



Socioeconomic inequalities in drug utilization for Sweden: Evidence from linked survey and register data

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ABSTRACT

This study analyzes the socioeconomic gradient in drug utilization. We use The Swedish Prescribed Drug Register, merged with the Survey of Living Conditions (the ULF), and the study sample consists of 8138 individuals. We find a positive education gradient (but no income gradient) in drug utilization, after controlling for health indicators. Whereas high-educated men use a larger number of drugs, high-educated women use both a larger number of drugs and more expensive drugs. For males, but not as clearly for females, we find that the education gradient is weaker for more health-related drugs but stronger for more expensive drugs. We conclude that the main reason for the education gradient in drug utilization is doctors' behaviour rather than compliance with medication and affordability of drugs.

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Introduction

There are large disparities in health by socioeconomic status (SES) in Sweden and throughout the world (see for example; Nordin & Gerdtham, 2010; Baum & Ruhm, 2009; Buckley, Denton, Robb, & Spencer, 2004; Deaton & Paxton, 1998; Gerdtham & Johannesson, 2000, 2002, 2004; Smith, 2004; van Doorslaer et al., 1997; Wagstaff & van Doorslaer, 2000; van Doorslaer & Koolman, 2004). Although the link between health and SES is not fully understood, differences in access to adequate healthcare might partly cause SES-health disparities (van Doorslaer, Koolman, & Jones, 2004; van Doorslaer et al., 2006; Gerdtham & Trivedi, 2001; Morris, Sutton, & Gravelle, 2005; Sutton et al., 2002). Studies show, for example, that there is SES inequality in physician utilization and inpatient care in Sweden and other countries, and that the affluent account for the larger number of specialist visits in most OECD countries (Sutton et al., 2002; van Doorslaer et al., 2004).

Another healthcare aspect that might cause the SES-health gradient is differences in the availability and utilization of (medical) drugs. Non-compliance with medication is a major health-related problem (Larsen, Stovring, Kragstrup, & Hansen, 2009), and for most diseases only 50 percent of the patients seems to take their prescription drugs correctly (Morris & Schultz, 1992;

WHO, 2003). Against this background, the objective of this study is to find out whether there is a positive association between SES and drug utilization in Sweden, i.e. if there is SES inequality in drug utilization.

The main explanation for a SES gradient in drug utilization is, of course, that health is the main predictor of drug utilization and health is (as acknowledged above) related to SES. In fact, such a negative correlation between drug utilization and SES has been established for Sweden (Henricson et al., 1998; Weitoft, Rosén, Ericsson, & Ljung, 2008). Therefore, it is fundamental to control for health, otherwise we would again just be estimating the familiar SES-health gradient when using drug utilization as a proxy for health.

In Sweden studies have found positive associations between women's education level and hormone replacement therapy (Merlo et al., 2003), and between education level and dementia drugs (Johnell, Weitoft, & Fastborn, 2008). However, medical literature on the relationship between SES and drug utilization shows no consistency in results, possibly because of small and specific subpopulations (Nielsen, Hansen, & Rasmussen, 2003). Another drawback of these studies is that they often use self-reported drug utilization (for example Furu, Straume, & Thelle, 1997; Nielsen et al., 2003), a measure that is likely to be plagued with measurement errors. Illness or disabilities might for example seriously influence the process of recalling information.

We use The Swedish Prescribed Drug Register, merged with the Survey of Living Conditions (the ULF), and register data from

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Statistics Sweden (LISA). Thus, with a rich dataset containing dispensed drugs, health measures and SES indicators, we contribute key findings to both the healthcare inequality literature and the drug utilization literature. The project which this study is part of received ethical approval (Dnr 498/2006) by the Regional Ethical Review Board in Lund.

We analyze the following measures (on a yearly basis); total public and individual cost of drugs, the individual number of drugs and the public and individual mean cost of drugs. With the mean cost of drugs we analyze whether there is an association between SES and utilizing more expensive drugs. We relate these outcomes to the education level or the income of the individual. The SES gradient is, as mentioned above, expected to increase with the inclusion of health indicators. However, because it is not feasible to have a full battery of health indicators, a (positive) health gradient in drug utilization is still plausibly underestimated, though.

For several reasons, drug inequality might vary with the type of drug and the motive for taking the drug. For example, inequality in drug utilization might be related to severity/acuteness of illness, side-effects, generic substitutes, compliance or cost of drug. Therefore, based on the Anatomical Therapeutic Chemical (ATC) classification system, we perform a detailed analysis of different types of drugs. We also try to explain the heterogeneity in results found for different drugs.

Modelling the relationship between SES and drug utilization

The Andersen model (1968), and the refined model in Andersen and Newman (1973), were created to empirically test hypotheses about inequality of access to healthcare, acknowledges three sets of predictive factors in the process leading to health consumption: predisposing, enabling and need factors. The predisposing factors are a set of personal characteristics (demographics, social structure including education, and health beliefs) that predict illness. The enabling factors (including income, health insurance and physical access to health providers) make health service resources available to the individual. Only with such access to services will a predisposition translate into utilization. The need factor points out that the individual has to recognize the illness, respond appropriately, and get a professional evaluation. Although the doctor's judgement is primarily medical, social considerations may be influential (Andersen, 1995). The model identifies different sets of factors necessary for the process of healthcare use but the main drivers are contextual.

In accordance with the Andersen model, we consider individual drug utilization as a result of a process and SES is a factor that influences every step of the process. The drug utilization process starts with a demand for health services (response to illness). In the second step the demand meets a supply of health services (i.e. a doctor who can write out a prescription is available and affordable). The third step contains the healthcare production (the doctor writes out the prescription based on medical and possibly other considerations such as patient SES). In the fourth step of the process the individual collects the prescription and in the final step consumes the drug (on the condition that the individual can afford the drug, has access to a pharmacist and complies with the treatment).

Our analysis has the ambition of finding out if there is SES inequality in the third to fifth step of the drug utilization process. However, because our data contain information on dispensed prescriptions but no actual drug consumption, we cannot capture SES differences in the fifth step. By controlling for health and doctor visits (in a sensitivity test), we argue that SES differences in the first and the second step of the process are handled. In other words, by comparing individuals with the same health status and the same

number of doctor visits but with different SES, the relationship between SES and; illness, propensity to seek healthcare and (physical and financial) access to health service providers is not a part of our socioeconomic gradient in drug utilization.

Given the health and the doctor visits of the individual, we identify three possible main explanations for a positive SES gradient in drug utilization, i) doctors prescribe more drugs to those with a high SES, ii) SES determines whether one can afford the prescribed drugs, or iii) SES is related to compliance with medication. A fourth explanation concerns the availability of pharmacies. We are unable to account for SES differences in this respect, because we have no information on the number of pharmacies in the living area of the individual. However, in Sweden the infrastructure level is probably of minor importance for drug utilization (nevertheless, we use regional controls that to some extent capture differences in pharmacy access between urban and rural areas).

Focussing on the first explanation, concerning mainly the professional evaluation of need, there are at least two reasons why doctors may prescribe more drugs to the well-off. It might be due to status, or as suggested by McIntyre, Thiede, and Birch (2009) a good doctor–patient fit in terms of their attitudes towards each other and their expectations about the consultation (e.g. patient compliance and provider competence). A US study, for example, observes a positive relationship between patient SES and physicians' perceptions of their patients (van Ryn & Burke, 2000). The second reason relates to the well-off having an information advantage and being more articulate compared to the poor and the less educated. For example, the well-off (and especially the high-educated) might influence the doctor's treatment recommendations by making suggestions concerning the use of a specific (or new) drug.

In Sweden, it is unlikely that affordability is the main explanation behind SES differences in drug utilization, since there is an individual maximum yearly payment of SEK 1800 (around 200 euro) for medicines. With regard to the third hypothesis, a recent study shows that compliance is not related to country-differences in sociodemographic and socioeconomic factors (Larsen et al., 2009). Still, young age, financial strain, low self-rated health, and low trust in the healthcare system do seem to affect compliance negatively (Johnell, Lindström, Sundquist, Eriksson, & Merlo, 2006). Researchers are yet to clarify the underlying factors behind the potential correlation between compliance and SES. However, findings indicate the influence of perceived need, formed by health beliefs and by doctor–patient interaction (cf. Griffith, 1990; Grossman, 2000).

Data

We use The Swedish Prescribed Drug Register kept by the Centre for Epidemiology at the National Board of Health and Welfare (Socialstyrelsen). The register contains data on all dispensed prescriptions to the whole population of Sweden, and contains (among other things) information on dispensed item, date of prescribing and dispensing, amount, dosage, expenditure, reimbursement and prescriber's profession (see Wettermark et al. (2007) for more information on the register). Over-the-counter (OTC) medications and drugs used in hospitals are not included in the register. The drugs are classified according to the ATC-classification system.

Since the register of drugs includes patient identifiers (since July 2005), we are able to merge the data with Statistics Sweden's Survey of Living Conditions (the ULF). Every year, Statistics Sweden (SCB, 2006) conducts systematic surveys of living conditions, in the form of 1-h personal interviews with randomly selected adults aged 16–84 years. Since 1975 about 6000 individuals have been

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