Social Science & Medicine 70 (2010) 802–812

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Can patient self-management explain the health gradient? Goldman and Smith's "Can patient self-management help explain the SES health gradient?" (2002) revisited☆

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ARTICLE INFO

Article history:
Available online 1 February 2010

Keywords:
Education
Health gradient
Patient self-management
USA

ABSTRACT

In their much-cited paper, "Can patient self-management help explain the SES health gradient?" Goldman and Smith (2002) use samples of diabetic and HIV+ patients in the United States to conclude that disease self-management is an important explanation for the much-documented positive gradient in education and health outcomes. In this paper, I revisit their analysis and point to some fundamental difficulties in interpreting their results as conclusive evidence in favor of self-management. I also argue that for individuals for whom self-management might be expected to matter –i.e. populations of patients managing complex conditions – economic factors such as resource availability and insurance access might be a more important mechanism behind the gradient than medical compliance. The impact of self-management, though it might matter, is likely to be small.

Introduction

There is a large literature documenting the positive association between education and health outcomes, known as the education-health gradient. The association holds across countries and over time, and it holds for different measures of health outcomes, such as mortality, morbidity, physical functioning, health behaviors and self-reported health (Cutler & Lleras-Muney, 2007, 2008; Grossman, 2006).

The continuing existence of the gradient indicates that education-driven health inequalities persist even as societies become healthier and more educated overall (Cutler & Lleras-Muney, 2008). If policy is to effectively alleviate such inequalities, we must first understand the different mechanisms driving the gradient and their relative importance. A large body of work has devoted itself to this task (Grossman, 2006; Mirowsky & Ross, 2003).

One group of theories focuses on the role of economic and labor market-related factors in driving the gradient (Cutler & Lleras-Muney, 2008; Mirowsky & Ross, 2003). Higher education facilitates full-time employment and the obtainment of better jobs (Pencavel, 1991; Ross & Wu, 1995). Better jobs have higher wages, leading to higher income, prevention of material deprivation and better access to quality healthcare (Andrulis, 1998; Card, 2001; Fiscella, Franks, Gold, & Clancy, 2000; Marmot, 2002; Pencavel, 1991). Better jobs also typically entail better working conditions and more opportunities for productive self-expression (Brown, 1980; Kohn, 1976; Lazear & Oyer, 2007). The availability of resources can alleviate the stress associated with economic hardship (Fremont & Bird, 2000; Ross & Huber, 1985). Finally, economic stability can help to ease time and money constraints which impede the adoption of healthy practices (Cutler & Lleras-Muney, 2007). All of these factors have a positive effect on health (Bindman et al., 1995; Karasek et al., 1988; Ross & Mirowsky, 1995; Ross & Van Willigen, 1997; Zhang et al., 2008).

Another set of theories invokes behavioral factors to explain the gradient. Social scientists have proposed that 'learned effectiveness' plays an important role in motivating behaviors that lead to healthier outcomes (Mirowsky & Ross, 2003). One aspect of learned effectiveness is cognitive: the ability to seek and use information to successfully achieve one's goals. Another aspect, such as 'personal control', is non-cognitive: the belief that personal actions are responsible for outcomes, and the confidence in one's ability to affect the same. Education enhances both cognitive and non-cognitive aspects of learned effectiveness by imparting specific knowledge and skills such as critical thinking (Cutler & Lleras-Muney, 2007; de Walque, 2004, 2005; Lleras-Muney & Lichtenberg, 2002; Rosenzweig & Schultz, 1989; Spandorfer, Karras, Hughes, & Caputo, 1995; Williams, Baker, Honig, Lee, & Nowlan, 1998), and by increasing exposure to and confidence in problem solving thereby

☆ I would like to thank Anne Case, Adriana Lleras-Muney, Joshua Goldstein and two anonymous referees for their many useful comments on this paper. All remaining errors are my own.

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doi:10.1016/j.socscimed.2009.08.043

generating a sense of control (Fremont & Bird, 2000; Mirowsky & Ross, 2003; Ross & Wu, 1995; Seeman & Seeman, 1983; Seeman, Seeman, & Budros, 1988).

Both the economic and behavioral mechanisms described above assume that good health is a universally desirable goal. But economists have argued that personal goals are themselves determined by individual preferences (Cutler & Lleras-Muney, 2007, 2008). Education could alter these preferences.

Specifically, education could make individuals more averse to risk; it could also make individuals value the future more or lower their discount rates (Becker & Mulligan, 1997; Fuchs, 1982; Leigh, 1990). This could lead to greater investment in health, and hence healthier outcomes. Early-childhood or intrauterine environment has been suggested as another individual-specific factor that could be responsible for health outcomes (Barker, 1995, 1997; Case, Fertig, & Paxson, 2005; Ravelli et al., 1998).

Yet another group of theories suggests that education affects health outcomes through its social impact. Education enables access to networks which provide financial, psychological and emotional support (Berkman, 1995; Berkman & Syme, 1979; Cutler & Lleras-Muney, 2008). Societal rank and peer effects may also influence health outcomes (Cutler & Glaeser, 2007; Marmot, 2002).

These explanations are not mutually exclusive. For example, economic factors (e.g. job characteristics) or social factors (e.g. social rank) could drive the gradient by enhancing personal control (Ross & Mirowsky, 1992) or a related concept, self-efficacy (Berkman, 1995; Mirowsky & Ross, 2003). These and other linkages have been extensively investigated, but even so, much of the education-health gradient remains unaccounted for (Cutler & Lleras-Muney, 2007, 2008; Kenkel, 1991; Lahelma, Martikainen, Laaksonen, & Aittomaki, 2004; Meara, 2001; Mirowsky & Ross, 2003).

In a much-cited paper, Goldman and Smith (2002) argue that education impacts health via its effect on disease management. The argument is based on the cognitive advantage hypothesis of social scientists (Mirowsky & Ross, 2003). Education enhances cognitive skills and is hence a good proxy for the ability to comprehend and execute complex treatment regimens. Education is also a marker for the ability to internalize the future outcomes of poor behavior. Education thus leads to better self-management behavior, and hence to better health outcomes.

Goldman and Smith test their hypothesis for patients from different samples suffering from two chronic conditions – insulin-dependent diabetes and HIV – known for the complexity of their treatment regimens. Treatments for these conditions are potentially efficacious, but often involve intricate combinations of oral and injected medications, constant monitoring, and meticulous coordination. As such, careful disease management is vital to better health outcomes.

In this paper, I revisit Goldman and Smith's (2002) analysis of diabetics from the Health and Retirement Study (HRS), and highlight several difficulties in interpreting their results as evidence that self-management drives the gradient. Furthermore, I argue that in patients for whom self-management of conditions might matter – viz. individuals with chronic conditions requiring complex treatments – economic factors such as resources and access to healthcare are likely to matter more. While cognitive ability is an advantage for successful disease self-management, it is not sufficient; a necessary condition for such management to be effective is the affordability of treatment. The availability of resources ensures that long-term complex treatments remain affordable; it also gives individuals the potential to bypass the need for self-management by hiring caregivers.

Results using Goldman and Smith's sample of HIV+ patients are not presented here, but point to the same qualitative conclusions, both regarding the flaws in the argument and the relative importance of economic factors.

Specifically, I find that resource availability and insurance access are the two most important individual factors explaining the gradient in the HRS sample of diabetics. Controlling for these factors reduces the gradient by 34% and 27%, respectively. Cognitive ability is the third most important factor, although the magnitude of its impact (11%) is only a third that of economic resources. Other factors that explain the gradient, albeit by very little, are health behaviors (smoking, drinking, exercise) and risk preferences. Considered jointly, all of these factors explain close to 60% of the gradient in education and health.

This leaves 40% of the gradient to be explained by mechanisms beyond those considered here. Some of these mechanisms may be even more important than economic factors; future research must identify these. However, my results strongly suggest that economic factors may matter more for explaining the education-health gradient than disease self-management, in populations where the latter might be most important.

Does patient self-management explain the gradient? Revisiting Goldman and Smith

Goldman and Smith (2002) use panel data from three U. S. surveys covering two conditions (diabetes and HIV). They employ a two-step argument to establish the role of patient self-management in driving the gradient. First, they show that poor adherence to treatment regimens by patients increases the likelihood of their reporting a deterioration in health between the first and later waves. Next, they demonstrate that such poor behavior is significantly less likely to occur among more educated respondents. These two steps are combined to imply that education reduces the type of self-management behavior associated with a worsening of health. Hence, self-management drives the education-health gradient.

Replication of Goldman and Smith (2002): diabetic patients (HRS)

The sample is drawn from the US Health and Retirement Study (HRS), a nationally representative longitudinal survey of 12,650 respondents born between 1931 and 1941, and their spouses. The respondents are followed over time at two-year intervals, beginning in 1992. I follow Goldman and Smith (2002) in using the first four waves of the survey, conducted in 1992, 1994, 1996 and 1998. The sample includes 862 respondents who reported being diagnosed with diabetes in the first wave and who are followed in each wave till 1998. Summary statistics are reported in Table 1.

Goldman and Smith define poor self-maintenance behavior as any one or more of three practices: if a patient on any treatment regimen stops completely (practice A), if she switches from one treatment regimen to another before returning to the original regimen (practice B), or if she adds a second treatment over time to the first (practice C).

Table 2 (column 2) and Table 3 replicate, and are consistent with, Goldman and Smith's results.

Table 2 shows ordered probits of change in self-reported health status (SRHS) between the first and fourth waves, on education and other controls. The coefficients on the education categories represent the gradient. As expected, higher education is associated with an improvement in health over the waves (column 1). In particular, respondents with 12 years and 13–15 years of education are significantly more likely to report an improvement in health than those with 0–11 years.

Column 2 of Table 2 introduces poor self-maintenance behavior (as defined by Goldman and Smith) as an independent variable. Poor behavior significantly increases the likelihood of a worsening of health across the waves; this is the first step in the two-step argument.