

# The epidemiology of edentulism and the associated factors: A literature Review

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## ABSTRACT

Considering the advancement of curative and preventive dentistry, edentulism is still a challenging problem for healthcare providers all over the world. Dental caries and periodontal diseases are the main causative factors to teeth loss and eventually, if untreated, lead to edentulism. The socioeconomical factors also contribute to the edentulism as it has an association with education and income status. This literature review will put some highlights in the epidemiology and etiology of edentulism, its prevalence, and the association with the social-economical factors.

**Keywords:** Edentulism, edentulous, teeth loss

## Introduction

Edentulism is the state of being edentulous, or without natural teeth.<sup>[1]</sup> Complete edentulism is an oral cavity without any teeth. Adequate dentition is quite essential for well-being and life quality. Edentulism is one of the public health burdens for elderly people and effects clearly the practice of primary care. Edentulism is a devastating and irreversible condition and is described as the “final marker of disease burden for oral health.”<sup>[2]</sup> Patients who are suffering from edentulism exhibit a wide range of physical variations and health conditions. Teeth loss affects mastication, speech, and may result in poor esthetics which in turn affect the quality of life.<sup>[3]</sup>

This literature review will highlight the epidemiology and etiology of edentulism, its prevalence, and the association with the social-economical factors.

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## The Epidemiology of Edentulism

There is a debate in the literature about the increasing and the decreasing rate of edentulism; Khazaei *et al.*<sup>[4]</sup> concluded that the total rate of edentulism is believed to be on a steady decrease in developed countries, while in the developing countries, the reverse is seen. However, Douglass *et al.*<sup>[5]</sup> demonstrated that edentulism continues to grow due to aging and the increasing numbers of the older adult. Gender has a tendency to be one of the important factors affecting the prevalence of edentulism.<sup>[6]</sup> Numerous studies hypothesized that edentulism could be more prevalent in women than in men.<sup>[6,7]</sup>

Age is a critical factor affecting the Epidemiology of edentulism; it is clear that the older age group is mostly affected and exhibits the physical features that edentulism can inflict.<sup>[8]</sup> According to the united nations in their World Population Ageing report,<sup>[9]</sup> they found that the number of older adults (60+) in the world has increased considerably in recent years and that growth is expected to be more in the coming decades. There were 901 million persons aged 60 years or above in 2015, an increase of 48% over the 607 million old adults worldwide in 2000. Furthermore, older adults will account for a more significant proportion of

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the total population as the younger generation continues to age. For instance, Thompson and Kreisel<sup>[10]</sup> studied the impact of the demographics of aging and the edentulous condition, and they estimated that a 36.5% increase in Canada's older adult population by the year 2015. They found that there is declining in the rate of edentulism since the improved dental care and they expected that the expansion of the old adult population is still will be present.

### The Prevalence of Edentulism

Edentulism is an irreversible and debilitating condition and is termed as the "final marker of disease burden for oral health."<sup>[3]</sup> While the prevalence of complete edentulism has reduced over the last decade, tooth loss remains a significant disease worldwide, mainly among the elderly population.<sup>[5]</sup> However, the prevalence of complete edentulism varies from country to another country and from region to another region,<sup>[11]</sup> and comparing between national samples is challenging because of the impact of several factors like lifestyle, economic circumstances, education, oral health knowledge and beliefs, and attitudes toward dental care.<sup>[6]</sup>

In the United States, according to Slade *et al.*<sup>[12]</sup> surveyed 432,519 adults; among adults over 15 years of age and above, the prevalence of edentulism was 4.9%. In Canada, the overall rate of edentulism in 2010 was 6.4% - 21.7% among adults between 60 and 79 years of age.<sup>[13]</sup> The rate of edentulism tends to be different from a region to another region within a country. A wide variation has been found between provinces in Canada, from 14% (Quebec) to 5% (Northwest Regions) due to related factors such as access to fluoridated water and smoking.<sup>[11]</sup> In Brazil, the more industrialized states and wealthier places tend to have lower rates than other parts of the country.<sup>[14]</sup>

Peltzer *et al.*<sup>[8]</sup> surveyed complete edentulism among older adults (50 years) and above in all of China, Ghana, India, Mexico, Russia, and South Africa. They found that the overall prevalence of edentulism was 16.3% in India and 9% in China. Mexico was the higher prevalence rate at 21.7%, Russia comes at second place in prevalence at rates of 18%, and the prevalence in South Africa was 8.5%. The least prevalence rate was Ghana at a rate of 3%.

In Europe, many studies have demonstrated the prevalence of complete edentulism,<sup>[15]</sup> in Sweden did five cross-sectional interviews from 1975 to 1997 and interviewed 11,582 individuals. They reported that in the age group 25–74 years, the prevalence decreased from 19% in 1975 to 3% in 1997, and the proportion of dentate persons increased from 75% in 1975 to 97% in 1997 in the age group 45–64 years with similar ways in the other age groups.

Zitzmann *et al.*<sup>[16]</sup> in Switzerland, in their Swiss Health Survey interview and questionnaires, the sample size was 14,326 in population-based stratified samples among the population age from 15 to 74. They concluded that the total rate of complete edentulism was 5.7% knowing that the significant rate of edentulism in a group of age between 65 to 74 years.

In a more recent study in 2018, Pengpid and Peltzer<sup>[17]</sup> reported that the overall prevalence of edentulism in Indonesia was 7.2%, while it was 29.8% among 80 years and older individuals.

### The Etiology of Edentulism

The reasons for edentulism are many. While primarily it's the result of microbial or genetic diseases that have strong individual and behavioral impacts, edentulism can be the result of iatrogenic, traumatic, or therapeutic causes.<sup>[18]</sup> Lower income and education level, poorer oral health, and reduced general health correlated with the incidence of tooth loss. Higher periodontal disease marks perceived poor dental health, the perceived need for extractions, history of smoking, and low ascorbic acid intake.<sup>[19]</sup>

In modern ages and civilized countries where people have access to dental care, the most significant reason for tooth loss is caries followed by periodontal diseases.<sup>[20]</sup> Hull *et al.*<sup>[21]</sup> reported in a cohort study of 389 extracted teeth that caries is the most dominant cause for teeth extraction by 37% followed by periodontal diseases 29%, other reasons 33%, trauma is 12%, and wisdom teeth extraction accounts for 6%.

On the other hand, Chrysanthakopoulos<sup>[22]</sup> in his survey in Greece concluded that periodontal diseases were the most common cause for teeth loss (38.09%), especially in the older population (66.17%), while dental caries was the primary cause of tooth extraction in the youngest population (56.12%).

Locally in Saudi Arabia, Almadina, Al Hamdan and Fahmy<sup>[23]</sup> did a cross-sectional study investigating the primary reasons for teeth extraction. They found that the most common causes for extraction of permanent teeth were caries (89.8%) followed by trauma (4.1%), the third common cause was an orthodontic treatment (1.9%). Extraction due to periodontal disease was (1.7%). The least cause for teeth extraction was prosthodontic treatment reasons (1.2%).

### Socioeconomic Reasons Correlated with Edentulism

Socioeconomic factors play a massive rule when speaking about edentulism, such as low income, low education level, and limited social support, especially in elderly people.<sup>[24]</sup> Edentulism can also be the primary concern of younger society and may be related to cultural factors, private care access, and socioeconomic factors. These factors impact the spreading and prevalence of complete and partial tooth loss between developed and less-developed countries.<sup>[24]</sup>

Eklund and Burt<sup>[19]</sup> reported that regardless of the overall decline in edentulism, the less-educated and poor of all ages continued to be much more likely to become edentulous. The study showed the relationship between edentulism and socioeconomic factors; they stated that socioeconomic variables are a significant predictor of edentulism when the number of remaining teeth.

Some studies<sup>[19,25-27]</sup> stated the incidence of edentulism associated with education and income status with those in the lower levels showing higher risks of becoming edentulous. Individuals within a given society who have full access to dental care clinics have a lesser rate of edentulism, on the contrary, a society who have no access to dental care exhibit a higher rate of edentulism.

While Al Hamdan and Fahmy<sup>[26]</sup> surveyed the correlation between Socioeconomic factors and complete edentulism for female patients in Saudi Arabia and concluded that age, educational level, and socioeconomic status play a vital role in edentulism and denture demand. Makhviladze<sup>[27]</sup> in Georgia studied the relationship of education level, family financial status, and edentulism. He found that money shortage and low medical education background can remarkably influence teeth loss.

Pengpid and Peltzer<sup>[17]</sup>, who found the overall prevalence to be 7.2% in Indonesia, concluded that the prevalence is well linked to education as they found that the prevalence to be 11.8% among those with no formal education.

## Conclusion

Despite the development of curative and preventive dental care in the last decades, edentulism continues to be a challenging problem to healthcare provider.

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## Conflicts of interest

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