Socioeconomic equity in amenable mortality in Finland 1992–2008

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ABSTRACT

This study presents an approach to assess socioeconomic equity in the effectiveness of health services. As an indicator of health system performance we use amenable mortality which captures premature deaths that should not occur in the presence of effective and timely health care. Data on amenable deaths by income groups in Finland in 1992–2008 came from the National Causes of Death Register which was linked to sociodemographic data in population registers. We evaluate the extent of and trends in socioeconomic differences with two widely used inequity indices, the concentration index and the slope index of inequality, and also for different categories of amenable mortality. By categorizing conditions according to the level of intervention associated with the conditions it is possible to evaluate the effect of types of health interventions. Causes of death attributable to specialized and primary care interventions comprise the main groups. By this approach of decomposing equity in amenable mortality in Finland we detected major and increasing socioeconomic inequities and also greater inequity among deaths amenable to specialized health care interventions. Moreover, we saw that inequity increased at a faster pace among deaths amenable to specialized health care interventions yet primary health care interventions made a greater contribution to overall inequity. Although the overall rate of amenable mortality decreased notably during the follow-up, the time trends of socioeconomic differences in amenable health care indicate a substantial increase in inequities in health care in Finland.

Introduction

Amenable mortality measures health system performance by capturing premature deaths that should not occur in the presence of effective and timely health care. These deaths are an indicator of potential weaknesses in health care that can then be investigated in more depth (Nolte & McKee, 2004). Mortality amenable to medical intervention comprises selected causes of deaths. The selection of causes focuses on conditions for which effective clinical interventions exist in people less than 75 years old (a general age limit). Age limits vary for some diseases to take into account the fact that health systems may not be able to contribute substantially to survival above or below a certain age. The definition of amenable mortality and a list of causes of unnecessary and untimely death were first proposed over 35 years ago (Rutstein et al., 1976). Since then several researchers have adopted and modified the list (e.g. Nolte & McKee, 2004).

Important objectives of health policy are equitable access to and quality of health care. The improving quality of health services and decreasing rates of amenable mortality are connected as shown in a number of studies (Korda & Butler, 2006; Simonato, Ballard, Bellini, & Winkelmann, 1998). Several papers have addressed socioeconomic inequities in health care in terms of access to and receipt of services, particularly specialist services (Asada & Kephart, 2007; Keskimäki, 2003; Lasser, Himmelstein, & Woolhandler, 2006; Veugelers & Yip, 2003). In some countries, similar findings have also been reported from studies of socioeconomic variations in amenable mortality (Mackenbach, Stronks, & Kunst, 1989; Marshall, Kawachi, Pearce, & Borman, 1993; Poikolainen & Eskola, 1995; Schwarz, 2007; Stirbu et al., 2010; Westerling, Gullberg, & Rosén, 1996; Wood, Sallar, Schechter, & Hogg, 1999). In the field of health services research there is a significant role in measuring quality and equity of health care. Monitoring inequities in amenable mortality provides useful information on changes in socioeconomic differentials in health service utilization and effectiveness (Schwarz & Pamuk, 2008).

The aim of this study is to assess equity of health care by examining the extent of and trends in socioeconomic inequities in

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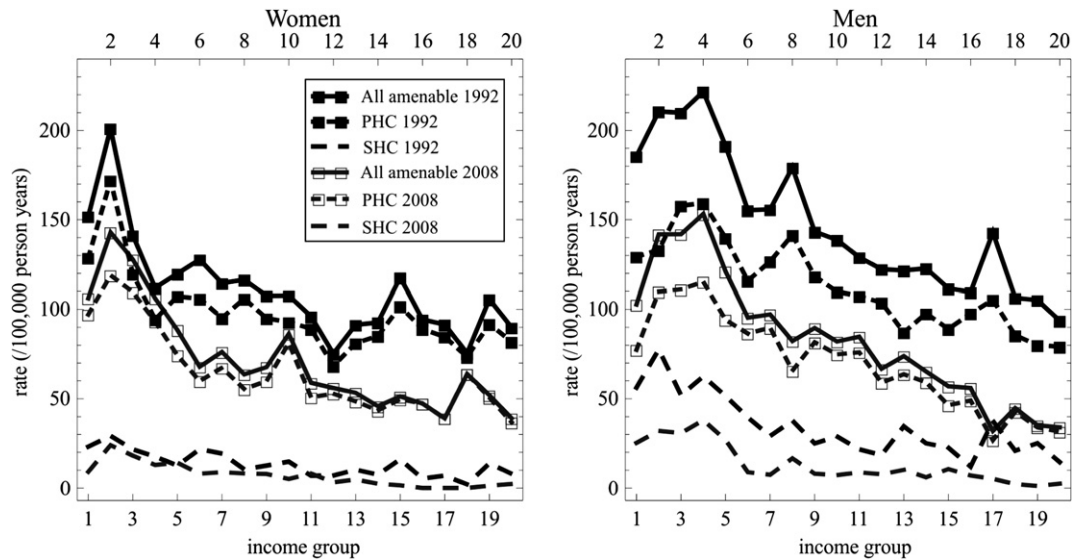
Fig. 1. Age-standardized amenable mortality rate (per 100,000 person years) by category (all amenable causes, mortality amenable to primary (PHC) and specialized (SHC) health care) and income group in 1992 and 2008 among the population aged 25–74 in Finland.

amenable mortality. In addition, we evaluate equity in more detail by categorizing conditions that cause amenable deaths according to the place of intervention to which conditions are responsive. We modified and updated the categorization used by Simonato et al. (1998) to estimate the contributions of levels of interventions to the overall equity as described in the methods section. The main groups comprised here were causes of death attributable to specialized and primary care interventions. Both absolute and relative differences should be explored when monitoring inequities in amenable mortality and evaluating policy interventions, as relative differences may increase while absolute differences decrease if the mortality rate declines (Mustard & Etches, 2003; Regidor, 2004). We therefore measure socioeconomic inequity in this study both in absolute and relative terms with two widely used inequity indices: the slope index of inequality (SII) and the concentration index (C). Due to privacy regulations researchers do not always have the possibility to use individual level data. Thus, with the example of tabulated register data of amenable deaths in Finland covering the years 1992–2008 we explore inequities in amenable mortality and illustrate the connection and differences between the SII and the C.

Methods

Due to data protection regulations we analysed data compiled from individual level register data on mortality in tabulated form. Our data included amenable and all-cause deaths of resident Finnish citizens aged 25 to 74 in 1992–2008. By means of unique identification codes, the information on mortality was derived from the Causes of Death Register and individual demographic and socioeconomic variables such as gender, age and income from the annual individual-level employment statistics database. Both registers are compiled and maintained by Statistics Finland. In this study we used income as a measure of socioeconomic status. We used disposable family net income, adjusting for family size using the OECD equivalence scale (OECD, 1982). Income was divided into 20 groups each containing 5 percent of the population. The income record for the year before the death was applied. Both genders had the same income thresholds. We excluded people registered as institutionalized (mainly long-term inpatients) and people under

25 from our analyses because income information may be inadequate for such groups and not comparable with the general population (Epland & Törmälehto, 2007; Keskimäki, Salinto, & Aro, 1995). The final data set included records on deaths and factors including sex, year, family income and age. Age was grouped in five year age bands. The study protocol was approved by the Research Ethics Committee of the National Institute for Health and Welfare (Decision number 9/2009).

In this study the selection of causes of death considered amenable to health care was an adaption of classifications used by Nolte and McKee (2008) and Page et al. (2006) (See Appendix A). Ischemic heart disease was not included, as the precise contribution of health care to reductions in deaths from this condition cannot be defined. We were not able to include deaths due to "accident or misadventure due to health care" as these are not classified separately in the Finnish Causes of Death Register; however, those deaths represent a small fraction of all amenable mortality (Nolte & McKee, 2004). Causes of death were coded according to the International Classification of the Diseases (ICD), 9th Revision for 1992–1996 and 10th Revision for 1996–2008.

To study the influence of specific categories of amenable mortality in more detail, we refined the categorization of Simonato et al. (1998) (primary prevention, early detection and treatment, improved treatment) to one more suitable for the Finnish health care system by dividing treatable conditions by the main place of a potentially effective intervention: specialized health care (SHC) and primary health care (PHC). PHC, which includes outpatient care administered by general practitioners, was further subdivided into three groups according to the timing of the interventions: 1) primary prevention, 2) early detection and treatment and 3) improved treatment and medical care. This grouping of the place and timing of potentially effective interventions are somewhat arbitrary but we assume that they have a descriptive value to indicate the sector of weaknesses in the health care system to be analysed further.

Statistical methods

First, we explored the annual rates of amenable mortality in 1992–2008. The age-specific rates, i.e. the number of amenable