. Mutans to the child is from the mother [De Soet JJ, 1998].

While the primary aetiology is due to microbial and dietary factors, an important role in the spread of caries is due to social factors, and behavioural and economic conditions in which children live. Often families of low socioeconomic status have difficulty in accessing preventive dental care that could provide important information on oral health promotion strategies and raise awareness of the importance of good nutrition and proper oral hygiene [De Soet JJ, 2001; Cianetti S. et coll. 2017].

Poor education and second-hand smoke can also contribute to the greatest risk of developing tooth decay. Second-hand smoke harms the smile of children and this was confirmed by a Japanese study from which it was found that four month olds' exposure to smoke doubles the risk of developing caries in deciduous teeth [Tanaka, 2015]. In fact, second-hand smoke induces a variation of biochemicals in the composition of the salivary fluid that reduces its protective effect on tooth enamel. Finally, several authors have demonstrated an increased prevalence of enamel defects in the deciduous and permanent dentition of preterm children and/or low birth weight [Pimlott, 1985]. In fact, premature births, a higher number of dental enamel defects were found, compared to term births, both in deciduous and permanent dentition [Aine, 2000].

The exact pathogenetic mechanism and the aetiological factors responsible for this phenomenon are not yet clear, but the incomplete dental development is attributed to intrauterine nutritional deficiency, hypoxia and vitamin deficiencies. [Eastman, 2003]

These dental defects, in addition to causing aesthetic damage, can represent a *locus minoris resistentiae* for the subsequent formation of carious lesions [Lai, 1997].

The structure of deciduous and permanent teeth is the same but in the former the enamel and dentin are thinner and less resistant while the dental pulp is more extensive than in the latter. For all of these reasons, caries affecting a deciduous tooth, if not treated in time, progresses much more rapidly, quickly affecting the pulp. The clinical picture of children with ECC can range from initial forms of enamel demineralisation to complete destruction of deciduous teeth. Achieving this condition may also involve the very early extraction of the highly compromised deciduous teeth. Recent studies have shown that children with ECC are more exposed to onset of pain and dental emergencies, risk of malocclusion and development of new caries, recurrent infections, development of fear and dental phobia as adults, possible development and growth alteration, difficulty in learning and reduced school performance [Mansoori, 2019; Paglia, 2017].

Although the prevalence of caries varies between parts of the world, ECC is clearly an important public health issue for both developing and industrialised countries, with a major impact on public health costs given the young age of the affected children and often with the lack of cooperation of the child, the treatments must frequently be addressed under general anaesthesia. ECC can be prevented through simple measures that include a proper diet, appropriate oral hygiene, and early and regular dental visits from birth. This can be achieved by giving mothers the correct instructions and appropriate suggestions to maintain the oral health of the child. Recent research suggests that there may be a 15% drop in the risk of developing ECC if the mothers with newborns or pregnant women are educated on healthy baby diets and eating practices [Riggs, 2019]

The present work aims to evaluate, through an epidemiological study, the prevalence of ECC in an Italian pediatric population, aged up to 71 months, evaluating some determinants that will be illustrated in this study in order to adopt preventive care and intervene as early as possible to limit the development of this disease.

Materials and methods

The sample included 76 children aged up to 71 months, examined at the Pediatric Dentistry Clinic of the University of L'Aquila. The children's parents were informed of the research that was taking place. All of them read the information sheet explaining the study and signed the informed consent where it was emphasised that the data collected would be treated and stored in a strictly confidential manner, pursuant to Legislative Decree 196/2003 in force in Italy since June 30, 2003, regarding the protection of individuals with regard to the processing of personal data. At the end of this study, a standardised questionnaire was administered (Fig. 1).

The questionnaire we used to acquire the data relating to the characteristics of the population was structured as follows.

- Part One: Information regarding the general data of the child and the medical history of the parents.
- Part Two: The parent was asked to answer some questions regarding the child.

The questionnaire was very similar to others used to determine the prevalence and determinants related to the disease. It was filled in directly by the parent/guardian regarding information related to the clinical records of the child. The questionnaire is composed of both dichotomous and open-ended questions (e.g., number of cigarettes smoked per day, number of months of breastfeeding, allergies etc.). The questions were formulated using basic language, devoid of technical terms. The only technical term that appears in the questionnaire is the "dmft" referring to decayed, missing, filled teeth item that was filled in by the clinician. Although the questionnaire was filled in by the parents, the clinician was always available to respond to any doubts the parent had. It was noted that the clinician's intervention was necessary to clarify the difference between "past" and "last month" related to questions that refer to the use of sugared drinks/fruit juices, and chocolates/candies. Here the clinician underscored that the "past" meant the time elapsed prior to the last month.

Among all the questions that have been submitted in this study it was decided to evaluate only some. In fact, with regards to the recollection of the parents, a descriptive survey was carried out. However, to assess the association with the dmft>0 in children, the only parameter that was taken into consideration was cigarette smoking. Among all the data acquired regarding the children, only a few items have been taken into consideration such as their age and gender of the child, the type and duration of breastfeeding, the use of sweetened pacifiers, oral hygiene and the frequency of intake in the past and in the last month of sugared drinks/fruit juices and chocolates/candies and identifying the age when these began.

A dental check-up was carried out for each child aged up to 71 months to identify the dmft (decayed, missing, filled teeth).This epidemiological index is important because it allows us to evaluate the caries experience in the population.

The visits were carried out by placing the child in the dental

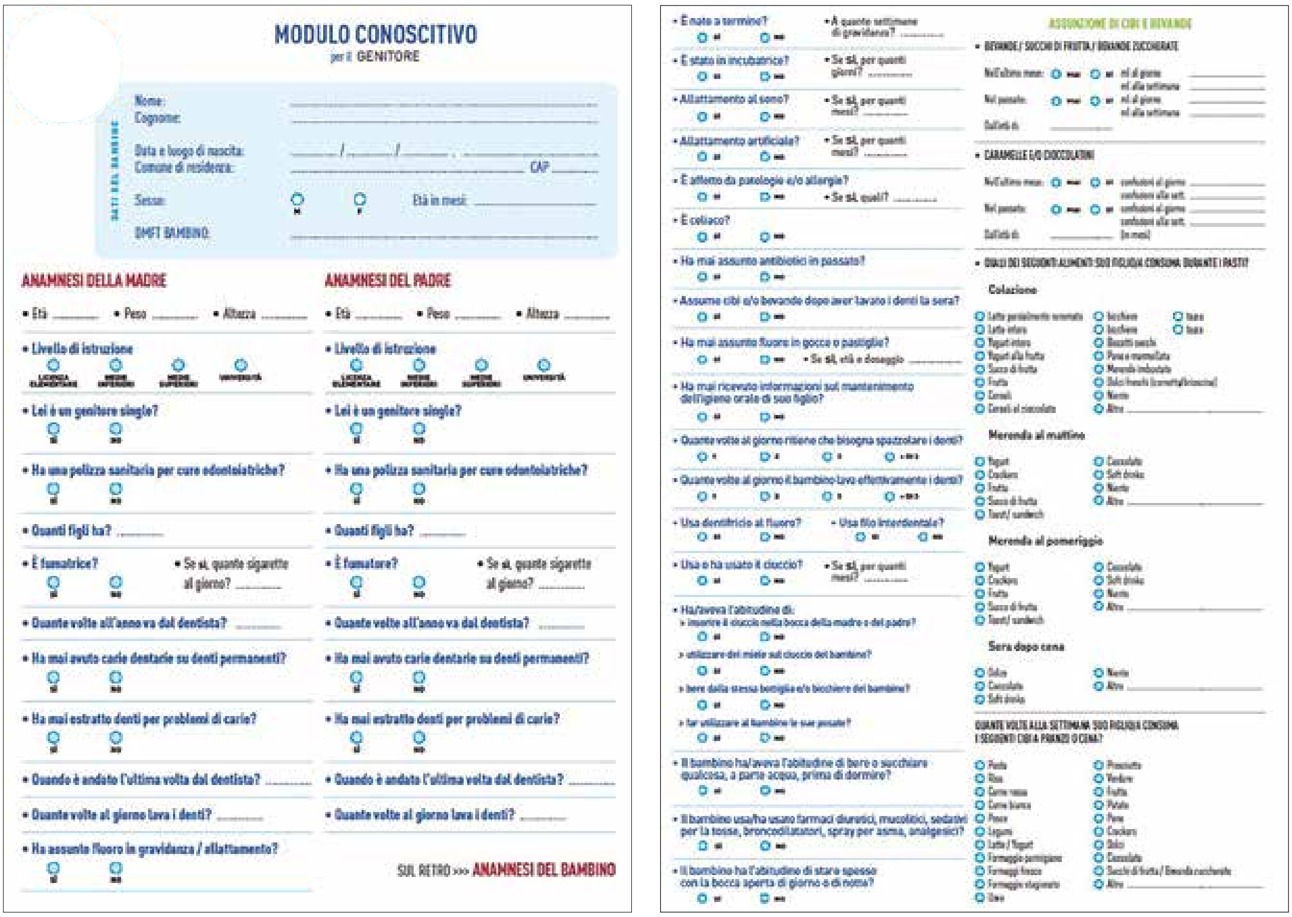

FIG. 1 The questionnaire.

chair, with the smaller children being held in the mother's arms. This was always conducted in the dental chair. A probe and a mirror were used to determine the dmft. The initial reversible carious lesions were also evaluated.

Inclusion criteria were: Children accompanied by at least one parent/guardian over the age of 18; Age ≤ 71 months of age; No detectable caries.

Exclusion criteria were: Presence of genetic syndromes or children considered special needs patients or who had diseases such as epilepsy or diabetes.

The data were collected for a period of about 12 months, consequently a descriptive statistical analysis was conducted in which the characteristics of the population under consideration were outlined. Discrete and nominal variables were described with frequencies and percentages. The percentage differences were evaluated using the chi-square (χ^2) test and the Fisher test.

Quantitative variables were expressed in terms of mean and standard deviation and significance was assessed by the Mann-Whitney test. The level of significance was established as $p < 0.05$.

A logistic regression was conducted to evaluate the risk factors associated with a dmft>0, dmft=0/dmft>0 as the dependent variable and the variables investigated as explanatory variables. The evaluation of the association was reported as the odds ratio with the 95% confidence interval.

The statistical analysis was carried out using the Stata 12/1C statistical package.

Results

Our population, made up of 76 children, has an average age of 40.82 ± 21 months. Of these 44 are males (55.89% of the sample) and 32 are females (42.11% of the sample), thus defining a homogeneous sample for the gender variable (Fig. 2). The children were then divided into classes based on age (Fig. 3). Evaluating the dmft for each child, known as the epidemiological index most used to evaluate the experience of caries in a population, it can be observed that "caries free" subjects, i.e. those who have never experienced caries, represent 59.21% of the entire population, while children who have a dmft >0 make up 40.79%. So, it can be stated that 40.79% of our study population is affected by ECC (Fig. 4). By dividing the population by gender and evaluating the caries-free subjects and those who have a dmft >0, we can observe that through the χ^2 test we obtain a p value of 0.654 which is not statistically significant to define an association between gender and 1 experience of tooth decay (Fig. 5).

Following the responses received from the children's parents, it is recorded that the average age of mothers is 36.19 ± 5.64 years while that of fathers is 38.87 ± 5.71 years. The level of education of the parents is medium-high: 51% of mothers graduated from high school while 36.84% attended college; the sample of fathers is reduced to 74 units since there are two missing answers, with 59.46% attended secondary school while 22.97% attended college.

The smoking habit of both parents was assessed and it was

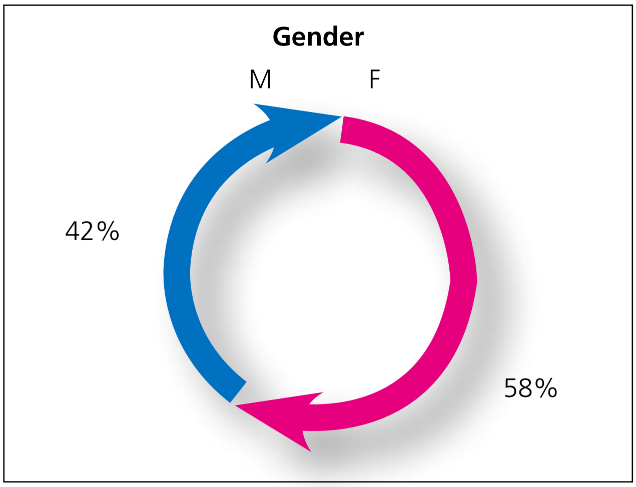

FIG. 2 Gender (M/F) percentages of the population studied.

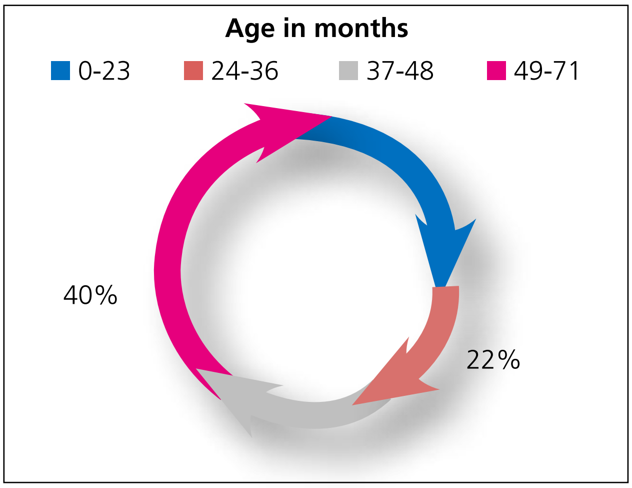

FIG. 3 Population statistics by months of age.

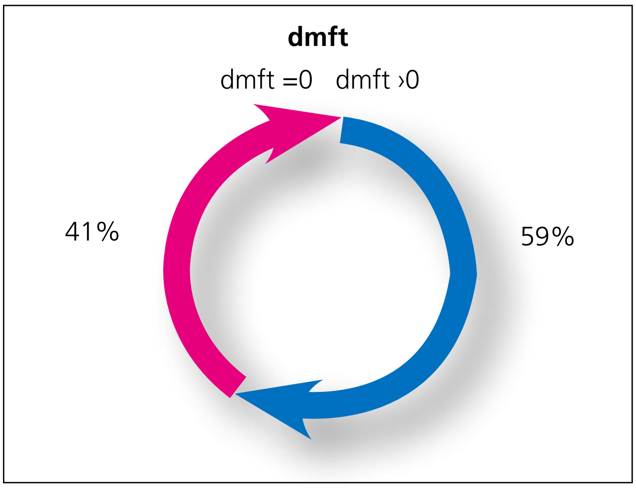

FIG. 4 Graph representing the percentage of children with ECC.

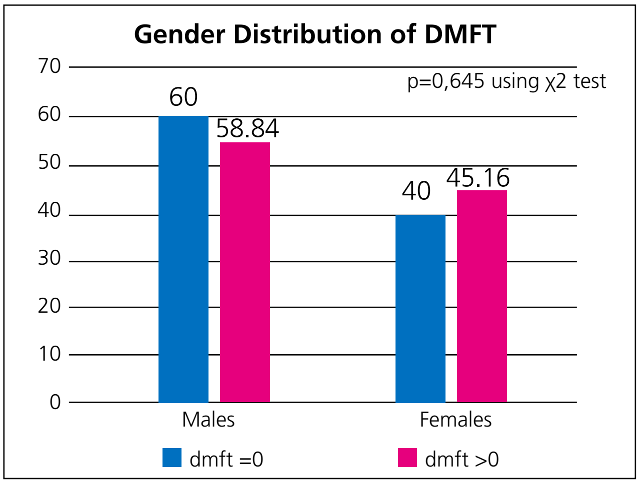

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FIG. 5 Gender distribution of dmft within the study group population.

determined that 17.11% of mothers and 44% of fathers smoked. With the $\chi 2$ test, which allows to evaluate the association between two variables, and evaluating the difference, it was observed that smoking for both parents is not a statistically significant variable in relation to the presence of caries (Table 1).

The p values of mother and father are relatively low since, although there is substantial uniformity between cases with the presence of caries and caries-free in the presence of smoking parents, if the smoking habit is not present there is a clear prevalence of caries-free subjects. Another significant variable is the number of cigarettes per day consumed, but the sample is very small, especially for mothers (only 13 smokers). Similarly, this applies to breastfeeding, with 88.16% of babies being breastfed and 50.67% taking formula. In this sample no association between dmft>0 and type of lactation was found; in fact the p values are both greater than 0.05 and there is no statistical significance (Table 2).

57.89 % of the children used the pacifier and for 13.16% it was applied honey on it: in particular, out of 10 of these who had such behaviour, 9 had a dmft >0 with a p value of 0.001, so this parameter was statistically significant (Table 3).

To the questions related to eating habits, and to those relating to the intake of sugared drinks/fruit juices and candies/chocolates, not all parents answered, so we will refer to a different number, albeit very close to that of the sample analysed.

Variables	dmft=0	dmft>0	p value
	45 (59.21)	31 (40.79)	
Smoker- Mother, n (%) No	40 (88.89)	23 (74.19)	0.095a
Yes	5 (11.11)	8 (25.81)	
Smoker- Father, n (%) No	28 (63.64)	14 (45.16)	0.112a
Yes	16 (36.36)	17 (54.84)	

TABLE 1 Cigarette smoking variable associated with children's dmft, p value identified with $\chi 2$ test.

To the question "did your child take sugared drinks/fruit juices in the last month", five children were excluded from the sample because no answer was given; in addition, it should be noted that these five children were under the age of 6 months and probably the parents did not consider it necessary to answer the question due to their young age. Thus, of 71

Variables	Dmft =0	Dmft >0	P value
		Breastfeeding	
No	4 (8.89%)	5 (16.13%)	0.276
Yes	41 (91.11%)	26 (83.87%)	
		Artificial breastfeeding	
No	23 (51.11%)	14 (46.67%)	0.706
Yes	22 (48.89%)	16 (55.33%)	

TABLE 2 Breastfeeding and dmft in children.

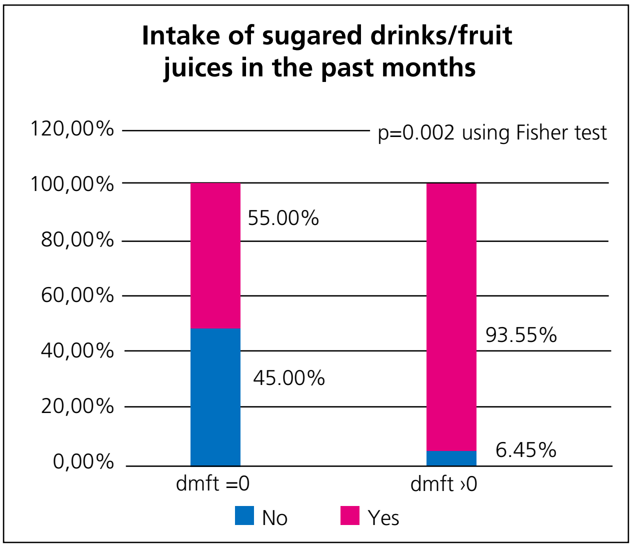

TABLE 4 Intake of sugared drinks/fruit juices in the last month and dmft.

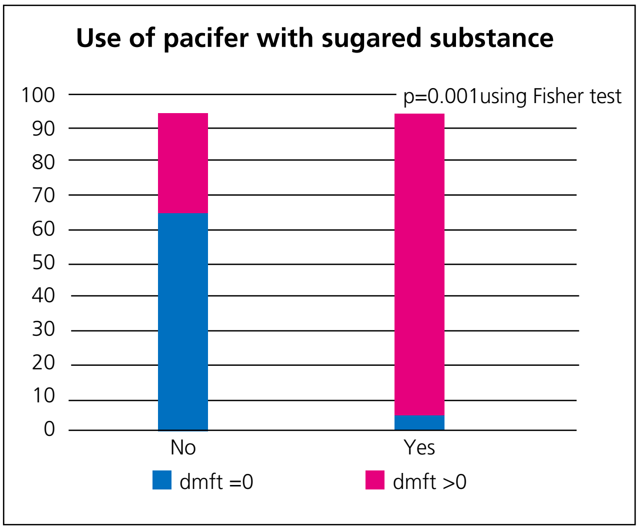

TABLE 3 The use of a sweetened pacifier associated with the dmft.

	dmft=0	dmft>0	*p* value
Intake of sugared drinks/			
Fruit juices in the past.			
No	21 (55.26%)	2 (6.45%)	<0.001
Yes	17 (44.74%)	29 (93.55%)	

TABLE 5 Intake of sugared drinks/fruit juices in the past and dmft.

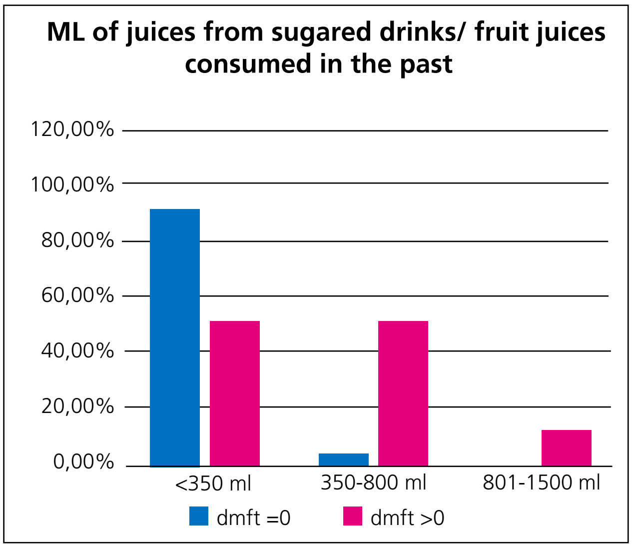

TABLE 6 ml of juices from sugared drinks/fruit juices consumed in the past and dmft.

children, 71.83% consumed sugared drinks/juices of fruit in the last month. Of the children who consumed such drinks, 93.55% have tooth decay, or dmft >0 (p value <0.001) (Table 4). Even the intake of sugared drinks/fruit juices in the past seems to be affecting the presence of caries (Table 5). The percentages obtained were calculated on a total of 69 children as 7 did not answer the question. Evaluating in the past the amount (ml) of sugared drinks/fruit juices consumed, through the Fisher test we obtain a p value = 0.021. Therefore, it can be stated that also the quantity of sugared drinks/fruit juices consumed among those presenting a dmft =0 and a dmft >0 is different and affects the development of ECC (Table 6). The intake of candies and chocolates was also significant, both for the intake during the last month and for the intake prior to that. Here too the sample of children is reduced due to the question being left blank by some parents. However, the p value obtained with the Fisher test is significant and therefore we can say that there is a significant correlation in those who consume chocolates/candies and have caries (Table 7, 8).

In conclusion, a univariate logistic regression was carried out to measure the association between the presence of the condition that was statistically significant and the caries experience. The odds ratio and the confidence interval were then evaluated. Odds ratio is a statistical index that measures the degree of association between two factors, in this case between a risk factor and the disease. The results obtained: are reported in Table 9. Having obtained an OR>1 we can say that this risk factor may be involved in the onset of ECC. The explanatory tables of the statistical analysis performed are shown in Tables 10, 11 and 12.

Discussion and conclusion

The present study sought to estimate the prevalence of ECC in an Italian paediatric population, aged up to 71 months referred to the paediatric ward of the University of L’Aquila.

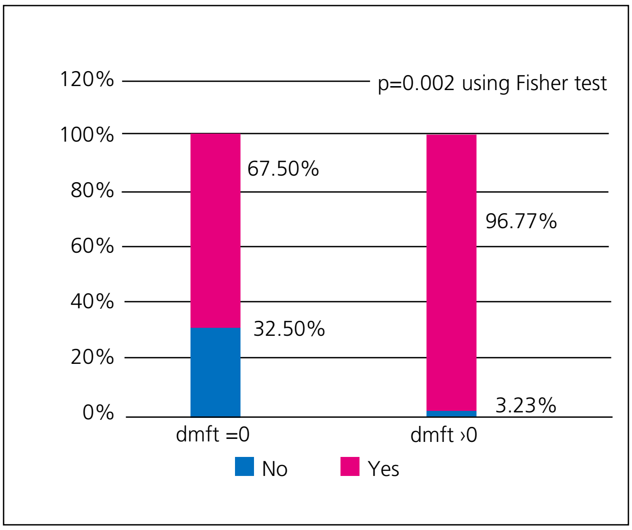

TABLE 7 Intake of chocolates/candies in the past and last month and dmft.

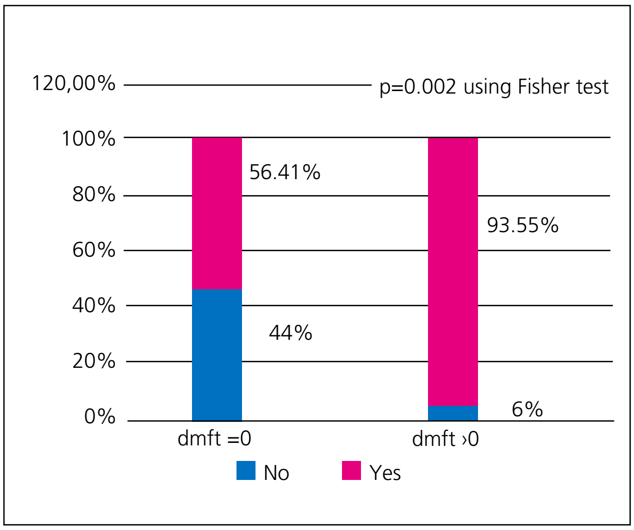

TABLE 8 Intake of chocolates/candies in the past and dmft.

Features	OR	*p* Value	IC 95%
Intake of candies/ chocolates in the past month	14.44	0.013	(1.77-117.87)
Intake of candies/ chocolates in the past	11.20	0.003	(2.33-53.67)
Intake of sugary drinks/ fruit juices in the last month	11.86	0.002	(2.48-56.59)
Intake of sugary drinks/ fruit juices in the past	17.91	<0.000	(3.73-86.02)
Habit of honey on the pacifier	18	0.008	(2.14-151.22)

TABLE 9 Univariate logistic regression.

Subjects aged up to 71 months represent the target population of the definition of ECC as given by the American Academy of Pediatric Dentistry. The results obtained show that in the study population composed of 76 children, 41% have a dmft>0. The caries experience by age group was analysed by stratification, comparing the group of caries free children with those having dmft >0: This study differs from other studies in the literature, since the studies conducted on the prevalence of ECC were often carried out involving children in kindergarten or primary school with an age therefore greater than 3 years [Campus, 2009].

In the present study, unlike one recently published in the European Journal of Pediatric Dentistry by Colombo et al. [2019], no children who experienced caries in the age range 0–23 months were identified.

The descriptive analysis that was conducted has brought to light data that deserve to be discussed such as the "number of times the child brushes his/her teeth after having eaten". Nine of the children in the study group never brushed their teeth after eating and this figure is important because the answer was given by mothers who were also asked if, after breastfeeding their child, they cleaned their children's oral mucosa with gauze. This factor turns out to be relevant since, after lactation, it is recommended by the Ministry of Health that mothers clean the oral cavity of their child, especially before sleeping as this prevents the plaque from depositing on the teeth, and if these teeth are damaged, preventing caries from spreading [Iii, 2014]

In our study, as in others, the association between the presence of caries and the type of lactation has not proven statistically significant [Paglia, 2016]. It is likely that to investigate the lactation variable you must change the population targets, carrying out studies that control over time the type, duration of lactation and the onset of carious lesions, and controlling the diet factor that takes over after the sixth month, when exclusive breastfeeding lapses. The questions asked in the questionnaires should also be more detailed, precisely to assess the frequency of breastfeeding, especially at night. Breastfeeding is very important for the development of the baby since it promotes sensory and cognitive development and protects the baby from infections and chronic pathologies. Breast milk changes flavour with each feed and mothers need to be made aware of this as it is affected by their diet. Breastfeeding thus determines the stimulation of the taste of the child and guides future nutrition. The lack of association between the type of breastfeeding and the duration is however in line with the conflicting results found in the literature [Kirthiga, 2019]. This should prompt researchers to investigate the subject further. In any case, it is important to monitor the oral hygiene of the child from the first months of life. ECC is a multifactorial pathology in which eating habits play a very important role. A diet that since childhood is characterised by a high consumption of food and drinks rich in sugars is highly associated with the incidence of ECC in the following years. Frequent and early exposure to sugary foods inevitably influences future food preferences and behaviours. In this study, dichotomous questions concerning the intake of

Characteristics of the parents	
	Total of children
	N = 76
Mother age in years, mean ± DS	36.19 ± 5.64
Father age in years, mean ± DS	38.87 ± 5.71
Educational level - Mother, n (%)	
Primary school diploma	2 (2.63)
Middle school	7 (9.21)
Upper middle school	39 (51.32)
University	28 (36.84)
Educational level - Father, n (%)	
Primary school diploma	0 (0.0)
Middle school	13 (17.57)
Upper middle school	44 (59.46)
University	17 (22.97)
Smoker- Mother, n (%)	
No	63 (82.89)
Yes	13 (17.11)
Smoker- Father, n (%)	
No	42 (56.00)
Yes	33 (44.00)
If yes, how many cigarettes per day , Mother	
<9	7 (53.85)
9-20	3 (23.08)
;>20	3 (23.08)
If yes, how many cigarettes per day, Father	
<9	8 (24.24)
9-20	13 (39.39)
>20	12 (36.36)
Have you ever had cavities on your permanent teeth ? - Mother	
No	7 (9.46)
Yes	67 (90.54)
Have you ever had cavities on your permanent teeth? - Father	
No	13 (17.81)
Yes	60 (82.19)
How many times a day do you brush your teeth? - Mother	
1 time	2 (2.63)
2 times	27 (35.53)
3 times	40 (52.63)
>3 times	7 (9.21)
How many times a day do you brush your teeth? - Father	
1 time	4 (5.33)
2 times	35 (46.67)
3 times	30 (40.00)
>3 times	6 (8.00)

TABLE 10 Characteristics of the parents.

Characteristics of the children (n=76)	
Gender, n (%)	
Males	44 (57.89)
Females	32 (42.11)
Baby age in months , average ± DS	40.82 ± 21.00
Age n (%)	
0-23 months	17 (22.37)
24-36 months	14 (18.42)
37-48 months	15 (19.74)
49-71 months	30 (39.47)
dmft	
dmft=0	45 (59.21)
dmft>0	31 (40.79)
Breastfeeding	
No	9 (11.84)
Yes	9 (11.84)
If yes , how many months of breastfeeding?	
≤ 2 months	11 (16.18)
3-6 months	20 (29.41)
7-9 months	14 (20.59)
≥10 months	23 (33.82)
Artificial breastfeeding	
No	37 (49.33)
Yes	38 (50.67)
If yes, how many months of artificial breastfeeding?	
≤ 2 months	4 (10.53)
3-6 months	9 (23.68)
7-9 months	13 (34.21)
≥10 months	12 (31.58)
Does your child take food or drink after brushing his/her teeth?	
No	40 (52.63)
Yes	36 (47.37)
How often does the child brushes his/her teeth?	
Never	9 (11.84)
1 time	19 (25.00)
2 times	34 (44.74)
3 times	10 (13.16)
> 3 times	4 (5.26)
Did/does your child use pacifier?	
No	32 (42.11)
Yes	44 (57.89)
If yes for how many months?	
1-5 months	5 (11.36)
6-12 months	9 (20.45)
13-24 months	6 (13.64)
>24 months	24 (54.55)
Did/do you use honey on the baby pacifier?	
No	66 (86.84)
Yes	10 (13.16)
Has/had your child a habit of drinking or sucking something, other than water, before going to sleep?	
No	42 (55.26)
Yes	34 (44.74)

TABLE 11 Characteristics of the children

Distribution of dmft among children			
	Dmft =0	Dmft >0	P value
	Caries free	Caries	
	45 (59.21)	31 (40.79)	
Gender, n (%)			0.654[a]
Males	27 (60.00)	17 (54.84)	
Females	18 (40.00)	14 (45.16)	
Age in months, average ± ds	31.02 ± 19.43	55.09 ± 13.96	<0.001[b]
Age, n (%)			<0.001[a]
0-23 months	17 (37.78)	0 (0.00)	
24-36 months	10 (22.22)	4 (12.90)	
37-48 months	8 (17.78)	7 (22.58)	
49-71 months	10 (22.22)	20 (64.52)	
Smoker- mother, n (%)			0.095[a]
No	40 (88.89)	23 (74.19)	
Yes	5 (11.11)	8 (25.81)	
Smoker- father, n (%)			0.112[a]
No	28 (63.64)	14 (45.16)	
Yes	16 (36.36)	17 (54.84)	
If yes, how many cigarettes per day ? Mother			0.230[a]
<9	3 (60.00)	4 (50.00)	
9-20	2 (40.00)	1 (12.50)	
>20	0 (0.00)	3 (37.50)	
If yes how many cigarettes per day? Father			0.199[a]
<9	4 (25.00)	4 (25.53)	
9-20	4 (25.00)	9 (52.94)	
>20	8 (50.00)	4 (23.53)	
How many times a day do you brush your teeth? - Mother			0.571[a]
1 time	2 (4.44)	0 (0.00)	
2 times	15 (33.33)	12 (38.71)	
3 times	23 (51.11)	17 (54.84)	
>3 times	5 (11.11)	2 (6.45)	
How many times a day do you brush your teeth? Father			0.826[a]
1 times	3 (6.82)	1 (3.23)	
2 times	19 (43.18)	16 (51.61)	
3 times	18 (40.91)	12 (38.71)	
>3 times	4 (9.09)	2 (6.45)	
Breastfeeding			0.337[a]
No	4 (8.89)	5 (16.13)	
Yes	41 (91.11)	26 (83.87)	
If yes, how many months of breastfeeding?			0.276[a]
≤ 2 months	9 (21.95)	2 (7.41)	
3-6 months	10 (24.39)	10 (37.04)	
7-9 months	7 (17.07)	7 (25.93)	
≥10 months	15 (36.59)	8 (29.63)	
Formula			0.706[a]
No	23 (51.11)	14 (46.67)	
Yes	22 (48.89)	16 (53.33)	

TABLE 12 Distribution of dmft among children.

Distribution by dmft among children			
	Dmft=0	Dmft>0	P value
	Caries free	Caries	
If yes, how many months of artificial breastfeeding?			0.344[a]
≤ 2 months	3 (13.64)	1 (6.25)	
3-6 months	4 (18.18)	5 (31.25)	
7-9 months	6 (27.27)	7 (43.75)	
≥10 months	9 (40.91)	3 (18.75)	
Does your child take food or drink after brushing his/her teeth?			0.279[a]
No	26 (57.78)	16 (51.61)	
Yes	19 (42.22)	17 (54.84)	
How many times does the child washes his/her teeth?			0.090[a]
Never	9 (20.00)	0 (0.00)	
1 time	11 (24.44)	8 (25.81)	
2 times	19 (42.22)	15 (48.39)	
3 times	4 (8.89)	6 (19.35)	
>3 times	4 (4.44)	2 (6.45)	
Do/did you use the pacifier?			0.332[a]
No	21 (46.67)	11 (35.48)	
Yes	24 (53.33)	20 (64.52)	
If yes, how many months?			0.168[a]
1-5 months	5 (20.00)	0 (0.00)4 (16.00)	
6-12 months	4 (16.00)	5 (26.32)	
13-24 months	4 (16.00)	2 (10.53)	
> 24 months	12 (48.00)	12 (63.16)	
Did you had a habit of using honey on your baby's pacifier?			
No	44 (97.78)	22 (70.97)	
Yes	1 (2.22)	9 (29.03)	
The child has/had a habit of drinking/ sucking something, other than water, before going to sleep?			0.001[a]
No	26 (57.78)	16 (51.61)	
Yes	19 (42.22)	15 (48.39)	
Sweets/ chocolates in the last months			0.002[a]
No	13 (35.20)	1 (3.23)	
Yes	27 (67.50)	30 (96.77)	
Packs per day			0.172[a]
1-2	27 (35.20)	28 (3.23)	
3-5	0 (67.50)	2 (96.77)	
Packs per week			0.318a
1-2	10 (37.04)	6 (20.00)	
3-5	11 (40.74)	11 (36.67)	
6-9	5 (18.52)	10 (33.33)	
> 10	1 (3.70)	3 (10.00)	
Sweets/chocolates intake in the past			0.001a
No	17 (43.59)	2 (6.45)	
Yes	22 (56.41)	29 (93.55)	

TABLE 12 Distribution of dmft among children.

Distribution of dmft among children			
	Dmft =0	Dmft >0	P value
	Caries free	Caries	
Packs per day			0.842[a]
1-2	21 (95.45)	28 (96.55)	
3-5	1 (4.55)	1 (3.45)	
Packs per week			0.008[a]
1-2	19 (86.36)	15 (51.72)	
3-5	2 (9.09)	14 (48.28)	
>10	1 (4.55)	0 (0.00)	
From the age of (months)			0.122a
≤ 12 months	5 (18.52)	6 (19.30)	
13-24 months	8 (29.63)	13 (41.94)	
25-36 months	13 (48.15)	6 (19.35)	
37-48 months	1 (3.70)	5 (16.13)	
49-71 months	0 (0.00)	1 (3.23)	
Intake of sugar drinks/ fruit juices in the last months.			<0.001[a]
No	18 (45.00)	2 (6.45)	
Yes	22 (55.00)	29 (93.55)	
Ml per day			0.379[a]
150-250	22 (100.00)	28 (96.55)	
251-350	0 (0.00)	1 (3.45)	
Ml per week			0.249[a]
<350 ml	9 (40.91)	5 (17.24)	
350-800 ml	8 (36.36)	13 (44.83)	
801-1500 ml	5 (22.73)	10 (34.48)	
1500-2500 ml	0 (0.00)	1 (3.45)	
Food and beverage intake in the past			<0.001[a]
No	21 (55.26)	2 (6.45)	
Yes	17 (44.74)	29 (93.55)	
ML per day			
150-250 Ml=1;	17 (100.00)	29 (100.00)	
ML per week			0.021[a]
<350 ML=1;	16 (94.12)	16 (55.17)	
350-800 ML=2;	1 (5.88)	10 (34.48)	
801-1500=3;	0 (0.00)	0 (10.34)	
From the age of.. (In months)			0.702[a]
≤ 12 Mesi=1;	6 (27.27)	7 (24.14)	
13-24 Mesi=2;	8 (36.36)	11 (37.93)	
25-36 Mesi=3;	7 (31.82)	7 (24.14)	
37-48 Mesi=4	1 (4.55)	4 (13.79)	

A χ2 or Fisher test
B Mann-Whitney test
P > 0.05, No statistically significant difference between groups.
P < 0.05, Statistically significant difference between groups

TABLE 12 Distribution of dmft among children.

sugared drinks/fruit juices and chocolates/candies consumed both in the last month and in the past and the related experience of caries were statistically significant. Nevertheless, the daily amount of these foods in the two groups was not statistically significant. However, what should be noticed is that even though we have given very wide ranges for the amount (ml) of sugared drinks/fruit juices, both groups (without and with caries) there is a daily consumption of

	dmft =0	dmft >0	*p* value
	N=45 (59.21%)	N=31 (40.79%)	
Age			<0.001
0-23 months	17 (37.78%)	0	
24-36 months	10 (22.22%)	4 (12.90%)	
37-48 months	8 (17.78%)	7 (22.58%)	
49-71 months	10 (22.22%)	20 (64.52%)	

TABLE 13 Caries experience distribution by age group.

	Dmft>0	Dmft=0
ml/die (the last month)		
150-250	22 (100%)	28 (96.55%)
251-350	0	1 (3.45%)

TABLE 14 Daily consumption of drinks in the two groups.

150–250 ml in the "last" month. However, the daily amount of such foods in the two groups was not found to be statistically significant. What needs to be looked at, however, is that despite giving very wide intervals for consumption of sugared drinks/fruit juices, in both groups without and with experience of caries there is a daily consumption of 150–250 ml in the last month (Table 14).

It is established that a diet rich in sugars lowers pH, facilitating the metabolism of bacteria with acid formation. This plays an important role in the development of carious lesions because sucrose is necessary as a substrate in the production of extra-cellular polysaccharides, which in turn facilitate bacterial adhesion to the dental surface and increase the porosity of plaque, resulting in acid production on the surface of the enamel. This condition is an aggravating factor in the development of carious lesions in the primary dentition since the enamel of the deciduous teeth has a reduced thickness. Moreover, the dentine of primary teeth is less hard than in permanent teeth since dentine tubules have a non-homogeneous distribution. However, excessive consumption of added sugars also has important systemic consequences [Fidler, 2017; Fattore, 2017].

In children more than 125 ml per day of added sugars can cause osmotic diarrhoea. Also, a diet rich in free sugars can lead to chronic systemic diseases such as diabetes, metabolic syndrome and obesity.

A systematic literature review investigated sugar intake in connection with the development of adiposity and concluded that the amount of free sugars in the diet affects weight in both children and adults. This study shows that 87% of the entire population group did not give honey to their child. By contrast, 13% of the population still had this habit, which was statistically significant in association with the experience of caries.

Of the children in our sample, 44.74% have or had the habit of drinking or sucking something, other than water, before going to bed; it is therefore clear that this percentage (almost 1 in 2) is much higher than the Italian national level (1 in 5). Information campaigns on oral health need to be set up to raise public awareness on the consequences of the use of a pacifier soaked in honey and the consumption of drinks other than water.

Early childhood caries is a multifactorial pathology in which eating habits play a very important role. A diet that from childhood is characterised by a high consumption of sugar-rich food and drinks is highly associated with the incidence of ECC in later years.

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