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Review Article

Theoretical basis and explanation for the relationship between area-level social inequalities and population oral health outcomes – A scoping review

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ABSTRACT

This study was conducted to review the evidence on the association between area-level social inequalities and population oral health according to type and extent of social theories. A scoping review was conducted of studies, which assessed the association between area-level social inequality measures, and population oral health outcomes including self-rated oral health, number of teeth, dental caries, periodontal disease, tooth loss, oral health-related quality of life (OHRQoL) and dental pain. A search strategy was applied to identify evidence on PubMed, MEDLINE (Ovid), EMBASE, Web of Science, ERIC, Sociological Abstracts, Social Services Abstracts, references of selected studies, and further grey literature. A qualitative content analysis of the selected studies was conducted to identify theories and categorize studies according to their theoretical basis. A total of 2892 studies were identified with 16 included in the review. Seven types of social theories were used on 48 occasions within the selected studies including: psychosocial ($n=13$), behavioural ($n=10$), neo-material ($n=10$), social capital ($n=6$), social cohesion ($n=4$), material ($n=3$) and social support ($n=2$). Of the selected studies, four explicitly tested social theories as pathways from inequalities to population oral health outcomes, three used a theoretical construct, seven used theories for post-hoc explanation and two did not have any use of theory. In conclusion, psychosocial theories were used most frequently. Although theories were often mentioned, majority of these studies did not test a social theory.

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1. Introduction

'He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he may cast' – (Leonardo da Vinci 1452–1519).

Theory is essential to understanding patterns in ideas and observations, and to develop causal explanations (Krieger, 2011, 2014). It has a paramount role in the field of social epidemiology (Bartley, 2004; Krieger, 2014) as the discipline is not only limited to study effects of socio-structural factors on health (Honjo, 2004; Kawachi & Berkman, 2000) but also to understand the causal explanations and to intervene in order to effect change. Oral diseases affect 3.9 billion people and untreated dental caries (tooth decay) is the most prevalent condition globally (Marcenes et al., 2013). Oral diseases significantly affect quality of life (Marcenes et al., 2013) and are associated with significant health care costs (Listl, Galloway, Mossey & Marcenes, 2015). Baker and Gibson (2014) have argued that routine testing of theoretical pathways is not generally evident in the field of social oral epidemiology. This scoping review assesses the extent to which theory is used in any capacity in studies of social inequality and oral health.

1.1. Theory, social ecology and health

A curvilinear association between average national income and overall health has been observed since the late 1970s (Rodgers, 1979). These observations gave rise to the 'income inequality hypothesis' (IH), which states that beyond a certain threshold of average income within a society, the distribution of income has a greater effect on average population health than average income (Wagstaff & Doorslaer, 2000). This hypothesis has given rise to studies of 'social ecology' to test the association between inequality and overall health. At least 300 studies of social ecology with various health outcomes have been published (Pickett & Wilkinson, 2015a), and, the importance of income inequality as a 'social pollutant' (Subramanian & Kawachi, 2006) has been widely debated over the past three decades (Pickett & Wilkinson, 2015b). While earlier reviews expressed scepticism with regards to the evidence on this relationship (Lynch et al., 2004; Wagstaff & Doorslaer, 2000), more recent reviews have supported this association. These later reviews concluded that detrimental effects of area-level social inequality, primarily income inequality, are universally evident (Kondo et al., 2009; Wilkinson & Pickett, 2006), causally related and affect the majority of the population (Pickett & Wilkinson, 2015a). They are not simply the result of higher rates of poverty in more unequal societies (Pickett & Wilkinson, 2015b).

Several theories/theoretical models have been proposed to explain how area inequalities may influence societal levels of health and disease (Bartley, 2004; Coburn, 2000; Kawachi & Kennedy, 1999; Lynch et al., 2004; Lynch, Smith, Kaplan & House, 2000; Marmot & Wilkinson, 2000; Navarro, 2002; Wilkinson & Pickett, 2006). Six distinct theories are identified that can be tested in studies of the association between social inequality and oral health (Bartley, 2004). The first two represents ecological counterparts to explanations for the association between individual socioeconomic position and health within the Black Report (Townsend, Davidson & Black, 1982), while the remainder were developed specifically to explain differences between populations:

i) **Materialist:** materialist explanations emphasize the role of the external environment on health; these vary with the level of inequality. Exposure to risks to health, and to protective factors varies with social position. Macroeconomic variables such as levels of production and unemployment affect health. Attention is paid to the roles of stress associated with material

factors and with the hazardous nature of work. At an ecological level, more unequal societies have more people exposed to these risks (Townsend et al., 1982; Macintyre, 1997).

- ii) **Behavioural:** behavioural explanations state that unequal societies generate higher levels of unhealthy behaviours. There are two versions of this explanation (Macintyre, 1997). One (hard) version of behavioural explanations identifies individual inadequacy as the main source of this behaviour. A second (soft) version is that behaviours have social gradients and contribute to observed gradients in health status.
- iii) **Psychosocial:** psychosocial was developed to explain individual-level inequalities. At an individual level, psychosocial explanations claim that social position affects health in one of two ways. First, people's perception of their social position affects health. Second, there is an inverse association between levels of control, and resulting chronic stress and social position that affects health. Whether through perception or control/stress, the subsequent effect on health is either through direct physiological changes or through health damaging behaviours (Bartley, 2004). Within unequal societies, due to constant social evaluative threats, it is likely that people who are less well-off tend to compare themselves to those who are relatively better. Such comparisons lead to a constant perception of belonging to a low status group, along with lack of control and coping strategies consequently leads to chronic stress. This stress through either health compromising behaviours or through directly affecting physiological health, may lead to higher levels of disease (Wilkinson, 1997). The more unequal a society, the greater the decrement in power and control and the more damaging the perception and lack of psychosocial assets, thus the greater the impact on health. Because the social gradient is steeper within unequal societies, these effects may be more evident higher up the social gradient compared to more equal societies (Marmot & Wilkinson, 2000).
- iv) **Social capital:** social capital explanations are often described as a subset of psychosocial explanations. These explanations state that unequal distribution of income undermines trust and damages social relationships. This can manifest in low levels of social support or civic participation, or in high levels of antisocial behaviour, particularly crime. This has been accepted as a potential pathway since Kawachi, Kennedy, Lochner, and Prothrow-Stith (1997) demonstrated that the association between inequality and mortality in the United States was mediated by social capital (Kawachi & Kennedy, 1999; Subramanian & Kawachi, 2004).
- v) **Neo-material:** neo-material explanations arise from criticism that the psychosocial and social capital explanations ignore upstream factors that affect health and may be associated with greater inequality. Specifically, they ignore the role of uneven distribution of power and class relations, and labour market dynamics in sustaining and driving inequalities (Muntaner, Lynch & Oates, 1999; Navarro, 2002; Coburn, 2000). This results from a systematic underinvestment in human, physical, health, and social infrastructure that support health (Lynch et al., 2000, 2004).
- vi) **Structural:** the structural explanation states that it is likely that the income inequality results in greater residential segregation leading to spatial concentrations of race and poverty, which in turn influences individual health. This may consequently lead to worse population health (Subramanian & Kawachi, 2004).

Many of these pathways are linked (Lynch & Kaplan, 1997) and some are treated as a subset of others in the literature. These pathways are unlikely to be mutually exclusive with more than

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