Women's Marital Trajectories and HIV Risks:
An Assessment Using Demographic and Health Surveys

Simona Bignami-Van Assche, *Université de Montréal*
Shelley Clark, *McGill University*

Background

A growing body of research has shown that in generalized AIDS epidemics, like those occurring in several countries in sub-Saharan Africa, decisions about marriage—when to marry, whom to marry, whether to stay married, and whether to remarry—are critically linked to an individual's risk of acquiring HIV over the course of his or her lifetime. During the first decade of the epidemic, roughly during the 1990's, most of the research focused on HIV risks associated with non-marital partners, including both pre-marital and extra-marital sexual partners. Increasingly, however, researchers have come to recognize the significant risks spouses pose to each other. According to a recent study in urban Zambia and Rwanda, between 55.1% and 92.7% of new heterosexually-acquired HIV infections take place within serodiscordant married or cohabiting couples (Dunkle et al. 2008).

The virus can enter into a marriage via two primary sources: either from an infected spouse at the time of marriage or from a spouse's extra-marital sexual partners. Men and women living in sub-Saharan Africa appear to be acutely aware of these specific sources of risks. In a study of youths in rural Malawi both men and women reported that being HIV-negative was the single most important characteristic they sought in a potential

spouse, ranking above attractiveness and education for men and above education and employment for women (Clark, Poulin and Kohler 2009). Moreover, over 80% of both men and women said they planned to get tested before marriage (Clark, Poulin and Kohler 2009). Yet, aside from one microsimulation, there has been little research on who is actually more likely to be infected at the time of marriage (Bracher, Santow and Watkins 2003). After marriage, however, there is strong evidence that women are more likely to think they will contract HIV from their spouse than are men. When asked to identify their primary risk for contracting AIDS, 52% of wives compared to 23% of husbands in rural Malawi said their spouse (Watkins 2004). Among currently married women in Kenya who perceive themselves to be at moderate or great risk of getting AIDS, 78.5% cited their spouses' infidelity as their as their primary reason for concern, compared to 31.0% of currently married men (CBS, MOH and ORC-Macro 2004). The elevated fears expressed by wives compared to husbands appear to be well-founded. Prospective studies of uninfected couples have found that men are nearly twice as likely as women to get infected first and, subsequently, expose their spouse to the virus (Carpenter et al. 1999; Lurie et al. 2003; Serwadda et al. 1995).

Given these two main sources of HIV risk within marriage, one obvious protection strategy is to enter into a marriage where both spouses are HIV-negative and both remain sexually exclusive in an enduring monogamous relationship. Such a strategy, however, may not be feasible for everyone—particularly for women. In societies with substantial gender inequality, women may have little say in when they marry, whom they marry, whether their relationship endures, and whether the union is sexually exclusive. Moreover, the younger a woman is when she marries the less input she is likely to have in these decisions. Not surprisingly, studies have shown that married adolescent women have some of the highest prevalence rates of HIV/AIDS (Clark 2004; Clark, Bruce and Dude 2006). After marriage, women may also have very little direct ability to curtail their husbands non-marital sexual behaviors (Orubuloye, Caldwell and Caldwell 1992). Discussions of marital infidelity are often indirect and vague (Zulu and Chepngeno 2003). As a result, women are often not aware of whether or not their spouses are faithful (Clark 2009). Although wives who suspect their spouses of infidelity are more

likely to get divorced (Reniers 2008), probably the majority of women who suspect their spouses remain married. Women who are financially dependent on their husbands or risk losing custody of their children following a divorce may be particularly reluctant to leave their marriage.

Thus, despite the growing evidence that both men and women use marital strategies to minimize their exposure to HIV, the options—particularly for women—may be rather constrained. Furthermore, some options which may confer short-term benefit may prove to entail high risks on the long-term. Unfortunately, much of the existing research on marital protection strategies tends to focus on one single decision at a time. While such work is important and informative, it generally fails to consider the long-term implications on individual's lifetime risk of acquiring HIV. For example, studies showing the elevated risk of HIV among married adolescent girls, even compared to sexually active unmarried girls in the same age group, would suggest that delaying marriage would afford girls greater protection. However, at least one study has suggested that while being a young virginal bride carries a higher risk than being an older virginal bride, delaying marriage but having premarital sexual partners is also a dangerous strategy (Boileau et al. 2009). Similarly, Reniers (2008) notes that while divorcing a unfaithful spouse may provide protection in the short-term, in the long-run "divorcing an adulterous spouse and taking one's chances on the marriage market may be counterproductive, resulting in increased rather than diminished exposure to HIV (particularly for women) (Reniers 2008: 432). Similar questions could be asked with respect to remarriage. On the one hand, a new marriage exposes women to the risks associated with their new spouse, while on the other hand, women who remain unmarried, may turn to having multiple sexual partners as a means of obtaining material support. If marital trajectories are key to avoiding HIV risks, then evaluating the lifetime risks associated with different combinations of decisions, rather than single events, is important.

In this study we draw on data from recent nationally representative surveys of adult women age 15-49 carried out in six countries (Ethiopia, Kenya, Malawi, Zimbabwe,

Dominican Republic, and India) to examine the association between recent marital histories and HIV status. In particular, we will use sequence analysis techniques to explore how women's trajectories with respect to their first and subsequent marriages are correlated with their HIV status at the time of the survey. While we are cognizant that these associations do not imply causality, indeed, many of these trajectories are likely to be endogenous. For example, spouses that are serodiscordant with respect to HIV are more likely to get divorced (Carpenter et al. 1999; Porter et al. 2004), such associations can help identify particularly dangerous marital trajectories. Moreover, this study will expand the existing literature in at least two important ways. First, by modeling multiple events within a trajectory, we will better identify the long-term rather than short-term implications of different marital patterns. Second, much of the work on marriage and HIV risks has drawn on data from relatively small samples of women in rural Malawi (Boileau et al. 2009; Clark et al. 2009; Reniers 2008). This paper, on the contrary, uses nationally representative data (which covers both rural and urban areas) from six diverse countries with substantially different marital patterns and HIV prevalence rates ranging from 0.3 in India to 17.8% in Zimbabwe.

Data

The data for the study come from Demographic and Health Surveys (DHS) for all countries where information on both the respondent's HIV status and marital history was collected.

The latest round of DHS (started in 2000) included HIV testing for all interviewed respondents (women and men) who consented[1]. Testing for HIV was conducted using standard blood collection, testing, and quality-control procedures (Macro International 2007a, 2007b). Specifically, HIV testing was done using two HIV enzyme immunosorbent assays (EIA), based on different antigens. Specimens with equivocal or discordant test results were resolved by Western Blot testing. For quality control, all

[1] Respondents provided separate informed consent for the survey interview and for HIV testing.

HIV-positive specimens and a sample of HIV-negative specimens (usually 5 percent) were re-tested at a different laboratory using the same testing algorithm.[2] HIV test results for individual respondents can be linked anonymously to the information gathered in the household and individual survey questionnaires using unique identifiers. HIV prevalence measured from DHS has enabled direct estimates of population HIV prevalence (Mishra et al. 2006, 2008; Walker et al. 2004).

Concerning the respondent's marital history, the standard DHS questionnaire collects only a limited amount of information for both men and women: the marital status at the time of the survey, the date of first marriage, the number of times married, and the type of current union (monogamous or polygamous[3]). For respondents who have been married more than once, the standard DHS questionnaire does not collect information on the date of any of their subsequent marriages, including their current marriage. As a result, it is impossible to measure the duration of each marriage. However, in countries with high contraceptive prevalence (more than 40%), the DHS women's core questionnaire includes a detailed calendar of events for the five years preceding the survey that includes the respondent's unions. As it can be seen in an example of this calendar presented in the Annex, for each of the 60 months preceding the survey, the interviewer records whether the respondent was in union or not. The main purpose of the DHS calendar is to collect information on contraceptive use and discontinuation, so that this information is quite crude, and excludes, most notably, the reason for union termination (separation, divorce or widowhood). Yet the DHS calendar allows us to describe women's recent marital trajectories. Indeed, if all of the respondent's remarriages occurred during the five years preceding the survey, the DHS calendar will allow us to capture women's complete marital trajectories including not only her total number of marriages, but also how long she spent in each marriage.

[2] Protocols for the HIV testing and survey interview are cleared by the Institutional Review Boards of Macro International and approved by the local governments and implementing partners.
[3] Respondents who report to be in a polygamous union are also asked about the number of co-wives residing in the household.

The countries where information on both the woman's HIV status and recent marital history were collected are: Ethiopia, Kenya, Malawi, Zimbabwe, Dominican Republic, and India.[4] These are thus the countries selected for the present analysis. Table 1 displays the sample size and HIV prevalence for women in each country.

Methods

To examine the association between women's recent marital histories and HIV status, we proceed in two steps.

In the first step of the analysis, we use sequence analysis to describe, compare and group women's trajectories with respect to their first and subsequent marriages. Sequence analysis is an approach for studying life courses as whole conceptual units from a quantitative point of view that has been increasingly used in both sociology and demography in recent years (Abbott and Tsay 2000; Billari 2001).[5] The basic idea is to represent each trajectory in the life course (in our case, women's marital trajectories) as a string of characters. By doing so, appropriate statistical techniques allow calculating indicators for the characteristics of each sequence, compare sequences though optimal matching, and group "similar sequences" of women according to the timing and sequencing of events in their marriage history (Brzinsky-Fay et al. 2006).

In the second step of the analysis, we explore the basic demographic determinants of sequence group membership (for example, cohort, type of place of residence, age at first sexual intercourse). We then use the grouped sequences as the main independent variable to predict women's HIV status at the time of the survey through standard logistic regression analysis.

[4] Further details on survey design and implementation are provided in the individual country reports (CSA [Ethiopia] and ORC Macro 2006; CBS [Kenya], MOH [Kenya], and ORC Macro 2004; NSO [Malawi] and ORC Macro 2005; CSO [Zimbabwe] and Macro International 2007; CESDEM [Dominican Republic] and ORC Macro 2003; IIPS [India] and Macro International 2007).

[5] In the social sciences, most applications of sequence analysis have focused on the topic of working histories, and there is still a lack of applications related to demographic trajectories such as union histories, childbearing, and residential mobility.

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