

Strategies and approaches in oral disease prevention and health promotion

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Abstract Oral health is an important element of general health and well-being. Although largely preventable, many people across the world still suffer unnecessarily from the pain and discomfort associated with oral diseases. In addition, the costs of dental treatment are high, both to the individual and to society. Effective evidence-based preventive approaches are needed to address this major public health problem. The aim of this paper is to outline public health strategies to promote oral health and reduce inequalities. An extensive collection of public health policy documents produced by WHO are reviewed to guide the development of oral health strategies. In addition a range of Cochrane and other systematic reviews assessing the evidence base for oral health interventions are summarized. Public health strategies should tackle the underlying social determinants of oral health through the adoption of a common risk approach. Isolated interventions which merely focus on changing oral health behaviours will not achieve sustainable improvements in oral health. Radical public health action on the conditions which determine unhealthy behaviours across the population is needed rather than relying solely on the high-risk approach. Based upon the Ottawa Charter, a range of complementary strategies can be implemented in partnership with relevant local, national and international agencies. At the core of this public health approach is the need to empower local communities to become actively involved in efforts to promote their oral health.

Keywords Oral health; Tooth diseases/prevention and control; Health promotion/methods; Health policy; Social justice; Socioeconomic factors; Risk factors; Evidence-based medicine; Strategic planning; Case reports (*source: MeSH, NLM*).

Mots clés Hygiène buccale; Dent, Maladies/prévention et contrôle; Hygiène de vie; Promotion santé/méthodes; Politique sanitaire; Justice sociale; Facteur socioéconomique; Facteur risque; Médecine factuelle; Planification stratégique; Étude de cas (*source: MeSH, INSERM*).

Palabras clave Salud bucal; Odontopatías/prevención y control; Conducta de salud; Promoción de la salud/métodos; Política de salud; Justicia social; Factores socioeconómicos; Factores de riesgo; Medicina basada en evidencia; Planificación estratégica; Casos clínicos (*fuentes: DeCS, BIREME*).

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Introduction

Oral health is an integral element of general health and well-being. Good oral health enables individuals to communicate effectively, to eat and enjoy a variety of foods, and is important in overall quality of life, self-esteem and social confidence (1). However, oral diseases affect a significant proportion of the world's population and exact a heavy toll in terms of morbidity and mortality (2). A range of diseases and conditions can be classified as oral diseases including dental caries, periodontal diseases, oral cancers, noma, dental erosion and dental fluorosis. Oral diseases are highly prevalent and their impact on both society and the individual is significant. Pain, discomfort, sleepless nights, limitation in eating function leading to poor nutrition,

and time off school or work as a result of dental problems are all common effects of oral diseases.

Although overall improvements in oral health have occurred in many developed countries over the last 30 years, oral health inequalities have emerged as a major public health challenge because lower income and socially disadvantaged groups experience disproportionately high levels of oral disease (2). In many developing countries economic, social and political changes have had a significant effect on diet and nutrition with a shift occurring from traditional towards more "westernized" diets (3). As a consequence the consumption of sugars has risen and levels of dental caries have increased (2). This is a particular problem in the primary dentition in which most caries remain untreated. In some parts of the developing world, oral

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cancers and noma are a significant cause of premature death and extreme disability.

Oral diseases are however largely preventable. The challenge is to create the opportunity and conditions to enable individuals and communities to enjoy good oral health. Although advances in clinical operative techniques have made dental treatment more effective and acceptable, treatment approaches alone will never eradicate oral diseases. Indeed in many low-income countries in the developing world, the total costs of providing traditional operative dental care would exceed the entire health care budget (4). Effective public health approaches are therefore required to prevent oral diseases and promote oral health across the population. The aim of this paper is to outline public health strategies to promote oral health and reduce inequalities. An overview of the Ottawa Charter and other public health policy frameworks developed by WHO is presented. The evidence base for preventive interventions for oral disease is then summarized. The principles underlying oral health strategies are outlined, and finally some case studies are presented to illustrate the approaches recommended.

Methods

A collection of published information sources was used as reference material for this paper. A series of WHO policy reports and reviews provided valuable guidance on the public health principles underpinning the development of oral health strategy. A range of Cochrane and other systematic reviews that have assessed the effectiveness of oral health interventions are summarized below. In addition, key publications on oral health and a collection of international case-studies have been used to provide practical details of the public health approaches used to promote oral health.

Global context for health promotion and public health policy

In recognition of the limited ability of health education and clinical prevention to produce sustainable improvements in health and to reduce inequalities, WHO organized an international conference in Canada in 1986 to develop a more radical public health approach to prevention. Following the discussions at this conference the Ottawa Charter was published to provide a set of guiding principles for health promotion (5).

The Ottawa Charter defined health promotion as: “The process of enabling individuals and communities to increase control over the determinants of health and thereby improve their health. Health promotion represents a mediating strategy between people and their environment, combining personal choice and social responsibility for health to create a healthier future” (5).

Five key areas of health promotion action are outlined in the Charter:

- *Promoting health through public policy*: by focusing attention on the impact on health of public policies from all sectors, not just the health sector.
- *Creating supportive environments*: by assessing the impact of the environment and clarifying opportunities to make changes conducive to health.

- *Developing personal skills*: by moving beyond the transmission of information, to promote understanding and to support the development of personal, social and political skills which enable individuals to take action to promote their health.
- *Strengthening community action*: by supporting concrete and effective community action in defining priorities, making decisions, planning strategies and implementing them to achieve better health.
- *Reorienting health services*: by refocusing attention away from the responsibility to provide curative and clinical services towards the goal of achieving health gain.

Following the Ottawa Charter a series of WHO international conferences was organized to explore and further develop health promotion policy and practice. These conferences were as follows:

- Second International Conference on Health Promotion, Adelaide, Australia, 1988. Central theme: healthy public policy (6).
- Third International Conference on Health Promotion, Sundsvall, Sweden, 1991. Central theme: supportive environments for health (7).
- Fourth International Conference on Health Promotion, Jakarta, Indonesia, 1997. Central theme: health promoting partnerships (8).
- Fifth International Conference on Health Promotion, Mexico City, Mexico, 2000. Central theme: bridging the equity gap (9).
- Sixth International Conference on Health Promotion, Bangkok, Thailand, August 2005. Central theme: policy and partnership for action — addressing the determinants of health.

Evidence base for preventive interventions for oral disease

In recent years, in line with the evidence-based movement in clinical dentistry, the effectiveness of preventive interventions has been scrutinized to determine which interventions are effective and which are not. Table 1 summarizes the findings of a range of reviews of the effectiveness of preventive measures for improving oral health. As can be seen from Table 1, the most significant limitation of these largely clinical and educational interventions is that they fail to achieve sustainable improvements in oral health as the programmes are palliative in nature and largely ignore the underlying factors that create poor oral health. As a result, inequalities, rather than being reduced, may indeed be increased because those with more resources are able to benefit the most from the interventions delivered (27). These problems are not unique to dentistry. Reviews of the evidence base for a wide range of topic areas have highlighted the limitations of the clinical preventive approach (28).

Public health agenda

Largely through the influence of WHO, a public health approach to disease prevention and health promotion has emerged as the dominant strategy for combating noncommunicable diseases worldwide (29). The WHO Global Oral Health Programme has adopted this approach as the best means

Table 1. Evidence base summary of oral health interventions

Topic	Reference	Review type	Summary findings
Water fluoridation	Locker (1999) (10) McDonagh et al. (2000) (11)	Systematic reviews	Quality of studies low to moderate Estimated caries preventive effect — 14% reduction Effect tends to be greatest in primary dentition
Topical fluorides	Marinho et al. (2002) (12) Marinho et al. (2002) (13) Marinho et al. (2003) (14) Marinho et al. (2003) (15) Marinho et al. (2003) (16) Marinho et al. (2004) (17) Marinho et al. (2004) (18)	Cochrane reviews	Specific reductions in caries rates were estimated to be 24% for fluoride toothpaste, 26% for mouth rinses, 28% for gels and 46% for varnishes. Overall estimate of benefit was 26% in permanent dentition and 33% in primary dentition
Fissure sealants	Ahovuo-Saloranto et al. (2004) (19)	Cochrane review	Caries reductions ranging from 86% at 12 months to 57% at 48 months were achieved. The level of effectiveness is dependent upon the baseline caries rate
Dental health education	Brown (1994) (20) Schou & Locker (1994) (21) Kay & Locker (1996) (22) Sprod et al. (1996) (23) Kay & Locker (1997) (24)	Effectiveness review	Majority of interventions health education in nature Short-term improvements in oral health knowledge achieved, but effects on behaviour and clinical outcomes limited Provision of health information alone did not produce long-term behaviour changes School-based toothbrushing campaigns ineffective at improving oral hygiene No evidence on effectiveness of dietary interventions to reduce dental caries Mass media campaigns are ineffective at promoting either knowledge or behaviour change Study design and evaluation quality generally poor
Periodontal health	Watt & Marinho (2005) (25)	Systematic review	Interventions all involved health education Short-term reductions in plaque and gingival bleeding achieved in many studies. Clinical and public health significance of these changes questionable Evaluation quality generally poor
Screening for oral cancer	Kujon et al. (2003) (26)	Cochrane review	Very few high-quality studies were identified One randomized controlled trial found no difference in age-standardized oral cancer mortality rates for screened group No evidence to support or refute the use of visual examination or other methods of screening for oral cancer

of promoting oral health and reducing inequalities within and between countries (2). Details of the underlying principles of this public health approach are given below.

Social determinants of oral health

Based upon a biomedical model of disease, oral health professionals have traditionally focused preventive and educational action on altering those behaviours which were seen to be the cause of dental diseases. This “lifestyle” approach has dominated preventive practice across the world for many decades (30). The underlying theory behind this approach is that once individuals acquire the relevant knowledge and skills, they will then alter their behaviour to maintain good oral health.

The assumptions underlying this narrow and reductionist approach are fundamentally flawed. Firstly, human behaviour is extremely complex. Knowledge gain alone rarely leads to sustained changes in behaviour (23). Secondly, it is incorrect to assume that lifestyles are freely chosen and can be easily changed by everyone. Health knowledge and awareness are of little value when resources and opportunities to change do not exist. People’s behaviours are enmeshed within the social, economic and environmental conditions under which they are

living (31). Although behaviours and lifestyles undoubtedly have some influence on health, it is essential to understand the broader context which determines patterns of behaviour (32) (Fig. 1).

Based upon an analytical framework developed from a social model of health, the broader context determining behaviour becomes apparent. For example, individual behaviours such as oral hygiene practices, dietary patterns and attendance for dental care are largely influenced by family, social and community factors, as well as political and economical measures. Indeed social science and public health research now recognize the underlying importance to health and disease of psychosocial, economic, political and environmental factors (28, 32). Collectively these are known as the social determinants of health (33, 34). Public health strategies therefore need to be directed at the underlying determinants, *the causes of the causes* (35, 36).

Common risk approach

One of the major criticisms of clinical preventive measures and dental health education has been the narrow, isolated and compartmentalized approach adopted, essentially separating

the mouth from the rest of the body. All too often oral health programmes have been developed in isolation from other health initiatives. This uncoordinated approach at best leads to duplication of effort, but in fact often results in conflicting and contradictory messages being delivered to the public. The common risk approach recognizes that chronic noncommunicable diseases such as obesity, heart disease, stroke, cancers, diabetes, mental illness and oral diseases share a set of common risk conditions and factors (32, 37) (Fig. 2). Unhealthy conditions largely determine risk behaviours. For example a poor-quality diet, tobacco smoking, inadequate hygiene, stress and trauma are factors linked to the development of several chronic conditions including oral diseases (2, 37, 38).

The key concept of the integrated common risk approach is that by directing action towards these common risks and their underlying social determinants, improvements in a range of chronic conditions will be achieved more efficiently and effectively (2, 29, 39). The common risk approach provides a rationale for partnership working and is particularly applicable in countries with limited numbers of oral health personnel.

Preventive strategies

Geoffrey Rose in his seminal public health text, *The strategy of preventive medicine*, described two basic types of preventive approach, the high-risk and the population approach (35). The high-risk approach aims to focus attention on individuals at high risk who have been identified through screening tests. To be effective, the screening test must have an acceptable level of sensitivity, specificity and predictive power. Once identified, the high-risk individuals at the tail end of the disease distribution are then offered preventive support in an attempt to modify the course of the condition. This approach is very popular with

many health professionals as it fits well with a clinical approach to prevention. However from a public health perspective the high-risk approach has certain recognized limitations (40, 41). It is palliative in nature in that action is not directed at the underlying determinants of disease, new high-risk individuals will therefore constantly be emerging. The predictive power of available screening tests is limited and the approach ignores the majority of the population in whom most cases of disease occur. According to Beaglehole & Bonita (42) “the high-risk approach to primary prevention has overshadowed the more important population approach”.

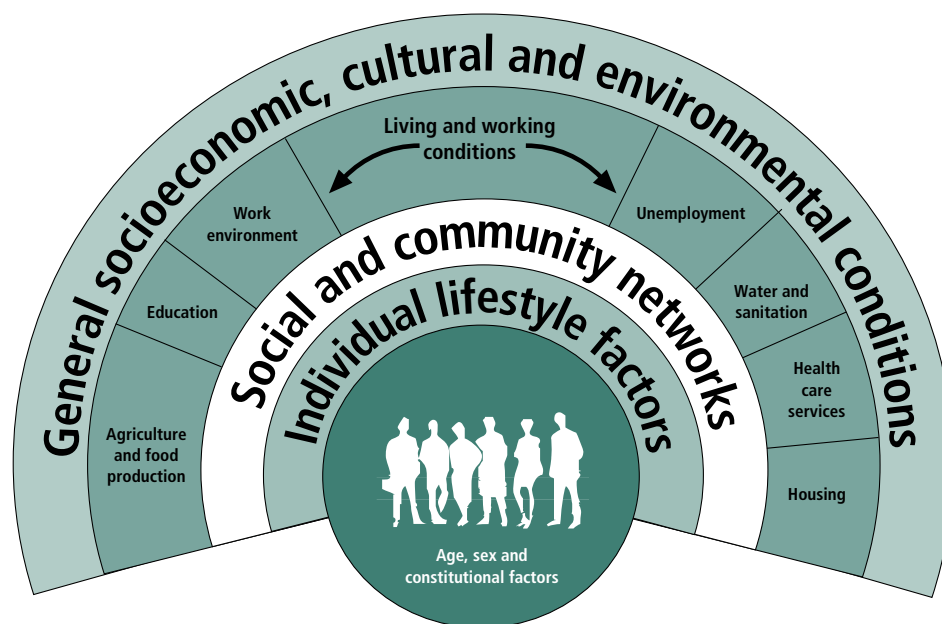
In the population approach, public health measures are implemented to reduce the level of risk in the whole population, shifting the whole distribution to the left (35). This more radical approach aims to address the underlying causes of disease across the whole population. Another option, known as the targeted or directed population approach, involves focusing action on higher risk groups or subpopulations. Screening methods are not used to identify the higher risk groups. Instead epidemiological and/or sociodemographic data are used to define a particular subpopulation.

In the prevention of oral diseases the high-risk approach has been largely dominant. It is now increasingly acknowledged that a combination of the high-risk and directed population approaches is the best option (2, 29, 35, 42).

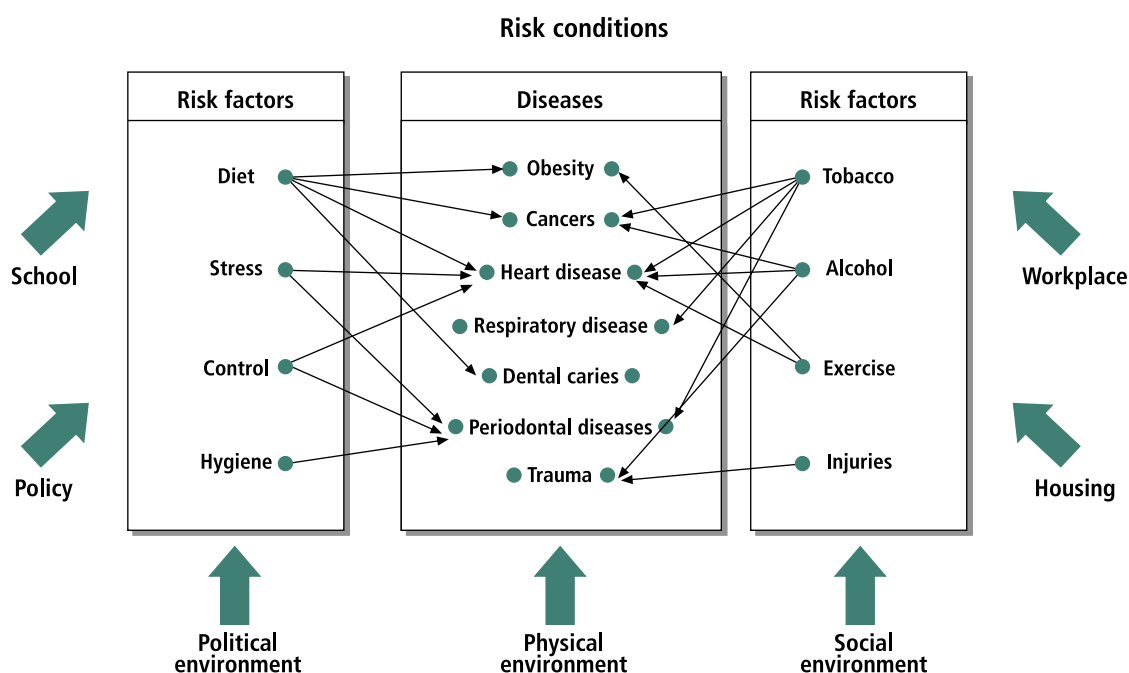
Multiple strategies implemented in different settings

A key element of health promotion is the development and implementation of a range of complementary strategies to promote health (5). It is now widely recognized that clinical preventive and educational approaches alone can achieve only

Fig. 1. Social determinants of health



Source: Dahlgren G, Whitehead M. Tackling inequalities in health: what can we learn from what has been tried? Background paper for “The King’s Fund International Seminar on Tackling Health Inequalities”. Ditchley Park, Oxford: King’s Fund; 1993. Reproduced with permission of the authors.

Fig. 2. **Common risk approach.** Modified from Sheiham & Watt, 2000

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limited short-term effects, and may indeed widen health inequalities (27). Rather than relying solely on preventive and health education programmes targeted at high-risk individuals, a mix of complementary public health approaches is required which focus both on assisting individuals and communities to avoid disease and on the creation of supportive environments conducive to sustained good health. Policy development, organizational change, community action and legislation are all approaches that can be used to prevent oral diseases. In combination these strategies should address the broader social determinants of oral health.

Traditionally schools have been the main setting for oral health interventions (30), but a range of other settings can also be used. For example nurseries, youth centres, colleges, workplaces, places of worship and community centres may provide suitable settings in which to target defined population groups. In addition, rather than focusing solely upon influencing the general public, it may be more useful to target action at decision-makers and influential individuals in the local community. For example working with head teachers, local politicians or community representatives may lead to significant and sustainable change.

Case-studies: public health action to promote oral health

Based upon the actions outlined in the Ottawa Charter (5), a selection of case-studies from both developed and developing countries is presented below. These illustrate the different strategies to promote oral health that can be implemented in diverse locations. In many parts of the developing world, the prevalence of oral diseases and of many other chronic conditions are increasing (2, 29). In view of the very limited resources available for treatment, effective public health action is urgently needed. Isolated clinical preventive measures and educational programmes will have a minimal impact and be wasteful of

scarce resources. Joint action in combating the common risks to general and oral health is needed.

Reorientation of services — smoking cessation in clinical dental settings

Tobacco use adversely affects general and oral health, and is a significant global public health problem. Dentists and their teams are ideally placed to provide advice on smoking cessation, to offer support to smokers and to become actively involved in broader tobacco control policies (2). For many years, in several countries, smoking cessation initiatives have been developed for use in dental practices (43). A range of barriers have however hindered major progress in this important area of prevention.

Healthy public policy — Oral Health Strategy, Victoria, Australia

Vic Health in Australia has developed a wide range of innovative and progressive public health programmes. Their Oral Health Strategy has adopted many elements of the Ottawa Charter and was developed on the basis of a thorough review of the evidence base (44). The strategy outlines detailed examples of a range of oral health policies, together with clear guidance on the roles and responsibilities of different partners.

Supportive environments — health promoting schools in Curitiba, Brazil

The WHO Health Promoting Schools Initiative has encouraged the development of holistic action to improve the physical and social environment, curriculum and ethos in schools. A health promoting school can be characterized as a school that is constantly strengthening its capacity as a healthy setting for living, learning and working. In the city of Curitiba in southern Brazil, the local government has developed a range of healthy public policies including a health promoting schools network.

A detailed evaluation of the impact of this approach on oral health revealed positive effects on levels of dental caries and orofacial trauma among the children attending schools with supportive policies (45).

Personal skills — participatory schools programme in Scotland

Scottish children have one of the highest levels of caries experience in Europe. To address this problem a randomized controlled trial was undertaken to assess the efficacy of supervised toothbrushing in schools. The innovative element of the programme was the delivery of the intervention by local mothers who volunteered to supervise toothbrushing (46). A significant mean reduction in caries increment was found in the test groups when compared with the controls.

Community action — empowering local people in Chiang Mai, Thailand

The national Thai Health Promotion Foundation has supported and encouraged a variety of community initiatives to empower the community and foster participation in health programmes. In Chiang Mai, in the north of Thailand, rural oral health outreach programmes have been established in which the local community is actively engaged in efforts to promote better oral health (47). The dental faculty in Chiang Mai is also developing the concept of a health promoting dental school. One of the aims of this programme is for dental students to engage with the wider community in activities for the promotion of oral health.

Criteria for developing oral health strategies

Based upon WHO guidance on the development and evaluation of public health policy (48), the following set of criteria are presented as a framework within which to assess the quality of oral health strategies:

- *Empowering*: oral health strategies should enable individuals and communities to assume more power over the personal, socioeconomic and environmental factors that affect their oral health.
- *Participatory*: oral health professionals should encourage the active involvement of key stakeholders in the planning, implementation and evaluation of oral health strategies.

- *Holistic*: oral health initiatives should foster physical, mental and social health, and focus upon the common risks and conditions that influence both general and oral health.
- *Intersectoral*: Oral health professionals should collaborate with the relevant agencies and sectors to place oral health upon a wider agenda for change.
- *Equity*: Oral health policies should be guided by a concern for equity and social justice and should ensure that inequalities in oral health are addressed where possible.
- *Evidence base*: Oral health interventions should be developed on the basis of existing knowledge of effectiveness and good practice.
- *Sustainable*: Oral health policies should bring about changes that individuals and communities can maintain and sustain once initial funding has ended.
- *Multi-strategy*: Oral health strategies should use a combination of approaches, including policy development, organizational change, community development, legislation, advocacy, education and communication to promote improvement in oral health.
- *Evaluation*: Sufficient resources and appropriate methods should be directed towards the evaluation and monitoring of oral health strategies. Both process and outcome evaluation measures should be used.

Conclusion

Future improvements in oral health and a reduction in inequalities in oral health are dependent upon the implementation of public health strategies focusing on the underlying determinants of oral diseases. A range of complementary actions delivered in partnership with relevant agencies and the local community are needed. Clinical prevention and health education alone will not achieve sustainable improvements in oral health. In addition these approaches are very costly and are dependent upon the availability of appropriately trained oral health personnel. In both developed and developing countries public health strategies based upon the common risk approach are more likely to be effective in achieving significant oral health gains. ■

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Résumé

Stratégies et démarches visant à prévenir les affections et à promouvoir la santé dans le domaine bucco-dentaire

La santé bucco-dentaire est une composante importante de la santé et du bien-être en général. Bien que les affections bucco-dentaires puissent être prévenues dans une large mesure, un grand nombre de personnes de part le monde souffrent encore inutilement de la douleur et de l'inconfort qui accompagnent ces pathologies. En outre, le coût des traitements dentaires est élevé, tant pour l'individu que pour la société. Pour faire face à ce problème de santé publique majeur, des démarches préventives efficaces et fondées sur l'expérience sont nécessaires. Le présent article expose des stratégies de santé publique destinées à promouvoir la santé bucco-dentaire et à réduire les inégalités dans ce domaine. Il passe en revue une longue série de documents de politique sanitaire,

élaborés par l'Organisation mondiale de la Santé et pouvant guider la mise au point des précédentes stratégies. En outre, l'article récapitule diverses revues systématiques, Cochrane ou autres, évaluant les bases factuelles des interventions en faveur de la santé dentaire et buccale. Les stratégies de santé publique doivent s'attaquer aux déterminants sociaux sous-jacents de la santé bucco-dentaire à travers l'adoption d'une démarche commune à l'égard des risques. Pour obtenir des améliorations durables de cette santé, des interventions isolées, axées uniquement sur la modification des comportements, seront inopérantes. Une action radicale sur les conditions déterminant les comportements nuisibles à la santé parmi la population s'impose, plutôt qu'une approche

visant uniquement les individus à haut risque. En s'appuyant sur la Charte d'Ottawa, une série de stratégies complémentaires pourra être mise en œuvre, en partenariat avec les organismes locaux, nationaux et internationaux compétents. Cette démarche

de santé publique s'appuiera principalement sur une prise de responsabilités des communautés locales, destinée à impliquer celles-ci plus activement dans les efforts de promotion de la santé bucco-dentaire parmi leurs membres.

Resumen

Estrategias y enfoques de prevención de las enfermedades bucodentales y promoción de la salud

La salud bucodental es un elemento importante de la salud y el bienestar general. En todo el mundo, muchas personas sufren aún innecesariamente el dolor y el malestar asociados a las enfermedades bucodentales, pese a que éstas son en gran medida prevenibles. Además, el costo de los tratamientos dentales es elevado, tanto para el individuo como para la sociedad. Se necesitan enfoques preventivos eficaces basados en la evidencia para abordar este importante problema de salud pública. El objeto de este artículo es describir someramente algunas estrategias de salud pública destinadas a promover la salud bucodental y reducir las desigualdades. Se analiza una extensa recopilación de documentos sobre políticas de salud pública elaborados por la Organización Mundial de la Salud para orientar la formulación de estrategias de salud bucodental. Además se resumen diversas revisiones Cochrane y otras revisiones sistemáticas que evalúan la base evidencial de las intervenciones de salud bucodental. Las

estrategias de salud pública deberían abordar los determinantes sociales básicos de la salud bucodental adoptando un enfoque centrado en los riesgos comunes. Las intervenciones aisladas centradas únicamente en el cambio de los comportamientos en materia de salud bucodental no lograrán mejoras sostenibles en ese campo. Hay que intervenir con medidas radicales de salud pública en las condiciones que determinan los comportamientos poco sanos en la población, en lugar de depender exclusivamente de un enfoque centrado en los factores de alto riesgo. Tomando como base la Carta de Ottawa, es posible aplicar toda una serie de estrategias complementarias en colaboración con los organismos locales, nacionales e internacionales pertinentes. En el núcleo de ese enfoque de salud pública hallamos la necesidad de empoderar a las comunidades locales para que participen activamente en las actividades de fomento de la salud bucodental.

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