Global aspects of preventive dental care

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This paper reviews some of the evidence of success for preventive dentistry in the global context and presents some challenges for preventive dentistry in the coming years. Rather than attempting a detailed analysis of individual countries the global view looks at trends and patterns of prevention, care and disease in the context of demographic and other societal changes. In citing examples from countries with which the author has associations, the paper emphasises the trend for fewer and fewer differences between countries, with both developing and developed countries converging in relation to oral health trends and demographics trends. The main future challenges to preventive dentistry firstly relate to the demographic changes combined with overall attitude changes to oral health. Secondly, it is a challenge for preventive dentistry to address the common disease risk factors approach and make the contribution of preventive dentistry a natural component of integrated population health strategies. Finally, there are major challenges to improve the methodologies that we are using for documenting most of the preventive dentistry activities in which we are involved and establish a relevant evidence base.

Key words: Prevention, oral health, common risk approach, systemic disease, fluorides

Global demographic changes

A global perspective of preventive dental care must examine the demographic changes in the world, oral health and dental care trends over time, and the opportunities of preventive dentistry in the context of the common risk factors approach.

Figure 1 summarises population developments across the world over a rather long time perspective. During the years 1950-2050, the population aged 60 years and older increases from 8% of the world’s population in 1950 to around 22% of the world’s population in the year 2050. Meanwhile, 50 years ago, the population of 14 years and younger formed almost one third of the world’s population, which is estimated to decrease to around 20% of the population by 2050.

Figure 1 also indicates that overall, the population in areas that we usually consider developing countries is increasing and the population in so-called developed countries is stagnant or decreasing. Although 2050 may seem far away today, it is intriguing to note that current undergraduate dental students will quite possibly still be in practice in that year. Those students, as graduates and dentists, will be experiencing the developments themselves, the implications of which presently are difficult to grasp. One example is the changing age structure of the Australian population, where the fastest growing population group are those over 80 years. As seen in Figure 2 what used to be a traditional age pyramid in 1925 where the largest proportion of the population was in the younger age groups is gradually reshaped into a coffin form as projected for 2045 with the younger age groups becoming relatively smaller and the older age groups relatively larger.

Simultaneously with this development, changes in people’s education levels will have immense importance for the health services in general and for dental services in particular. From 2001-2051 the proportion of Australian adults with a university education or more will completely change. In 2001, a cross-sectional view of the population showed that about 25% of 25-year-olds had a tertiary education or over, gradually decreasing across the age groups to around 5% in the 70-year-olds with higher education. In 2051, it is projected that this proportion will instead be increasing across the age-groups from around 25% in the 25-year-olds to around 30% in the 70-year-olds reflecting a general higher education level of the population. The ageing population at generally higher education levels will lead
to a different perception of, and demands for health services. As pointed out by Douglas and Sheets, with higher education we see changes in patients’ expectations and in their knowledge about modern dental services. Furthermore they become more aggressive in holding health care providers accountable for the quality of care. These trends may have been identified earlier in the USA, but without doubt a lot of dentists across the world are experiencing these changes in patients, which have been ascribed to easier access to the Internet, information activities in general and maybe also to a greater focus from the healthcare professionals themselves to teach people awareness in health.
Oral health trends

To illustrate the oral health trends it is useful to look at data from a different part of the world. Denmark has a long tradition of collecting dental epidemiologic information from its children's dental services. Figure 3 illustrates the caries development over a 30 year period in Danish children. What is clearly demonstrated is what has taken place in many countries, which is the dramatic decrease in DMFT developments over this 30 year period. What we do not usually focus on is the question of the consequences this decrease in disease levels in children has in the adult population.

One simple measure of this is to chart the changing picture in edentulousness (Figure 4). In 1975, overall 25% of the adult Danish population was edentulous, with the oldest age group having the highest percentage of people without any natural teeth and decreasing percentages through the younger age groups. However, when comparing 1975 with 2005 an amazing development has taken place. During the 30 year period the percentage of adults in Denmark without teeth has decreased from around 25% to just 5%, from one out of four adults being edentulous to one in twenty.

Figure 3. Caries development 1974-2004 in Danish children. Data from National Board of Health, Copenhagen, Denmark.

Figure 4. Trends in edentulousness in Danish adults 1975-2005
It is intriguing to convert these data to real numbers of people and teeth. The Danish population in the 15-75-year-old age range was 3.9 million people in 1975, which had increased to 4.3 million people by 2005. In 1975, taking into account the number of teeth in the 75% dentate adults, about 94 million teeth would have been present compared to the theoretical total of about 126 million teeth. In 2005, in contrast, the dramatic increase in remaining teeth resulted in 133 million teeth being present in the adult population. Similar calculations have been made in Australia, where epidemiological data show that numbers of permanent teeth will increase over the next 10 years by 50% in the age group 45-54 and double in the age groups above 55 years. That means that the number of teeth that dentists and auxiliaries need to look after in that population is projected to increase by 200 million teeth, a considerable increase by any measure at the same time as workforce shortages are registered in dentistry.

In neither case is a judgement made with regard to real needs or demands following on from these trends. However, a consequence of these dramatic changes might be that dentists will be overwhelmed by the treatment needs of the growing number of teeth, if we approach dental care in the traditional way, which is why we need to look at alternative approaches including use of dental professionals complementary to dentists and the total dental team. Another consequence is that the need for maintenance care will increase rather than needs for extractions and other emergency treatments. We are looking, for example, at the maintenance of teeth with pre-existing treatments and of treatment of periodontal problems in elderly people on declining incomes, in a population which will grow rapidly and in a situation in which the character of care as we know it today will have changed considerably. On the other hand, although the pool of younger and more affluent patients in need of care may shrink, it may not necessarily mean that demand for dental care will diminish but the demand for less disease-oriented care may diminish. We are seeing some of this already in terms of the demand for aesthetic dental care which is not really related to traditional oral diseases but still requires time and resources in the dental care system.

Preventive dentistry in a common risk factor approach

Increasingly, during the last five years, oral diseases have come to be considered within a common risk factor approach, especially supported and promoted by the World Health Organisation (WHO), which holds that a core group of modifiable risk factors is common to many chronic diseases and injuries. The strong correlation between several oral diseases and noncommunicable chronic diseases is primarily a result of the common risk factors. The four most prominent noncommunicable diseases – cardiovascular diseases, diabetes, cancer, and chronic obstructive pulmonary diseases – share common risk factors with oral diseases; these are preventable risk factors that are related to lifestyle and behaviours. For example, dietary habits are significant in the development of chronic diseases and influence the development of dental caries; and smoking habits have been called the overarching enemy of both chronic diseases and periodontal diseases. Many general disease conditions also have oral manifestations that increase the risk of oral disease which, in turn, is a risk factor for a number of general health conditions. Severe periodontal disease, for example, is associated with diabetes mellitus and has been considered the sixth complication of diabetes. Most significantly, coronary heart disease, stroke, cancer, diabetes, and chronic respiratory diseases account for 50% of all deaths in the world; it is projected that 350 million people are going to die of these diseases over the next 10 years. If we were able to reduce the prevalence of these diseases by 2%, 36 million deaths could be saved.

In this kind of perspective our contribution in preventive dentistry may be considered of miniscule importance in an isolated sense, but our preventive activities must still be considered as our relevant response to the common risk factor approach. Consequently, we need to cooperate with other health care professionals who are working on preventing obesity, coronary heart disease and other lifestyle related diseases. With the growing evidence for the relationship between, for instance, the inducing microbes for periodontal diseases and some of the more serious diseases and conditions like coronary heart disease, stroke, and pre-term births, preventive dentistry activities will have an even greater role in the overall picture of disease prevention.

But even as isolated events, there are nevertheless good examples of success in preventive dentistry as recorded in the Cochrane library, the international collaborative organisation which recounts scientific evidence in various areas presented in clinical and preventive trials [www.cochrane.org]. In relation to dental caries, studies have taken place on water fluoridation, topical fluoride, toothpaste, mouth rinses, gels, varnishes, and fissure sealants and indicate a good preventive effect from these fluoride activities. When we look at the overall DMF trends (Figure 5) we find similarities in the decrease in dental caries in many parts of the world whether countries have adjusted fluoride in the drinking water or not. The main lesson is without doubt that whether water fluoridation has been implemented or not, alternative strategies of using fluoride toothpaste, gels, varnishes and other fluoride vehicles have had major impacts on dental caries in most countries. When we look at the evidence for the preventive effect of fluoridated milk the reviews are indicative of insufficient studies with good quality evidence but it does show that those studies where fluoridated milk has been effective for
school children. This is of course of special interest in those countries where this programme has been taking place.

When we go to periodontal health there have not been many studies that show effects of specific preventions in the decrease of periodontal diseases. However, some of the later reviews have looked at routine scale and polish and recall intervals for oral health.\textsuperscript{8,9} They indicate evidence of insufficient quality to reach any conclusions regarding the beneficial or adverse effects of routine scaling and polishing for periodontal health. This review has turned out to be extremely controversial because part of routine dental care for many years has been examination, scaling and cleaning but this shows that the evidence that we find in studies may actually be affected by the quality of the methodologies that we use.

On the other hand if we look at manual versus power tooth brushing there are good reviews which indicate that power toothbrushes with a rotating, oscillation action reduced plaque and gingivitis more than manual tooth brushing. These studies are relatively solid.\textsuperscript{10}

Comparatively, oral health education is an area with a weak evidence base, which we have known for some years. There is little evidence to show that education programmes and campaigns have shown effectiveness in reducing oral diseases in general.

In relation to oral cancer the reviews show that there is insufficient evidence to support or refute the use of a visual examination as a method of screening for oral cancer using visual examination in the general population. This does not mean that specific targeted programmes to high risk groups could not be effective but that is not what the study was about.\textsuperscript{11}

**Future challenges in preventive dentistry**

Firstly, the demographic changes combined with overall attitude changes to oral health will drive the focus from treatment services to prevention. It will add to calls for promotion and early intervention even for the elderly populations which have traditionally been outside health care systems. Inherent in this challenge is that new dental graduates should be sufficiently flexible to encompass these changes and recognise the need for change.

The second challenge for preventive dentistry is that the common disease risk factors make the contribution of preventive dentistry a natural component of integrated population health strategies. The special challenge to us as dentists is that we need to learn to collaborate and appreciate collaborating with other health professionals. Looking at it from the other side, health professionals need to accept dentists as part of the promotion towards general health and oral health within the same set of goals and strategies of healthcare.
Finally there are major challenges to improve the methodologies that we are using for documenting most of the preventive dentistry activities in which we are involved. Apart from fluorides, which are now fairly well known to be effective, we have a major challenge in being able to show evidence of the effectiveness of a range of the other preventive activities to which we are directing resources and manpower. Even this challenge may be more effectively pursued within a collaborative approach with other health professionals who have identical concerns.

References


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