Social Science & Medicine 142 (2015) 37–46

Contents lists available at ScienceDirect

Social Science & Medicine

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

The causal effect of education on HIV stigma in Uganda: Evidence from a natural experiment

Alexander C. Tsai [a, b, c, *], Atheendar S. Venkataramani [a, b, d]

[a] Massachusetts General Hospital, MGH Global Health, Boston, MA, USA
[b] Harvard Center for Population and Development Studies, Cambridge, MA, USA
[c] Mbarara University of Science and Technology, Mbarara, Uganda
[d] Division of General Internal Medicine, Department of Medicine, Massachusetts General Hospital, Boston, MA, USA

ARTICLE INFO

Article history:
Received 7 March 2015
Received in revised form
1 August 2015
Accepted 6 August 2015
Available online 10 August 2015

Keywords:
AIDS/HIV
Behavioral interventions
Developing countries
International health
Social determinants

ABSTRACT

Rationale: HIV is highly stigmatized in sub-Saharan Africa. This is an important public health problem because HIV stigma has many adverse effects that threaten to undermine efforts to control the HIV epidemic.
Objective: The implementation of a universal primary education policy in Uganda in 1997 provided us with a natural experiment to test the hypothesis that education is causally related to HIV stigma.
Methods: For this analysis, we pooled publicly available, population-based data from the 2011 Uganda Demographic and Health Survey and the 2011 Uganda AIDS Indicator Survey. The primary outcomes of interest were negative attitudes toward persons with HIV, elicited using four questions about anticipated stigma and social distance.
Results: Standard least squares estimates suggested a statistically significant, negative association between years of schooling and HIV stigma (each $P < 0.001$, with t-statistics ranging from 4.9 to 14.7). We then used a natural experiment design, exploiting differences in birth cohort exposure to universal primary education as an instrumental variable. Participants who were <13 years old at the time of the policy change had 1.36 additional years of schooling compared to those who were ≥13 years old. Adjusting for linear age trends before and after the discontinuity, two-stage least squares estimates suggested no statistically significant causal effect of education on HIV stigma (P-values ranged from 0.21 to 0.69). Three of the four estimated regression coefficients were positive, and in all cases the lower confidence limits convincingly excluded the possibility of large negative effect sizes. These instrumental variables estimates have a causal interpretation and were not overturned by several robustness checks.
Conclusion: We conclude that, for young adults in Uganda, additional years of education in the formal schooling system driven by a universal primary school intervention have not had a causal effect on reducing negative attitudes toward persons with HIV.

1. Introduction

While there is a general scientific consensus that socioeconomic status as measured by educational attainment correlates positively with health outcomes (Montez and Friedman, 2015), there has been considerably more debate about the link between education and HIV risk. Analyses of cross-sectional data have generated somewhat conflicting conclusions (de Walque et al., 2005; Hargreaves et al., 2008a; Hargreaves and Glynn, 2002; Hargreaves et al., 2008b). A more recent and growing body of work has demonstrated causal associations between greater educational attainment and lower HIV risk in several sub-Saharan African countries (Alsan and Cutler, 2013; Behrman, 2015; De Neve et al., 2015; Dupas, 2011). The mechanisms underlying this observed association may include increased exposure to HIV prevention messages and uptake of related HIV prevention activities, such as condom use, abstinence, and male circumcision (Agüero and Bharadwaj, 2014; Gummerson, 2013; Gummerson et al., 2013).

* Corresponding author. Massachusetts General Hospital, MGH Global Health, 125 Nashua Street, Suite 722, Boston, MA 02114, USA.
E-mail address: actsai@partners.org (A.C. Tsai).

http://dx.doi.org/10.1016/j.socscimed.2015.08.009
0277-9536/

Less clear is whether (lack of) educational attainment influences other important HIV-related outcomes, particularly negative attitudes toward persons with HIV. In many countries throughout sub-Saharan Africa, HIV is highly stigmatized (Genberg et al., 2009; Kalichman et al., 2005; Maman et al., 2009; Nyblade et al., 2003; Tsai, 2015). This is an important public health issue because, in general population samples, negative attitudes toward persons with HIV have been associated with reduced uptake of HIV testing and increased HIV transmission risk behaviors (Corno and de Walque, 2013; Delavande et al., 2014; Kalichman and Simbayi, 2003; Kelly et al., in press; Pitpitan et al., 2012). Among persons with HIV, internalization and anticipation of these negative attitudes are associated with isolation and depression (Fife and Wright, 2000; Link, 1987; Link et al., 1989; Simbayi et al., 2007; Takada et al., 2014; Tsai, 2014; Tsai et al., 2012) and may compromise HIV treatment adherence and engagement in care (Govindasamy et al., 2012; Katz et al., 2013; Sikkema et al., 2010; Tsai et al., 2013b, 2010).

In cross-sectional studies, education and HIV-related knowledge have been found to be inversely associated with HIV stigma (Babalola et al., 2009; Chiao et al., 2009; Girma et al., 2014; Stephenson, 2009), but the estimation strategies employed in these studies do not permit inference about the degree to which the observed association is causal. The hypothesized causal influence of education on HIV stigma is motivated by a larger body of research in political science and sociology in which formal schooling is thought to be one of the most important socializing agents in deepening one's commitment to the norm of tolerance (Prothro and Grigg, 1960). Consistent with this line of research, formal schooling has played a major role in weakening negative attitudes toward stigmatized "outgroups" in the U.S., including racial (Hyman and Sheatsley, 1964), religious (Rosenfield, 1982), and sexual minorities (Loftus, 2001), as well as increasing tolerance in general (Bobo and Licari, 1989; Knoke and Isaac, 1976). Overall, the link between formal schooling and tolerance for outgroup members has been described as "one of the most stable and consistent findings in empirical social research of contemporary American society" (Weil, 1985) (p.458). Quinley and Glock (1979), writing about anti-Semitism in the U.S., proposed a threefold mechanism of action through which education was thought to increase tolerance: providing students with greater knowledge about the historical, social, and political factors responsible for group differences; teaching students to recognize prejudice and its negative social impacts; and imparting cognitive skills, which in turn increase capacity to recognize prejudice. The dominant approach to HIV stigma reduction in the intervention literature has accordingly relied on psycho-educational strategies such as information provision, counseling, and testimonials (Brown et al., 2003; Sengupta et al., 2011; Stangl et al., 2013). However, many of these studies have employed designs that lack sufficient rigor to permit causal inference and in general have had varying degrees of success. Furthermore, some studies have shown that HIV stigma is actually increasing in countries like South Africa and Uganda (Chan et al., 2015b; Maughan-Brown, 2010) where average educational attainment has been rising, potentially calling into question the hypothesis that formal schooling reduces stigma. To date, the causal influence of education on negative attitudes toward persons with HIV still remains unclear.

To address this gap in the literature, we sought to determine the extent to which education is causally related to HIV stigma. The implementation of a universal primary education (UPE) policy in Uganda in 1997 provided us with a natural experiment to test this hypothesis. Specifically, the primary aim of this study was to estimate the causal relationship between additional years of schooling in the formal education system and negative attitudes toward people living with HIV.

2. Methods

2.1. Ethics statement

The ICF International Institutional Review Board approved all data collection procedures for the 2011 Uganda Demographic and Health Survey (UDHS) and the 2011 Uganda AIDS Indicator Survey (UAIS). The UAIS was additionally reviewed and approved by the Science and Ethics Committee of the Uganda Virus Research Institute and a review committee at the U.S. Centers for Disease Control and Prevention. Consistent with national guidelines, the UAIS received clearance from the Uganda National Council of Science and Technology. The specific analysis described in this article was approved by MEASURE DHS. Because this analysis was based on deidentified, public-use data, no additional approval was sought from the Partners Human Research Committee.

2.2. Data sources

The data for this analysis were pooled from the 2011 UDHS and UAIS. The UDHS is a publicly available, population-based survey implemented by the Uganda Bureau of Statistics with technical assistance from ICF International (through the MEASURE DHS project), the Ugandan Ministry of Health, Makerere University School of Public Health, and the Biochemistry Department of Makerere University. The UAIS is a publicly available, population-based survey implemented by the Uganda Ministry of Health with technical assistance from ICF International, the Uganda Bureau of Statistics, and the Uganda Virus Research Institute. Both the UDHS and UAIS employed a multistage stratified design with probabilistic sampling, with enumeration areas selected from a list of previously sampled clusters and a fixed number of households selected from within each cluster. In the UDHS, all women of reproductive age (15–49 years) who were either permanent household residents or visitors who slept there the night before the survey were eligible for participation; and in a subsample of one-third of the households, all men aged 15–54 years were eligible for participation if they were either permanent household residents or visitors who slept there the night before the survey. In the UAIS, all women and men aged 15–59 years who were either permanent household residents or visitors who slept there the night before the survey were eligible for participation. Among the 10,086 households selected for the UDHS, the response rate was 94 percent among women and 89 percent among men. Among the 11,434 occupied households selected for the UAIS, the response rate was 98 percent among women and 96 percent among men. Additional details regarding pretesting, field training, and survey implementation can be found in the UDHS and UAIS country reports (Uganda Bureau of Statistics & ICF International Inc., 2012; Uganda Ministry of Health, 2012).

2.3. Measures

The primary outcomes of interest were negative attitudes toward persons with HIV, which were elicited in the UDHS and UAIS with four questions administered to study participants who reported that they had "ever heard of an illness called AIDS." These questions have been proposed as core indicators for monitoring the HIV epidemic by the Joint United Nations Programme on HIV/AIDS (UNAIDS, 2000) and have been incorporated – with minor variations by country – in DHS conducted throughout sub-Saharan Africa (Mishra et al., 2009). The first question is: "If a member of your family got infected with the AIDS virus, would you want it to remain a secret or not?" An affirmative response to this question indicates subjective awareness of negative attitudes toward