Socioeconomic differences in disability by age in sub-Saharan Africa: A cross-national study using the World Health Survey

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Introduction

Lower socioeconomic status (SES) has been shown to be related positively to poorer health among many populations in various social contexts (Adler et al., 1994; Hosseinpoor et al., 2013; von dem Knesebeck, Verde, & Dragano, 2006). This relationship appears robust across multiple indicators of both SES (for example, education, income, occupation, and wealth) and health (mortality, chronic diseases, disability, and self-rated health) (Hosseinpoor et al., 2013; Hosseinpoor, Stewart Williams, Itani, & Chatterji, 2012; House et al., 1994; Lauderdale, 2001; Ross & Wu, 1996). The robustness and virtual universality of the SES-health relationship have increased recognition of its central place in efforts to understand and improve overall population health around the world (Herd, Goesling, & House, 2007).

Prior research has provided good theoretical insights into the mechanisms behind the relationship between measures of SES (especially education) and health. For example, education is thought to improve health by providing not only economic resources (such as income and occupation), but also psychosocial resources such as personal control, social support, coping skills and problem-solving abilities, as well as knowledge of health risks (Mirowsky & Ross, 2003; Ross & Wu, 1995). Poorly educated people appear to face a greater amount of chronic stressors and negative life events, which may have negative effects on health (Lantz, House, Mero, & Williams, 2005; Turner, Wheaton, & Lloyd, 1995). Moreover, the less educated are less likely to engage in health-promoting behaviors such as good nutrition, physical activity, utilization of health care, and abstaining from smoking (Lantz et al., 1998; Mirowsky & Ross, 2003).

Despite the vast amount of literature on the relationship between SES and health, most research has been conducted in Western countries. In non-Western settings, the majority of studies that have examined this issue, with a few exceptions (Chen, Yang, & Liu, 2010; Hosseinpoor et al., 2013; Hosseinpoor et al., 2012), has focused mainly on Asian, Latin American and Caribbean countries and on the elderly persons. These studies generally showed a more erratic and weaker relationship between measures of SES and health than in Western countries (Beydoun & Popkin, 2005; Rosero-Bixby & Dow, 2009; Smith & Goldman, 2007; Zimmer & Amornsirisomboon, 2001). However, given that most of these studies have focused specifically on the elderly population, not only their results only represent a truncated examination of the SES-health relationship, but also they could not address possible variations

in the effects of SES on health covering a broad range of age from early adulthood to very old ages. In the developed world, the empirical evidence on age differences in the relationship between SES and health is conflicting, and much remains unknown about whether these differences increase, decrease or remain stable across age (Leopold & Engelhartdt, 2013).

Therefore, the age gradient in the relationship between SES and health is still a largely open question. This issue is currently discussed in the literature in terms of three contrasting theoretical hypotheses: the cumulative disadvantage hypothesis, the age-as-leveller hypothesis, and the status maintenance hypothesis (Leopold & Engelhartdt, 2013). The cumulative disadvantage hypothesis suggests that socioeconomic differences in health continue to increase with age due to the fact that the effects of initial disadvantages in SES accumulate with age to produce wide health disparities between socioeconomic groups in later life (Lynch, 2003; Ross & Wu, 1996).

The age-as-leveller hypothesis, on the other hand, posits that the SES-health relationship increases from young age to middle age and then decreases in old age (House et al., 1994), suggesting that age acts as a levelling force, which shrinks the health gap by SES in later life (Herd, 2006). One explanation for this narrowing of health inequalities by SES at older ages may be later-life reductions in socioeconomic differences in exposure to psychosocial and behavioral risk factors, as well as in the risk factors' effect on health (House et al., 1994). Another explanation is that over age, changes in health become more closely related to age than to any other predictor, and thus the health effects of SES may diminish with age (House et al., 1994). However, a major explanation for why health differentials by SES narrow in later life may be mortality selection, which biases downwards the "true" SES-health relationship at older ages (Lynch, 2003).

Finally, the status maintenance hypothesis proposes that the effect of SES on health remains rather stable irrespective of age (O'Rand & Henretta, 1999), suggesting that social positions which individuals attain in early adulthood do not change considerably in later life. Thus, the health gap between different socioeconomic groups is expected to remain constant across their lives (Leopold & Engelhartdt, 2013).

To date, empirical research has found evidence for all three potential types of age gradient in the SES-health relationship mentioned above. For example, using data for US adults, an increase in the strength of the SES-health relationship across the life course has been found for various health outcomes (Kim & Durden, 2007; Lynch, 2003; Ross & Wu, 1996). In contrast, a decrease in the relationship between SES and health outcomes in old age, consistent with the age-as-leveller, has been reported (Elo & Preston, 1996; Herd, 2006; House et al., 1994). Still studies conducted in European societies with strong social welfare policies for people of all ages support for a constant effect of SES on health over the life course, consistent with the status maintenance hypothesis (Marmot & Fuhrer, 2004; Schöllgen, Huxhold, & Tesch-Römer, 2010).

In sum, previous research, conducted almost exclusively in Western countries, has documented a positive robust relationship between low SES and poor health, although there is a debate as to whether this relationship increases, decreases or remains stable with age. The conflicting findings about age variation in the effects of SES on health stress how the strength of the SES-health relationship may depend on the socioeconomic context (Park, 2005), and highlight the importance of studying this issue in sub-Saharan African settings.

In an effort to fill this knowledge gap, this study exploits data from the World Health Survey (WHS) conducted in 2002-2004 by the World Health Organization (WHO) (Üstün, Chatterji, Mechbal, Murray, & WHS Collaborating Groups, 2003) to examine the relationship between SES and multiple disability measures among adults aged 18 and older in 18 sub-Saharan African countries, and to determine whether socioeconomic differences in disability are characterized by an increase, decrease or stability with increasing age. In 2003 (the year most of the surveys were conducted), apart from Mauritius, which was an upper middle-income country, all the other countries under study were low-and lower middle-income countries (World Bank, 2005).

To address our research questions, this study relies on one measure of SES (education level) and difficulties in eight core functional domains (mobility, self-care, pain and discomfort, cognition, interpersonal activities, vision, sleep and energy, and affect) developed by the WHO (Salomon, Mathers, Chatterji, Sadana, & Üstün, 2003). Although methodological challenges pertaining to the comparability of health status data across populations may exist, previous research has shown that the WHO functional domains are highly consistent across countries (Üstün et al., 2003). By conducting our analyses separately for every functional domain, we highlight the heterogeneity of the trajectories of education-related inequality in different disability measures.

Methods

Study population and sampling

This study used data from the World Health Survey (WHS), which was conducted by the WHO in 2002-2004 in 70 countries across the world (Üstün et al., 2003). The WHS was designed to use standardized modules and instruments for collecting cross-sectionally comparable data on health status for populations from 6 world regions (Üstün et al., 2003). In each participant country, the WHS was designed to produce a nationally representative sample of non-institutionalized men and women aged 18 and older. This study concerns 67,461 adults aged 18 and older from the 18 sub-Saharan African countries which have participated in the WHS: Burkina Faso, Chad, Comoros, Congo, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Malawi, Mali, Mauritius, Mauritania, Namibia, Senegal, South Africa, Swaziland, Zambia and Zimbabwe.

Variables

Outcome variables

The WHS participants aged 18 and older were asked to rate the degree of difficulty they had experienced in each of the eight functional domains in the previous 30 days. The response categories were: 1 = no difficulty, 2 = mild difficulty, 3 = moderate difficulty, 4 = severe difficulty, 5 = extreme difficulty/cannot do. In this study, the outcome variable is the dichotomy poor functional health (comprising the functional domain responses "moderate", "severe" or "extreme/cannot do") vs. good functional health (comprising the functional domain responses "none" or "mild"). This binary outcome variable was created for each functional domain.

Explanatory variables

We use education level as the key measure of SES. The socio-demographic variables considered as covariates were: sex (male vs. female), age (18-29, 30-39, 40-49, 50-59, 60-69, and 70+ years), marital status (never married, married/cohabiting, and separated/divorced/widowed), place of residence (rural vs. urban), and country of residence.

Statistical analysis

We began by examining unadjusted bivariate associations between education level and measures of disability using pooled data from all 18 sub-Saharan African countries considered. We then used logistic regression models to estimate the association of each measure of disability with education level, controlling for sociodemographic factors. Finally, we examined age variations in the associations between educational level and each measure of disability. Therefore, we added interaction terms between age and education to the logistic regression models. The estimated coefficients for interaction terms allowed us to calculate average predicted probabilities of each binary outcome variable for each education level across multiple age groups. We presented these predicted probabilities as graphical representations to explore the form of the interactive relationships. This analytical strategy enabled us to detect patterns of convergence, divergence or stability by education level across age. Due to the complex sampling strategy used to collect the WHS data, all models were estimated using the Huber/White estimator of variance in Stata. All analyses were weighted using the available sampling weights.

Results

Educational differences in poor functional health

Poor functional health was more prevalent in individuals without education than in more highly educated persons. For all functional domains (except for affect), a descending gradient in the prevalence of poor

functional health was observed, running from to the lowest to the highest educated individuals. Logistic regression models showed that there was a significant increase in the odds of poor functional health with decreasing education level, after controlling for sociodemographic factors. Educational inequalities (to the detriment of noneducated people) in health were consistently statistically significant for all functional domains (except for affect). However, the size of these inequalities varied across functional domains.

Age differences in the relationship between education and poor functional health

The predicted probability of poor functional health gradually increased with advancing age for all educational levels, and the pattern of findings was observed for all functional domains. For every functional domain, the predicted probability of poor health was higher among individuals without education, and differences between educational groups generally seem to remain relatively constant with advancing age. In sum, the predicted values of the eight functional domains, although different in terms of shape, all had a relatively constant gap across educational levels over age. These findings support for the status maintenance hypothesis in sub-Saharan Africa.

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