

# **The Economic Impact of Dental Diseases and Remedies on Overcoming the Burden**

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## **ABSTRACT**

Dental diseases are common, and the management of these diseases is costly. This creates an enormous impact on the economy. This counts the burden on the patient and the immediate family. The productivity of the population is significantly affected by dental diseases. Nevertheless, most of these dental diseases are preventable. Thus, it is important to concentrate on measures needed to prevent dental diseases which will minimize a major share of the expenditure incurred on treatment. In addition to prevention, early detection of dental diseases also helps in minimizing the cost by instituting simple less expensive treatment protocols.

**KEYWORDS:** Economic impact, Dental disease, Periodontal disease, Dental caries, Oral cancer

## **Introduction**

Dental diseases have a higher incidence in society. It is universally accepted that the cost of dental treatment is extremely high. The World Health Organization (WHO) reported that dental diseases are the fourth most expensive category of disease to treat globally (Petersen, 2003). Direct treatment costs due to dental diseases worldwide were estimated at US\$298 billion yearly, corresponding to an average of 4.6% of the global health expenditure. These calculations are for treatment whereas an indirect burden through compromised productivity should also be considered. The actual burden and cost of oral conditions are likely to be much higher than dental conditions such as oral cancer, dysplasias of the oral mucosa, oral infections, and oral developmental disorders (Listl et al., 2015). Potentially, over 40 million hours are lost annually due to dental problems and treatment in Canada with subsequent potential productivity losses of over US\$1 billion (Hayes et al., 2013). The patients seek treatment only once they begin to experience symptoms and suffer. The high incidence of dental disease is mainly due to patients showing inadequate attention to prevention. Preventive measures need not necessarily be performed at the professional level. Simple day-to-day oral health measures at home are useful in most instances. Some diseases like oral cancer can be easily prevented by altering and restraining certain adverse habits.

### **Common Dental Disorders**

Dental caries, periodontal disease (advanced gum disease) and oral cancer are common oral diseases. Yet, there is a trend in increasing the incidence of tooth wear since the population is becoming older universally. In addition, the incidence of Dento–alveolar trauma is also increasing in modern populations.

### **The Cost of Treatment**

Though the success in dental treatment strategies is excellent, the cost has mounted together with the advancement of technology and knowledge of the disease. Indirect costs due to dental diseases worldwide amounted to US\$144 billion yearly, corresponding to economic losses within the range of the 10 most frequent global causes of death (Listl et al.,2015). In South Asia, the dental expenditure is 0.75 billion US\$ annually.

Productivity is badly affected by dental disease. According to the global health economic studies, severe tooth loss was responsible for 67% of global productivity losses due to dental diseases, and periodontal disease and untreated caries were found to imply 21% and 12% productivity loss, respectively (Righolt et al.,2018).

Dental caries (Dental decay) is a common disease that needs professional intervention. Restorative treatment is (dental fillings) done to preserve the teeth. The present materials are comparatively more expensive than their predecessors. In addition to the cost of the material, the procedures involved using advanced technology and incorporating expensive machinery incur an enormous cost. Furthermore, if the disease extends into the dental pulp (where the nerves and blood vessels of the tooth are), the tooth will either need root canal treatment or extraction. Root canal treatment is very expensive and involves a lot of expertise. The tooth must be replaced if is determined for extraction.

Periodontal disease is the commonest dental disease. This will ultimately lead to the loss of teeth after they have become mobile. The disease affects the supporting tissues of the teeth. Maintaining the affected teeth is challenging, time-consuming and needs long-term follow-up. Thus, this will result in a lot of indirect costs to the patient, family, and the system.

Oral cancer is common in Sri Lanka and the region. It is the commonest cancer in males. It is well known that the common aetiological factors are betel chewing, consumption of tobacco, smoking, and alcohol. Having a reasonable knowledge of aetiological factors and preventive strategies, a significant percentage of them do not change their habits. The cost in the management of oral cancer is variable. It involves the surgical treatment, irradiation, and cytotoxic drug therapy. The hospital stays are usually extended. Long-term care is necessary in excluding the recurrence and preventing complications of the disease and treatment. All these will incur a lot of expenditure. From the patient's and family's point of view, the sacrifice and associated loss of income is significant.

Tooth wear is a common dental disease in the modern population. As the life expectancy increases, the teeth are exposed to more wear and tear. In addition, some teeth are extracted or broken making the remaining teeth become overstrained.

Overstrained teeth are worn and associated with many complications. Complications are aesthetic issues, sensitivity and pain. In extreme cases, they are no longer competent to serve as normal counterparts. This necessitates advanced treatment like root canal therapy and building the crowns which will incur a substantial cost.

Trauma associated with road traffic accidents, sports injuries, workplace injuries and assault is high in modern populations. These injuries lead to loss of part of the tooth or complete loss of tooth/teeth associated with soft tissue and/or jawbone injuries. These injuries are common in relatively young populations and always demand rehabilitation/ replacement of lost structures. Rehabilitation of these patients needs a lot of expenditure. Dental trauma results in both direct and indirect costs, with a predominance of direct costs. The direct costs primarily depend on the degree of severity, while indirect costs are mostly due to compromised access to health care services. An additional cost is associated with long term treatment and maintenance care which may continue for several years (Glendor et al.,2001).

Due to most of the dental diseases discussed above, there will be tooth/teeth loss compelling replacement. Prevalence of tooth loss increases gradually with age, showing a steep increase around the seventh decade of life that was associated with a peak in incidence at 65 years (Kassebaum et al.,2014). The replacement cost fluctuates in a wide range according to the type of replacement. The various options in tooth replacement range from removable devices like dentures to advanced options like dental implants. Dental implants give a very reliable treatment outcome with good aesthetic and functional results, yet they are extremely expensive. In the last few decades, there was an ongoing discussion about the need for replacing each lost tooth. Käyser suggested the “shortened Dental Arch Concept” which describes the rationale for accepting several missing teeth without replacement, provided there is no functional compromise (Käyser,1981). The studies revealed that shortened dental arches comprising anterior and premolar teeth, in general, fulfil the requirements of a functional dentition (Kanno and Carlsson, 2006).

### **Minimizing the Expenditure**

The consequences of dental caries were described earlier. Thus, it is always highlighted that preserving a tooth in its original status without risking dental caries. Furthermore, it is always highlighted even with the advancement of science that none of the artificial materials are good or compatible with natural tooth materials. Prevention of caries is straightforward. Reducing sugar consumption, use of fluoridated toothpaste and sticking to good oral hygienic measures are useful in preventing dental caries from its initiation. Oral health promotion which brings about the use of fluoride is effective in reducing caries (Kay and Locker, 1998). These can be done at individual or community levels. It is also important to identify vulnerable individuals and reinforce preventive strategies and keep them under close monitoring.

Similarly, periodontal diseases can be prevented by simple methods practiced at the domestic level.

Measures like sticking to good oral hygiene are adequate in preventing this disease. Though most of the population practices brushing teeth, they do not stick to the ideal technique for them to be free of disease. The correct technique must be emphasized. Health education at the community level will help in this target. It is imperative to impart this knowledge in the early part of life when children are customized to good oral hygienic measures in preserving their teeth lifelong. The national guidelines are to screen the mothers during their pregnancy and instil all hygienic measures which would be rewarding for another generation.

Oral cancer is a life-threatening disease and can still be prevented easily. Prevention can be initiated at the community level. Simple education about adverse habits and their contribution to cancer should be highlighted. These strategies are already incorporated into national policies but further reinforcement is needed. Some oral conditions are identified as pre-cancerous which denotes a higher susceptibility to cancer. If such patients are identified early and monitored according to the guidelines, it would minimize the incidence of oral cancer, and help in identifying early. Early identification helps in managing the disease at a less invasive stage with predictable treatment outcome. In Sri Lanka, the mean cost of managing stage II oral cancer in a patient for 1 year was Sri Lankan rupees (SLR) 58 979 to the health system (Amarasinghe et al.,2019).

Tooth wear as explained before is mostly associated with patients who have lost some teeth and have habits like grinding teeth. These can be addressed earlier by replacing the missing teeth, intervening the habits and treating predisposing conditions like gastritis. Such interventions will halt the progression of tooth wear making the management easier and cheaper.

Overall measures in minimizing road traffic accidents would contribute to a great reduction in dental and facial trauma. Sports injuries can be curtailed by wearing mouth guards, especially in contact sports. The public should be convinced in abiding by the road rules and following measures to minimize road traffic accidents.

## **Conclusion**

In general, dental treatments incur a huge amount of expenditure. Yet most dental diseases are preventable. Prevention is always better than cure as the adage has proved correct over the centuries. This will spare a lot of time energy and other consequences of diseases like pain and discomfort. From an economic perspective, improvements in population dental health are highly beneficial and contribute to reducing health expenditure. Furthermore, if the disease is diagnosed in the early stages, the outcome is better, and expenditure is markedly cut down and consequences are less. The national strategies should be reinforced and driven towards the prevention and early detection of dental diseases.

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