Dental fluorosis and social determinants of health: Integrative review

Fluorose dentária e determinantes sociais da saúde: Revisão integrativa

Fluorosis dental y determinantes sociales de la salud: revisión integradora

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RESUMO

Objetivo: verificar o desenvolvimento da fluorose dentária e sua relação com os Determinantes Sociais da Saúde (DSS) através de uma revisão integrativa. **Método:** trata-se de uma revisão integrativa de estudos que abordam os aspectos dos DSS e sua relação com a fluorose dentária. A coleta de dados foi realizada entre o período de agosto de 2020 a abril de 2021. **Resultados:** dos estudos selecionados de língua portuguesa e inglesa observou-se que o Fluorose Dentária é um problema de saúde pública, de âmbito mundial. **Conclusão:** Assim, é oportuno pensar que a fluorose dentária pode ser influenciada pelo meio ao qual o indivíduo se insere, suas condições sociais, econômicas, psicológicas e comportamentais devem ser consideradas, conforme o olhar dos DSS.

Descritores: Saúde Bucal; Determinantes Sociais da Saúde; Fluorose Dentária.

ABSTRACT

Objective: to verify the development of dental fluorosis and its relationship with the Social Determinants of Health (SDH) through an integrative review. **Method:** this is an integrative review of studies that address aspects of DSS and its relationship with dental fluorosis. Data collection was carried out between August 2020 and April 2021. **Results**: from selected studies in Portuguese and English, it was observed that Dental Fluorosis is a public health problem, worldwide. **Conclusion:** Thus, it is opportune to think that dental fluorosis can be influenced by the environment in which the individual is inserted, their social, economic, psychological and behavioral conditions must be considered, according to the perspective of the DSS.

Descriptors: Oral Health; Social Determinants of Health; Dental Fluorosis.

RESUMEN

Objetivo: verificar el desarrollo de la fluorosis dental y su relación con los determinantes sociales de la salud (DE) a través de una revisión integradora**.** **Método:** se trata de una revisión integradora de estudios que abordan los aspectos de las SD y su relación con la fluorosis dental. Los datos fueron recolectados entre agosto de 2020 y abril de 2021. **Resultados:** a partir de los estudios seleccionados de portugués e inglés, se observó que la fluorosis dental es un problema de salud pública en todo el mundo. **Conclusión:** Por lo tanto, es oportuno pensar que la fluorosis dental puede estar influenciada por el entorno al que se incluye al individuo, se deben considerar sus condiciones sociales, económicas, psicológicas y de comportamiento, de acuerdo con la mirada del SSD.

Descriptores: Salud Bucal; Determinantes Sociales de la Salud; Fluorosis dental.

REVIEW

Introduction

Access to public health measures is essential for improving an individual's health conditions, and the realization of this right also has a great impact on reducing health inequality.[1] When it comes to oral health, we have the introduction of fluoride to public water supply and toothpaste, which contributed to a reduction in the prevalence of dental caries, along with other factors.[2]

However, every public health measure must be monitored, since the fact that the population does not follow the determined guidelines can worsen the situation that should be addressed by the actions of the population. In the same context, the two recent epidemiological surveys carried out by the so-called SB Brazil project at the national level by the Ministry of Health, were completed in 2003 and 2010, and prove the importance of organizing health services to intervene and control them. Furthermore, the responsibility of the health team is essential for active interventions in the Brazilian oral health system, whose problems at the local level have been caused.[3]

It is also noteworthy that it is important to understand how social inequalities related to health-disease processes and oral hygiene are expressed in this, since, although more popular social groups may use private dental offices and treatment techniques, which overestimate the aesthetic value, other social groups suffer from untreated cavities, tooth loss, dental pain and infections and even find it more difficult to access dental care. Therefore, it can be seen that dental services reflect signs of exclusion and social inequality.[4] Thus, according to the defined goals and strategic guidelines and with the information allowed to understand the field, the professional team must consider the best practical alternatives for work, including health actions to improve the oral health of the population.

It should also be noted that the use of the health vulnerability index proved to be an important tool for identifying users with worse oral health conditions, that is, oral health problems are very similar to the individual's quality of life and with your personal comfort.[5] In this context, it should be considered that the social conditions where a group is inserted delimit the space of experience of its members, and therefore there is recognition of the importance of socioeconomic determinants in the field of health and oral health.[6]

The Social Determinants of Health (DSS) in turn are, for the National Commission on Social Determinants of Health, social, economic, cultural, racial/ethnic, psychological and social factors. Behavioral factors that influence the occurrence of health problems and their Risk Factors in the population.[7] Furthermore, the aforementioned authors say that the homonymous commission of the World Health Organization adopted a shorter definition, according to which SDH are social conditions in which the people live and work.

The average prevalence of dental fluorosis in Brazil, 16.7% in 2010, may be associated with the absence of hetero-control in the concentration of fluoride in public water supply and the inadvertent use of fluoride toothpaste[8], which indicate that there is a strong correlation of the equity component in the variant of dental fluorosis, since social determinants produce inequalities in exposure to health situations and living conditions.

In this context, the present work intends to present a critical stance on

studies that relate social conditions in the area of oral health, recognizing the influence of socioeconomic and behavioral factors on the risk of developing dental fluorosis. The theme is relevant, as some studies have considered dental fluorosis as a public health problem in Brazil.[8] Thus, we intend to answer the following research question: "What is the influence of Social Determinants of Health on the occurrence of Dental Fluorosis?".

Therefore, the objective of this work is to verify the development of dental fluorosis and its relationship with DSS through an integrative review.

Literature revision

Tooth enamel anomalies

Enamel is one of the main structures forming the dental organ, and the most mineralized and resistant tissue in the human body, composed of about 97% of minerals. It is the tissue responsible for protecting the entire tooth and its thickness varies along the tooth surface, being often thickest at the cusps and thinnest at the cementoenamel junction. However, despite its property of hardness and resistance, it can undergo changes in its structure through local, systemic or hereditary factors, which can affect its mineralization process[9].

There are several classifications proposed for Dental Enamel Anomalies (AED), which according to the International Dental Federation can be quantitative defects, when there is a decrease in the amount (thickness) of enamel formed, that is, a deficient or incomplete formation of the matrix occurs. organic (hypoplasia), or qualitative, where the enamel has normal thickness, but with alteration in translucency (hypomineralization)[10].

Figure 1: Dental enamel hypoplasia photograph.

Source TAVARES[11].

It is possible to see in the figure above (FIGURE 1) that hypoplasia manifests itself with the partial or total lack of enamel surface, presenting an unsatisfactory esthetics, sensitive teeth, malocclusion, as well as a predisposition to dental caries.

Nutrient consumption and dietary routine (such as systemic etiological factors) interfere with the integrity of the enamel structure in both primary and permanent dentition. This intervention occurs through the indirect nutritional effect on dental development, as well as the association of the direct effect of the

erosive properties deriving from the diet on the dental structure, that is, enamel hypoplasia can be a consequence of systemic, traumatic, environmental or genetic events that occur during the development of teeth, interfering with the normal formation of the enamel matrix, causing defects and irregularities on its surface. These factors will interfere with the formation of the dental enamel matrix, causing defects and irregularities on its surface.[10].

Dental fluorosis

Dental fluorosis is a developmental anomaly and occurs due to prolonged ingestion of fluoride during the period of tooth formation and enamel maturation, with higher prevalence and severity at younger ages. According to José[12]:

> Combined exposure to fluoride from the consumption of fluoridated water, from foods prepared with fluoridated water and from brushing teeth from an early age, twice a day with fluoride toothpastes, should be recommended to control the progression of caries lesions without causing this. negative impact on oral health-related quality of life (p.49).

There is a variety of dental anomalies that are associated with defects in the development of teeth, caused by heredity, local, systemic or traumatic factors, which may affect the deciduous and/or permanent dentition. In this context, there are severe enamel mineralization defects directly associated with the amount of fluoride ingested, characterizing dental fluorosis, which in its mild forms is common where there is fluoridated public water supply[13].

For this reason, Moreira, Nations and Alves[6] state that the territory can negatively influence the life of the population, since it can be considered a reflection of the socioeconomic conditions of individuals and be subject to social inequities, since the fluoridation of water from public supply, as Baldani *et al*.[5] comments: "it influences significantly and in greater intensity the variation of the CPO-D in those municipalities with the worst indicators of social inequality".

In addition to the fluoride dosage, other factors interfere with the severity of the disease, such as low body weight, skeletal growth rate and periods of bone remodeling (phases of greater fluoride absorption), nutritional status, altitude and changes in blood pressure should also be considered. renal activity and calcium homeostasis as relevant factors[14].

The severe form of the disease is generally observed in places where fluoride is present in high concentrations in water sources and in the absence of hetero-control of fluoride concentration in public water supplies.[10].

Rigo *et al*.[15] say that the clinical signs of fluorosis that appear in the dental enamel can be fine white opaque streaks crossing the surface of the tooth until the stages in which the enamel breaks down, incorporating brownish pigment. The clinical appearance of teeth affected by fluorosis is highly variable, often related to differences in fluoride content.

Enamel defects are bilateral, affecting similar teeth in all four quadrants, affecting those that are developing during ingestion of high levels of fluoride.

Because it occurs symmetrically and bilaterally, in addition to having the etiology of excessive fluoride ingestion, associated with its clinical appearance, the diagnosis of dental fluorosis becomes apparently simple, through a good anamnesis and a thorough physical examination[16].

The clinical features of dental fluorosis range from thin opaque white lines crossing the tooth on all parts of the enamel, to streaks where parts of the porous, chalky white outer enamel are discolored. The loss of the enamel surface in the most severe cases results in loss of the anatomical shape of the teeth[17].

Most cases reported in the literature point to the occurrence of very mild or mild fluorosis, which is therefore not considered a public health problem[18], as these only cause aesthetic changes, characterized by white pigmentation of the dental enamel. On the other hand, the moderate and severe degrees, characterized by yellow or brown spots, in addition to structural defects in the enamel, have aesthetic, morphological and functional repercussions[19]. In these cases, the undesirable effects of esthetic impairment can affect the psychological, financial and behavior of the individual[15], requiring the esthetic rehabilitation of the affected dental units.

The greatest risk for fluorosis is between zero and six years of age, considering that, considering the aesthetic problem, the period between two and three years of age is considered the critical age for dental fluorosis, as it is during this period that dental fluorosis occurs. formation of permanent maxillary central incisors[17]. For Gaspar[20]: "children aged between 1 and 4 years old comprise the critical period of risk in terms of F- intake, as enamel mineralization is taking place in this period".

Dental Fluorosis in Brazil

Dental fluorosis, in its mild forms, is common where there is fluoridated public water supply, contributing to this other systemic and topical forms of fluoride use. Declining caries and increasing prevalence of fluorosis in milder forms have been observed in different regions of the world.

In Brazil, there is uneven coverage between regions with fluoridated public water supplies. Among the main problems in the country, there is the difficulty in maintaining operational systems for monitoring the optimal levels of fluoride in the water, either due to lack of human, technical-operational or relevant resources for the community. Most of the studies that monitor the measurement of the optimal level of fluoride in Brazilian municipalities describe irregular levels of fluoride supply, which makes it difficult to assess the magnitude of the protective effect against dental caries and the risk of dental fluorosis[14].

The first studies on the prevalence of fluorosis in Brazil date back to the early 1970s, a time when artificial fluoridation of public water supplies was in its initial implementation phase and the use of fluoridated dental products was quite restricted. As a result, these studies restricted their objectives to just alerting health agencies to the need to monitor fluoride levels in the waters consumed by populations, especially those supplied by sources and wells, in which there were already reports of outbreaks of the disease[21].

Ribas and Czlusniak[22] argue that it is necessary to control the adequate concentration of fluoride in public water supply systems in order to prevent an

increase in the prevalence of dental fluorosis without reducing the protective effect against dental caries. In addition, the need to reinforce the contraindication of the use of fluoride supplements, in addition to other drugs containing the substance, is reaffirmed in places where there is fluoridated water supply, in order to avoid excessive systemic intake. There is unanimity, however, in recognizing the need for greater precision and strengthening of health surveillance measures, including actions in the field of epidemiology, health surveillance, the prescription and use of fluoride products and oral health education.

Comparing data from SBBrasil 2003 and SBBrasil 2010 in relation to the prevalence of fluorosis in 12-year-old children, there is an increase of 9% and 16.7% between 2003 and 2010, respectively[8]. Several factors may be associated with this increase (inadvertent ingestion of fluoride toothpastes by at-risk children, lack of monitoring of fluoride concentration in water, fluoridated water itself, abusive use of processed foods, among others), and many of these were reported in research with children at risk age for developing dental fluorosis, which may explain such an increase in the prevalence of fluorosis between these two periods[19].

Social determinants of health

The Social Determinants of Health (DSS), according to the National Commission on Social Determinants of Health[23], comprise: "determinants linked to individual behaviors and living and working conditions, as well as those related to the economic, social and cultural macrostructure". These authors believe that public strategies and policies should be based on an understanding of the main influences on health[24].

For the National Commission on Social Determinants of Health (CNDSS), SDH are the social, economic, cultural, ethnic/racial, psychological and behavioral factors that influence the occurrence of health problems and their risk factors in the population[7]. While individual factors are important to identify which individuals within a group are at greater risk, differences in health levels between groups and countries are more related to other factors, especially the degree of equity in income distribution[7].

The relationships between social determinants and health consist of establishing a hierarchy of determinations between more distal factors, those that are social, economic and political and those that are more proximate directly related to the way of life, with different factors that affect the health situation of groups and people. In addition to the epidemiological concept of social determinants of health as risk factors, it is also necessary to understand the social determination of health as a broader concept, characterized by a context of social deprivation. In this event, the definition of social deprivation encompasses the concept of social exclusion, comprising a situation of lack of access to opportunities offered by society to its members, implying a lack of resources at different levels, including environmental, cultural, economic, political and social, not infrequently being cumulative, that is, comprising several or even all of them.[25]

The Organic Health Law recognizes that health is a right of every citizen and that the State must provide the conditions for its exercise, in addition to

establishing the bases of the Unified Health System (SUS). And oral health is an integral part of the general health and quality of life of individuals, but on the other hand, fluoridation of public water supplies has the greatest impact in regions where social conditions are worse and the population does not have access to other means. protection[3].

According to the World Health Organization[26], social determinants influence the well-being and health of individuals. Factors such as income, education, support from family and friends, can intervene for a better or worse health condition of people. According to Moreira, Nations and Alves[6], communities with a higher degree of inequality have more oral health problems, regardless of their wealth as a whole.

Social Determinants of Health and Dental Fluorosis

Oral health is an inseparable and integral component of general health. Many systemic diseases have their first manifestations in the mouth and also suffer consequences of the oral health condition. Oral diseases are important early diagnostic signs for general health problems.

In the field of oral health, the analysis of the relationship between social indicators and oral health indicators occupies an important place today, especially when studies that assess the decline in dental caries in industrialized countries conclude that a wide range of social factors (e.g., education, income level and distribution and fluoride toothpaste market) contribute to reducing tooth decay much more than oral health services[27].

It is necessary to take into account not only the biological component, but also the social determinants of oral diseases. The definition of health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, enshrined in the WHO Constitution at the time of its founding in 1948, is a clear expression of a very health, in addition to a disease-centered approach[7]. In this context, to understand health, including oral health, it is essential to analyze populations in the context of public policies and health actions aimed at society[28].

Before the Federal Constitution of 1988 and the creation of the Unified Health System (SUS), only workers who contributed to INAMPS (National Institute of Medical Assistance for Social Assistance) were entitled to public dental care, as was also the case in other sectors. of health. This assistance prioritized curative actions, restricted and isolated, on an outpatient basis and on demand, performed individually by the Dental Surgeon (CD). With the SUS, the population's universal access to health services was legally guaranteed and the exclusion of population groups is no longer allowed[29].

Also, according to Mattos *et al*.[29], in order to expand the population's access to Oral Health actions, thus stimulating the reorganization of these actions at the primary level of care, the Ministry of Health proposed the inclusion of Oral Health Teams (ESB) in the Strategy Family Health (ESF). This inclusion took place through Ordinance 1444 of December 2000. A few months later, Ordinance 267 of March 2001 was also published, which regulated and established the Plan for Reorganization of Oral Health Actions in Primary Care, describing the list of procedures included in this level of care, as well as the types of team: Modality I, composed of a Dental Surgeon (CD) and Dental Assistant, currently Oral Health

Assistant (ASB); Modality II, composed of CD, ASB and Dental Hygiene Technician, current Oral Health Technician (TSB).

It is recognized that the prevalence of oral diseases reflects biological, behavioral and socioeconomic factors, as well as factors of access to consumer goods and health services. Higher education is considered an essential element in accessing services, in communication with the health professional, in the effectiveness of prevention, treatment and cure of diseases, as well as in the notions of health and disease[30].

Thus, one of the public health measures that made it possible to reduce the social effect on oral health was the introduction of fluoride in public water supply and in toothpastes, as it allowed for a reduction in the prevalence of caries. Fluorides are important elements for the mineralization of body tissues. Its consumption, at appropriate levels, is beneficial to bones and the integrity of teeth and, as such, has an important and positive impact on oral health and general health[19].

However, products containing fluorides are generally used inappropriately, both in public water supply and in toothpastes, and this inappropriate use, and/or excessive intake of fluoride, by young children, highlights the potential risk of dental fluorosis[31]. An example of this is that many authors admit that, on average, 25% of the toothpaste placed on the toothbrush is ingested during brushing[32].

In this context, the action of sanitary surveillance is considered essential, controlling the fluoride content in products that contain it, and also the action of epidemiological surveillance, controlling the number and types of cases in the population[31]. According to the manual on the use of fluorides in Brazil, published by the Ministry of Health in 20098 (BRASIL, 2012), it is recommended that "the entire population, especially children under nine years of age, should use fluoride toothpastes in small amounts." amounts (about 0.3 grams, equivalent to a grain of rice), due to the risk of dental fluorosis". Toothpaste with low fluoride or non-fluoride concentrations is not recommended.

Methodology

Data collection was carried out between August 2020 and April 2021, following the following inclusion criteria: studies in full and from any publication period, quantitative and analytical epidemiological studies, in Portuguese, Spanish and English, published in journals and scientific journals addressing the proposed theme. Studies that did not meet these criteria, as well as those carried out in animals and that addressed DSS without a focus on dental fluorosis, were excluded from this review.

The Virtual Health Library (VHL) and PUBMED electronic portals were used for electronic research in the Latin American Caribbean Literature on Health Sciences (LILACS), Scientific Electronic Library Online (SCIELO) via VHL, and Medical Literature databases. Analysis and Retrieval System Online (MEDLINE) via PUBMED.

To search the databases, it was necessary to define the search descriptors. Thus, the Health Sciences Descriptors website (DeCS/MeSH) was consulted to identify the descriptors, defining the following: "Social Determinants of Health", "Dental Fluorosis", "Oral Health" and "Mouth Diseases" , and their English versions: "Social Determinants of Health", "Fluorosis Dental", "Oral Health" and

"Mouth Diseases".

The databases follow their own search method, therefore, the reviewers strictly followed these methods. And for this, the Boolean operator AND was used to establish combinations between the descriptors, contributing to the identification of articles likely to be elected for this review (Chart 1).

Chart 1- Search strategies.

COMBINATION	SEARCH STRATEGY IN PORTUGUESE	SEARCH STRATEGY IN ENGLISH
Combination 1	"Social Determinants of Health" and "Oral Health"	"*Social Determinants of Health*" and "*Oral Health*"
Combination 2	"Determining Social Health" and "Diseases of the Mouth"	"*Social Determinants of Health*" and "*Mouth Diseases*"
Combination 3	"Determining Social Health" and "Dental Fluorosis"	"*Social Determinants of Health*" and "*Fluorosis Dental*"
Combination 4	"Oral Health" and "Dental Fluorosis"	"*Oral Health*" and"*Fluorosis Dental*"

In this step, two reviewers independently selected the studies by titles and abstracts according to the inclusion criteria, then filed the selected articles in the Zotero program, in which they managed the studies, allowing the organization in the process of selection and removal of the articles duplicate articles. After that, the full reading of the studies allowed the final selection of the articles that were part of this integrative review. To date, reviewers are in the manual search phase in the references of selected studies, checking if other articles can be included in the review. Thus, the counting of eligible articles for this review has not been finalized. The two reviewers are following without disagreements in the selection of articles, not needing a third reviewer.

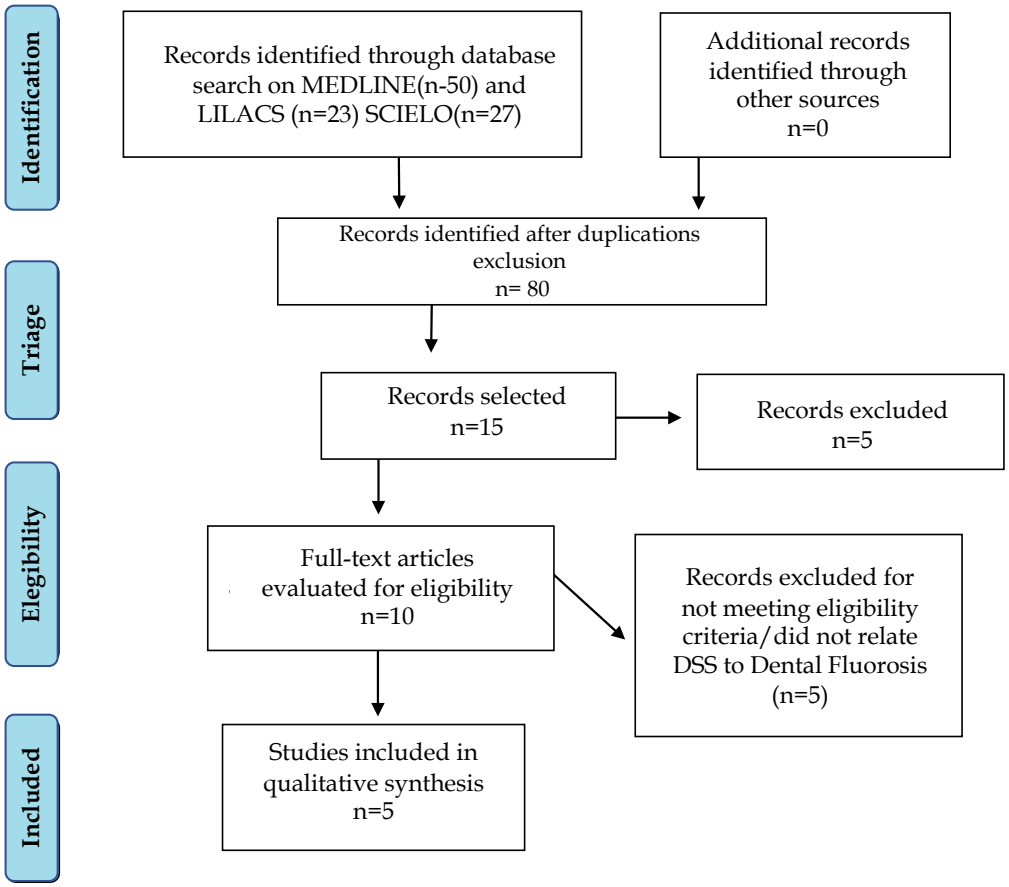
At this stage, some information from the selected studies is being extracted, and for this, a table in *Microsoft*® Word was created, with the following points to be informed: name of authors, journal and year of publication, study location, study design, study population, classification of dental fluorosis and social determinants of health.

Results and Discussion

Through the search strategy highlighted in the methodology, 100 articles were found. After reading these in full, and by selecting the eligibility criteria, the articles are considered eligible to compose the present integrative review study, already shown in Table 1.

The flowchart below demonstrates the results of each step of the article selection process (Figure 2).

Figure 2: Flowchart of the selection and evaluation process of articles 2022.



The main characteristics analyzed can be seen in Table 2. The period of publication of the studies was from 2001 to 2018, the dissemination magazines were in the area of dentistry and national collective health.

Chart 2- Studies related to the social determinants of health and the occurrence of dental fluorosis. 2022

Author/ Year/ Magazine	Study location	Study design	Study population	Social determinants of health
BAKER et al. (2018). Rev. Journal of Dental Research	Austrália (372), Nova Zelândia (três amostras; 352, 202, 429), Brunei (423), Camboja (423), Hong Kong (542), Malásia (439), Tailândia (261,506), Reino Unido (88,374), Alemanha (1498), México (335) e Brasil (404).	Exploratory study	Epidemiological samples aged 8 to 15 years, 6,648 people.	Fundamental structural determinants (governance, macroeconomic policy, public policies and social policies).

OLIVEIRA & MILBOURNE (2001). Rev. Sad Pública	Public School of the Municipality of Rio de Janeiro, RJ.	exploratory study	266 children aged between 7 and 12 years old	The authors do not observe any DSS influencing Dental Fluorosis
CANGUSSU, et al. (2002). Cad. Saúde Pública	Studies published in the country on Dental Fluorosis	Integrative literature review	national articles	High concentration of fluoride in natural water sources
BARROS & TOLMITA (2010). Rev. Saúde Pública	Studies published on Dental Fluorosis in children/adolescents in Brazil between 1993 and 2006	Integrative literature review	National and international articles	Reaffirms the importance and safety of fluoridation of public water supply as a collective health measure
MOURA et al. (2010). Rev. Gaúcha Odonto	Municipal public schools in the city of Teresina, Piauí.	Exploratory study	374 students from the municipal school system	The authors do not observe any DSS influencing Dental Fluorosis

According to the results of selected studies in Portuguese and English, it was observed that Dental Fluorosis is a public health problem, worldwide. This problem has a close relationship with health determinants, demonstrating that the location, socioeconomic conditions, economic and health political system, condition the occurrence and aggravation of the problem.

In view of the foreign language findings, the research by BAKER *et al*.[33] published by Rev. Journal of Dental Research, when carrying out a study in 11 countries, including Brazil, with the objective of identifying the social relationships with oral health, in young people between the age group of 8 to 15, obtained as a result that structural determinants are causal axes of oral health problems, including dental fluorosis.

The study by Baker *et al*.[33] agrees with the English language study by Dominique *et al*.[34], which aimed to examine the causal factors of poor oral health in African-American children in the USA, through a literature review. Therefore, it was identified that poor dental health conditions were related to structural and health determinants, such as food, housing, health guidelines and low socioeconomic conditions, in addition to lack of family support, in the role of caregiver[34].

However, not very recent studies show that they disagree with the above authors, at the national level. A survey carried out in a public school in the city of Rio de Janeiro, Brazil, considered that dental fluorosis is not a public health problem[35].

However, in the following year, a study by Cangusso *et al*.[14], reviewing the literature when discussing the relevance of considering dental fluorosis as a public health problem in Brazil, identified that the pathology is a problem present in the population. Brazilian population, associating it with the result that social determinants such as the quality of drinking water interfered in the emergence of dental fluorosis[14].

The study supports the statement, by presenting the results of the study that the amount of fluoride present in public water supply is considered high, being one of the causal factors of a public health problem. In addition, the lack of professional guidance regarding the correct amount of toothpaste use is another factor that contributes to the emergence of fluorosis, especially in childhood[14].

The result of the study by Cangussu *et al*.[14] corroborates the results of the study by Barros and Tolmita[36], who, through an integrative literature review, believe that the safety of fluoridation of public water supply as a health measure is of paramount importance. collective, in addition to the need for greater incentives in health education.

According to research by Barros and Tolmit36, dental fluorosis can also be present in locations without public water supply that has fluoride control. The authors present that fluorine levels can also vary in untreated water. Thus, health education is evidenced as a fundamental conduct for oral health.

However, a study by Moura *et al*.[37], when determining the prevalence and degree of severity of dental fluorosis in schoolchildren aged 12 years, in the city of Teresina, Piauí, identified a low occurrence of cases of the disease, and did not consider the result of the study as a public health problem. However, the results of this study also showed that the degree of fluorosis is high in public school students, and the author's conclusion is contradictory in not considering the problem as a public health problem.

In analysis, the guidelines for oral health professionals by the Ministry of Health, it is pointed out that among the risk factors for the emergence of dental fluorosis is the high fluoride content in public water supply; use of fluoride-containing medicines and the absence of surveillance systems for fluoride levels in public water supplies[3].

Despite the exploration of the phenomenon, it is worth mentioning that the present study presented some difficulties in its elaboration process, since there is a wide academic production on the subject with a great variation of different indices according to the geographic location, economic and social issues of a given place. . Which, while facilitating the understanding of the influence of these issues on the development of fluorosis, also makes it difficult to have an exact notion of how this phenomenon occurs.

Therefore, it is evident the importance of knowledge about dental fluorosis, as well as its causes and consequences, by the population, and for this, it is necessary to develop educational actions and projects that are capable of reaching the most distant communities and that promote guidance on the risks of excessive fluoride intake, always bringing information about its adverse effects and how they can be avoided. Strict monitoring of fluoride levels in toothpastes and public water supply is also extremely important, considering that this is one of the main means of access responsible for excess fluoride intake.

Conclusion

Therefore, this integrative review found that socioeconomic and behavioral factors influence the development of dental fluorosis. Thus, it is opportune to think that dental fluorosis can be influenced by the environment in which the individual is inserted, their social, economic, psychological and behavioral conditions must be considered according to the perspective of the Social Determinants of Health.

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