Macro-level determinants of young people's subjective health and health inequalities: A multilevel analysis in 27 welfare states

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ABSTRACT

Objectives: Cross-national studies have rarely focused on young people. The aim of this study is to investigate whether macro-level determinants are associated with health and socioeconomic inequalities in young people's health.
Study design: Data were collected from the Health Behaviour in School-aged Children (HBSC) study in 2006, which included 11- to 15-year old adolescents from 27 European and North American countries ($n = 134,632$). This study includes national income, health expenditure, income inequality, and welfare regime dummy-variables as macro-level determinants, using hierarchical regression modelling.
Main outcome measure: Psychosomatic health complaints and socioeconomic inequalities in psychosomatic health complaints.
Results: Adolescents in countries with higher income inequality and with liberal welfare tradition were associated with more health complaints and a stronger relationship between socioeconomic status and macro-level determinants compared to adolescents from countries with lower income inequality or the Social Democratic regime. National income and health expenditure were not related to health complaints. Countries with higher national income, public health expenditure and income inequality showed stronger associations between socioeconomic status and psychosomatic health complaints.
Conclusion: Results showed that macro-level characteristics are relevant determinants of health and health inequalities in adolescence.

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1. Introduction

Although life expectancy and quality of life have improved in recent decades in all wealthy countries, socioeconomic inequalities in health are still a persistent feature of modern societies [1]. Health

and health inequalities are not only determined by individual characteristics such as social and material living conditions, but also by factors at the macro-level, such as welfare state characteristics, national income, income inequality and public health spending [2–10]. Previous studies have shown that mortality and morbidity were lower in the Scandinavian countries compared to the Anglo-Saxon and Eastern European states [4–6,11], as well as in countries with higher national income [8] and lower income inequality [12].

Recent studies have shown that the smallest absolute socioeconomic inequalities in health between high and low affluent groups are not found in egalitarian countries, such as the Scandinavian

Macro-level determinants

National income, health expenditure, income inequality, and type of welfare state regime
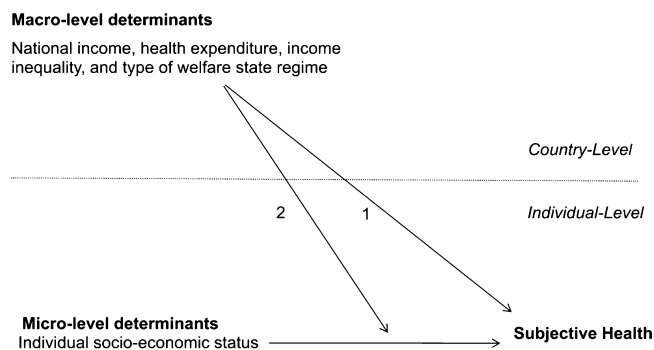

Fig. 1. Conceptual model. Effect of country-level (arrow 1) and cross-level interaction effects between individual socioeconomic and macro-level determinants (arrow 2) (modified according to Levin et al. [30]).

countries, but rather in Western central and Southern European countries [4–6,13]. Furthermore, previous cross-national studies revealed that macro-level determinants interact with socioeconomic differences in health at the individual level [8,4–6,14]. However, the extent to which health inequalities differ according to the degree of redistributive policies is highly debated [15].

With regard to macro-level determinants, the impact of different social policy arrangements has become central to the understanding of health and health inequalities [13]. During the past two decades, comparative research on welfare states has been influenced by Esping-Andersen's (1990) three "ideal" types of welfare state regimes: The *Social Democratic* (Scandinavian countries), *Conservative* (Germany, Austria and France) and *Liberal* welfare regimes (e.g., USA, UK and Canada). This typology has been expanded to include two further welfare regimes with different ideals: The *Southern European* (Mediterranean states) and *Eastern European* countries [4–6].

Generally, welfare state traditions determine economic and political outcomes such as income inequality or the level of redistribution of welfare provision. Further, they moderate the impact of socioeconomic determinants of health through various policies such as education, taxation, or child and health care [13].

Although socioeconomic differences in health are less apparent in young people than in adults, several studies found significant differences for individual [16,17] as well as country-level measures of socioeconomic position [18]. However, little research on adolescent health has examined the role of welfare regimes and single macro-level determinants of health as well as the associations between macro-level determinants and socioeconomic inequalities in health [19–22]. Further, previous studies have rarely applied multilevel modelling in order to account for the nested data structure (individuals nested in countries). The aim of the present study is, thus, to extend previous regime-oriented studies by looking at additional macro-level determinants that relate to welfare state policy outcomes, such as income inequality, national income and public health expenditure taking into account multilevel modelling techniques. Specifically, we analyze (see Fig. 1) whether macro-level and welfare state determinants are associated with adolescent subjective health (arrow 1), as well as whether these determinants moderate socioeconomic inequalities in health in adolescence (arrow 2)?

2. Materials and methods

Data were obtained from the Health Behaviour in School-aged Children (HBSC) study 2005/2006, a cross-national survey conducted in collaboration with the World Health Organization. The objective of the study was to investigate health, health behaviours and their social determinants among 11-, 13- and 15-year old

adolescents [23]. Research groups in 41 countries in the Europe, North America and Israel took part in the 2005/2006 survey, using a standardized questionnaire and adhering to an internationally agreed protocol [23]. The data were collected by means of standardized questionnaires, administered in school classrooms according to standardized instructions. The response rate at the school level was above 80% in the majority of the countries. Ethical approval was obtained for each national survey according to the national guidance and regulation at the time of data collection. The present analysis was based on 27 out of 41 countries (n = 134,632). England, Wales and Scotland form one country as well as French and Flemish regions of Belgium. Four countries had to be excluded due to the fact that they could not be classified into one of the five welfare regimes (Turkey, Iceland, Israel and Greenland). Another five countries (Denmark, Malta, Portugal, Russia, and Slovakia) were excluded because of a high number of missing values for the individual variables described below (>10%) or missing values in macro-level indicators. Table 1 shows the sample size for each country and type of welfare regime. The sample statistics for the nine excluded countries can be found in the Appendix (see Table A2).

The health outcome used in the analysis was psychosomatic health complaints [20]. Health complaints were measured using the HBSC symptom checklist. Students were asked to indicate how often in the last 6 months they had experienced the following symptoms: headache; stomach ache; backache; feeling low; irritable or bad tempered; feeling nervous; difficulties in getting to sleep; and feeling dizzy. The response options were "almost daily", "several times per week", "almost every week", "about once per month", "rarely or never". A sum index indicating the number of at least weekly health complaints was calculated from the eight items [23] (range: 0–8 health complaints).

Socioeconomic status was measured using the HBSC Family Affluence Scale (FAS), which was developed as an alternative for the measurement of the socioeconomic status [24]. Cross-national studies have shown that the FAS has a good validity, reliability and is easier for children to report accurately [25,26]. The scale consists of four different items: Does your family own a car? (0, 1, 2 or more); How many times did you travel away on holiday with your family during the past 12 months? (0, 1, 2, 3 or more); Do you have your own bedroom for yourself? (no = 0, yes = 1); and How many computers does your family own? (0, 1, 2, 3 or more). A sum score was calculated by summing the responses to these four items ranging from 0 (=low) to 7 (=high). Table 2 shows the country-specific means of the FAS index.

Three macro-level indicators were used in the analysis: national income measured by the Gross National Product (GNP per capita in US dollars), public health expenditure (% of GNP) and income inequality (Gini index) (Table 2). Data on these country characteristics were obtained from the World Bank (http://hdrstats.undp.org/indicators). The Gini index represented income inequality at the societal level, ranging from 0 (no inequality) to 1 (total inequality). All macro-level variables were centred on the grand mean across countries. Further, we included five regime type dummy variables in our models (Social Democratic, Conservative, Liberal, Southern, and Eastern European). The Social Democratic regime was chosen as the reference category.

The study utilized multilevel analysis that allows the modelling of hierarchical or nested data structures. The level 1-units in the sample are individual students; the level 2-units are the 27 countries. Multilevel analysis is based on the assumption that both the regression constant (intercept) and the regression coefficients of the individual predictors (slope) may vary for individuals between contexts (here: countries) and may be explained by country-level characteristics [27]. By using health complaints