

Challenges in dental public health – An overview

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Abstract: Oral health diseases are common in all regions of the world and their impact on anatomical and social functioning is widely acknowledged. Their distributions are unequal between and within countries, with the greatest burden falling on disadvantaged and socially marginalized populations. The risk factors and social determinants for oral diseases have been comprehensively documented, and the evidence base for their prevention is growing. However, decisions on health care are still often made without a solid grounding in research evidence. Translation of research into policy and practice should be a priority for all. Both community and individual interventions need tailoring to achieve a more equal and person-centered preventive focus and reduce any social gradient in health. The major challenges of the future will be to translate knowledge and experiences in oral disease prevention and health promotion into action programmes. The international oral health research community needs to engage further in research capacity building and in strengthening the work so that research is recognized as the foundation of oral health policy at global level.

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Introduction

Oral diseases such as dental caries, periodontal disease, tooth loss, oral mucosal lesions, oropharyngeal cancers and oro-dental trauma are major public health problems¹ because of their high prevalence and incidence in all regions of the world.² As has been observed for all other diseases, the distributions of oral diseases are unequal between and within countries, with the greatest burden falling on disadvantaged and socially marginalized populations. Consequently severe impacts in terms of pain and suffering, impairment of functions and effect on quality of life have been extensively reported, as well as the rising costs of treating these diseases.

The risk factors and social determinants for oral diseases have been comprehensively documented, and the evidence base for their prevention is growing. However, as global social changes gather pace, the search to capture the dynamic interplay between risk factors and social determinants must be maintained. In addition, research to build on the evidence base for controlling oral diseases must be continued, as must the evaluation of the implementation of preventative strategies, so that good practice may be shared.

The International Association for Dental Research (IADR) recently signalled its commitment to addressing the challenge of global oral health inequalities through its Global Oral Health Inequalities: the Research Agenda (GOHIRA) initiative.³ This initiative was established in 2009 to develop a program of priorities for research that would have the potential to create meaningful reductions in inequalities in global oral health within five years.

This paper reviews the epidemiological burden of tooth loss, dental caries, periodontal diseases and oral cancer, considers their risk factors and social determinants, appraises the evidence base for their prevention, and highlights the public health challenges in controlling them.

Epidemiological burden of oral diseases

Tooth loss

Tooth loss is a common measure of poor oral health as it impacts on masticatory, speech and social functioning. It is a common consequence of dental caries and periodontal diseases, and may be caused by dental trauma. The prevalence rates of tooth loss and experience of oral problems vary substantially by WHO region and national income. Tooth loss largely affects older people, and the experience of oral problems among older people is high in low income countries; meanwhile, access to health care is poor, particularly in rural areas.⁴

In Malaysia, tooth mortality has been reported to be a public health problem among adults and the elderly

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with only 76.9% and 23.9% of those in the 35-44 and 60-70 age groups respectively having at least 20 teeth.⁵ In the elderly aged 65 years and above, some 40% were reported to have no natural teeth in the 2000 Adult Dental Health Survey⁶, which is relatively high when compared to neighboring Singapore (21%), Thailand (16%) and Indonesia (24%).¹

Dental caries

Dental caries is a childhood disease that is caused by a combination of infection and diet. Data from the WHO Oral Health Data Bank indicated that the 51% of 12-year-olds in 1980 had on average three or fewer decayed, missing and filled permanent teeth (DMFT), whereas in the year 2000, 68% had three or fewer DMFT.¹ Although it has become less common over the past few decades, the declines have mostly been observed in high-income countries and less so in non-industrialised countries.⁷ Caries reduction among children and young adults in the Nordic countries is amongst the most dramatic documented.⁸ The reduction would appear to have occurred whether dental care was provided by public or private dentists, or by any specific 'dental care model'. Improved welfare leading to behavioural changes, as well as a more prevention oriented approach to dental treatment have been cited as attributable factors. Among industrialised countries inequality in dental caries has been reported to be closely associated to income inequality⁹ and education.¹⁰ Variations in caries experience therefore exist between countries as well as within populations, leading to international calls for further research and strategies to address its unequal distribution.^{11,12} The 2005 National Oral Health Survey of Malaysian 5-year-olds reported that some 75% had experienced dental caries as indicated by the presence of at least one decayed, missing or filled deciduous tooth (dmft).^{13,14} Higher proportions of rural populations (86%) were affected when compared to urban populations (69%). In Malaysian adults, 90% have been assessed to have experienced dental caries.⁶

Periodontal diseases

Inflammation of the gingival and periodontal tissues is manifested by swelling of the gums and bleeding on brushing. When severe, recession of the gums occur with inevitable loss of bone support for the teeth that result in tooth mobility and eventually tooth loss. Gingival bleeding has been reported to be highly prevalent among adult populations in all regions of the world, whereas advanced periodontal diseases (with deep periodontal pockets of ≥ 6 mm) affect some 10% to 15% of adults worldwide.¹⁵

In Malaysia, only 26% of 15-19-year-olds have been reported to have healthy periodontal tissues.⁶ In those aged 35-44 years, only 5% was reported to have healthy periodontal tissues. Overall, 7.2% were reported to have deep pockets of ≥ 6 mm.

Oral cancer

Oral cancer is a major health problem worldwide, accounting for 274,000 new cases and 145,000 deaths annually, of which two thirds occur in developing countries.¹⁶ The mouth and oropharynx are among the ten most common sites affected by cancer. Global incidence rates vary widely, with 1-10 men per 100,000 inhabitants affected in many countries.¹ In Asia, the age standardized incidence rate of oral cancer per 100,000 population ranges from 0.7 in China to 4.6 in Thailand and 12.6 in India.¹ In south-central Asia, oral cancer is the second commonest in men after lung cancer.¹⁶ In some populations oral cancer is the most common, e.g., Tamil women in Malaysia and men in Sri Lanka.¹⁷

Impact on anatomical functions and social functioning

Oral health is generally recognized as an integral part of general health. Periodontal disease, for example, has been reported to be associated with cardiovascular disease and diabetes.¹⁸ Individuals with complex medical conditions are more vulnerable to oral diseases, which may result from dry mouths caused by medications

and therapies used to treat their medical conditions. Some medical conditions manifest signs in the mouth, and oral lesions may be the first signs of other life threatening diseases such as HIV/AIDS. General and associated oral health conditions have a direct influence on elder people's quality of life and lifestyle.¹

Poor oral health can affect individuals' ability to speak, chew and swallow without any pain or discomfort. In addition, social functioning such as going to work or school, smiling and socializing confidently with others may also be affected.¹⁹⁻²²

In Malaysia, some 10% of adults considered their oral health to be poor, with pain related to teeth and gums affecting a quarter of the young adult population.⁶ The proportion reporting pain was 15.7% among preschool children aged 5-6 years and 13.6% among 16-year-olds.⁵

Left untreated, dental caries in young children can lead to pain, and impaired quality of life, nutritional status and physical development.²³ For example, children with caries are more likely to weigh less than those without caries, after controlling for age, gender, race and socioeconomic status²⁴, or weigh less than their ideal weight.²⁵ Caries in the deciduous dentition is predictive of caries in the permanent dentition^{26,27}, suggesting that health-damaging behaviours practised in childhood may continue into adolescence.

Risk factors and social determinants

The risk factors for dental caries have been extensively documented.²⁸ Recent reports have emphasized the importance of the social determinants²⁹ of the disease, arguing that individual behavioural risk factors such as snacking, poor oral hygiene, lack of fluoride exposure and non-dental attendance are practised within the context of the family and the wider socio-environmental setting.^{30,31}

At the individual level, the role of dietary patterns in caries development has been widely reported.^{32,33} In particular, snacking habits have been emphasized³³,

for example, sugary snacks and their frequency between meals have been reported to increase the risk for caries in American³⁴, Japanese³⁵, Icelandic³⁶, Arabian^{37,38}, Belgian³⁹ and Swedish⁴⁰ pre-school children. A diet that is high in sugars is also a risk factor for obesity and diabetes.⁴¹⁻⁴⁴

National interests in the dietary habits of Malaysians are evident, as shown by the publication of the first official dietary guidelines in 1999 and reviewed in 2010.⁴⁵ A ban on junk food advertising on television was imposed by the Government in 2007, but paradoxically the frequency of snack food advertising during children's prime time television has been reported to be five times more than fast foods since the ban.⁴⁶ The prevalent advertising of snack food would suggest that snacking habits are common, with its inevitable consequence on young children's caries experience and weight problems. Other individual behaviours such as toothbrushing and dental attendance are also associated with caries in pre-school children.²⁸

The risk factors for periodontal diseases have also been extensively documented. The available evidence shows that important risk factors for periodontal diseases relate to poor oral hygiene, tobacco use, excessive alcohol consumption, stress, and diabetes mellitus.¹⁵ However, there are fundamental knowledge gaps in the mechanisms of disease initiation and progression. There is also a lack of ability to identify high-risk forms of gingivitis that progress to periodontitis and lack of evidence on how to prevent the diseases effectively.⁴⁷

Tobacco and alcohol are regarded as major risk factors for oral cancer. The population-attributable risks of smoking and alcohol consumption have been estimated to be 80% for males, 61% for females, and 74% overall. The evidence that smokeless tobacco causes oral cancer was confirmed recently by the International Agency for Research on Cancer.¹⁶ Studies have shown that heavy intake of alcoholic beverages is associated with nutrient deficiency, which appears to contribute independently to oral carcinogenesis.⁴⁸

The evidence base for controlling oral diseases

The evidence base for the prevention of dental caries through topical fluoride⁴⁹⁻⁵² and water fluoridation^{53,54} has been firmly established. The WHO recommends that every effort must be made to develop affordable fluoridated toothpastes for use in developing countries. Water fluoridation, where technically feasible and culturally acceptable, has substantial advantages in public health; alternatively, fluoridation of salt and milk fluoridation schemes may be considered for prevention of dental caries.⁵⁰

Several low- and middle-income countries of Asia have not yet implemented systematic fluoride programmes. The reasons for this relate to misconceptions about the mechanisms of fluoride, low priority given to oral health in the national health policy and strategic plan, and lack of interest among public health administrators.⁵⁵ Water fluoridation at a concentration of 0.4-0.6 ppm has been implemented in Malaysia since early 1950s, with approximately 70% of the population now benefiting from its cariostatic effect.⁵⁶ Although supposedly fluoridated, geographical variations in fluoride levels of Malaysian drinking water have been reported, with more sites sampled having lower than the optimum level. Furthermore the increasing use of water filters, particularly those designed to work by reverse osmosis, has led to expressed concerns as reverse osmosis could actually remove fluoride from the water through the filtration process.⁵⁶ That is why that topic is a priority for research.

Prevention of oral diseases and the promotion of oral health need to be integrated with chronic diseases prevention and general health promotion as the risks to health are linked.¹ Individual risk and susceptibility to oral diseases can no longer be understood in isolation, but as part of a complex set of influences that include individual, family, community or neighborhood characteristics, and health system factors.⁵⁸ Although the means are available to reduce if not eliminate social inequalities in oral health, initiation of actions depends

simply on the political will. The Ottawa Charter for Health Promotion⁵⁹ has emphasized the importance of policy for health, healthy environments, healthy lifestyles, and the need for orientation of health services towards health promotion and disease prevention. It is recognized that oral health for all can be promoted effectively by applying this philosophy.²⁹

Oral cancer has been described as a disease of the poor and dispossessed, and national policies coordinated with wider health and social initiatives are needed to address this health inequality.¹⁷ These include the control of the environment, safe water, adequate food, public and professional education about early signs and symptoms of oral cancer, early diagnosis and intervention, evidence-based treatments appropriate to available resources, and thoughtful rehabilitation and palliative care. In addition, the common risk factor approach to controlling risk factors that are common to other diseases such as tobacco use and a poor diet has been advocated.⁶⁰ The WHO Global Oral Health Programme has established a global surveillance system of oral cavity cancer in order to assess risk factors and to help the planning of effective national intervention programmes.⁴⁸ Epidemiological data on oral cancer incidence and mortality are stored in the Global Oral Health Data Bank. In 2007, the World Health Assembly (WHA) passed a resolution on oral health for the first time in 25 years, which also considers oral cancer prevention.

Challenges for the future

Translation of research into policy and practice should be a priority for all. Both community and individual interventions need tailoring to achieve a more equal and person-centered preventive focus and reduce any social gradient in health.¹¹ Although guidelines have been developed for the clinical prevention of oral diseases⁶¹ and community prevention of dental caries⁶²⁻⁶⁴, the practice of evidence-based interventions is rarely evaluated or reported. The major challenges of the future will be to translate knowledge and experiences

in oral disease prevention and health promotion into action programmes. The international oral health research community needs to engage further in research capacity building and in strengthening the work so that research is recognized as the foundation of oral health policy at global level.⁶⁵ The WHO has noted that decisions on health care are still often made without a solid grounding in research evidence.⁶⁶ The World Health Report for 2012 will be on the theme of “No Health without Research”, focusing on research for better health.

The scarcity of dental research in developing countries is exemplified in Malaysia. Given that dental caries affects the majority of young children in Malaysia despite water fluoridation, it is surprising that there has been so little research on this public health problem. The very little evidence available suggests that consumption of sugary snacks is commonly practised, but this evidence is weak. It is based on three small studies; 1. A pilot study published over 20 years ago that reported ethnic variations in sweet preferences⁶⁷; 2. A recent preliminary survey of a small sample of 34 secondary caretakers of children attending day-care centers that reported 53% gave sweetened liquid in bottles⁶⁸; and 3. A government report of a survey of 52 government kindergartens that reported over 90% provided sugary snacks to the children.¹⁴ Although national epidemiological surveys have been carried out on the oral health of Malaysian adults and children, their findings have rarely been reported in international peer-reviewed journals. The challenge here is to be able to make better use of data collected, especially data collected through public funding. For example, in writing the National Oral Health Plan for Malaysia 2011-2020, published in 2012⁵, data from the 2000 rather than the 2010 national survey were used. Making better use of the data collected would also mean archiving the data in the public domain so that they may be accessed by academic researchers.

In addition to research, there is also a need to develop skills in critical appraisal of the research literature so that commissioners and practitioners of dental public

health may be equipped to engage in evidence-based practice. They will then need to be able to evaluate the implementation of their practices and publish them so that best practice may be shared.

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