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Do welfare regimes matter for oral health? A multilevel analysis of European countries

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ABSTRACT

While the role of political factors on population health has recently received increasing attention, relatively little is known in that respect for oral health. We aimed to assess the influence of welfare state regimes on the variation in adult oral health between European countries, building on the existing literature by using a multilevel approach. Our analysis also explored how the oral health of people with different socioeconomic position was influenced by living in five different welfare state regimes. We analysed data from the Eurobarometer survey 2009. The main outcome was no functional dentition, defined as having fewer than 20 natural teeth. Age, gender, marital status, education and occupational social class were the individual-level explanatory variables, while welfare regimes, GDP per capita and GDP annual growth were the country-level variables. Multilevel logistic regression models were fitted with individuals nested within countries. Results revealed that country-level characteristics accounted for 8.1% of the variation in oral health. Adults in all welfare regimes were more likely to have poorer oral health than their counterparts in the Scandinavian regime, with those in Eastern countries being 6.94 (95% CI: 3.62–12.67) times as likely to lack a functional dentition as adults in Scandinavian countries. The variation at country-level reduced significantly when welfare regimes were introduced into the model (from 0.57 to 0.16; 72% reduction), indicating that welfare regime explained much of the variation in the outcome among European countries. Finally, adults with less education and lower occupational level were more likely to have no functional dentition, especially in the Eastern and Bismarckian welfare regimes.

1. Introduction

Oral health plays a key role in people's general health and quality of life. It affects other chronic diseases and is independently related to various physical, psychological and social functions such as eating, speaking, smiling, and socializing comfortably (Sheiham, 2005). While there is a large body of research about the influence of social determinants on oral health, the role of political factors has gained importance only recently (Guarnizo-Herreno et al., 2013a, 2013b, 2014; Sanders et al., 2009). As social policy can potentially influence the allocation and distribution of resources that are relevant for oral health, the study of the political context (referring to the structure or affairs of government, the state, public policies, power and authority (Bambra et al., 2007; Solar and Irwin, 2010)) is central to the understanding of oral health and patterns of inequalities.

Furthermore, the socioeconomic and political context affects psychosocial factors (Dahl et al., 2006) which in turn influence the distribution of oral health outcomes (Boyapati and Wang, 2007; Locker, 2009; Sabbah et al., 2009; Sanders and Spencer, 2005; Sheiham and Nicolau, 2005). Political systems that prioritize the concentrated accumulation of private wealth over redistribution of power and privilege contribute to larger socioeconomic inequalities with poorer health for those experiencing adverse living and working conditions (Birn, 2009; Krieger et al., 2010). The theoretical perspective of this study postulates that the underlying distal determinants are in the socio-political structure and the more immediate proximal determinants are socially and politically patterned (Borrell et al., 2009; Navarro et al., 2006; Solar and Irwin, 2010).

Comparative research on welfare states has been used to analyse the potential impact of social policy on population health and health

inequalities (Alvarez-Galvez et al., 2014; Bambra, 2007a; Bambra and Eikemo, 2009; Bambra et al., 2010, 2009; Eikemo et al., 2008a, 2008b, 2008c; Richter et al., 2012). For that purpose, countries have been grouped in types or regimes according to the principles of their welfare structure and institutions (Bergqvist et al., 2013; Dahl and van der Wel, 2013). A welfare state regime framework is used in that respect to assess the potential role of a general approach of a combination of social policies. Characteristics of the welfare states could influence oral health through different pathways. First, the distribution of resources that are important to oral health, such as education, income support and access to healthy foods, strongly depends on political decisions, particularly in relation to the social policies of the welfare state (Borrell et al., 2007; Eikemo et al., 2008b; Espelt et al., 2008; Zambon et al., 2006). In turn, those social policies have the potential to influence population oral health and the relationship between socioeconomic position and oral health (Eikemo et al., 2008b; Olafsdottir, 2007). Second, health care systems, including oral health services, are organized and reformed according to the social policies and political institutions in different countries (Kunitz and Pesis-Katz, 2005). Characteristics of the oral health services, such as funding, coverage, and characteristics of provision are expected to be related to population oral health and patterns of inequalities (Palencia et al., 2014). Third, the social organization of welfare states is related to interpersonal trust, social cohesion and sense of belonging (Martikainen et al., 2004). These are aspects of social capital at the collective level with the potential to benefit oral health.

In our previous work, we compared population oral health and patterns of socioeconomic inequalities across five European welfare regimes: Scandinavian, Anglo-Saxon, Bismarckian, Southern, and Eastern. We found consistently lower prevalence rates of edentulousness (no natural teeth), no functional dentition and oral impacts in the Scandinavian regime (Guarnizo-Herreno et al., 2013a), while significant educational and occupational inequalities in oral health were identified in all welfare regimes (Guarnizo-Herreno et al., 2013b). Comparing the magnitude of inequalities in oral health across regimes showed a complex picture with different findings according to the outcome, socioeconomic indicator and nature of the inequalities (absolute and relative) (Guarnizo-Herreno et al., 2013b, 2014). However, such analyses did not consider the role of economic growth and development and did not formally quantify the between country variation in oral health or modification of the social gradient by welfare regime since they were based on stratified analysis.

Consequently, in this analysis, we aimed at quantifying the influence of welfare state regime on the variation in oral health, in particular functional dentition, between European countries by using a multilevel analytical approach. In addition, we account for country differences in economic growth and development –by introducing variables on GDP per capita (at purchasing power parity) and GDP annual growth rate (%), since they were considered to potentially confound the primary association of interest between welfare regimes and no functional dentition. We also examined cross-level interactions between welfare regime and individual socioeconomic position. Such information would be relevant to discuss the role of the welfare state not only in terms of reducing overall inequalities, but also for improving the situation of those at the bottom of the socioeconomic hierarchy (Bambra, 2013). We are not aware of previous studies using multilevel modelling to examine the role of welfare regimes on oral health.

2. Methods

2.1. Data source and study sample

We employed data from the Eurobarometer 72.3, a survey carried out in 2009 in 31 European countries. The survey used a multi-stage, random sampling design to produce nationally representative samples. In every country, all administrative regional units (EUROSTAT -

Statistical Office of the European Union, 2012) were assessed and from each unit, sampling points were selected with probability proportional to population size and density. Then, households were randomly selected from each sampling point, and in each household, one person was randomly selected for the interview. Since the focus of the analysis was on welfare regimes, we considered the 21 countries classified in one of the five European regimes frequently used in analyses of health inequalities and population health: Scandinavian, Bismarckian, Anglo-Saxon, Southern and Eastern (Alvarez-Galvez et al., 2014; Bambra, 2007a; Bambra and Eikemo, 2009; Bambra et al., 2010, 2009; Eikemo et al., 2008a, 2008b, 2008c; Richter et al., 2012). In addition, our sample was limited to 16,314 individuals aged 20 years and older with complete data on the study variables. Participants aged less than 20 were excluded because a large proportion of them were still studying and therefore, including them in analyses based on contemporary educational attainment and occupation could have introduced some bias in the SEP measurement. The proportion of respondents with missing data was less than 3% and therefore, no imputation of missing data was carried out.

2.2. Variables

2.2.1. Oral health outcome

The main outcome was no functional dentition, defined as having fewer than 20 natural teeth (Moynihan and Bradbury, 2001; Sarita et al., 2003; Sheiham et al., 1999). This captures the cumulative effect of oral disease and experience of dental treatment. A binary variable was derived from the question on number of natural teeth (five response options: all; 20 or more, but not all; 10–19; 1–9; no natural teeth), with respondents answering '10–19', '1–9' or 'no natural teeth' classified as not having a functional dentition.

2.2.2. Individual-level explanatory variables

These included demographic and socioeconomic characteristics. The demographic variables were: 1) Age in years, treated as continuous and centred at the sample mean of 51 years; 2) Gender; and 3) Marital status, categorized as married/cohabiting, single, and divorced/separated/widowed. The socioeconomic variables were: 1) Education, measured as age when completed full-time education and categorized into: 20 years and older, 16–19 years, and up to 15 years; and 2) Occupational social class: managerial and professional, intermediate, and routine-manual. For retired participants, allocation to an occupational class was based on their last job. Students, unemployed, homemakers, and subjects who never did any paid job were not included in the occupational classification.

2.2.3. Country-level explanatory variables

We considered five welfare state regimes according to Ferrera's classification (Ferrera, 1996) and the additional Eastern European regime. Ferrera's typology examines both the quantity of welfare provided and the way in which benefits are delivered (Bambra, 2007b; Eikemo et al., 2008c; Kim et al., 2012). It has shown high within-regime homogeneity and between-regime heterogeneity (Bambra, 2011), and has been used in population health and health inequalities studies (Bambra et al., 2010; Eikemo et al., 2008a, 2008b, 2008c). Ferrera identified four welfare regimes: Scandinavian, Bismarckian, Anglo-Saxon and Southern. The Scandinavian regime is characterised by generous and universal welfare provisions with a state committed with socioeconomic equality. In the Bismarckian regime, the state provides certain earnings-related benefits with little impact on the socioeconomic redistribution. In this regime, the market does not have a key role in the provision of welfare benefits and services. In the Anglo-Saxon, the market has a dominant role in the welfare provision while the role of the state is minimal. Finally, the Southern regime clusters countries with a fragmented welfare provision, clear public-private mix in services and benefits, and a system of distribution of