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## Literature Review Article

# Prevalence of oral diseases, socioeconomic indicators, and provision of dental services: exploring nexus

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## Abstract

**Introduction and objective:** A number of studies have associated prevalence of oral diseases, socioeconomic factors, and dental services in Brazil, and this study aimed to review, in narrative mode, the causal nexus between them. **Literature review:** The high prevalence of dental problems such as caries and periodontal disease is still found worldwide, despite the significant reduction. The impacts resulting from tooth loss are not limited to the physical condition, but also to the social aspects. The association between oral diseases and microbiological and hygiene factors is recognized, but deficient as explanatory power. The discussion of correlated factors, associated with the development of relevant oral diseases and marking existing inequities, must be expanded. **Conclusion:** The factors studied showed an involvement, indicating that inequities in oral health are striking in the Brazilian population, with serious consequences. Efforts are needed to control and modify this context.

## Introduction

Oral diseases, such as dental caries and periodontal disease is still public health problems, especially for some age ranges, gender, socioeconomic levels, education levels, and geographical sites [35]. In Brazil, these characteristics are exemplified by prevalence estimates found in the last oral health epidemiological survey– SB Brasil 2010 [10], despite of the reduction of caries disease in permanent teeth (DMFT) at the age ranged of 12 years and 15-19 years [10].

Although caries disease historically tends to decline in prevalence means, – recorded worldwide [21] and in Brazilian young population [10] –, much remains to be done considering the economic, social, caring, and human consequences of the disease. Globally, caries disease still affects from 60% to 90% of scholars and most of the adults with different severities of the clinical sequela [30]. Moreover, caries is still the etiopathogenic factor accounting for relevant outcomes expressed by the marked partial or total tooth loss rates in Brazilian population [14].

Many hypothesis try to explain the different variations in the caries prevalence and caries sequelae rates, including proximal variables (microbiological agents and dietary aspects), and more complex factors as distal variables (political, socioeconomic, psychocultural, and provision/use of oral health actions and services) [4, 22, 35].

By raising the discussion on periodontal disease, many questions still require further explanation. It is not known if the periodontal disease is reducing worldwide. Probably not, but reports claim that eventual reduction in adults' edentulism may indicate the decrease in the disease severity, that is, deep pockets [29]. Notwithstanding, in Brazil, especially in North, there is a high extraction rate at the age range of 65-74 years, which may reflect a mutilating characteristic of the care model and also the prevalence of severe disease cases [10].

Thus, the research field is become greater in searching evidences proven the existence of multiple causes surpassing the relationship between periodontal alterations and punctual factors as the biofilm control. Studies have been conducted aiming to evaluate many other putative factors associated with periodontal outcomes [19].

In this context, in which is evident the situation complexity, the literature lacks consensus on discussing the implication of either socioeconomic determinants or provision of dental services on oral diseases.

The general aim of this review study is to explore the pertinent literature on findings correlating the prevalence of oral diseases, socioeconomic factors, and dental services and discuss on the consistence and scope of such causal nexus, weighing the importance to guide more resolute oral health politics and services. Also, it is important to discuss briefly on the use of the following terminologies "accessibility", "access" and "use of services".

## Literature review

### Fixing concepts

The *Thematic glossary: health economy* defines accessibility to health services as "the economic, geographic, legal, cultural, or organizational that a population has to attend health service" [11].

According to Travassos and Martins [34], after reviewing and discussion many concepts, access was established as an imprecise, complex, and mutable concept. The access is related to the contact with health service, either direct through the appointment or indirect through complimentary exams. Thus, clearly, access is related and it measures the performance of the health systems.

Even in countries considered as "developing", the access to health services and the health condition of the population itself is permeated by the heterogeneity that many times can translate not only the expected variations but also social inequities reflected in health (unjust and avoidable inequalities). In a study comparing Canada and United States, the individuals living in the later had much little chance of accessing the health services than those living in the former. However, the access differences related for example to race and income occurred in both, but with more significant outcomes in American population [23].

The potential access to health services of poorer populations can be favored by the greatest provision of public health services, but this cannot be interpreted as an automated result of benefit [26]. This confirms that not only is the question of access to service, but also the outcome quality that the service provides at either individual or populational level. In Dentistry, this situation is common because even for those individuals with access to the services, if this access relates to invasive treatments, there is still the possibility for tooth loss [12].

Specifically regarding to access to dental service, there is a relevant impact on the perception of the individuals on the importance of oral health access

[33]. Celeste *et al.* [13] confirmed after analyzing 4,033 youth at 15-19 years that the public dental service impacts the reduction of the untreated caries number despite of the impossibility of the public health is inferred to total caries experience, to which the authors accounted a possible accumulation of false-positive diagnoses. In their conclusions, the authors pointed out that although the service has eventually the character of immediate social demand, the service always accounts for the increasing in the number of filled and/or missed teeth at mid- and long-term.

Concerning to the concept of use of health services, Andersen and Newman [1] studies the determinants of the use of medical services. The model proposed by these authors was adopted and further employed in a study on the explanations related to the use of dental services [24]. It is known that the different standards of use vary according to many factors [31], as age, gender, race, material conditions of life, education, conditions of displacement to the service, among others.

Travassos and Martins [34] defined the use as the center of the functioning of the health services, expressing the access together with a series of other individual and contextual factors. The authors affirmed that the use comprises from the contact with the service to the outcomes. Davenport *et al.* [15] affirmed that frequent appointments to the dentist relates to the smaller number of untreated carious teeth, and consequently to the greater number of filled teeth.

One of the most corroborative studies is that of Nadanovsky and Sheiham [27]. The authors observed that the contribution of dental services in reducing caries prevalence of 12-year children living in industrialized countries was not relevant. They still indicated that socioeconomic factors explained the reduction of caries (65%).

## Discussion

After the conceptual discussion of the ideas involved in this review, by discussing the oral problems eventually related to the factor access/use of services, it is necessary to recover the concept of social determination of health/disease process, reflecting the iniquitous epidemiological distribution of the oral diseases and the contradictions in the provision of oral health services [2].

For some authors, the resources to surpass the barriers of the inequalities in the access to health services are potentiated by the government support in the sense of minimizing the social and

economic differences [3]. The same can be affirmed for the dental service, in addition to the necessity of increasing service offer and work task [20].

By evaluating variables such age, race, education of the parents, and geographic site regarding to access to dental service, Edelstein [18] confirmed the presence of a negative relationship among them, that is, conditions considered as unfavorable increase the inequalities of access of American children. In 2009, Edelstein and Chinn [17] found a discreet increase in the proportion of dental appointment of children from 42% to 45% between 1996 and 2004. However, the inequalities are still evident when associated with age, familial income, and race.

The universal and equal access to dental service assured in theory by the Brazilian law [8] still has barriers that have not been exceeded, demanding discussion. The initial clue of this discussion, the actual Brazilian situation clarifies that the greater is the Human Development Index (HDI), the greater is the size of the municipal sector measured by the tax revenue itself. Moreover, the socioeconomic and geographic factors, age range, gender, and race have been classified as health iniquity determinants of the population [16].

Because the Dentistry is part of the system of health demands, the situation is not different. Barros and Bertoldi [7] revealed the problem severity by identifying that 77% of children at the age range from 0 to 6 years had never saw a dentist according to the National Household Sample Survey (PNAD) from 1998. Other result found by the authors was that 4% of the adults at 20 to 49 years had the same condition. The proportion of individuals from the poorest group that had never saw a doctor was 16 times greater than the richest group. The treatment provided by the Unified Health System (SUS) to the poorest was 68%.

The study of Pinheiro and Torres [32] revealed that markers of inequalities are those factors linked to both the individuals and the country. This allowed the authors infer that to be a non-white man with low education and socioeconomic level, without health insurance, and living in a poorer state increases the chance of never seeing a dentist. Other factor of great relevance was that the increasing of one dentist per 1,000 inhabitants dropped down the chance of never seeing a dentist in 46.6%, which also evidenced a greater service offer.

The interface among oral diseases, socioeconomic factors, and access to oral health service was studied by Baldani *et al.* [5]. The authors evaluated the cities of the state of Paraná, Brazil, in 1996. The

results indicated a reduction of the caries levels in the cities with better socioeconomic situation with access to fluoridated water. Concerning to the service offer, the greater relative number of dentists per population resulted in smaller DMTF index. However, the analysis driven by the socioeconomic and fluoridation lost the explicative power. Other revealed data was that there was the greatest public service offer in poorest cities, highlighting the question on why DMTF index is high in these conditions.

Baldani *et al.* [6], in a new study with the same sample found that the greatest offer of collective dental procedures (preventive), restorative and extractions is related to the greatest dentist/SUS/inhabitant proportion together with a greater number of devices per inhabitant. However, in the group with the worst socioeconomic conditions at the studied period the number of extractions decreased. The authors commented that the redistribution of values for oral health tend to increase the benefits to cities in worst condition from the year of 2000, due to the inclusion of oral health in the Brazil's Family Health Strategy (FHS).

Similarly, by evaluating the association among extractions, socioeconomic indicators, and offer of dental services, Palmier *et al.* [28] identified that income and organization of health services contribute to explain the observed tooth losses. The previous research of Matos *et al.* [25] showed in which the public service is directly associated to the extraction procedure.

In the search for establishing a greater equality in accessing the dental health service, the Brazilian government launched the Guidelines of the National Policy on Oral Health [9]. Specifically, regarding to the access enlargement, it is stated the overcoming of the biomedical model of attention and proposed transversal insertion of oral health in the different comprehensive health programs: 1) care lines e 2) life condition.

Brazil's Smiling Program, implemented in the year of 2004, was composed by 4,857 cities and the Federal District. The areas most covered were: Northeast (72.5%), followed by Midwest (50.3%), and North (43.2%). Other highlight at that time is the implementation of the Centers of Dental Specialties (CEO), resulting in an increase of the number of dental equipment and treatments of higher complexity, such as endodontic and periodontal treatment, oral diagnosis, dentures, small surgeries, and the treatment for individuals with special needs. The incentive to fluoridation of public water was also highlighted.

Currently, the Oral Health Teams of the Basic Care reach 90% of the Brazilian cities. The system is composed by 1,037 CEO, more than 1,955 Local Prosthesis Laboratories, and 151 Mobile Dental Units in functioning. In 2015, 64.8 thousand dentists worked at SUS ([http://dab.saude.gov.br/portaldab/apc\\_brasil\\_sorridente.php](http://dab.saude.gov.br/portaldab/apc_brasil_sorridente.php)).

## Conclusion

Even if governmental actions have pretty clear goals based on the reduction of inequalities, it is necessary to highlight the importance of studies evaluating their results and benefits.

Despite all effort attempting to reduce the inequalities in oral health, there is still much to be done. Firstly, it is of utmost importance that the influence of socioeconomic factors is recognized on the health-disease process, herein including the oral diseases. We also highlighted that the difficulties faced in Brazil is the result of its major geographical amplitude and alarming inequalities, accumulated. One must recognize the nature of the problems, altering the process of defining policies, programs, and strategies.

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