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Variations in the relation between education and cause-specific mortality in 19 European populations: A test of the “fundamental causes” theory of social inequalities in health

Johan P. Mackenbach^{a,*}, Ivana Kulhánová^a, Matthias Bopp^b, Patrick Deboosere^c,
Terje A. Eikemo^{a,d}, Rasmus Hoffmann^a, Margarete C. Kulik^a, Mall Leinsalu^{e,f},
Pekka Martikainen^g, Gwenn Menvielle^{h,i}, Enrique Regidor^j, Bogdan Wojtyniak^k,
Olof Östergren^l, Olle Lundberg^{l,m}, for the EURO-GBD-SE Consortium¹

^a Department of Public Health, Erasmus MC, P.O. Box 2040, 3000 CA, Rotterdam, Netherlands

^b Institute of Social and Preventive Medicine, University of Zurich, Switzerland

^c Department of Sociology, Vrije Universiteit Brussel, Belgium

^d Department of Sociology and Political Science, NTNU, Trondheim, Norway

^e Stockholm Centre on Health of Societies in Transition, Södertörn University, Huddinge, Sweden

^f Department of Epidemiology and Biostatistics, National Institute for Health Development, Tallinn, Estonia

^g Department of Sociology, University of Helsinki, Finland

^h INSERM, UMR_S 1136, Pierre Louis Institute of Epidemiology and Public Health, Department of Social Epidemiology, Paris, France

ⁱ Sorbonne Universités, UPMC Univ Paris 06, UMR_S 1136, Pierre Louis Institute of Epidemiology and Public Health, Department of Social Epidemiology, Paris, France

^j Department of Preventive Medicine and Public Health, Universidad Complutense de Madrid, Spain

^k Department of Monitoring and Analyses of Population Health, National Institute of Public Health-National Institute of Hygiene, Warsaw, Poland

^l Center for Health Equity Studies, Stockholm, Sweden

^m Department of Health Sciences, Mid Sweden University, Östersund, Sweden

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ABSTRACT

Link and Phelan have proposed to explain the persistence of health inequalities from the fact that socioeconomic status is a “fundamental cause” which embodies an array of resources that can be used to avoid disease risks no matter what mechanisms are relevant at any given time. To test this theory we compared the magnitude of inequalities in mortality between more and less preventable causes of death in 19 European populations, and assessed whether inequalities in mortality from preventable causes are larger in countries with larger resource inequalities.

We collected and harmonized mortality data by educational level on 19 national and regional populations from 16 European countries in the first decade of the 21st century. We calculated age-adjusted Relative Risks of mortality among men and women aged 30–79 for 24 causes of death, which were classified into four groups: amenable to behavior change, amenable to medical intervention, amenable to injury prevention, and non-preventable.

Although an overwhelming majority of Relative Risks indicate higher mortality risks among the lower educated, the strength of the education–mortality relation is highly variable between causes of death and populations. Inequalities in mortality are generally larger for causes amenable to behavior change, medical intervention and injury prevention than for non-preventable causes. The contrast between preventable and non-preventable causes is large for causes amenable to behavior change, but absent for causes amenable to injury prevention among women. The contrast between preventable and non-preventable causes is larger in Central & Eastern Europe, where resource inequalities are substantial, than in the Nordic countries and continental Europe, where resource inequalities are relatively small, but they are absent or small in Southern Europe, where resource inequalities are also large.

* Corresponding author.

E-mail address: j.mackenbach@erasmusmc.nl (J.P. Mackenbach).

¹ Other members of the EURO-GBD-SE consortium who contributed to this paper were: Annibale Biggeri (Florence, Italy), Carme Borrell (Barcelona, Spain), Lynsey Brown (Newport, United Kingdom), Giuseppe Costa (Turin, Italy), Santiago Esnaola (Vitoria Gasteiz, Spain), Johannes Klotz (Vienna, Austria), Katalin Kovacs (Budapest, Hungary), Anita Lange (Copenhagen, Denmark), Maica Rodriguez-Sanz (Barcelona, Spain), Bjørn Heine Strand (Oslo, Norway), Chris White (Newport, United Kingdom).

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In conclusion, our results provide some further support for the theory of “fundamental causes”. However, the absence of larger inequalities for preventable causes in Southern Europe and for injury mortality among women indicate that further empirical and theoretical analysis is necessary to understand when and why the additional resources that a higher socioeconomic status provides, do and do not protect against prevailing health risks.

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1. Introduction

In all countries with available data, mortality rates are higher among those in less advantaged socioeconomic positions (Commission on Social Determinants of Health, 2008). This is not only the case in poor parts of the world but also in high income countries with advanced health care systems and elaborate systems of social security (Mackenbach, 2012; Mackenbach et al., 2008), and these inequalities in mortality have been observed throughout the 20th century, despite massive changes in disease patterns and determinants of disease (Pamuk, 1985).

In order to explain the robustness of the inverse association between socioeconomic status and mortality across time and place, Link and Phelan have proposed that socioeconomic status is a “fundamental cause” of inequalities in mortality. In their view, socioeconomic inequalities in mortality persist over time and place despite changing specific mechanisms because socioeconomic status “embodies an array of resources, such as money, knowledge, prestige, power, and beneficial social connections, that protect health no matter what mechanisms are relevant at any given time” (Phelan et al., 2004, page 265).

According to this theory, a person's socioeconomic status provides him or her with “flexible resources” which can be used “to avoid disease risks or to minimize the consequences of disease once it occurs” regardless of the prevailing circumstances. The association between socioeconomic status and health then “is reproduced over time via the replacement of intervening mechanisms”, and as opportunities for avoiding disease expand so health inequalities continue to exist (Link and Phelan, 1995; Phelan et al., 2004; Phelan et al., 2010, various pages).

It is important to note that this explanation of inequalities in mortality does not compete with conventional explanations based on specific determinants, such as the higher prevalence of unfavorable material, psychosocial and behavioral factors in lower socioeconomic groups (Marmot, 2003), but refers to what has been called a “metamechanism”: an overarching mechanism that explains how multiple specific mechanisms reproduce a particular relationship in different places and different times (Freese and Lutfey, 2011; Lutfey and Freese, 2005).

In essence, the “fundamental causes” theory implies that health results from purposive action or “health-directed human agency”, and that socioeconomic differences in the availability of the means to achieve health goals are the crucial factor on which the fundamental relationship between socioeconomic status and health rests (Phelan and Link, 2005a). If this is correct, then this allows for an empirical test of the theory, because it predicts that socioeconomic status is more strongly associated with mortality from preventable causes than with mortality from less preventable causes.

In one of the few empirical tests of the “fundamental causes” theory, Phelan et al. reasoned that, when relatively little can be done to prevent death from a particular cause, the association between socioeconomic status and mortality should be substantially diminished, and that the strongest associations should be found for preventable causes of death. Using data from the United States National Longitudinal Mortality Study, they compared income- and

education-related disparities in mortality between a group of causes with high preventability and a group of causes with low preventability, and found that indeed inequalities in mortality were higher for the first than for the second, implying support for the theory (Phelan et al., 2004).

Other tests of the theory followed a similar reasoning. Phelan and Link compared trends in mortality by socioeconomic status between two groups of diseases: three causes for which the capacity to prevent death has increased significantly (e.g., heart disease) and two causes for which that is not the case (e.g., brain cancer). They found that over time sharp disparities emerged in the United States for the first, but not for the second group (Phelan and Link, 2005b). Educational disparities in the United States also widened over time for mortality from heart disease and lung cancer but not for mortality from non-preventable cancers (Masters et al., 2012). Furthermore, mortality from diseases for which there has been more progress in their prevention or treatment (as indicated by the number of active drug ingredients available to treat a disease, or the rate of decline in mortality from that disease) is more strongly associated with education in the United States than mortality from diseases with less technological progress (Glied and Lleras-Muney, 2008).

In a study focusing not on mortality but more directly on the innovation that reduced mortality, Link et al. found that disparities by education and income arose in the United States during the introduction of the Pap test (for cervical cancer) and mammography (for breast cancer) (Link et al., 1998). In the 1960s and 1970s, knowledge that smoking causes lung cancer travelled unevenly through the United States population, and a sharp gradient favoring the higher educated emerged where none had existed in the 1950s (Link, 2008). Similarly, during the introduction of statins disparities favoring the higher income groups arose in their use, and in cholesterol levels, in the United States (Chang and Lauderdale, 2009).

While these are important studies, they only cover a single country, and it remains unknown whether their results also apply to other high-income countries – as would be necessary under the “fundamental causes” theory. These studies also are limited in their coverage of causes of death – often, only a few conditions are studied, or all preventable causes are lumped together as in Phelan et al.'s study (Phelan et al., 2004), which did not check whether larger inequalities were present for all preventable causes individually, as the theory predicts. The first objective of this paper therefore is to assess the generalizability of previous studies' findings, by comparing inequalities in mortality between 18 preventable and 6 non-preventable conditions for 19 European populations. If the “fundamental causes” theory holds, we expect inequalities in mortality from all preventable causes to be larger than those for non-preventable causes in all these populations.

The broader comparative scope of our study, however, also allows us to add a second objective, which is to assess whether the contrast between preventable and non-preventable causes is larger in countries where social inequalities are larger. If the “fundamental causes” theory holds, one would expect the link between socioeconomic position and mortality from preventable causes to

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