Through which pathways do cohabiting married couples become HIV serodiscordant? Evidence from a longitudinal study in rural Malawi

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Background

The HIV/AIDS epidemic is one of the greatest challenges sub-Saharan Africa is facing. According to UNAIDS (2010), as of December 2009, 22.5 million people in the region were infected by HIV/AIDS. This represents around 67.8 percent of the estimated worldwide total and implies that 5.0 percent of adults living in the region are HIV positive.

In sub-Saharan Africa, transmission of the HIV virus occurs primarily through heterosexual intercourse. HIV discordance among cohabiting couples in sub-Saharan Africa is quite widespread, and the importance and challenges in preventing HIV transmission within serodiscordant couples (from the infected to the uninfected partner) are well recognized. Yet until recently, analyses of serodiscordant couples have mainly referred to small-scale medical studies of selected populations, and have been overall inconclusive about the factors related to the emergence of serodiscordance between cohabiting partners (e.g. Hugonnet et al., 2002; Lurie et al., 2003; Freeman et al., 2004; Malamba et al., 2005).

In spite of the limited amount of evidence, most programs assume that it is the male partner who represents the source of infection in serodiscordant couples, because he gets infected from an external source (i.e. extramarital partners) and brings HIV infection into the marriage. An increasing amount of nationally-representative data from several countries in sub-Saharan Africa has recently begun to challenge this view by suggesting that in a large proportion of HIV-discordant couples it is the female partner who is infected, not the male partner. By using data from the new wave of the Demographic and Health Surveys (DHS), which include HIV testing, a recent study found that at least two-thirds of the infected couples in Burkina Faso, Cameroon, Ghana, Kenya, and Tanzania in 2002-2004 are serodiscordant, and between 30 and 40 percent of the infected couples are discordant female, that is, couples in which only the female partner is infected (de Walque, 2007). An analogous study carried out for an expanded number of countries

(Burkina Faso, Cameroon, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Rwanda, Tanzania, Uganda, and Zimbabwe) reached similar conclusions. It also found that, although the proportion of female discordant couples is greater in polygamous unions and when the duration in the current union is less than 10 years and, even among monogamous couples, discordant female couples represent a substantial proportion of all discordant couples (Mishra et al., 2007).

In sum, the recent studies that use DHS data are at odds with the common perception that unfaithful males are the channels through which HIV is transmitted from high-risk groups to the general population, and contradict women's low self-reported levels of extramarital sex. However, the specific pathways through which the female (or the male) partner gets infected are poorly understood. In addition, because these studies rely on cross-sectional data, they are prone to selection bias. The lack of knowledge about the dynamics of HIV transmission within sero-discordant couples limits developing effective joint voluntary counseling and testing programs, which have shown promising results for reducing HIV transmission in at least a few countries (e.g. Roth et al. 2001; Allen et al. 2003).

The main objective of this study is thus to better explore the pathways through which cohabiting married couples become HIV serodiscordant, and their implications for HIV prevention, by analyzing data from a large-scale **longitudinal** couple survey in rural Malawi. Malawi is a sub-Saharan country with the 8th highest HIV prevalence in the world, and eight hundred thousands people (about 11% of the country's population) are currently living with the virus (UNAIDS, 2010). Approximately 8 percent of currently married, cohabiting couples, is serodiscordant and, of these, 55 percent are serodiscordant female. HIV prevalence is 1.5 times higher for this latter group than for couples who are serodiscordant male, that is, 6 vs. 4 percent, respectively (Mishra et al. 2007).

Data

We use data from the Malawi Diffusion and Ideational Change Project (MDICP), a longitudinal couple survey that examines the role of social networks in changing attitudes and behaviours regarding family planning and HIV/AIDS in rural Malawi. Since 1998, the MDICP has collected data every two years for a population-based, representative sample of approximately 2500 respondents age 15 years or older. Since 2004, biomarkers for HIV and other sexually

transmitted infections also started being routinely collected for all interviewed respondents who consented (Bignami et al. 2004).

The MDICP is one of the few databases that can be used to carry out the proposed project for two main reasons. First, it collected complete marital histories for all interviewed respondents. In contrast, other surveys such as the Demographic and Health Surveys collect information only about the respondent's marital status at the time of the survey. Second, respondent's marital histories can be linked to their characteristics (including HIV risk perception, sexual behavior and condom use) as well as their own and their spouse's serostatus, if they both consented to be tested for HIV. In related work, Bignami-Van Assche has analyzed these data to assess knowledge and perceptions of one's and one's spouse's HIV status in this setting (Anglewicz et al. 2010). The present analysis will extend this line of research by addressing the following research question: what are the marital trajectories that lead an individual to be in a sero-discordant couple?

Methods

We use an analytical approach similar to that recently used by Bignami-Van Assche and Clark (2011), and we thus proceed in two steps. First, we use sequence analysis to describe and categorize the different marital trajectories of MDICP couples. Second, we use these groups of marital trajectories as the main independent variable to predict MDICP couples' HIV status at the time of the most recent survey to which they participated. Since the dependent variable is categorical (concordant HIV+, concordant HIV-, serodiscordant female, serodiscordant male), we use multinomial logistic regression, and we also control for other couples' characteristics that are known to be associated with HIV infection.

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