# Theoretical explanations for social inequalities in oral health

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Abstract – Social inequalities in health and oral health continue to present a major challenge to public health. Progress towards the development of interventions to reduce health inequalities is currently being hampered by an incomplete understanding of the causes of inequalities in health. This paper aims to provide oral health researchers with an overview of four current explanations for inequalities in oral health and to suggest further areas of research needed to advance our understanding of the causes of social inequalities in oral health.

Despite vast improvements in oral health during the 20th century (1), some oral diseases continue to pose a threat to oral health. Particularly noticeable is the burden of disease experienced by the less affluent. Social inequality in oral health is a universal phenomenon (2), higher levels of disease are found in more deprived areas in the industrialized and non-industrialized world alike. This is unfair and unjust and there is a definite need to build public policy to address this problem (3).

Concerted efforts are being made to reduce social inequalities in health and oral health. For interventions to be successful they must be underpinned by theories of the mechanisms that cause oral health inequalities; the social determinants of oral health inequalities. At present we do not have a full and comprehensive explanation for social inequalities in oral health and this is hampering our progress in reducing the problem (4).

There is no shortage of opinion on explaining the relationship between socioeconomic status and health. Existing theories vary in their focus from the effects of material deprivation, to individual lifestyle decisions. Recent reviews outlining the different forms of explanation have largely excluded data from the field of oral health, with the exception of a paper by Peterson (5). Peterson (5) examined the empirical evidence for inequalities in dental health in Denmark and outlined four theoretical explanations for health inequalities proposed Community Dentistry and Oral Epidemiology

# Commentary

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by the authors of the seminal report on inequalities in health in the UK, commonly known as the Black Report (6) who assessed the factors which had the greatest relevance for dental health. Research developments since 1990 have brought significant advances in our understanding of the inequalities phenomenon, two of the theories proposed by the Black Report have been largely discredited (artefact and social selection explanations) and new ideas have emerged.

The aim of this review is to provide oral health researchers with an overview of four current explanations for inequalities in oral health, to review the evidence relating to these explanations and to suggest research developments needed to advance our understanding of the causes of social inequalities in oral health.

# The materialist explanation

The materialist explanation emphasizes the role of the external environment, factors which are beyond the individuals' control. The terms 'material' and 'materialist' should not be confused (7). Material explanations explore the relationship between socioeconomic position and access to tangible resources such as food, shelter, services and amenities (8), arguing that income and wealth are the direct, main determinants of health

inequalities. Materialist explanations emphasize factors which are linked to an individual's position in the social structure, arguing that factors such as income and education are not directly responsible for inequalities in health (9). This is an important point for the operationalization of these concepts in research. Measures of material wealth are not sufficient to test materialist theories.

# Cultural/behavioural explanations

Traditional behavioural explanations focus on the behavioural and lifestyle choices made by people from different socioeconomic backgrounds. The theory suggests that people from low socioeconomic backgrounds are more likely to engage in behaviours that are damaging to their health than people from higher socioeconomic backgrounds (10) and consequently this leads to higher levels of disease.

Evidence suggests that both poor health outcomes and health-damaging behaviours such as poor diet, lack of exercise, smoking and alcohol consumption are more prevalent in the lower socioeconomic groups (11–13), which appear to offer a direct mechanism to explain the relationship between socioeconomic status and health. The assumptions underpinning this theory are, however, fundamentally flawed (14). Human behaviours are extremely complex, the decision-making process being influenced by numerous social, economic and environmental conditions.

Traditional behavioural explanations have been challenged by an alternative model focusing on the influence of culture in determining behavioural choices. This theory suggests that behaviours are not freely chosen but are influenced by cultural norms of behaviour. It is hypothesized that these norms of behaviour differ between the social groups. There is relatively little empirical work exploring this perspective. Research in this area tends to draw on the work of Bourdieu who argues that social groups use lifestyle choices as a way of displaying their membership of different social groups (15).

# Psychosocial perspective

This perspective argues that health inequalities result from differences in the experience of psychological stress between socioeconomic groups (16). Individuals from lower socioeconomic backgrounds are hypothesized to experience higher levels of psychosocial stress resulting from a higher number of negative life events (17), having lower levels of social support (11) less control at work (18, 19), less job security (20) and living in communities with lower levels of trust and higher levels of crime and antisocial behaviour (21), than individuals from higher socioeconomic groups.

There are two mechanisms through which stress could influence health: the direct and indirect models (11). The aetiological basis of the direct model postulates that stress leads to the development of ill health by triggering a specific chain of events that leads to the development of specific diseases, or by having a general negative effect on the body, reducing resilience and increasing vulnerability to disease (22). The indirect model proposes that people experiencing higher levels of psychosocial stress are more likely to make behavioural or lifestyle choices that are damaging to health (11).

# The life course perspective

The life course perspective states that health status at any given age, for any given birth cohort is a result not only of current conditions but also of the embodiment of prior living conditions from conception onwards (23). Health inequalities therefore result from the interaction of materialist, behavioural and psychosocial factors over time. There are two popular models within this perspective (24): the accumulation model and the critical periods or latent effects model.

The accumulation model suggests that exposure to advantage or disadvantage at different stages of life course has a cumulative effect (25) and this increases or decreases the risk of developing chronic disease (26). Social circumstances during childhood such as poverty, health status and educational achievement set the individual off on a life trajectory that in turn influences health status (16). No one factor has a large impact on health, as ill health results from an accumulation of risk (27). The critical periods model suggests that chronic diseases such as heart disease and stroke have their origins during critical periods of development. A critical period is defined as 'a limited time window in which an exposure can have adverse effects on development and subsequent disease outcome. Outside this window, this developmental mechanism for mediating exposure and disease risk is no longer available' (28: p. 288) One such period is the time spent *in utero* (25). This early life experience is hypothesized to determine health in adult life, independently of intervening factors (16).

### A review of the evidence

The next section examines the research evidence relevant to each of the four explanations described above. The majority of the evidence presented has been generated by studies in industrialized countries. Research on the causes of oral health inequalities in non-industrialized countries is relatively scarce and that which does exist tends to look at inequalities between countries and regions as opposed to between social groups within countries (29), which are the focus of this review.

## The materialist explanation

Access to dental services can be limited by materialist factors in two ways: (i) cost of treatment, (ii) costs incurred in accessing treatment. In many non-industrialized countries there is an acute shortage of trained dental personnel, and the small number of dental services tend to be concentrated in hospitals in urban centres. Access for poor families who live in rural areas is restricted by the cost of transport to and from hospital and means that even the most basic care cannot be received (1, 2). In many industrialized countries access to dental services is limited by the high costs of treatment. This is a particular problem in the UK at present. The limited availability of NHS dentists means that more and more people are being forced to attend private practices to receive dental care. In areas where the availability of NHS dental practitioners is low, access for poor families is prevented by the high costs of treatment. Regular attendance at the dentist is therefore associated with individuals of higher socioeconomic status (30).

This explanation rests on the assumption that regular attendance (having attended the dentist for non-emergency treatment in the last year (31) for dental care improves oral health, an assumption for which there is conflicting evidence, while some studies have found that regular dental attendance improves oral health (32) others have found that those who attend the dentist on a regular basis have higher DMFT scores (33) and greater impact of their oral health on the social and psychological aspects of their lives (34). It is therefore difficult to assess whether higher rates of attendance in the higher social classes are contributing to improved oral health status. Kay (35: p. 204) argues that better oral health in the higher social classes may be the result of 'differences in lifestyle, attitudes, behaviour and access to health providing products, foods and services rather than being due to the effectiveness of preventive dentistry.

Of the many determinants of diet, two relevant to this discussion are preference, a person's liking or disliking of a food (36), and purchasing power. While a complex array of social, psychological and cultural factors may determine preference (37), purchasing power is influenced by structural, material and economic constraints (38), and may therefore offer a materialist explanation for inequalities in oral health. Evidence shows that within industrialized societies lower socioeconomic groups purchase higher amounts of sugars, preserves and refined carbohydrates (36), risk factors for oral disease such as dental caries (39), than higher income groups. This is largely because these energy-dense foods are cheaper and more filling representing good value for money for lowincome families. Healthier diets containing higher amounts of fruit and vegetables cost more, and may therefore be out of reach to low-income families (40).

Water fluoridation is known to be an effective method of preventing dental caries (41) and studies in the UK, Australia and New Zealand have shown that water fluoridation can reduce inequalities in oral health in children (42–44). Although water fluoridation is an environmental determinant of oral health, access to water fluoridation is not affected by individuals' position in the social structure, their level of income or education. Water fluoridation is a political and ethical issue (45) and therefore its role in explaining inequalities in oral health between social groups is limited.

## Cultural/behavioural explanations

Studies examining the role of alcohol and tobacco consumption, diet and dental self care (brushing with fluoride toothpaste and the use of additional products such as mouthwash) in explaining inequalities in oral health are extremely popular in industrialized nations and have been used as the basis for many behaviour-change interventions,

such as the Brushing for Life initiative and the more recent Five-a-day campaign in the UK. However, evidence suggests that these interventions have not been successful in altering caries rates (46), and have widened the health gap between the rich and the poor (47) as only those who have the time, money and education to make use of health information, the higher social classes, make appropriate changes to their behaviour (48). Behaviour change interventions have been criticized for failing to achieve sustainable improvements in oral health (14) and failing to address the underlying social, political and economic determinants of health. This evidence suggests that behavioural factors are perhaps not as influential in explaining inequalities in oral health as once thought, behaviours may in fact be an expression of underlying material and social influences.

Sanders et al. (49) investigated the extent to which social inequalities in oral health could be explained by the behaviours of dental attendance and dental self care (measured by the Dental Neglect Scale; 50). The results showed that the behaviours were associated with oral health outcomes in the adult population, but accounted for little, if any of the socioeconomic gradient in oral health. The authors did not, however, consider whether diet, smoking or alcohol consumption could account for the variance in oral health between different social groups. Further work is needed to assess whether additional dietary and lifestyle behaviours can increase the amount of variance that is explained.

Future studies need to be directed towards understanding the factors that determine behaviours and the social context in which behavioural choices are made. There is a need to move away from the notion that individual choices are responsible for 'bad behaviour' and understand the social factors that influence behavioural decisions. A social/cultural perspective on behavioural decision making is still largely absent from the health inequalities literature. Qualitative methods would provide an invaluable range of techniques to explore the complex interplay of these variables. Alternatively, multivariate methods can be used to test complex causative models (51).

# **Psychosocial perspective**

Evidence suggests that those in lower socioeconomic groups experience a greater level of psychosocial stress and anxiety than those in higher socioeconomic groups (52, 53) and that this increased level of psychosocial stress can lead to an increase in smoking and/or an increase in the consumption of 'comfort foods' (chocolate, confectionary) (54, 55). This evidence supports the indirect model, providing a mechanism through which stress could lead to inequalities in oral health and highlighting one of the potential influences on behavioural decision making discussed above. There is more debate over the possibility of a direct relationship between psychosocial stress and oral disease.

Evidence suggests that psychosocial stress is a significant risk factor in the development of periodontal disease in adults (54–56). However, the evidence is equivocal, not all studies report a positive relationship between psychosocial stress and periodontal disease (57–59), and consequently some doubts remain about this explanation. It is suggested that stress may activate the neuroendocrine systems, including the hypothalamic–pituit-ary–adrenal axis which leads to reduced potential of the host to fight infections (60) thus leading to an increase in inflammatory conditions and impaired wound healing (59).

The relationship between psychosocial stress and dental caries is less well understood. One area that has been examined is the effect of parental stress on the development of early childhood caries (ECC). Tang et al. (61) and Quinonez et al. (62) examined the relationship between caregiver stress and ECC. The results in both studies showed a significant bivariate association between caregiver stress and ECC but no significant relationship was found in the multivariate analysis. There are no empirical studies examining the relationship between psychosocial stress and caries in adults. It is generally accepted that stress is a distal aetiological factor in dental caries (63).

There is some evidence to suggest that psychosocial stress is an important concept in understanding and explaining social inequalities in oral health. The pathway through which stress affects health appears to be related to the type of disease in question. It appears that periodontal disease can be caused directly or indirectly due to psychosocial stress, but that it is more likely that dental caries are caused by the indirect, behavioural pathway. This suggests that social inequalities in different types of oral disease may be best understood using different types of explanation.

## The life course perspective

This perspective is the most recent theoretical development and emerges as a strong contender in terms of providing a complete explanation for social inequalities in oral health. Its major strength is that it can combine material, behavioural and psychosocial factors in understanding causation. The life course perspective can not only provide explanations for the development of dental disease in individuals, but also accounts for the persistence of inequalities over time in spite of improvements in living standards and knowledge about health and health promotion through the transmission of health beliefs, attitudes and behaviours between the generations.

There is evidence to support both the accumulation model and the critical period's model for explaining inequalities in oral health. Thompson et al. (64) examined whether adult oral health could be predicted by childhood socioeconomic advantage and disadvantage and also by oral health in childhood. Seven hundred and eighty-nine members of a longitudinal cohort study were dentally examined at age 5 and 26 years, and data on socioeconomic status were collected. Those who were of low socioeconomic status at age 5 years had substantially greater risk of caries and periodontal disease in adulthood. A similar pattern was found (when controlling for socioeconomic status) among those with high levels of caries at age 5 years and oral disease at age 26 years. Adult oral health can be predicted by childhood socioeconomic disadvantage and also oral health in childhood.

Barker (65) has suggested that impaired foetal nutrition cannot only lead to low birth weight, and also leave a child with an in built vulnerability to disease in later life (25). Burt and Pai (66) investigated whether one of these diseases could be dental caries. In a systematic review of the evidence, no relationship was found between low birth weight an increased risk of caries, however, only four studies were found so the possibility cannot yet be ruled out. Nicolau et al (24) demonstrated that socioeconomic and biological risk factors in early life are significantly related to dental caries experience at 13 years of age. These findings provide some support for the critical periods model.

It remains to be seen whether bringing material, behavioural and psychosocial factors together in a longitudinal study will increase the amount of variance in social inequalities in oral health that can be explained.

## **Future research**

Theoretical explanations for health inequalities are based on data collected using modern epidemiological methods (67). These data are geared towards identifying and quantifying risk factors for disease (25). They are intended as a basis for description and not explanation (68), and this raises questions about the validity of current explanations. Epidemiology is widely criticized for disconnecting individuals from their social context (69), neglecting broad social factors and failing to dig below the surface into issues such as how different social class groups live their lives and what influences their lifestyle decisions. Current explanations are based only on what epidemiological researchers can see and measure, factors that are harder to assess (such as culture) but which may be critically important to advancing our understanding of social inequalities in health are neglected (67). To overcome this problem we need to complement existing data sets with qualitative research based in the interpretivist tradition. Qualitative research can be used to explore the inner world of health inequalities (70), providing accounts of how people in different social class groups describe their experiences of inequality and the theories they offer for understanding its causes. A number of studies of this type can be found in the literature offering explanations for inequalities in general health (71, 72); however, to date there is no research exploring how the population understand and account for inequalities in oral health which remains a significant omission as it could offer promising new insights.

Mortality rates and morbidity data generated by positivist epidemiological methods remain important for measuring levels of health and disease in the population (73); however, in the light of changes to the definition of health it is becoming clear that these measures alone do not reflect the multidimensional nature of health. The traditional medical model of health defined health as an absence of disease. To measure health what was therefore needed were objective, clinical indicators of health status such as the DMFT index. Contemporary definitions of health recognize that the situation is actually more complex and that health includes physical, mental and social well-being.

Simply measuring disease does not reflect the health status of the population. Despite the fact that measures which could provide a more complete picture of health are starting to emerge, e.g. quality of life measures (74), epidemiologists have largely persisted in the use of disease-based measures to assess inequalities in health and oral health. The failure to accurately measure the concept of health has important implications for explanation. At present the explanations outlined in this paper are essentially theories of social inequalities in disease. The most significant advance to our understanding of social inequalities in health may come from the creation of a data set that measures health as defined by World Health Organization (75). Progress towards a complete understanding of the causes of social inequalities in health will be limited until a widespread shift in the way that health is measured takes place.

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