



(REVIEW ARTICLE)



Early childhood caries and its impact on general health: Narrative review

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Abstract

Objective: To analyze publications about the impact that early childhood caries has on the general health of this group of patients.

Materials and methods: A narrative review was conducted that included articles published from 2017 to 2023 in the following electronic databases: PubMed, Scielo and Google Scholar.

Results: Of the 21 articles selected for the narrative review, it was found that the most frequent problems were: the presence of dental pain, followed by difficulty eating and drinking hot and cold beverages, and finally difficulty sleeping.

Conclusion: Early childhood caries is considered a worldwide health problem that affects children under 6 years of age, causing problems both in the oral cavity and in general health, generating phonetic and psychological risks, among others that affect the quality of life of the child and his or her parents or caregivers.

Keywords: Quality of life; Dental caries; Oral health; Complications; Health evaluation.

1. Introduction

Caries is one of the most common chronic diseases in childhood and affects between 60% and 90% of children (1). Early childhood caries is a condition that has a negative impact on general health (2), the consequences that become evident over time in those lesions that have not been treated can cause: acute or chronic pain, premature loss of teeth, delays in growth and development (3). It even produces phonetic, functional, and psychological problems, among others (4), which inevitably affect the quality of life not only of children but also of parents and caregivers (5).

In Ecuador, in a cross-sectional descriptive study that was carried out in preschoolers between 3 and 5 years of age in the provinces of Napo, Tungurahua, Morona Santiago and Pichincha, it was shown that early childhood caries affects the quality of life of children, because the most frequent factor reported was pain ($p= 0.152$), followed by difficulties drinking ($p= 0.003$), consuming food ($p= 0.03$) and finally discomfort with smiling ($p= 0.002$). or when speaking (0.09) (6). While in a study carried out in Azogues, it was reported that the most prevalent dimension was in Oral Symptoms with question #4: "You have problems with food stuck between your teeth" with 54.5%, followed by question # 2: Bleeding in your gums when eating or brushing your teeth with 22.7%, and finally, the Functional Limitation Dimension with question # 5: Problems eating hard things with 20.5%, sharing the same value in the Emotional Well-being Dimension with question # 11: "You are worried about what your colleagues think about your teeth" with 20.5% (7).

The objective of this research is to analyze publications about the impact that early childhood caries has on the general health of this group of patients.

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2. Theoretical framework

Early childhood caries was previously also known as: baby bottle caries, recurrent caries or baby bottle syndrome (8). It is defined as the presence of one or more decayed tooth surfaces, whether cavitated or non-cavitated, absence of teeth due to caries, or teeth with restorations on any primary tooth in a child under 6 years of age (9). It is a serious problem, which mainly affects children between the ages of 3 and 5 all over the world (2).

The process of early childhood caries has multiple causes; in ancient times it was assumed that this dental deterioration was caused solely by diet (8), however, it is currently recognized as a multifactorial disease, effectively caused by the frequent intake of sugars and carbohydrates that are metabolized by bacterial strains that create an acidic oral environment and produce demineralization of tooth surfaces (3). Likewise, oral hygiene habits, salivary characteristics, hypoplasia, and socioeconomic conditions are considered determining factors for the appearance and progression of the disease (4). Oral health is related to general health and quality of life, which emphasizes the importance of maintaining good functional teeth (10). A healthy mouth allows not only the nutrition of the physical body but also improves social interaction and promotes self-esteem and a sense of well-being (10). Oral health affects people physically and psychologically (10). Likewise, good oral health during infancy and childhood is also important for a child's overall health and well-being, and is one of the pillars of a disease-free life (10). Oral health-related quality of life is a multidimensional concept that shows individuals' comfort in eating, sleeping, and communicating with social circles and their self-confidence and satisfaction with their oral health (4). Tooth decay has a negative impact on children's lives, including pain when drinking hot and cold drinks, chewing and biting difficulties, reduced appetite, weight loss, sleeping difficulties, behavioral changes such as irritability and low self-esteem and decreased school performance (4).

The development of early childhood caries is mainly characterized by being rapid, the evolution from enamel to dentin can occur in six months or less, the affected teeth are the upper incisors, upper and lower temporary molars, in that order, according to the progression of the disease and its severity, it affects the lower incisors (11). The evolution is affected by the sequence of eruption of primary teeth, the duration of the factors that cause it, patterns of tongue movement and action of oral muscles (11).

It is important to consider the signs present in early childhood caries, for a correct diagnosis and treatment of the disease. In an article published by Anchava J. et al (2021), the characteristics of early childhood caries are briefly detailed according to their progression (12).

Table 1 Characteristics of early childhood caries according to its progression.

Initial stage	Moderate stage	Severe stage
White or brown spots on upper incisors.	White or brown spots on upper incisors and lower molars.	White or brown spots on upper incisors, lower molars and lower incisors.

On the other hand, Anchava J. et al (2021), present a classification according to severity and etiology, which is detailed below.

Table 2 Characteristics of early childhood caries according to severity and etiology

Type I	Type II	Type III
Isolated caries lesions in incisors and/or molars and poor hygiene (12).	Vestibulolingual lesions in upper incisors and molars. It is associated with the use of combined bottles and/or breast milk, and poor hygiene (12).	Lesions with the characteristics of type I and II, lesions in lower incisors and a highly cariogenic diet and poor hygiene (12).

3. Materials and methods

In the present study, a narrative, descriptive review was carried out with a mixed approach, whose methodology is inductive of a transversal type, where scientific articles that present quantifiable results have been included, but also the pragmatic perspective of the researcher, which gathers information about the early childhood caries and the impact on the general health of preschool children. The search covers articles published from 2017 to 2023 in the following

electronic databases: PubMed, Scielo and Google Scholar. Key terms were used such as: quality of life, dental caries, oral health, complications, health evaluation; in two different languages, English and Spanish.

Among the inclusion criteria were considered: systematic reviews, bibliographic reviews, experimental studies and descriptive observational studies that examine the relationship between early childhood caries and general health. Additionally, articles in which the sample is boys and girls under 6 years of age. On the other hand, the exclusion terms were articles with a different focus on the impact of early childhood caries on general health, such as: prevalence, treatments, dental management, risk factors and prevention.

The articles selected by the title of their publication were 134, of which 78 were excluded after reading the content of their abstract, 56 articles were selected, of which 33 were excluded due to lack of information about the impact of primary caries. childhood in health and for its approach, aimed at different topics such as: treatment, risk factors, among others. In total 21 articles were included.

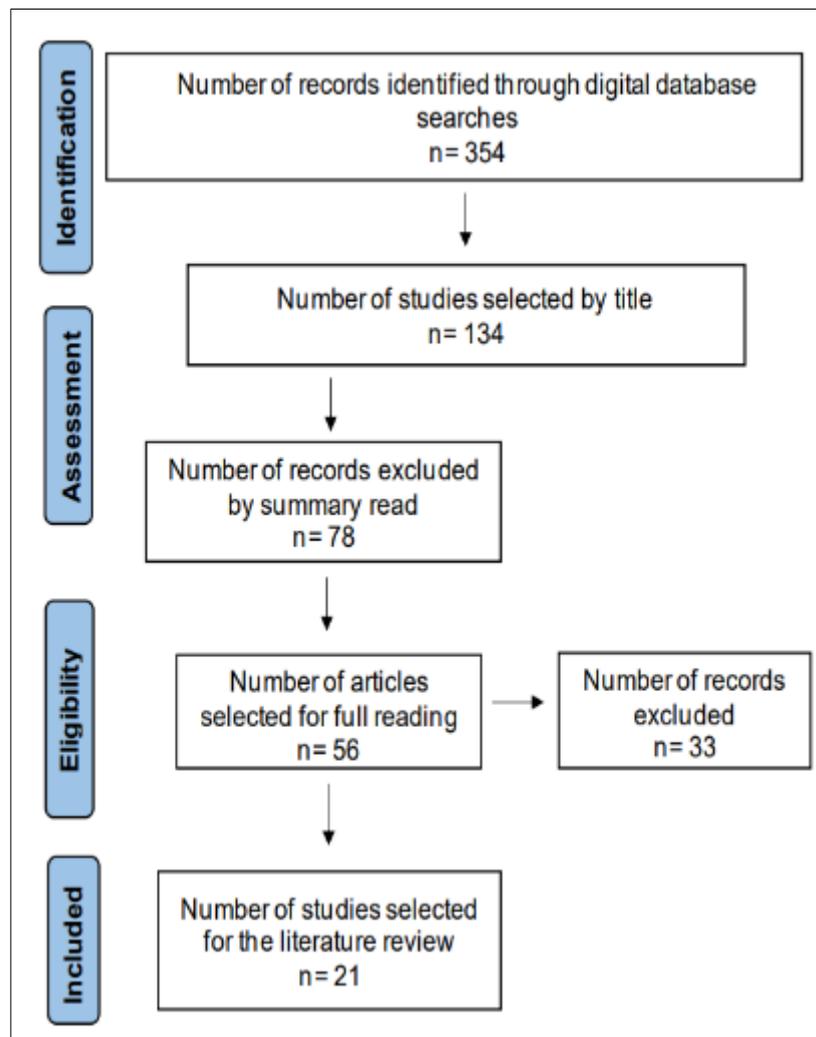


Figure 1 Flowchart, article selection

4. Results

For the study, 21 bibliographic references published in an interval between 2016-2023 on early childhood caries and their impact on general health were used. The types of studies considered were: systematic reviews, experimental studies, cross-sectional studies, descriptive observational studies, clinical trials, theses. The articles included for this narrative review with their main characteristics are summarized in the following Table 1.

Table 3 Articles selected for the narrative review

N°	Search engine	Type of study	Title	Objective	Year	Results
1	PubMed	Review article	Early childhood caries epidemiology, etiology, risk assessment, societal burden, management, education, and policy: Global perspective (3).	Convey a global perspective of the definitions, etiology, risk factors, social costs, management, educational curriculum and policies of ECC (3).	2019	Early childhood caries was related to the frequent consumption of sugars, there are serious consequences on the quality of life of children, although this condition is poorly treated, it shows a high prevalence (3).
2	PubMed	Systematic review	Impact of early childhood caries on oral health-related quality of life: a systematic review and meta-analysis (5).	To carry out a systematic review to evaluate the impact of early childhood caries and its severity on quality of life related to oral health (5).	2022	Early childhood caries can cause oral symptoms, behavioral disorders and learning disorders with negative consequences on children's quality of life. Additionally, there is a disruption to caregivers' daily activities, such as missed work days and the burden of additional financial expenses for dental care (5).
3	PubMed	Systematic review	Does Dental Caries Increase Risk of Undernutrition in Children? (9).	To systematically review the published evidence on the effect of severity and prevalence of dental caries on the risk of wasting or stunting in children (9).	2021	The review noted that 15 studies determined a positive association between dental caries and malnutrition and 6 studies showed a positive association between early childhood caries and growth retardation (9).
4	PubMed	Experimental study	Impact of early childhood caries on quality of life: Child and parent perspectives (2).	To examine the impact of early childhood caries on quality of life based on children's self-report and parental perception (2).	2020	According to the results, 27% of preschool and school-aged children showed problems when playing, 48% of children reported pain when drinking hot and cold drinks, 41% of children reported that they had problems sleeping due to pain (2).
5	PubMed	Transversal study	Early Childhood Oral Health and Nutrition in Urban and Rural Nepal (8).	To examine sociobehavioral risk factors for CHD in rural and urban populations and associations between caries and malnutrition in Nepalese children to help guide interventions to improve children's health and well-being (8).	2019	Most of the Nepalese children between 5 and 6 years old had untreated cavities, 1 in 5 children showed deep pain that limited eating, sleeping and concentration at school, and a positive association was determined between first-time cavities. severe childhood and malnutrition (8).

6	PubMed	Transversal study	Early Childhood Dental Caries, Mouth Pain, and Malnutrition in the Ecuadorian Amazon Region (1).	To examine the relationships between early childhood caries, parent-reported oral pain, and nutritional status among participating children from the Kichwa community (1).	2017	In total, 65.4% of the children had dental caries and 44.7% had severe decay. Mouth pain was present in 33.8% of the children, with mouth pain interfering with feeding in 26.8% and sleep in 21.5% of the children (1).
7	PubMed	Experimental study	The Effect of the Treatment of Severe Early Childhood Caries on Growth-Development and Quality of Life (4).	To examine the effect of dental treatments of children affected by ECC on their growth and development through changes in their quality of life, height, body weight, body mass index and percentile (4).	2023	In the present study, the negative conditions generated by early childhood caries were evaluated: infection, pain, premature loss of teeth, malnutrition, sleeping problems, speech disorders, psychological and socioeconomic problems, lack of school and a decrease in in the quality of life. In addition, some aesthetic, phonetic, functional and psychological problems that negatively affect growth and development (4).
8	PubMed	Transversal study	Impact of Early Childhood Caries on Oral Health-related Quality of Life Among 4–6-year-old Children Attending Delhi Schools: A Cross-sectional Study (10).	To evaluate the impact of ECC on oral health-related quality of life (OHRQoL) among 4- to 6-year-old children attending schools in Delhi (10).	2019	A high frequency of pain, irritation, difficulty eating and difficulty drinking hot or cold drinks, feelings of guilt, frustration and discomfort were observed in the ECOHIS responses (10).
9	PubMed	Descriptive observational study	Relationship Between Early Childhood Oral Health Impact Scale, Child's Dental Status and Parental Psychological Profiles (13).	To evaluate the influence of a child's dental status and parents' psychological profiles on parents' perception of their children's oral health (13).	2022	ECOHIS results appeared to correlate positively with the number of active caries ($R = 0.457$; $P < 0.001$). Furthermore, the ECOHIS showed a significant correlation with the DASS test results ($R = 0.356$; $P < 0.001$ for depression, $R = 0.247$; $P < 0.001$ for anxiety and $R = 0.235$; $P < 0.001$ for the stress result) (13).
10	PubMed	Descriptive study of transverse cut	Impact of early childhood caries on the quality of life of preschool children and their families in the commune of San Carlos, between the months of January and April 2018 (14).	Determine if the quality of life of 4 and 5 year old preschool children belonging to the CESFAM Dr. Jose Duran Trujillo of the commune of San Carlos is affected by early childhood caries and its severity (14).	2018	The most frequent condition in children was pain and inability to eat food (14).

11	PubMed	Prospective comparative observational study	Impact of early childhood caries and its treatment under general anesthesia on orofacial function and quality of life: A prospective comparative study (15).	To evaluate the impact of CCE and its treatment under general anesthesia on orofacial functions and quality of life in preschool children (15).	2017	The most frequent ECOHIS items cited by parents were “pain” (reported by 19/25 children), “difficulty eating” (15/25), “parents feeling guilty” (18/25), and “parents upset” (14 /25) (15).
12	PubMed	Transversal study	The Impact of Anemia-Related Early Childhood Caries on Parents’ and Children’s Quality of Life (16).	The present research was conducted to evaluate the effect of anemia on oral health-related quality of life (OHRQoL) in terms of children and parents (16).	2023	Occasional or more frequent oral/dental pain was reported by 81.5% of children. Subscale scores were determined for child symptoms (2.25 ± 0.067), child function (6.8 ± 0.22), child psychology (3.87 ± 0.128), self-image, and social interaction (1.74 ± 0.063), parental distress (3.82 ± 0.143) and family function (3.5 ± 0.121). On the other hand, 160 (79.2%) had drinking difficulties and 152 (76.7%) children had eating problems (16).
13	PubMed	Transversal study	Impact of dental caries on oral health-related quality of life in children with dental behavior management problems (17).	To evaluate the impact of dental caries and sociodemographic factors on the oral health-related quality of life (OHRQoL) of children with dental behavioral management problems (DBMP) and their families (17).	2022	The following results were found: oral/dental pain (26.1%), difficulty eating (28.4%), and being irritable or frustrated (22.4%) (17).
14	PubMed	Transversal study	Oral Health Status and Oral Health-Related Quality of Life of First Nations and Metis Children (18).	To assess the oral health status and oral health-related quality of life (OHRQoL) of young First Nations and Métis children (18).	2022	The most notable ECOHIS responses were: 13.9% of children experienced pain in the mouth, 11.1% had difficulty pronouncing a word, and 9.0% had difficulty eating (18).
15	PubMed	Population controlled study	The Impact of Dental Pain on the Oral Health-Related Quality of Life (OHRQoL) of Preschool Children in Austria (19).	To evaluate the impact of dental pain on the oral health-related quality of life (OHRQoL) of children aged 0 to 6 years and subsequently compare the results with a control group without tooth pain (19).	2023	The lowest score was attributed to the items “avoided smiling or laughing” (0.2 ± 0.7) and “avoided talking” (0.2 ± 0.5). The highest score was observed when caregivers were asked about the frequency of pain in the children's teeth, mouth, or jaw (2.0 ± 6.2) (19).
16	PubMed	Clinical trial	Oral Health-related Quality of Life of Children with Early Childhood Caries before and after Receiving Complete Oral	To evaluate the change in oral health-related quality of life in children <5 years of age undergoing complete oral rehabilitation under general anesthesia (20).	2021	More than half of the children reported frequent dental pain and almost 80% of them reported having difficulties eating (20).

			Rehabilitation under General Anesthesia (20).			
17	PubMed	Transversal study	Factors associated with Oral Health Related Quality of Life of children with severe -Early Childhood Caries (21).	To find out the association between severe early childhood caries and OHRQoL of children and their parents/caregivers visiting a government dental hospital in Delhi, India (21).	2019	It was found that pain, fever, swelling associated with caries along with difficulty eating, halitosis, sleep disorders and frequent absence from school were significantly more frequent in children with Severe Early Childhood Caries than with Early Childhood Caries (21).
18	PubMed	Transversal study	Association between Early Childhood Caries and Quality of Life: Early Childhood Oral Health Impact Scale and Pufa Index (22).	To assess quality of life in children with early childhood caries from 6 to 72 months using the Early Childhood Oral Health Impact Scale (22).	2019	The most frequent outcomes were “pain” and “difficulty eating and drinking” while “Smiling” and “talking” were the least frequent (22).
19	Scielo	Cross-sectional descriptive study	Quality of life and oral health in Ecuadorian preschoolers related to the educational level of their parents (6).	Determine the impact that oral health has on the quality of life of preschoolers, evaluated by their parents or guardians and related to their level of education (6).	2019	The results were: referred pain ($p=0.152$), difficulty drinking ($p= 0.003$), speaking ($p= 0.09$), eating ($p= 0.03$), smiling ($p= 0.002$), and economic impact. associated with oral health problems ($p= 0.003$) (6).
20	Scielo	Descriptive and cross-sectional study	Impact of caries experience on health-related quality of life. The association between caries experience and quality of life is inverse in patients with high oral levels; Machángara, Ecuador (23).	Associate the levels of experience of dental caries with the levels of impact of oral conditions on quality of life related to oral health (23).	2019	There is no significant correlation between the results of caries experience and the impact on daily performance ($Rho= -0.061$), on the other hand, there is a correlation between the high level of DMFT and the low level of SBQOL and the low level of DMFT with the high impact on the quality of life associated with oral health (23).
21	Scielo	Cross-sectional descriptive study	Impact of oral health on the quality of life in schoolchildren from the San Francisco de Peleusí de Azogues school 2016 (7).	To know the impact of oral health on quality of life through the CPQ (Oral Health Perception Questionnaire) (7).	2018	The following results were reported: “You have problems with food stuck between your teeth” with 54.5%, “Bleeding in your gums when eating or brushing your teeth” with 22.7%, and problems eating hard things with a 20.5% and “You are worried about what your peers think about your teeth” with 20.5% (7).

5. Discussion

Marvin So et al. (2017) conducted a cross-sectional study in which it was concluded that mouth pain was present in 33.8% of children, with mouth pain interfering with eating and interfering with sleeping in 26.8% and 21%. 5% of children, respectively (1). Similar results were found in a cross-sectional study conducted by Patricia Corrêa-Faria et al. (2022), in which a prevalence of oral/dental pain (26.1%) and difficulty eating (28.4%) was obtained (17).

Similarly, in a study conducted by Raja Raghu et al. (2021) concluded that more than half of the children reported frequent dental pain and almost 80% of them reported having difficulties eating (20). Similar values were obtained in studies carried out by Ningthoujam Sharna et al. (2019), in which they concluded that the most frequent elements in the child impact section were "pain" and "difficulty eating and drinking" (22), like Erika León et al. (2018) reported regarding the dimension of functional limitation with question # 5: Problems eating hard things with 20.5% (7).

However, in an experimental study by Neerja Singh et al. (2020) high values were obtained with respect to the item for difficulty sleeping, because they indicate that 41% of children reported that they had problems sleeping due to pain (2) compared to the 21.5% obtained in the study conducted by Marvin So (1).

On the other hand, Neerja Singh et al. (2020) conclude that 48% of children reported pain when drinking hot and cold drinks (2), similarly, significance values were obtained in a descriptive study by Ana del Carmen Armas Vega et al. (2019) on drinking difficulties ($p=0.003$) (6). Furthermore, Jaggi et al. (2019) in their cross-sectional study obtained that the items related to pain, irritation, difficulty eating some foods and difficulty drinking hot or cold drinks, feeling of guilt, feeling of frustration and discomfort were the most frequent in the child impact section. (CIS) (10).

Also, Sophie Lembacher et al. (2023) observed that the lowest score in the study group was attributed to the items "avoided smiling or laughing" (0.2 ± 0.7) and "avoided talking" (0.2 ± 0.5) (15). Similarly, Ningthoujam Sharna et al. (2019) concluded that the elements with the least frequency were "Smile" and "talk" (22).

However, Víctor Vélez et al. (2019) concluded that there was no statistically significant correlation between the caries experience score and its impact on daily performances ($Rho=-0.061$) (23). Differing results by Valérie Collado et al. (2017) in their prospective comparative observational study in which they concluded that the most frequent ECOHIS items cited by parents were "pain" (reported by 19/25 children), "difficulty eating" (15/25), "parents feeling guilty" (18/25) and "annoying parents" (14/25) (15).

6. Conclusion

Early childhood caries affects the health and quality of life of children. The data from this study showed that the most frequent problems were: the presence of dental pain, followed by difficulty eating and drinking hot and cold drinks, and finally the difficulty sleeping. The least frequent were avoiding smiling and talking. With these results obtained, it is important to mention that prevention and education about oral health should be directed to parents before, during and after the birth of children, with the aim of reducing the prevalence rate of early childhood caries. childhood and its impact on general health.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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