No association between gender inequality and peak HIV prevalence in developing countries – an ecological study

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The prevalence of both gender inequality and HIV prevalence vary considerably both within all developing countries and within those in sub-Saharan Africa. We test the hypothesis that the extent of gender inequality is associated with national peak HIV prevalence. Linear regression was used to test the association between national peak HIV prevalence and three markers of gender equality – the gender-related development index (GDI), the gender empowerment measure (GEM), and the gender inequality index (GII). No evidence was found of a positive relationship between gender inequality and HIV prevalence, either in the analyses of all developing countries or those limited to Africa. In the bivariate analyses limited to Africa, there was a positive association between the two measures of gender “equality” and peak HIV prevalence (GDI: coefficient 28, 95% confidence interval (CI) 9.1–46.8; GEM: coefficient 54.8, 95% CI 20.5–89.1). There was also a negative association between the marker of gender “inequality” and peak HIV prevalence (GII: coefficient −66.9, 95% CI −112.8 to −21.0). These associations all disappeared on multivariate analyses. We could not find any evidence to support the hypothesis that variations in the extent of gender inequality explain variations in HIV prevalence in developing countries.

Keywords: gender inequality; ecological; HIV prevalence; generalized HIV epidemics

HIV epidemiology needs to answer two important but conceptually separate questions. What are the causes of HIV cases and HIV incidence? The causes of cases seek to explain why certain individuals within populations contract HIV, whereas the causes of incidence ascertain why certain populations have higher HIV incidence and prevalence rates than others (Aral, Lipshutz, & Blanchard, 2007; Aral, Padian, & Holmes, 2005; Rose, 1993; Tunstall-Pedoe, 1996). The majority of HIV epidemiological investigations have focused on individual-level risk factor assessments (Aral et al., 2007; Aral, Leichliter, & Blanchard, 2010). These studies do not, however, explain the discrepant spread of HIV around the world. Of the 149 countries that United Nations Programme on HIV/AIDS (UNAIDS) provides annual HIV prevalence estimates for, in 98, HIV prevalence has never gone above 1% (median HIV prevalence 0.2%) and in only 20 (all in sub-Saharan Africa) has HIV prevalence peaked over 5% (median HIV prevalence 10.5%) (Kenyon & Buyze, in press). Understanding what determines these higher prevalences is of considerable importance to HIV prevention efforts in the most affected countries. Because HIV spreads via sexual networks (a population-level property) differences in the structure of sexual networks have been shown via different lines of evidence to have significant effects on HIV prevalence (Aral et al., 2005; Epstein & Morris, 2011; Johnson, Dorrington, Bradshaw, Pillay-Van Wyk, & Rehle, 2009; Kenyon, Buyze, & Colebunders, 2014; Morris, Epstein, & Wawer, 2010; Morris & Kretzschmar, 1997). Various factors could configure sex networks in a way that promotes HIV transmission. These include migration (Lurie et al., 2003), sexual partner concurrency (Morris & Epstein, 2011), age-discrepant relationships (Kelly et al., 2003), and gender inequality (Niëns & Lowery, 2009). Other mechanisms that are likely play a role in extensive HIV transmission include low circumcision prevalence (Drain, Halperin, Hughes, Klausner, & Bailey, 2006) and the high prevalence of other sexually transmitted infections (STIs) (Grosskurth, Gray, Hayes, Mabey, & Wawer, 2000).

A number of papers have argued that gender inequality is an important or even the most important factor driving HIV epidemics in Africa (Dunkle & Jewkes, 2007; Gupta, 2002; Kaye, 2004). Both the national levels of gender equity and HIV prevalence vary considerably globally and within Africa making this a testable hypothesis. There are two important levels at which to test the hypotheses that there is an association between the extent of gender inequality and HIV prevalence – at a global level and within the countries of Africa.

There are at least four plausible pathways through which gender inequality could lead to increased HIV transmission (Figure 1). First, inequalities are strongly

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linked to male physical and social dominance which could result in violence against women and thereby reduce women’s ability to negotiate condom use, fidelity, or go for and disclose HIV test results (Kim & Watts, 2005; Pettifor, Measham, Rees, & Padian, 2004). An association has been shown between sexual violence and HIV infection in women (Dunkle et al., 2006; Garcia-Moreno et al., 2006). Second, gender inequality may result in women’s economic dependence on men, which could reduce women’s autonomy and ability to negotiate safer sex practices (Gilbert & Walker, 2002; Hunter, 2005; Leclerc-Madlala, 2003). Third, men in areas with marked gender inequality may be under more normative pressure to operate in a hegemonically masculine fashion. The concept of hegemonic masculinity was advanced by Connell to describe a normative ideal where men are, and see themselves as, dominant and thus subjugate women (Connell & Messerschmidt, 2005). Qualitative research from Africa and elsewhere has suggested that the “successful” performance of masculinity in areas of high gender inequality may include both the ability to control women and sexual success (Dunkle & Jewkes, 2007; Hunter, 2005; Wood & Jewkes, 2001). Each of these may translate into increased HIV transmission. An association has been found between women having less power in their current relationship and their HIV status in one study (Dunkle et al., 2004) but not in another (Pettifor et al., 2004). Sexual success may be partly defined in terms of men’s multiple partnering, which could enhance HIV transmission (Leclerc-Madlala, 2009; Morris & Epstein, 2011). On the other hand, a recent systematic review of the effect of gender-based interventions to reduce HIV transmission found improvements in reported behavior in a number of the studies but no reduction in HIV transmission in any of the studies (Small, Nikolova, & Narendorf, 2013).

It is of considerable conceptual importance at this stage to note the distinction between causes of cases and incidence. Most of the above noted studies were conducted at the individual level and hence make a case for the role of gender inequality in determining which individuals are most at risk of HIV acquisition. These studies do not, however, show that dimensions of gender inequality play a role in determining the

Figure 1. A conceptual framework for understanding the pathways through which gender inequality, economic inequality, and religion may influence HIV transmission.
differential peak HIV prevalence in different populations. To do this we need to show that the relevant dimensions of gender inequality are more prevalent in populations with higher HIV prevalence. The only two published studies to investigate this relationship at an ecological level had somewhat differing findings. Niëns and Lowery found a strong positive relationship between gender inequality (as measured by the Gender-Related Development Index [GDI]) and HIV prevalence in a study limited to Africa (2004). Drain et al. found a negative association between adult female literacy rates and HIV prevalence in a study of 122 developing countries. They did not evaluate this relationship within African countries (Drain, Smith, Hughes, Halperin, & Holmes, 2009).

Since the publication of these papers, there have been a number of theoretical advances in the methodology of ecological studies with HIV prevalence as outcome variable. A significant problem with a number of ecological studies seeking to explain the differential spread of HIV, including both the Niëns and Drain papers, has been their use of HIV prevalence measured at the time of the exposure variable(s). This has two problems. The first problem relates to the fact that even without antiretroviral therapy, HIV-infected persons remain a part of the prevalent population of infected persons for around 10 years (Bongaarts, Buettner, Heilig, & Pelletier, 2008). The point prevalence of HIV in a population is therefore a product of the interactions between the prevalence of its component causes over the preceding decade or longer and not just at the time the exposure variable is measured. Second, HIV was introduced into different populations at different times, and if the year the exposure variable and hence the HIV prevalence is measured is soon after the introduction of HIV, then the HIV prevalence will be misleadingly low. Using peak HIV prevalence as the outcome variable gets around this HIV introduction time bias and has been shown to be a better measure of the national sex network(s) HIV transmission potential (Kenyon, Colebunders, Voeten, & Lurie, 2013). The utility of utilizing peak HIV prevalence as outcome variable in ecological association studies has been shown in the case of the relationships between peak HIV prevalence and migration (Kenyon et al., 2013) and sexual partner concurrency (Kenyon & Colebunders, 2012).

There have also been advances in the measurements used to quantify national levels of gender inequality. A number of problems have been raised with the use of the GDI. These include the way that income levels dominate the earned income component, which resulted in countries with low income levels not being able to get high scores, even in cases where their levels of gender inequality may have been low (Bardhan & Klasen, 1999; Beneria & Permanyer, 2010). For these and other reasons, the United Nations Development Program (UNDP) has, since 2010, substituted the GDI with the Gender Inequality Index (GII) (UNDP, 2010).

In this paper we use linear regression to analyze the relationship between national peak HIV prevalence and the GDI, GII, and Gender Empowerment Measure (GEM).

Methods

We classified countries according to the UNDP’s Human Development Index (HDI) data from the year 2000 Human Development Report (UNDP, 2000). The HDI is a measure of a country’s development status based on the basis of life expectancy, educational attainment, and adjusted real income (UNDP, 2000). We excluded the 46 countries classified as having high HDIs and limited our analyses to the 128 countries with medium or low HDIs (UNDP, 2000) – termed developing countries. Countries were classified into world regions according to the United Nations system (http://unstats.un.org/unsd/methods/m49/m49regin.htm).

National peak HIV prevalence was defined as the highest national HIV prevalence in 15- to 49-year olds between the years 1990 and 2009. These data were derived from the Global Health Observatory Data Repository of the World Health Organization, 1990–2009 (http://apps.who.int/ghodata/). The year peak HIV prevalence was attained fell between 1990 and 2009 (median year 1998, interquartile range 1996–2005).

A number of different measures of “gender inequality” were utilized:

GDI measures achievement in three basic capabilities. These are life expectancy at birth, education outcomes (a composite indicator of adult literacy rate and combined primary, secondary, and tertiary enrollment ratio in schools), and standard of living (as measured by earned income). These are the same variables used to determine the HDI, but the GDI takes note of and penalizes inequality in achievement of these variables between women and men (UNDP, 1995).

GEM evaluates the extent to which women are able to actively participate in economic and political life and take part in decision making. It includes three dimensions: women’s share of seats classified as professional, administrative, and managerial, women’s share of seats in parliament, and women’s share of income (Gross Domestic Product [GDP] per capita – purchasing power parity 1992 [PPP] $) (UNDP, 1995).

GII is a new composite measure that aims to capture the loss of achievement due to gender inequality using three dimensions: reproductive health, empowerment, and labor market participation. The reproductive health component has two sub-components: the maternal mortality rate and the adolescent fertility rate. The empowerment
dimension is measured by two indicators: the share of parliamentary seats held by women and the percentage of women who attain higher education qualifications. Labor market participation is measured by women’s participation in the workforce.

The GII does not include income levels as a component, which was one of the most controversial components of the GDI and GEM (Beneria & Permanyer, 2010). The GII was introduced in the 2010 Human Development Report and is calculated for the years 2000 and beyond.

We used these variables from the earliest year they were reported – 1992 for the GDI and GEM and 2000 for the GII. The year 1992 was chosen for the GDI and GEM as it predates the year peak HIV prevalence is attained in almost all countries. 2000 was chosen for the GII as there were no earlier data provided. We repeated the analyses with the GDI data from the year 1998, which was the first year used in the Niëns and Lowery (2009) paper. These variables were taken from the Human Development Reports 1995, 2000, and 2010. The GDI, GII, and GEM are all indices whose values range between zero and one.

Confounders

Since the GDI is a measure of development that is heavily weighted according to differences in gender equity, to use it as a measure of gender equity we need to control for its constitutive components that reflect development. This is particularly important since two of its components (economic development and educational attainment) may influence HIV prevalence themselves (Hargreaves & Glynn, 2002). To this end we use two controls in our model. To control for economic development we use GDP per capita (US$ PPP). To control for education we use a variable called “educational attainment.” This is a composite measure of adult literacy rates and the combined gross enrollment ratio for primary, secondary, and tertiary education. Both these variables are taken from the Human Development Reports. These variables are taken from the year 1990 for the analyses involving the GDI and the GEM and 1999 for those involving the GII.

Because the relationship between gender equity and HIV prevalence may also be confounded by economic inequality (Drain et al., 2004; Gillespie, Kadiyala, & Greener, 2007), religion (percentage of Muslims) (Drain et al., 2004; Gray, 2004), and circumcision prevalence (Drain et al., 2004, 2006), we adjusted our overall linear regression analyses for these.

There is evidence that societies characterized by high degrees of income inequality have a stronger dominance hierarchy among men (Wilkinson, Kawachi, & Kennedy, 1998). Where there is stronger dominance hierarchy among men, this may manifest in more competitive, violent, and macho societies where women are more likely to be dominated. Studies have shown that area levels of income inequality are fairly tightly correlated with women’s status (Kawachi, Kennedy, Gupta, & Prothrow-Stith, 1999) markers of male aggression (such as homicide rates) (Wilkinson et al., 1998) and rates of STIs (Aral, Over, Manhart, & Holmes, 2006). We use the “Gini coefficient” obtained from the Human Development Report 1990 for the GDI and GEM analyses and 1999 for the GII analyses to control for the possible confounding effect of economic inequality on the relationship between gender inequality and HIV prevalence. When data were missing, we used data from the HDRs from up to five subsequent years.

Previous studies have found that the “percentage of Muslims” in a country negatively predicted HIV prevalence (Drain et al., 2004, 2006; Gray, 2004). Data on the percentage of the national population that is Muslim was taken from the Pew Forum (www.pewforum.org/files/2012/12/globalReligion-tables.pdf)

The prevalence of circumcision was obtained from a World Health Organization publication that provided national estimates of the percentage of adult men who were circumcised (Weiss, 2008). In this publication, countries were classified as having low (<20%), intermediate (20–80%), or high (>80%) circumcision rates.

We did not control our analyses for other possible population-level determinants of peak HIV prevalence such as the prevalence of various sexual behaviors, efficacy of treatment of STIs, or prevalence of HSV-2 infection because we could think of no a priori justification for expecting these determinants to confound the relationship between gender inequality and HIV prevalence. As shown in the conceptual framework in Figure 1, sexual behaviors should act as mediating rather than confounding variables between the distal variables reflecting gender inequality and HIV transmission.

The evidence supporting the population-level effect of the prevalence of circumcision on HIV prevalence within Africa is particularly strong (Wamai et al., 2011). As a result, our first multiple regression models included only the circumcision variable as the only control. The second set of multiple regression models included all the possible confounding variables.

The various markers of gender inequality were related to peak HIV prevalence through linear regression, whereby Pearson $R^2$ reflects the proportion explained variance. We also compared the mean GEM, GDI, and GII scores for developing countries in each United Nations world region. All analyses were performed using STATA 12.0 software (Stata, East College Station, TX, USA).

Results

In the all developing country regressions, no evidence was found on bivariate or multivariate analyses of a relationship between the three markers of gender
Table 1. Bivariate and multivariate regression analyses of the relationship between three measures of gender inequality (GDI, GEM, and GII) and peak HIV prevalence within all developing countries and within sub-Saharan Africa.

<table>
<thead>
<tr>
<th></th>
<th>Sub-Saharan Africa</th>
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<tr>
<td></td>
<td>No.</td>
<td>Bivariate</td>
<td>GDI model</td>
<td>GEM model</td>
<td>GII model</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coefficient (CI)</td>
<td>p</td>
<td>Coefficient (CI)</td>
<td>p</td>
<td>Coefficient (CI)</td>
<td>p</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>GDI 36</td>
<td>28.0 (9.1 to 46.8)</td>
<td>.005</td>
<td>-18.3 (-54.9 to 18.4)</td>
<td>.307</td>
<td>-</td>
</tr>
<tr>
<td>GEM 31</td>
<td>54.8 (20.5 to 89.1)</td>
<td>.003</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>GII 17</td>
<td>-66.9 (-112.8 to -21.0)</td>
<td>.007</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>GDP 1990 42</td>
<td>0.0007 (-0.0001 to 0.002)</td>
<td>.090</td>
<td>0.003 (0.0009 to 0.005)</td>
<td>.077</td>
<td>0.002 (0.0008 to 0.004)</td>
<td>.007</td>
</tr>
<tr>
<td>GDP 2000 43</td>
<td>0.0007 (-0.0008 to 0.001)</td>
<td>.050</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Education 30</td>
<td>0.20 (-0.001 to 0.39)</td>
<td>.051</td>
<td>0.04 (-0.09 to 0.18)</td>
<td>.518</td>
<td>0.04 (-0.13 to 0.21)</td>
<td>.587</td>
</tr>
<tr>
<td>Education 1990</td>
<td>0.18 (0.04 to 0.32)</td>
<td>.016</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Gini coefficient 1990</td>
<td>43</td>
<td>0.40 (0.14 to 0.66)</td>
<td>.004</td>
<td>0.13 (-0.16 to 0.41)</td>
<td>.350</td>
<td>-0.04 (-0.30 to 0.21)</td>
</tr>
<tr>
<td>Gini coefficient 1999</td>
<td>43</td>
<td>0.40 (0.13 to 0.65)</td>
<td>.003</td>
<td>-</td>
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<table>
<thead>
<tr>
<th></th>
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<tr>
<td></td>
<td>0-20 Ref</td>
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<td></td>
<td>No.</td>
<td>Bivariate</td>
<td>GDI model</td>
<td>GEM model</td>
<td>GII model</td>
<td></td>
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<tr>
<td></td>
<td>Coefficient (CI)</td>
<td>p</td>
<td>Coefficient (CI)</td>
<td>p</td>
<td>Coefficient (CI)</td>
<td>p</td>
</tr>
<tr>
<td>0-20-80</td>
<td>45</td>
<td>-1.39 (-6.8 to 4.1)</td>
<td>.61</td>
<td>-2.1 (-8.3 to 4.1)</td>
<td>.479</td>
<td>0.32 (-7.6 to 8.2)</td>
</tr>
<tr>
<td>80</td>
<td>45</td>
<td>-12.3 (-16.2 to -8.3)</td>
<td>.000</td>
<td>-7.9 (-13.4 to -2.5)</td>
<td>.007</td>
<td>-9.1 (-14.9 to -3.4)</td>
</tr>
<tr>
<td>Religion 44</td>
<td>-0.092 (-0.15 to -0.037)</td>
<td>.002</td>
<td>-0.06 (-0.13 to 0.02)</td>
<td>.112</td>
<td>-0.03 (-0.10 to 0.05)</td>
<td>.458</td>
</tr>
<tr>
<td>Developing countries</td>
<td>GDI 88</td>
<td>-4.6 (-11.2 to 1.9)</td>
<td>.161</td>
<td>-13.8 (-31.5 to 3.8)</td>
<td>.121</td>
<td>-</td>
</tr>
<tr>
<td>GEM 77</td>
<td>0.95 (-13.1 to 15.0)</td>
<td>.893</td>
<td>-</td>
<td>-</td>
<td>5.6 (-26.6 to 37.8)</td>
<td>.723</td>
</tr>
<tr>
<td>GII 51</td>
<td>7.5 (-6.3 to 21.3)</td>
<td>.279</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>GDP 1990 107</td>
<td>-0.0015 (-0.0003 to 0.0005)</td>
<td>.146</td>
<td>0.0002 (-0.0003 to 0.0006)</td>
<td>.488</td>
<td>0.00001 (-0.0005 to 0.0005)</td>
<td>.954</td>
</tr>
<tr>
<td>GDP 2000 111</td>
<td>-0.0001 (-0.0003 to 0.0008)</td>
<td>.261</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Education 1990 79</td>
<td>-0.05 (-0.13 to 0.02)</td>
<td>.128</td>
<td>-0.02 (-0.2 to 0.16)</td>
<td>.840</td>
<td>-0.14 (-0.31 to 0.03)</td>
<td>.101</td>
</tr>
<tr>
<td>Education 2000 91</td>
<td>-0.40 (-0.10 to 0.02)</td>
<td>.206</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.09 (-0.16 to 0.34)</td>
</tr>
<tr>
<td>Gini coefficient 1990 99</td>
<td>0.27 (0.14 to 0.39)</td>
<td>.0000</td>
<td>0.4 (0.2 to 0.6)</td>
<td>.002</td>
<td>0.34 (0.13 to 0.56)</td>
<td>.002</td>
</tr>
</tbody>
</table>
inequality and peak HIV prevalence (Table 1). In the bivariate analyses limited to Africa, there was a positive association between the two measures of gender “equality” and peak HIV prevalence (GDI: coefficient 28, 95% confidence interval (CI) 9.1–46.8; GEM: coefficient 54.8, 95% CI 20.5–89.1, Table 1 and Figure 2). There was also a negative association between the marker of gender inequality and peak HIV prevalence (GII: coefficient −66.9, 95% CI −112.8 to −21.0). These associations all disappeared on multivariate analyses. In the case of the GEM and GII models, the inclusion of the circumcision variable in the models was sufficient to nullify the association between these variables and peak HIV prevalence. The GDI, which includes a stronger development component, required only the addition of the GDP per capita variable to negate the relationship. Correcting the relationship between GDI and peak HIV prevalence for circumcision prevalence weakened the relationship, but it remained a statistically significant association (coefficient 15.8, 95% CI 4.3–27.3).

The only associations that remained significant in the African-level multivariate analyses were circumcision prevalence and GDP per capita. These were significant in the GEM and GDI models. Only the Gini coefficient remained significant in the developing countries multivariate analyses, and it was significant in all three models tested.

When we repeated the simple and multiple regression analyses using the variables from the year 1998 as described in the Niëns and Lowery (2009) paper, we found no evidence of an association between GDI and HIV prevalence in the year 1998 or peak HIV prevalence (data not shown).

The mean GDI score was lowest in the African region (0.36, 95% CI 0.31–0.40; Table 2). Africa’s mean GEM score was the third lowest of all the regions (after the Middle East and South Asia). The GII score was second highest in Africa (after South Asia).

**Discussion**

We now have good evidence that HIV did not spread extensively in all populations in the world as it was originally feared it would (Whiteside, 2001). Only a small number of countries, all in Africa, developed generalized HIV epidemics. This presents the opportunity to evaluate what was different in these countries. The analyses presented here provide no evidence to back up the assertion that population levels of gender inequality were higher in countries or regions with higher peak HIV prevalences. This was true at the developing-country and within-Africa levels. In particular, the mean GEM score was lower in South Asia and the Middle East (both low HIV prevalence regions) than Africa. Only the GDI was highest in Africa, but as noted above, this is best
conceived as a measure of overall development which penalizes gender inequality.

The positive association between the markers of gender equality and HIV prevalence in Africa were largely explained by the fact that countries with lower HIV prevalence were more likely to have a higher percentage of Muslims and more likely to have a higher circumcision prevalence than high-prevalence countries.

There are a number of limitations with our study design. Chief amongst these is the fact that the gender inequality variables used are relatively crude measures that may not capture the aspects of gender inequality that may impact on enhancing HIV transmission. In particular, our measures of gender inequality did not measure relationship power equity or the prevalence of intimate partner violence, both of which have been linked to increased HIV transmission in one longitudinal study (Jewkes, Dunkle, Nduna, & Shai, 2010).

Our gender equality and control variables were also taken from discrete time points and although these span years, they do not fully capture the dynamic nature of gender inequality.

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Table 2. Comparison of mean values (and 95% CIs) for Gender GDI (1992), GEM (1992), and GII (2000) by world region.

<table>
<thead>
<tr>
<th>Region</th>
<th>GDI Mean (95% CI)</th>
<th>GEM Mean (95% CI)</th>
<th>GII Mean (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>0.36 (0.31–0.40)</td>
<td>0.27 (0.25–0.30)</td>
<td>0.63 (0.59–0.67)</td>
</tr>
<tr>
<td>Middle East</td>
<td>0.51 (0.42–0.60)</td>
<td>0.24 (0.21–0.28)</td>
<td>0.56 (0.49–0.64)</td>
</tr>
<tr>
<td>South Asia</td>
<td>0.43 (0.32–0.54)</td>
<td>0.26 (0.21–0.31)</td>
<td></td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>0.63 (0.54–0.72)</td>
<td>0.32 (0.27–0.38)</td>
<td>0.51 (0.41–0.61)</td>
</tr>
<tr>
<td>East Asia</td>
<td>0.68 (0.50–0.85)</td>
<td></td>
<td>0.51 (0.48–0.61)</td>
</tr>
<tr>
<td>Latin America</td>
<td>0.63 (0.58–0.68)</td>
<td>0.41 (0.38–0.43)</td>
<td>0.51 (0.48–0.61)</td>
</tr>
<tr>
<td>East Europe</td>
<td>0.80 (0.73–0.85)</td>
<td>0.35 (0.21–0.50)</td>
<td>0.24 (0.18–0.30)</td>
</tr>
</tbody>
</table>

Note: Analysis limited to countries classified as developing in Human Development Report 2000.
the key period 1990–2000 when most of the explosive increase in HIV in Africa occurred, the study methodology would have been improved if we could have used composite versions of these variables that spanned the entire 10–15 years leading up to each country’s peak HIV prevalence.

The comparisons we made were at the level of countries and regions, but it may be more meaningful to compare the relationships between gender equality and HIV at more local levels. A range of studies have shown how important different forms of homophily and other factors structure sexual networks, and it would be interesting to see if there was an association between gender equality and HIV at a more local level using different constructs of community (Laumann, Ellingson, Mahay, Paik, & Youm, 2005; Laumann & Youm, 1999).

Basic concerns for equity are sufficient to motivate for interventions to promote gender equity. In addition, there is evidence that the promotion of gender equity has a wide array of benefits including health, education, and development outcomes (Doyal, 2000; Klase, 2002). If gender inequality were to be shown to be associated with peak HIV prevalence, then this could enhance efforts to reduce this inequality. This study did not find an association between HIV prevalence and gender inequality and hence adds support to studies which argue that high HIV incidence in hyperendemic settings does not depend on underlying gender-related factors and can be reduced by behavior and norm change (Halperin et al., 2011; Kirby, 2008; Morris & Epstein, 2011).

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References


