



Different forms of household wealth are associated with opposing risks for HIV infection in East Africa

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ABSTRACT

The relationship between material wealth and HIV infection in sub-Saharan Africa has been the subject of considerable debate in part because many studies show that wealth is positively associated with infection. Others have critiqued such results, suggesting that the widely used indicators of wealth underlying these results fail to capture the diversity of livelihood portfolios in East Africa. Using population representative data from 35,799 households in Kenya, Ethiopia, and Tanzania, we estimate household wealth along two different dimensions, associated respectively with success in wage economies and agricultural economies. Regression models for men and women show consistent and opposing associations between type of wealth and HIV infection. Controlling for age, education, and urban dwelling, increasing achievement along the wage economy dimension is positively (often significantly) associated with HIV infection. In contrast, increasing achievement along the agricultural economy dimension is often negatively associated with HIV infection, and is never associated with increased HIV risk. Interestingly, variables to assess risky sexual behaviors do not mediate the relationship between either type of wealth and HIV infection. Our results suggest that future studies on the relationship between HIV and wealth need to take into account the different dimensions of household wealth found in East African countries. Our results also generate new, important questions about why and how different forms of wealth drive HIV infection.

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1. Introduction

More than a decade ago, public health researchers began to identify a puzzling relationship between wealth and HIV in sub-Saharan Africa. First in Kenya and then in Tanzania, nationally-representative and cross-sectional surveys showed that men and women in wealthier households were at substantially greater risk of HIV infection than those from poorer households (Shelton, Cassell, & Adetunji, 2005). These findings were soon confirmed in a number of other countries, including Ghana, Malawi, Lesotho, Cameroon, and Burkina Faso (Mishra et al., 2007), and generated considerable debate about the social roots of HIV infection (Bingenheimer, 2007; Fox, 2012; Gillespie, Kadiyala, & Greener, 2007; Hargreaves, Davey, & White, 2012; Hargreaves, Davey, Fearon, Hensen, & Krishnaratne, 2015; Long & Deane, 2015; Lopman et al., 2007; Mishra et al., 2007; Parkhurst, 2010; Shelton et al., 2005). A positive relationship between HIV and wealth (or, HIV and education, Forston, 2008) potentially

challenged emerging arguments that poverty-alleviation programs are a “key intervention in the fight against HIV” (Fenton, 2004). More broadly, they also provided a puzzling counter-example to the recurring finding in population health that indices of individual and household wealth robustly predict improved health across a range of measures (Wilkinson, Marmot, & ebrary Inc. 2003). Indeed, so robust is the positive association between access to resources and health that some social epidemiologists have labeled wealth and socioeconomic position “fundamental causes” in understanding the distribution of health across time and space (Link & Phelan, 1995).

Not surprisingly then, the paradoxical nature of the HIV-wealth relationship in sub-Saharan Africa generated considerable scholarship. For example, researchers have sought to describe more complex associations between household wealth and HIV, and have tried to explain varied findings on the relationship between HIV and wealth by testing the hypothesis that wealth might be positively associated with HIV infection early in an epidemic while later turning into a negative relationship as the epidemic unfolds over time—the so called “inverse equity hypothesis” (Hargreaves et al., 2012) (Victora, Vaughan, Barros, Silva, & Tomasi, 2000). However, these hypotheses met little empirical support in a recent

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study on the relationship between education and HIV infection among young people in East and Southern Africa (Hargreaves et al., 2015). Still others have focused on the interaction between household and national level poverty and wealth. For instance, Parkhurst (2010) suggested that wealth might be positively associated with infection probability in lower-income countries, whereas in higher-income countries the association may turn negative. Fox (2012) looked within countries and, also relying on DHS surveys, examined how the HIV-socioeconomic status association varies across wealthier and poorer regions, and, specifically, examined the role inequality may play in patterning the SES-HIV association. Her results from 170 regions in 16 countries show that “inequality trumps wealth” and that in wealthier regions/countries, poorer individuals are more likely to be infected, whereas in poorer regions/countries, wealthier individuals are more likely to be infected.

The results from each of these important studies rest critically on how household wealth is conceptualized and measured. It is important therefore to note that wealth estimates from the Demographic and Health Surveys (DHS) have dominated most work on the relationship between HIV and wealth with their large samples of households and individuals who have been tested for HIV. These studies have generally treated the measurement of wealth as unproblematic and have relied exclusively and uncritically on the DHS wealth index (Bingenheimer, 2007). The DHS wealth index is generated through a principal component analysis on household-level asset data, household construction attributes, and other variables such as source of drinking water. Consumer goods and modern housing construction load heavily on the first component, which ultimately becomes the wealth measure. On the other hand, the DHS wealth index down weights the importance of “traditional” forms of wealth, such as animal and land holdings, even though many African households construct a living through engagement in either a wage economy or an agricultural economy. This strongly suggests that this measure reflects a narrow conceptualization of wealth, specifically engagement in a wage economy. Based on this concern, Bingenheimer (2007) questioned the finding of many studies on the HIV-wealth relationship, specifically noting that the one-dimensional “wealth” scale used so frequently in HIV-wealth studies is “inconsistent with the complexities of contemporary African livelihoods” and, therefore, results linking “wealth” to HIV are potentially misleading. This leaves open the question of whether wealth matters for HIV or whether specific forms of wealth matter. This is the question we take up in this study.

Consistent with Bingenheimer’s critique, anthropologists have spent considerable time unpacking and contextualizing the meanings of wealth and exploring the diverse ways in which people can craft livelihoods to accumulate wealth (Ferguson, 1992; Guyer, 1995; Hruschka, Hadley, & Hackman, 2017; Kaiser, Hruschka, & Hadley, 2017), finding, as Bingenheimer notes, that livelihoods can be complex. Anthropologists have explicated and debated the nature of wealth, assessing the extent to which wealth is a uni- or multidimensional construct, and determining what value is added to our understanding of health by incorporating locally appropriate wealth measures (Hadley & Wutich, 2009; Hruschka et al., 2017; Little, McPeak, Barrett, & Kristjanson, 2008; Tucker, Huff, Tsiazonera, Hajaso, & Nagnisaha, 2011). Not surprisingly, these authors argue, whether implicitly or explicitly, that the diversity of livelihoods observed ethnographically might not map perfectly onto a single dimension of wealth. By drawing on ethnographic and experience-near knowledge, anthropologists have highlighted the diverse ways in which people make a living that, though successful, are orthogonal to capitalist modes of asset acquisition (BurnSilver, Madganz, Stotts, Beman, & Kofinas, 2016; Ferguson, 1992; Guyer, 1995; Little et al., 2008). The radically con-

textualizing approach of anthropology, contrasts with the use of single wealth metrics that are often applied cross-nationally. Notably, the Demographic and Health Surveys—multicountry, multiyear and nationally representative datasets—rely on a single wealth dimension based on asset ownership (Filmer & Pritchett, 2001; Rutstein, Johnson, Macro, & MEASURE, 2004). This measure and its single-dimensional variants may be among the most frequently used wealth indices in the health and social science literature (Hruschka, Gerkey, & Hadley, 2015; Rutstein & Stavestag, 2014; Smits & Steendijk, 2015). As such, as Bingenheimer hypothesized, it is possible that conclusions about the relationship between HIV and household wealth are marred by focusing on only one kind of wealth and, therefore, fail to consider the diverse pathways through which households accumulate material goods and status.

There is reason to believe that different forms of wealth will be differentially related to HIV risk. The growing literature on “sugar daddies” and transactional sex in sub-Saharan Africa repeatedly calls attention to cash and the material nature of the wealth exchanged. While reports highlight the exchange of sex for food (Weiser et al., 2007), especially among food insecure women, a more common theme, in both rural and urban settings, is the emphasis on the exchange of money, material goods, “fashionable goods”, items linked with “conspicuous consumption” (Dunkle et al., 2007; Fielding-Miller, Dunkle, Cooper, Windle, & Hadley, 2016; Luke, Goldberg, Mberu, & Zulu, 2011; Maganja, Maman, Groves, & Mbwambo, 2007; Stoebenau, Heise, Wamoyi, & Bobrova, 2016; Wamoyi, Wight, Plummer, Mshana, & Ross, 2010) or, as Masvawure (2010) notes, exchanging sex to be seen as “high-status, successful modern subjects.” Free lists of the items women hope to gain in sex transactions are overwhelmingly dominated by material goods (Fielding-Miller et al., 2016) and material exchange for sex has been linked with increased risk of HIV (Dunkle et al., 2004). These results suggest that wealth along a wage dimension may result in differential risk for HIV infection, perhaps mediated by increased numbers of partners, lack of condom use, or as suggested by Shelton et al, concurrent sexual partners (Shelton et al., 2005).

Until recently, a key barrier to assessing Bingenheimer’s critique is the lack of diverse livelihood and wealth measures in the kinds of large, representative surveys that dominate discussions about the HIV-wealth relationship (Howe et al., 2012). This has changed in the last decade, as Demographic and Health Surveys have begun to ask standard questions about agricultural wealth, such as land and livestock ownership. Recently, researchers have applied standard data reduction techniques (such as Multiple Correspondence Analysis) to these new data to estimate and validate multiple dimensions of wealth (Greenacre and Joe, 2006; Hruschka et al., 2017; Pagès, 2016). Applying these techniques to nationally representative survey data from Nepal, Bangladesh, Ethiopia, Kenya, Tanzania, and Guatemala, Hruschka et al. (2017) estimated a number of meaningful and reliable wealth dimensions. In each case, the MCA revealed at least two wealth dimensions in each country, and these generally mapped onto achievement: (1) in the wage economy and (2) the agricultural economy. Moreover, both achievement in the wage economy and agricultural economy showed strong positive associations with indicators of child and adult growth and household food insecurity, indicating that both dimensions of wealth positively contributed to physical wellbeing. In Kenya and Nepal a third reliable wealth dimension was also estimated which provided information about the kinds of agricultural livelihoods a household was pursuing (e.g. specializing in cattle ownership), but did not assess achievement per se. These results robustly suggest that multiple, orthogonal dimensions of wealth can contribute to our understanding of social inequality and health outcomes, and a one-dimensional wealth measure, especially one

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