Socioeconomic disadvantage and primary non-adherence with medication in Sweden

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Abstract

Objective. Lack of adherence with pharmacological therapy is a public health concern that compels tremendous costs for the health care system and the community. To analyse the association between socioeconomic disadvantage and primary non-adherence with medication, and to explore possible mediating effects of trust in health care and lifestyle profile.


Participants. The study comprised 13603 men and 18292 women aged 21–84 years who had any contact with a physician at a hospital or primary care centre.

Measures. Primary non-adherence with medication based on whether respondents reported that they refrained from purchasing at the pharmacy prescribed medication. Socioeconomic Disadvantage Index was based on four different indicators of economic deprivation.

Results. Socioeconomic disadvantage was associated with primary non-adherence with medication independent of long-term illness, risky lifestyle, low education, living alone and low trust for health care. This association increased with older age, particularly among women. Among individuals aged 21–34 years, severe compared with no socioeconomic disadvantage, was associated with two-fold increased odds for non-adherence with medication. The corresponding odds among individuals aged 65–84 years were three-fold increase among elderly men (OR = 3.3, 95% CI: 1.4–7.8) and six-fold increase among elderly women (OR = 6.2, 95% CI: 2.5–15.3). Yet every seventh elderly woman aged 65–84 years suffered from long-term illness.

Conclusions. Results indicate that health policies for ‘care on equal terms’ in Sweden have been less successful in relation to equitable access to prescribed medication, especially among the elderly.

Keywords: elderly, gender, medication, non-adherence, socioeconomic disadvantage, socioeconomic inequalities

Introduction

Health systems and health care services are important determinants of population health, and inequity in access to and utilization of these services may contribute to health inequalities. There is evidence that people with lower socioeconomic position are sicker and therefore tend to use comparatively more general health care services, but in contrast they use less specialist services than people in higher socioeconomic position [1–3]. Although it is likely that socioeconomic inequalities in health may be negligible due to absence of socioeconomic inequalities in access to general health care services, inequalities in specialist and high quality care services are likely to potentially widen these inequalities [2–4]. Thus current public health interventions for reducing health inequalities need to pay more attention to the role that the health care systems and the provision of health care services play in creating health inequalities [5].

Pharmacological agents may today be considered as important health care resources. This is because they are extensively used by the general population not only for the treatment of established medical disorders but also for the prevention of major diseases as myocardial infarction and stroke. Although pharmacological agents may play an important role in public health, there is little knowledge on determinants of utilization and effects of pharmacological agents in the community [5]. Most current knowledge on the effects of pharmacological agents is based on the results from randomized clinical trials. Those trials are often performed in a selected population of patients with a high adherence with

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Adherence with medication is a key condition for ensuring effectiveness of the pharmacological treatment in routine health care. Therefore, low adherence could be considered a major public health problem that compels tremendous costs for the health care system and the community [7, 8]. Adherence to medication includes primary adherence, whereby the patient has to redeem prescribed medication. The secondary adherence requires the patient to take medication as prescribed. In fact, redeeming prescribed medication is related to access and access is antecedent to medication, utilization and therefore to general medical adherence. Therefore, improving access could be considered as a public health concern [7]. The first step towards effective interventions for improving medical adherence is to identify key determinants of primary non-adherence and access to medication [9]. Adherence to medication may be determined by other factors such as, socioeconomic resources and individual’s beliefs or trust or expectations [5]. This circumstance could also be one of the mechanisms behind the well-known socioeconomic differences in health [10]. Most studies have focused on secondary non-adherence with medication, yet it is necessary to investigate whether patients do redeem their prescriptions as this is the first step in the process of adherence [11].

Sweden is pioneer country in having a National Public Health Policy endorsed by the parliament and supported by representatives from all political parties [12]. The National Public Health Policy is based on the principle of creating societal conditions to promote equity in health and access to health care on equal terms [13]. Sweden has a universal health insurance, whereby 94% of the health care system is publicly financed and prescribed medication being subsidized. All residents in Sweden are entitled to free prescribed medicines after spending 1800 SEK (equivalent to 257 USD) within the preceding 12 months [14]. Therefore, it is assumed that socioeconomic circumstances should not be a barrier for accessing health care services including prescribed medication. In spite of this, we have previously demonstrated the existence of a persistent association between socioeconomic disadvantage and lack of access to medical treatment and dental care [15, 16] in Sweden. Therefore, in the present study we aimed to investigate whether socioeconomic disadvantage is also associated with primary non-adherence with medication in Sweden. In addition, we hypothesized that factors such as health status (long-term illness and risky lifestyle) and health care-related factors (trust in the health care system, experiences of unfair treatment in the health care setting) may influence the association between socioeconomic disadvantage and primary non-adherence with medication.

Methods

Study population

Data from the Swedish National Survey of Public Health 2004 and 2005 were used for analyses. This survey was carried out by Statistics Sweden, in collaboration with a number of various health care regions and districts in Sweden and was coordinated by the Swedish National Institute of Public Health. The total study population comprised a randomly selected sample of 73330 individuals (33964 men and 39366 women) aged 16–84 years. Of the 73330 individuals, we identified 31895 individuals (18292 women and 13603 men) aged 18–84 years who had any contact with a physician at a hospital or primary care clinic centre during the past three months.

Collection of data

Data was collected in an intensive period of three months’ time (from 26th March to 15th June in both years), based on a postal self-administered questionnaire. Participants were reminded thrice if they did not return the questionnaire in given time. Participants were informed about data linkage on income, educational level, marital status and family characteristics with registry data from Statistics Sweden. The response rate for both years was 63%. A large proportion of dropouts were younger men or socioeconomically disadvantaged or suffering from long-term illness. Data from the completed questionnaire were controlled for errors, inconsistencies and internal missing data using a well established method developed by the Statistics Sweden [17]. The present study was approved by the Department of Data Inspection, the Research Ethical Committee at the Swedish National Board of Health and Welfare (20031208) and the Ethical Committee at Karolinska Institutet (DNR 2005/1146-31). Both committees have conformed to the principles embodied in the Declaration of Helsinki.

Study variables

Main outcome. Lack of primary adherence with medication was based on the question; ‘Have you during the past 3 months refrained from purchasing medicine prescribed for you by a physician?’ Alternative answers were ‘yes’ or ‘no’. ‘Yes’ was considered as refraining from purchasing prescribed medication.

Socioeconomic disadvantage. We attempted to develop the socioeconomic disadvantage index (SDI) that combines several indicators of economic deprivation to broadly describe the individual's underlying socioeconomic conditions, that we have previously used in relation to access to health care services [15, 16]. SDI was based on four variables that encompass a broad perspective of socioeconomic conditions; (i) being on social welfare at the moment of the survey, (ii) being currently unemployed, (iv) having a financial crisis (difficulties to pay for ordinary bills such as food or house rent for the past 12 months) or (iv)
lacking cash reserves (difficulty to get hands on 14 000 SEK (about 1800 USD) within a week if needed). All the four binary indicators were summed up resulting in a range of 0–4 points. SDI was categorized as ‘none’ (if the sum was equal to zero), ‘mild’ (if the sum was one) and ‘severe’ (if the sum was between two and four).

Long-term illness was based on whether the respondent suffered from any long-term illness, disability or infirmity and if this illness prevented the respondent from carrying out ordinary tasks. This was considered as a confounder as it is related to both SDI and limited possibilities to collect medication.

Mediating factors included trust in health care system and risky lifestyle profile. These factors are hypothesized to be socially patterned and to influence individual decisions concerning redeeming medication.

Trust in health care system. Respondents were asked if they had confidence in various institutions in society. Lack of trust in health care system was defined based on whether respondents had indicated that they did not have any confidence for health care setting.

Risky lifestyle profile. This was based on four life-style factors that are known to be associated with an increased mortality risk (smoking, dietary habits, alcohol consumption and physical activity). Each factor was dichotomized (‘yes’ equal to one, ‘no’ equal to zero) as explained below and, thereafter we considered a risky life style profile if the individual had more than one (i.e. two–four) of these factors. Daily smoking’ was categorized as yes or no based on the question ‘Do you smoke every day?’ ’Unhealthy dietary habits’ were defined as diet with poor intake of fruits and vegetables (once or less per day). ‘High alcohol consumption’ was assessed following an established methodology [18], as the total sum was equal to or greater than 8 for men and greater than 6 for women, based on three variables: (i) how often have you drunk alcohol in the past 12 months? (ii) how many glasses do you drink on a typical day? and (iii) how often do you drink six glasses at one go? Finally, ‘physical inactivity’ was dichotomized as sedentary or non-sedentary activities during leisure time.

Statistical methods
Stata Version 9 [19] was used to conduct multiple logistic regression analyses to estimate the associations of socioeconomic disadvantage with non-adherence with medication. In the logistic regression, we used the regression coefficients (standard errors) to obtain OR (95% confidence intervals). We stratified on four age groups (21–34, 35–49, 50–64 and 65–84 years). In order to ascertain independent associations between SDI and primary non-adherence with medication, we adjusted for possible confounders (long-term illness, living alone, low education, risky lifestyle and lack of trust in health care).

Results
The prevalence of lack adherence with medication decreased with older age from 11% among men and 13% among women aged 21–34 years to 4% among men and women aged 65–84 years.

Over 60% of people aged 50 years and above reported long-term illness when compared with above 40% of those below 35 years of age (Table 1). Larger proportions of women than men were observed in relation to degree of socioeconomic disadvantage across all age groups. Gender differences were also observed in relation to living alone; older women aged 65–84 years (45%) were more likely to live alone than older men (22%), while younger men were more likely to live alone (44%) than women (33%). A high

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<td>Primary non-adherence with medication (%)</td>
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The prevalence of risky lifestyle profile was observed in younger people, particularly men, than older people. Trust in health care decreased with younger age for both men and women.

The distribution of study variables are presented in Table 1. In the logistic regression analyses, we adjusted for long-term illness, risky lifestyle profile, low education, living alone and lack of trust in health care. Associations between degrees of socioeconomic disadvantage and primary non-adherence with medication showed a dose-response fashion across all age groups. This dose-response association was more consistent among women than men. A doubling of odds for primary non-adherence with medication was observed among women across all age groups, when comparing the odds for mild with those for severe socioeconomic disadvantage (Tables 2 and 3).

The likelihood of primary non-adherence with medication in relation to mild- and severe-socioeconomic disadvantage when compared with none increased with increasing age, particularly among women. Among individuals aged 21–34 years, severe compared with no SDI, was associated with two-fold increased odds for non-adherence with medication (OR in men = 2.3, 95% CI: 1.4–3.6 and OR in women = 2.4; 95% CI: 1.6–3.5). The corresponding odds among individuals aged 65–84 years were three-fold increase among elderly men (OR = 3.3, 95% CI: 1.4–7.8) and six-fold increase among elderly women (OR = 6.2, 95% CI: 2.5–15.3) (Tables 2 and 3).

Other independent associations with primary non-adherence with medication were observed with lack of trust in health care and long-term illness. However, these associations were only consistent and strong for younger women (aged 21–49 years). For men lack of trust with health care was associated with not redeeming medication almost across all age groups, while long-term illness was only relevant for younger men (aged 21–34 years) and upper middle-aged men (aged 50–64 years) (Table 2).

### Discussion

Socioeconomic disadvantage was associated with primary non-adherence with medication, independent of long-term illness.
illness, educational level, living alone, risky lifestyle profile and trust in health care. The size of relative socioeconomic inequalities in primary non-adherence with medication increased with older age, particularly among women. In spite of the fact that every seventh elderly woman 65–84 years suffered from long-term illness, those who experienced severe socioeconomic disadvantage were at three- to fifteen-fold increased odds for not redeeming prescribed medication. The major concern in Europe has been on inappropriate and excess medication among the elderly. However, results in the present study indicate that elderly with unfavourable socioeconomic circumstances refrain from redeeming the medication prescribed on them. Canadian studies have shown socioeconomic differentials in choice and quality of prescribed medications [21–22], indicating a chain of socioeconomic inequalities in health care outcomes among the elderly.

In spite of the Swedish pro-equity policy [12–13] that target for ‘care on equal terms’ for all Swedish inhabitants, our results revealed that individuals who experience socioeconomic disadvantage do not access the care that they need. Given the fact that Sweden is an egalitarian country and the first country ever to have a National Public Health Policy endorsed by the parliament and supported by representatives from all political parties [12], results on large socioeconomic inequalities in primary non-adherence with medication should be taken more seriously in other countries without such equity-oriented health policies. Primary non-adherence is the first step in the process of compliance with medication and may have serious implications for survival or longevity. In addition, the costs associated with developing pharmaceutical drugs are enormous and would be a great financial loss to pharmaceutical companies and governments if people do not redeem medicines prescribed on them.

The international debate on access to medicines has largely focussed on low-income countries, particularly in relation to vaccines and medication for HIV/AIDS. However, results in the present study indicate a need to revisit the equity debate in relation to access to medicines in high-income countries, even in countries with a welfare model of social and redistribution policies such as that of Sweden.

Findings in the present study support some previous studies that have demonstrated financial barriers to contribute to non-adherence with medication [9, 23, 24]. However, it has been argued that individuals with unfavourable socioeconomic circumstances are more likely to be smokers, have excessive alcohol consumption, sedentary lifestyle and unhealthy dietary habits. Because of the pronounced prevalence of unhealthy behaviours among socially disadvantaged individuals, they have often been blamed for having inappropriate health behaviours that may prevent them from seeking the care that they need [24]. Our results do not provide any support for risky lifestyle profile being associated with not redeeming prescribed medication.

Our findings also support previous studies which have demonstrated lack of trust in the health care system to be associated with non-adherence with medication [7, 25–30]. It is still not well understood why patients develop mistrust in the health care system [26, 31–33] and the role that the health care system plays in this context [8, 26]. It is plausible that the quality of the relationship between health care professionals and patients and the capability of the health care system to satisfy the health care needs of the individual may determine patient’s trust and thus impact on adherence with medication [34–36].

Study limitations and strengths
There are limitations which need consideration when interpreting results in this present study. First, we defined the study population as those who during the past three months had at least one contact with a physician at a hospital or primary care centre since we aimed to investigate primary non-adherence among those who could have been prescribed medication. However, a more appropriate definition would have included a period of a year since in Sweden prescription for chronic diseases is often issued on annual basis. Second, except for sociodemographical information that was obtained from registers, we used self-reported information on all other variables including primary non-adherence. Self-report can be subject to a less objective self-presentation and recall biases [37]. However, self-reports have been documented to offer a reasonably valid estimate of differences in utilization of health care between socioeconomic groups in the general population [38]. Third, we did not get adequate information on reasons for not purchasing prescribed medication. This limits drawing conclusions on whether refraining from purchasing prescribed medication was due to financial barriers or due to other factors. Fourth, because our study was cross-sectional the direction of the association is difficult to determine. Nevertheless, we adjusted for long-term illness in all analyses and we believe that the interpretation of the results we expose seems to be the most plausible, given the large data set based on a national survey that is representative of Sweden. Fifth, the non-response rate was 37% and included a large proportion of men, socially disadvantaged individuals, and inhabitants in metropolitan areas. This possible selection bias could have lead to an underestimation of the true associations between socioeconomic disadvantage and primary non-concordance with medication.

Conclusions
Socioeconomic disadvantage increased the likelihood of primary non-adherence with medication particularly among elderly people. Results indicate that health policies for ‘care on equal terms’ in Sweden have been less successful particularly among the elderly. Inequities in redeeming prescribed medication may not only impair health of the financially deprived people but may also reduce the effectiveness of pharmacological preventive strategies. We hope that these results will contribute to giving more attention to inequities and inequalities in adherence with medication.
Acknowledgements

We would like to thank Karin Nykvist for her excellent assistance with the administration of the survey and data collection and Dr Lars Sundman, Samhällsmedicin Gävleborg, for his expertise with the instrument to measure access to health care services. We also thank the county councils of Gävleborg, Dalarna, Kronoberg, Kalmar, Blekinge, Jönköping, Halland, the region of Västra Götaland and the municipality of Gotland for making it possible to carry out the survey. We are indebted to the Statistics Sweden for carrying out the selection and Dr Lars Sundman, Samhällsmedicin Gävleborg, for his expertise with the instrument to measure access to health care services. W e also thank the county councils of Gävleborg, Dalarna, Kronoberg, Kalmar, Blekinge, Jönköping, Halland, the region of Västra Götaland and the municipality of Gotland for making it possible to carry out the survey. We are indebted to the Statistics Sweden for carrying out this survey.

References


Accepted for publication 21 February 2007