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Dental Healthcare: A Human Right in Sweden?

Fernando Pessoa University

Faculty of Health Sciences

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RESUMO

Embora os cuidados com a saúde dental não tenham visibilidade mediática, as consequências de cuidados dentários inadequados são infecções, cáries e outras doenças agudas e crónicas. Negligenciar os cuidados com a saúde dentária traz consequências que, mais tarde, são custosas para os indivíduos e para o sistema de saúde. Os tratamentos de emergência futuros serão muito mais caros do que os serviços de consultório odontológico que poderiam tê-los evitado, o que se traduz numa perda de longo prazo para o beneficiário da assistência médica e para o Estado. As estatísticas do Eurostat mostram um aumento nos gastos com saúde na maioria dos países europeus, incluindo a Suécia.

É natural que os orçamentos governamentais aumentem devido a fatores como imigração, crescimento populacional, arrecadação de impostos, aumento dos gastos com a expansão do Estado social, entre outros fatores. Esses fatores podem interferir com as dotações orçamentais no sector da saúde e, em particular, na prestação de cuidados de medicina dentária, dado que podem causar uma perceção imprecisa da afetação de verbas ao sistema nacional de saúde.

O objetivo desta dissertação é demonstrar, com factos e dados estatísticos, os efeitos positivos da intervenção precoce em saúde dentária na Suécia. Com o planeamento financeiro de longo prazo, a possibilidade de taxas de assistência odontológica e de benefícios financeiros altamente reduzidos para a Suécia deve não apenas ser desejável, mas também viável.

Palavras-chave: Cuidados de saúde dentária; Direitos Humanos; Suécia.

ABSTRACT

Although dental healthcare does not make the headlines, the consequences of improper dental care lead to infections, tooth decay and numerous other acute and chronic illnesses. Just like poor medical care, neglecting oral health care will turn costly. Future emergency treatments will certainly be far more expensive than dental office care that could have prevented them. This might encompass a long-term loss for both healthcare recipients and the government. Eurostat statistical data show increased healthcare spending by the majority of the European countries, including Sweden.

Government budgets increase due to factors such as immigration, population growth, increased taxes, higher spending with the spreading of the welfare state, among other factors. These factors ought to be accounted for in this study and a net result is desirable to be taken into consideration, given the fact that these factors can produce an inaccurate perception of certain calculations.

The aim of this dissertation is to demonstrate, with facts and statistical data, the positive effects of early oral healthcare intervention in Sweden. With short-, and long-term financial planning, the possibility of reduced fees of dental healthcare and financial benefits for Sweden should not only be desirable, but also feasible.

Keywords: Dental healthcare; Human rights; Sweden.

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LIST OF ABBREVIATIONS

CVD	Cardiovascular disease
DHR	Dental Health Registry
EIRA	Epidemiological Investigation of rheumatoid arthritis
NHRC	National Health and Hospitals Reform Commission
RA	Rheumatoid arthritis
SA	Sickness presence
SCB	Statistics Sweden (<i>Statistiska Centralbyrån</i>)
SEK	Swedish Krona
SP	Sickness absence
TFP	Total Factor Productivity
WHO	World Health Organisation

I. INTRODUCTION

The Global Burden of Disease Study 2015 estimated that oral diseases affect 3,5 billion people worldwide with untreated dental caries being among the most prevalent diseases, this equates to roughly 46% of the world's population. (Kassebaum et al. 2015) This is not an isolated problem because poor dental and oral healthcare have scientifically been linked to many chronic illnesses and other systemic health issues. Not only are these systemic diseases extremely costly for the Swedish government, they also constitute and render a staggering political challenge and health care impediments for the government (Socialstyrelsen, 2008). Some of the obstacles regarding dental care in Sweden consist of accessibility, socioeconomic factors, income and educational background. Wamala *et al.* (2006) elaborate that these partly constitute a portion of a wider problem.

The main oral conditions in Sweden today comprise of tooth decay, gum disease, periodontal diseases, oral cancer and oral trauma. Sweden has free dental healthcare services for children and young adults up to the year of their 23rd birthday. For adults, as they turn 24, dental healthcare services are financed by state subsidization and patient out-of-pocket payment, while a small part is covered by the county council for some specific group in the population. Dental care is to a large extent (60% in the year 2018) financed by the consumers themselves (SCB, 2018).

The neglect of oral services is not a question of skills, capacity or lack of sufficient funds to the nation. Dental care presently constitutes about 3% of national health spending and comprehensive reform could be implemented with the implementation of additional funds (SCB, 2018). As an example, amongst all poor health conditions, periodontal diseases have shown significant linkage to illnesses such as cardiovascular disorders, diabetes, metabolic disease syndromes, obesity, cognitive impairment, adverse pregnancy outcomes, amongst others (Al-Zahrani *et al.*, 2003; Greenberg *et al.*, 2007; Taylor & Borgnakke, 2008; Wimmer & Pihlstrom, 2008; Noble *et al.*, 2009; Andriankaja *et al.*, 2010). Based on these facts, it seems that the Swedish government discriminating oral care and paying little attention to the problem, which many would argue should constitute an equal to other health illnesses in terms of human right to general healthcare.

The goal of the dissertation is to identify the major systemic illnesses that are associated to poor oral healthcare in Sweden, which will be covered in the first chapter. The second chapter

will elaborate the Swedish budget proposal for health care in 2020 and entail the government policies and plans towards both general and oral health care. Following these two chapters the aim is discuss the policies, repercussions, the economic burden on work, society and productivity of the status quo. In addition, brief proposals will be illustrated on the benefits of acting towards eliminating the problem of poor oral healthcare. This will be concluded by demonstrating the short-, and long-term effects of an increased financial investment in oral healthcare industry, and how this potentially can have an positive effect on the overall health care costs of Sweden, not only in the treatment of people, but also promote oral, and public health promoting disease prevention, education and motivation of people in healthcare.

In order to complete this dissertation, an electronic bibliographic research was made in databases (e.g. PubMed, B-on, Eurostat, Statistics Sweden). Budget proposals from the Swedish Ministry of Finance covering fiscal budget proposals for healthcare were examined to find relevant data to this dissertation. The following keywords were used in databases: “Dental health care”, “European Union”, “Human Rights”, “Oral Health”, “Health Care Budget”, “Health Care Policy”, “Oral Health Care Budget”, “Oral Health Care Policy”, “Economic impact of dental diseases”, “Health Economics”, “Health and productivity”, “Healthcare and economic growth”.

Books were also explored in the library of Fernando Pessoa University, B-on database, and Google Scholar. Since the timespan of bibliographical references was not restricted to a specific timeframe, this resulted in publications from 1993 to 2019.

Data in the study are written in English and Swedish. As far as I am aware of, similar studies with an equivalent narrative had not been explored previously. The inclusion of systematic reviews, oral healthcare access, understanding evidence-based public health policy, social inequalities in oral health were addressed in the dissertation.

II. DEVELOPMENT

Chapter 1 – Systemic illnesses linked to oral health

This chapter of the dissertation aims at elaborating on some of the major systemic and chronic illnesses that are linked to poor dental and oral care. Furthermore, this section ought to demonstrate the linkage between oral and systemic diseases and the burden this may represent for Sweden in terms of human and capital costs. However, human and capital costs will be discussed in greater depth in following chapter. The different types of dental and oral health problems include gum diseases (gingivitis), periodontitis, oral cancer, cracked or broken tooth, plaque, and caries lesions.

1. Cardiovascular disease

Cardiovascular diseases (CVD) entail diseases related to the circulatory system. There are many cardiovascular diseases, one group involving blood vessels, known as vascular diseases. Another group of cardiovascular diseases involves the heart. The diseases can occur suddenly or emanate from a long-term condition. These conditions affect people of all ages. However, the likelihood of being affected increases with age. Usually men above the age of 45 and women above 55 are mainly affected.

Cardiovascular diseases are the leading causes of death and disability in people living in all developed countries. This problem leads to an annual death toll of 2 million people in Europe, and approximately to 1 million deaths in the United States (Jontell *et al.*, 2009). This creates a substantial negative impact on healthcare related expenditures. Of the total cost of cardiovascular diseases in the European Union (EU), approximately 60% is related to direct healthcare costs, while 20% is related to costs of caretaking (Allender *et al.*, 2008). CVD is the leading cause of death in Sweden and accounts for 41% of total deaths (Nichols *et al.*, 2012).

A study was made with the purpose to find the relationship between oral health and mortality in cardiovascular diseases (Jansson *et al.*, 2001). A sample of 1.393 individuals was taken from the county of Stockholm. The subjects were examined in an epidemiological study in 1970 with respect to dental health. A follow up in 1997 witnessed the mortality rate of the sample from 1970-1996, as well as the cause of death, according to death certificate. The result of the study exposed the interaction between plaque and oral health score (a sum of scores for number of missing teeth, apical lesions, caries lesions and marginal bone loss), adjusted for age,

gender, smoking, was significantly correlated to fatal coronary events. Dental health was found to be a risk indicator of death due to CVD, especially with other risk factor, as smoking habits.

2. Dementia

Insufficient oral care can affect the central nervous system and the brain. The problem arises from inflamed gums due to infection, the release of substances from the infection site that indeed damage and eventually kill brain cells, which in turns leads to memory loss (Fereshtehnejad *et al.*, 2014).

Dementia may have an impact with irregular dental check-ups, which in turn results in poorer oral health. A study addressed the changes of dental trends in dental care and the emphasis was on the number of teeth before and after being diagnosed with dementia. Long-term cognitive and oral care related information had been merged using data on 58.037 newly diagnosed individuals from the Swedish Dementia Registry and Swedish Dental Health Register between 2007 and 2015. The results from these comparisons were not surprising, as dental care visits post dementia diagnosis had significantly declined. Individuals who were diagnosed with various degrees, for example with dementia in combination with parkinsonism, and those with faster cognitive impairment, had consequently a higher degree of deterioration concerning dental care utilization. The progression of dental diseases is more extensive in those with rapid progression of cognitive impairment (Chen *et al.*, 2013; Grönbeck-Linden *et al.*, 2016).

3. Respiratory infections

Poor oral healthcare can trigger complications on the respiratory system. This develops from the bacteria in the mouth from infected teeth and unhealthy gums that are inflamed. These bacteria are breathed into the lungs or travel there through the bloodstream. Once the bacteria have reached respiratory tracts, they cause respiratory infections, chronic obstructive pulmonary disease (COPD), pneumonia and even acute bronchitis (Stensson *et al.*, 2011).

Gómez *et al.* (2016) sought to investigate the association of gum bleeding with respiratory health in a population-based study from northern Europe. The aim of the study was to investigate whether gum bleeding is related to asthma, respiratory symptoms and self-reported COPD. The research included 13.409 respondents in seven Northern European cities of the

following countries: Norway, Estonia, Sweden, Iceland and Denmark. The research was conducted through postal questionnaire entailing questions about respiratory and oral health.

Results showed that gum bleeding was significantly associated with asthma symptoms with a 95% confidence interval. The conclusions stated that “a consistent link between gum bleeding and obstructive airways disease was observed” (Gómez *et al.*, 2016: 4), which could not be explained by common risk factors or metabolic factors. According to the authors, speculation could be made that oral pathogens might have adverse impact on the airways, and that the “direct continuity of the mucosa of the oral cavity and the airways reflect a pathway that might provide novel opportunities for interventions.” (Gómez Real *et al.*, 2016: 2)

4. Diabetes

Diabetes mellitus, commonly referred to as “diabetes”, is a chronic disease associated with abnormal levels of the sugar glucose in the blood. Diabetes has been affecting people of all ages and the prevalence of the disease has been increasing over the years. According to the World Health Organization (WHO), a minimum of 220 million people (2,8% of the world’s population) suffer from diabetes. Its development is rapidly increasing. It is calculated that by 2030, the disease will almost double in number (Wild *et al.*, 2004). The treatment of diabetes includes safe and effective oral and medical care for patients.

The disease can be categorized into two types: type 1 and type 2 diabetes. In type 1 diabetes, the body does not produce enough insulin as a result of most or all of the insulin-producing cells in the pancreas are destroyed. These insulin producing cells are named β -cells. These patients are therefore insulin dependent. Insulin is a hormone needed to allow sugar (glucose) to enter cells to produce energy. The age of diagnosis is usually young children or teens. Type 2 diabetes is chronic, the body cannot use insulin properly. The body’s cells resist the normal effect of insulin, which is to drive glucose in the blood into the cells. These patients’ bodies are insulin resistant. This results to glucose building up in the blood.

An efficient diabetic treatment requires proper understanding of the disease and also the familiarity with various general health and oral manifestations. The goal is to promote awareness about oral health and general health in patients who may have diabetes mellitus. The age of diagnosis is mostly in adults, however occurring in children and teens who are overweight and obese as well (Henriksson & Jönsson, 1998).

People with uncontrolled diabetes are more susceptible to oral infections such as infected gums that lead to periodontal disease. Periodontal disease also impacts on diabetes control. Symptoms can worsen as blood sugar levels go beyond control because of gum disease. Good oral hygiene and regular dental visits are strongly recommended to prevent and manage oral health problems associated with this disease (Taylor & Borgnakke, 2008).

A study, including 27.894 people with diabetes, was carried over in fourteen countries. The results found out that people with diabetes have inadequate oral health knowledge, poor oral health attitudes and fewer dental visits. The study stressed that people with diabetes have limited oral health knowledge, especially in relation to how their oral health can impact on their diabetic disease. It is therefore essential to educate patients about their increased risk for oral health problems. In addition, it is important to motivate them for good oral health behaviours and facilitate access to dental care (Poudel *et al.*, 2018).

5. Cancer

Patients with cancer and survivors of cancerogenic diseases are at considerable risk for unmet oral care need. Oral and dental side effects of cancer treatment can impede vital oral functions and seriously harm and affect patients' quality of life. Common oral manifestations of cancer treatments include Xerostomia, Mucositis/Stomatitis, Infection (bacterial, fungal, or viral), Bleeding (due to thrombocytopenia), Caries, Dysgeusia (alteration in taste sensation), Trismus, Osteonecrosis, Graft-versus-host disease. Patients who are at the highest risk of being affected by these complications are those who have been diagnosed with head and neck cancer are particularly affected by these complications because of the location of the disease. Therapies such as chemotherapy and radiation have serious side effects in the oral cavity and the surrounding structures (Palay, 2017; Östensson *et al.*, 2017). The Swedish government is increasing its efforts to strengthen the cancer care. It has therefore decided to allocate 500 million SEK (48,7 million €) per annum from 2020 onwards to develop and meet the demands of rising cases of cancer related incidents (Regeringskansliet, 2019: 54).

6. Rheumatoid arthritis

According to the National Rheumatoid Arthritis Society, people with gum disease were approximately four times more likely to have Rheumatoid Arthritis (RA). This was based on a study in 2012, which reported that 65% of RA patients had gum disease compared with just 28% of patients without RA. They found that RA patients were four times more likely to have

gum disease than their RA-free counterparts (NRAS, 2012). The study was later corroborated by the National Health and Nutrition Examination Survey (NHANES) data, which indicates that the prevalence of Periodontitis, estimated by the number of missing teeth, is four times higher in RA patients (de Molon *et al.*, 2019). Both diseases have inflammation in common. The bacteria that is derived from gingivitis can increase inflammation throughout the body. This will increase the risk of developing rheumatoid arthritis (Huang *et al.*, 2017). RA and chronic periodontitis are the most common chronic inflammatory diseases with exceptional pathological and clinical similarities, both at cellular and molecular levels (Joseph *et al.*, 2013).

A Swedish population-based case control study addressed the prevalence of periodontitis in patients with established rheumatoid arthritis. The aim was to investigate the possible link between periodontitis and rheumatoid arthritis. Periodontal status of 2.740 cases of rheumatoid arthritis and 3.942 matched controls was retrieved by linking the Swedish Epidemiological Investigation of rheumatoid arthritis (EIRA) with the National Dental Health Registry (DHR) where dental diagnostic codes on adult Swedish population have been registered. Results confirmed that 90% of the periodontitis diagnosis in DHR among RA cases, and 88% among controls. The findings were that the positive predictive value of periodontitis diagnoses in the DHR to be 89%. The conclusion of the data verify that the risk of periodontitis increased by age and current smoking status in both cases as well as controls (Eriksson *et al.*, 2016).

Chapter 2 – The Swedish budget proposal for health care in 2020

This chapter of the dissertation intends to briefly elaborate the Swedish budget proposal and policies towards general, oral, and social healthcare for 2020. Now that we have established the links between oral health and general healthcare, the purpose is to extract the necessary excerpts from the government health budget proposal and examine their plans and policies towards these issues. The objective is to search for any relevant information in the budget proposal document (Prop. 2019/20:1 Utgiftsområde 9) that may suggest improving or take any necessary measure to face the challenges elaborated in the previous chapter.

1. Healthcare policy

Each year the Swedish Ministry of Finance releases a fiscal budget proposition for healthcare, as they and many other countries do in various areas of the financial sector. The budget proposition, amongst many other aspects, include fiscal policy forecasts and expected results. This policy encompasses previous years' fiscal policy and the results of what it actually achieved in comparison with forecasts at the outset.

The Swedish healthcare policy aims at maintaining a world class healthcare for all citizens. Swedish healthcare is of high quality and compares well with other top-ranked countries. Follow-ups demonstrate good medical results. People are generally satisfied with the quality and have confidence in the healthcare system. These levels of satisfaction and confidence are on the rise (Regeringskansliet, 2019: 51-53).

We should keep in mind that the later are sources from the government. Needless to say, we unequivocally have cases that suggest the contrary, with patients with complaints and unmet healthcare needs (Sundler *et al.*, 2020). The Swedish healthcare is facing challenges in distinct areas. One of those challenges includes the availability of healthcare services and longer queues. (Regeringskansliet, 2019: 52). According to the Swedish Health and Medical Service Act (chapter nine, third paragraph), all regions of the country ought to report waiting time data to a national database. This data enables the government to calculate the cost of waiting times and queues (Riksdagen, 2017).

The Swedish government assesses the waiting time to access healthcare are generally too long, but they also vary depending on the county. For the fiscal year of 2020, the government is allocating approximately 2,9 billion SEK (Swedish krona) (280.000 million). This equals

about 30 € per capita annually in a country of just over 10 million inhabitants. Another 3 billion SEK (292,5 million €) will be spent on developing current primary care through the primary care reform program. Primary care in Sweden is endowed to local healthcare providers available in the counties (Regeringskansliet, 2019: 53).

The demand for healthcare in Sweden has surged based on a number of factors. The major factors include aging population, but also as a result of increased treatment options. Large retirements and strained staff situations result in challenges in ensuring and maintaining an effective and well-organized healthcare with the right skills in the right place. Generally, the access to healthcare needs to be improved. There is an immense demand of specialty skills in the healthcare industry. This will be crucial to meeting healthcare needs. For example, the government has suggested a huge part of the budget for 2020 to meet the demand of nurses with specialties in various areas of the healthcare system. The demand is to such an extent that the government budget for 2020 also mentions the investments that ought to be planned for 2021 and 2022. Greater amounts of funds are being planned to increase the enticement of becoming a specialist nurse in areas where the demand for general healthcare is greater (Regeringskansliet, 2019: 55).

2. Healthcare budget

The Swedish healthcare budget has for the last decade witnessed a great increase. Some specific areas within the healthcare system have risen sharply, for example the areas concerning pharmaceutical benefits, which increased 7 per centage points from 2017 to 2018. According to the government, growing population and expensive healthcare products explain to a large extent the rise of the healthcare budget (Regeringskansliet, 2019: 40-43). These explanations contain a fair level of validity. What is lacking, though, is a deeper and thorough understanding of other factors that have so far been overseen and that may have had a great impact on rising costs on the healthcare sector.

According to Eurostat (2017), among the EU Member States, besides France and Germany, Sweden had the highest healthcare expenditure relative to Gross Domestic Product (GDP) in 2017 (between 11.0 and 11.3%). Relative to population size and euro terms, current healthcare expenditure was €5.200 per inhabitant. Eurostat also demonstrates the EU member states healthcare expenditure over time. From 2012 to 2017, Sweden witnessed an increase of 13% in this regard (Eurostat, 2017).

3. Oral healthcare policy

Inequality on the access to dental care services is explained by socioeconomic disparities in the Swedish healthcare system, but it is also a mirror of future potential repercussions. Many studies that have been conducted in Sweden (Wamala *et al.*, 2006), concerning public health of the Swedish population, have concluded that poor oral hygiene is a contributing factor to several health problems.

According to the Swedish government, assessments conducted by the ministry of health determined that whether a person visits a dentist depends on factors such as the level of education, income and his/her socioeconomic status. Based on income, assessment made by the ministry of health determined that people belonging to the lowest income category, only 52% visited a dental clinic for an oral health evaluation. In comparison to the highest income category, 82% visited a dental clinic for the same purpose (Regeringskansliet, 2019: 55). However, the low-, and high-income categories are not specified in terms of what salaries are constituted by the “low income category” and the “high income category”. This may suggest that the discrepancy of dental office visits may differ even more between these two groups.

This fact is supported by Wamala *et al.* (2006): people with severe socioeconomic disparities were seven to nine times as likely to refrain from seeking required dental treatment. These associations remained after controlling educational levels, occupational status and lifestyle factors. Lifestyle factors alone accounted for 29% of socioeconomic differences in poor oral health among men and women, whereas lack of access to dental care services accounted for 60%. The study called for urgent public health interventions to increase equitable access to dental care services (Wamala *et al.*, 2006), which was not yet solved.

4. Oral healthcare budget

For the fiscal year of 2018, the following was the distribution of the Swedish government's total spending on healthcare: 3% was on dental healthcare, 7% on medicine and drugs, 7% on specialized psychiatric care, 1% on political activity, 16% on primary care, 8% on other health and medical care expenditures. The remaining staggering 47% was spent on specialized somatic care (SCB, 2018). Total dental spending amounted to SEK 27,4 billion (267 million €) for 2017. According to the data from Statistics Sweden (2018), county councils' spending amounted to SEK 6,9 billion (672 million €), the municipalities' spending amounted to SEK 12 million (1,17million €), and households' spending for dental care amounted to SEK 16,4 billion

(1,6 billion €). Of the total spending on dental healthcare in Sweden, households' expenditure accounted for about 60% (SCB, 2018).

In total, Sweden funded SEK 6,4 billion (623 million €) in state dental care support in 2018. This was SEK 0,6 billion (58,5 million €) more than in 2017. This is largely due to the reform for general dental care subsidies which came into effect on 15 April 2018 (Regeringskansliet, 2019: 49) based on Statistics Sweden (2018).

To conclude the examination of Swedish policies towards dental care, we witness a discrimination against Swedes in need of dental care. Private costs that create a barrier to access are commonly referred to as "out-of-pocket" spending. As mentioned above, this figure was about 60% according to SCB (2018). Given the fact that so many illnesses are associated to poor dental care and that only 3% of the total health care budget in 2018 was allocated to dental care, is just a reminder of how much room there is for improvement in the health sector. This will be discussed in the following section.

III. DISCUSSION

According to the World Health Organization (WHO), oral health is a key indicator of overall health, well-being and quality of life. It encompasses a variety of diseases that include dental caries, periodontal disease, tooth loss and oral cancer amongst other manifestations (WHO, 2020). Poor oral healthcare such as periodontal diseases can be associated to many other chronic illnesses and other systemic complications that have not been taken into consideration in this dissertation. Some of those illnesses encompass metabolic syndrome (Andriankaja *et al.*, 2010), obesity (Al-Zahrani *et al.*, 2003), cognitive impairment (Noble *et al.*, 2009), adverse pregnancy outcome (Wimmer & Pihlstrom, 2008) and erectile dysfunction (Singh *et al.*, 2017).

All these illnesses contribute to an immense burden for the Swedish government. By quantifying the economics cost of noncompliance, the results are undisputable. In a study by Muszbek *et al.* (2008), the authors showed that with a 10% increase in compliance, persistence and prevention of health conditions such as CVD and diabetes resulted in a 2-9 percent decrease in total annual healthcare costs. Given the fact that only 3% of the government's total healthcare costs are allocated to dental care in Sweden and that so many illnesses are associated with poor oral healthcare, it is time to act (SCB, 2018). Just as general healthcare is a human right in Sweden, with so many poor oral health issues associated to illnesses that have staggering costs for the state, it would be wise to increase the budget for dental care.

Based on the 2015 Global Burden of Disease Study, estimated that oral diseases affect 3.5 billion people worldwide, with untreated dental caries being among the most prevalent diseases, which equates to roughly 46% of the world's population (Kassebaum *et al.* 2015: 383) The study conducted by Kassebaum *et al.* (2015), concluded that in the last twenty-five years oral health has not improved and remained a major health challenge all over the world. The number of people with untreated oral conditions rose from 2.5 billion in 1990 to 3.5 billion in 2015. The rise in 64% was largely explained by demographic changes, population growth and aging. This constitutes a major public health challenge, showing that oral diseases are prevalent in the whole world, posing a serious public health challenge to policymakers.

Since socioeconomic status and income inequality are directly related to poor dental care, the government can revise an increased budget by allocating subsidies based on income and socioeconomic status (Wamala *et al.*, 2006). By increasing the dental budget, the Swedish government would face short, as well as long-term effects in the private and public sector. The

short-term effects of increasing the dental care budget by the Swedish government would unequivocally increase the demand for services in the dental sector.

The long-term effects would allow more dentists and dental specialists, dental assistants, and dental technicians to act, creating more jobs in the dental sector, increasing the demand for dental services and dental products. This would generate an increase in government income through taxes from all sectors of the dental industry. These include, dentists, professors educating future professionals, new dental clinics, importing or exporting dental related products and services. The increased demand in all these areas could increase the demand in research and development of dental machinery, products and future dental technology. Sweden could set an example to most other countries by being in the forefront of the dental industry. In the long-term this might bring huge benefits not only for the people but also the country.

According to SCB (2018), Sweden has one dentist for every 10.000 citizens. Private services could relieve the burden of excessive queues for lower priority care that presently occurs in the hospital. According to the National Health and Hospitals Reform Commission (NHHRC, 2009), increased access to dentists would relieve pressure on general practitioners' services by removing 7 to 10% of the current use of their services. NHHRC (2009) further concluded that pressure on hospitals and hospital waiting lists would be improved as admissions to hospitals decreased. As mentioned previously, Sweden is currently facing challenges struggling with the availability of healthcare services and longer queues (Regeringskansliet, 2019: 52).

All these diseases linked to poor oral healthcare eventually affect the workforce. Many authors, including Koopman *et al.* (2002), Boles *et al.* (2004), Burton *et al.* (2005), Gustafsson and Marklund (2011), provided studies that support that poor health, health status, sick leave are inputs to workforce productivity, an important factor for a company's overall business performance. Koopman *et al.* (2002) studied how workforce productivity and a lack thereof due to health constraints that become a critical factor in the strength and sustainability of a company's overall business performance. According to the authors (2002: 14), "even when the employees are physically present at their jobs, they may experience decreased productivity and below normal work quality – a concept known as decreased presenteeism".

Gustafsson and Marklund (2011) conducted a cohort study to determine whether self-reported sickness presence (SP) and self-reported sickness absence (SA) are specific risk factors

for future health problems or reduced work ability in the active workforce. The conclusion of Koopman *et al.* (2002) and Gustafsson and Marklund (2011) and of similar studies confirmed that several health issues, including physical complaints, poor health, low mental wellbeing, low work ability, SA, and SP, have a detrimental impact on productivity for any corporation or organization.

Baier *et al.* (2006) studied the importance of productivity, physical, and human capital for economic growth. The study was extensive, using newly organized data from 145 countries that spans more than 100 years for 23 of these countries. Baier *et al.* (2006: 42) concluded that “[o]ur new set of data covering 145 countries over a long time span provides evidence that little of the average growth of output per worker across the world is directly due to the growth of total factor productivity (TFP): 14 percent for all of the countries”. They extend the conclusion by stating that “this conclusion, however, reflects substantial variance across countries – TFP accounts for about 34 percent of the average growth of output per worker in the Western countries and 26 percent in Southern Europe” (Baier *et al.*, 2006: 42). Over long periods of time, the growth of output per worker is associated with the accumulation of physical and human capital and technological advances. What is interesting in their research is that they mention that in the short-term the supporting evidence might seem controversial, but eventually the data clearly indicates that the growth of physical and human capital is vital for economic prosperity.

IV. CONCLUSION

Evidence does exist to suggest that non-discriminatory treatment of oral health would have significant benefits. In 2018, Sweden funded SEK 6,4 billion (€623 million) in state dental care support. The Swedish GDP for the same year was SEK 4,9 trillion (€477,1 billion). Not only was the state dental budget 3% of the total health care budget, that figure would represent only 0,001% of GDP. The whole country would obtain some benefit, particularly the 52% who presently receive substandard access and care for financial reasons. Such amendment to the provision of dental care would immensely assist the most deprived groups of the community where suffering is presently concentrated.

Just like there is evidence to link oral care to other major health problems, they are unequivocally not the sole cause of these illnesses. During the study, as facts, information, data and statistics were searched for, a lot of illnesses have been proven to be congenital, accidental and/or hereditary, in which case an increased dental budget would be to no avail. Although relevant malformations at birth do or will concern general healthcare at some point in the future, there are considerable limitations to cure and combat major illnesses by simply increasing government expenditure on oral and dental diseases.

Besides, there are many other etiological factors that are linked directly and indirectly to several health conditions. Among the most common, the use of tobacco, alcohol, several types of drugs, maternal misbehaviour during pregnancy, government sponsored education and prevention programs must be considered. One interesting finding was that in order to combat and improve oral diseases, measures taken by governments in terms of expenditure, subsidy and funding very much depend on the country where these measures are applied.

In many countries, the aetiology of tooth decay and oral related diseases depend on distinct factors. For example, in a developed country like Sweden the government doesn't have to be inclined to spend money on education, prevention, and motivation programs on healthcare, or to increase water fluoridation to the public to reduce tooth decay as it may be the case in countries like Brazil, Bangladesh and India. The simple reason is poverty, income, access to clean water, healthcare provision, the level of education, population density and the supply and demand of services rendered.

Unfortunately, this study was constrained by the limit of pages and thus disregarded other relevant factors that would have been compelling and helpful to include, in order to compare, investigate and discuss. That might be an avenue of research for a future study covering areas of general healthcare, oral healthcare, dental treatments and prevention mechanisms.

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