Published in final edited form as:

Stud Fam Plann. 2012 September ; 43(3): 191–199.

Now or Never: Perceived HIV Status and Fertility Intentions in Rural Mozambique

Sarah R. Hayford [Assistant Professor],

School of Social and Family Dynamics and Center for Population Dynamics, Arizona State University, Box 873701, Tempe, AZ 85287-3701

Victor Agadjanian [E.E. Guillot Distinguished Professor], and

School of Social and Family Dynamics and Center for Population Dynamics, Arizona State University, Box 873701, Tempe, AZ 85287

Luciana Luz [Doctoral student]

School of Social and Family Dynamics and Center for Population Dynamics, Arizona State University, Box 873701, Tempe, AZ 85287-3701

Sarah R. Hayford: sarah.hayford@asu.edu

Abstract

As the HIV epidemic evolves, researchers are devoting increased attention to the infection's effect on various life-course activities, including marriage and reproduction. The impact of HIV on decisions about childbearing is particularly important, given the role that vertical transmission plays in the persistence of the epidemic. Previous studies on HIV and fertility intentions have yielded inconsistent results. This article expands on prior research by taking into account preferred timing of childbearing. Using data from a population-based survey in rural Mozambique, we show that higher perceived risk of HIV is associated with greater likelihood of both wanting to speed up childbearing and wanting to stop having children. The "now or never" approach to childbearing is shown to be consistent with the widely held belief that HIV infection is incompatible with childbearing in the long term.

As of 2009, 22.5 million individuals across sub-Saharan Africa were estimated to be infected with HIV (UNAIDS 2010). Testing and treatment have become more widely available in the region; thus, the length of time that individuals know they are HIV-positive and live with the disease has expanded. Addressing the epidemic's impact increasingly requires the study of health and mortality, but also how HIV infection influences behavior in other domains of life, such as education, work, marriage, and especially childbearing. Understanding how seropositive individuals think about the implications of their HIV status on childbearing and how they translate their knowledge and perceptions into fertility intentions and behavior is essential for the design of effective reproductive health programs for those living with HIV/AIDS. Given continued high HIV prevalence levels in much of southern and eastern Africa, the impact of HIV on fertility is also important for predicting overall fertility levels.

Evidence dating back to the onset of the African epidemic shows that HIV/AIDS reduces fertility at both the individual and the population level (see, for example, Zaba and Gregson 1998; Lewis et al. 2004; Kaida et al. 2006). The early literature on the association between HIV and fertility focused on mechanisms directly related to the physiological impact of the disease, including lower fecundability and greater fetal loss among HIV-positive women and lower coital frequency among HIV-positive couples because of illness (Lewis et al. 2004). Increasingly, researchers are also studying the ways in which HIV alters fertility behavior through more distal pathways, such as how current serostatus or perceived risk of future

infection affect plans for future childbearing. This growing body of research has yielded mixed results, with studies showing negative, positive, or no association between HIV status and fertility intentions.

In this study, we propose a framework that integrates these seemingly contradictory findings. This framework centers on women's perceptions that HIV infection and childbearing are incompatible in the long term and that any future childbearing must take place "now or never." We use data from a recent population-based survey in Gaza Province in southern Mozambique to illustrate the relationship between perceived risk of HIV infection and intentions to have more children soon, at some later date, or never. Results show that higher perceived risk is associated with greater odds of both wanting to stop childbearing and wanting to accelerate fertility relative to wanting children in a distant future.

Perceived HIV Infection Status and Fertility Intentions

Birthrates among HIV-positive women have been estimated to be 25–40 percent lower than those of uninfected women (Zaba and Gregson 1998; Lewis et al. 2004). Much of this reduction is attributable to biological and behavioral proximate determinants. Recent research, however, has shifted attention to how HIV influences fertility through conscious individual decisionmaking. Studies that examine the effects of perceived and actual serostatus on fertility behavior have found complex associations that vary by marital status, parity, and community characteristics (see, for example, DeRose 2009; Magadi and Agwanda 2010). The contingent nature of these associations suggests that the mechanisms are not purely biological but rather are shaped by social context and are at least partly attributable to individual preferences.

A small but growing body of research has assessed the impact of the HIV epidemic on reproductive intentions, with varying results. Some studies have examined how individuals modify plans for future childbearing in the context of a generalized epidemic rather than in response to individual HIV status. Individuals residing in high HIV-prevalence areas tend to believe that those living with HIV should limit childbearing to protect their own and their children's health (Baylies 2000; Rutenberg, Biddlecom, and Kaona 2000). Some respondents also report feeling constrained to have fewer children by the responsibilities of caring for AIDS orphans (Rutenberg, Biddlecom, and Kaona 2000). Researchers have also found, however, that some individuals have not changed their childbearing plans in response to the epidemic (Baylies 2000).

Other research analyzes how individuals' serostatus (actual or perceived) affects their own plans. Most studies have found that being HIV-positive or worrying that one is HIV-positive reduces the desire to have more children (Aka-Dago-Akribi et al. 1999; Grieser et al. 2001; Cooper et al. 2007; Yeatman 2009a and 2009b). Individuals express reluctance to bring children into the world when they fear they will not be alive to raise them to adulthood. With the introduction and expanding availability of treatments to prevent mother-to-child transmission (PMTCT), the possibility exists for HIV-positive women to have children without passing the virus to them. Nevertheless, women worry about the possibility of vertical transmission, even when these treatments are available (Cooper et al. 2007 and 2009). HIV-positive women also fear the effect of pregnancy and childbirth on their own health, because pregnancy is believed to weaken resistance to the virus (Yeatman 2011).

Some research, however, has found no association between reproductive plans and individual HIV risk (Moyo and Mbizvo 2004; Magadi and Agwanda 2010), and studies that show an overall negative association often find substantial minorities of HIV-positive individuals who want to continue childbearing (Nakayiwa et al. 2006; Cooper et al. 2009;

Yeatman 2009b). Continued strong pronatalism in much of sub-Saharan Africa means that having children is seen as necessary for “normal” adult life. Seropositive individuals may thus want to have children to satisfy their own need for normalcy, to conceal their status from others, or, especially for women, to maintain social status. Furthermore, in some cases perceived or actual HIV risk is associated with stronger fertility intentions. Concerns about HIV lead some women to want children sooner, because they predict that their health will worsen in the future (Grieser et al. 2001; Yeatman 2009b; Trinitapoli and Yeatman 2011).

In this study, we hypothesize that these mixed findings reflect two possible strategies in navigating the uncertainties that typically surround HIV risk and status. Despite the growing availability of antiretroviral treatments in sub-Saharan African countries, HIV is still widely perceived as a condition that inevitably leads to deteriorating health and, eventually, early death. Accordingly, in the long term, being seropositive is seen as being incompatible with childbearing, and individuals who know or suspect they are HIV-positive do not anticipate being able to have children at a later date. Fears about health implications of childbearing may lead such individuals to decide to stop reproduction. Given persistent pronatalist pressures, however, other individuals find that the benefits of having a child outweigh the potential costs to health, especially in rural settings. In these instances, having a child soon, before their health deteriorates, is the best available course of action. Therefore, both accelerating childbearing and avoiding it can be means by which individuals deal with the widely held assumption that HIV and childbearing are not compatible in the long term. Capturing both of these strategies requires analyzing intentions about the timing of childbearing along with intentions to continue or stop having children.

Guided by the “now or never” conceptual framework, we formulate and test hypotheses concerning the association between women’s perceived HIV risk and their intentions for future childbearing. Although perceived risk may not accurately reflect HIV status (as measured by biomedical tests), it functions as a more appropriate predictor of intentions than HIV diagnosis does. Perceived risk reflects individual interpretations of personal circumstances and thus is the most immediate influence on choices about how to behave in those circumstances. Women who have not been tested (about 41 percent of our sample) or have not been tested recently (only 19 percent of those tested in our sample had been tested in the past year) likely experience a great deal of uncertainty about their HIV status, although they also draw on assessments of their own and their sexual partners’ health and behavior to make systematic judgments about risk (Smith and Watkins 2005; Kohler, Behrman, and Watkins 2007; Anglewicz and Kohler 2009). Yet even women who have recently been tested may have doubts about their serostatus. The counseling that accompanies HIV testing emphasizes that the tests are not sensitive enough to detect infection within a window of time before the test (typically 4–6 weeks, but possibly up to 12 weeks), in effect introducing uncertainty into the testing process for women who test negative (Trinitapoli and Yeatman 2011). Women who test positive might also have misgivings about the validity of the results or the permanency of their HIV-positive status, because many women distrust health-care providers and by extension the test results they deliver (Hayford and Agadjanian 2010). Thus, perceived HIV risk is an appropriate measure for assessing how HIV shapes women’s plans for future childbearing.

Hypotheses

Following the findings of the literature on HIV status and fertility intentions and adapting them to our hypothesis about the compatibility of the two seemingly incompatible strategies for future childbearing, we propose the following interrelated hypotheses for the association between perceived risk and fertility intentions.

- H1** Women who think they are more likely to be HIV-positive will be more likely to want to stop childbearing than to want to have a child later.
- H2** Women who think they are more likely to be HIV-positive will be more likely to want to have a child soon than to want to have a child later.
- H3** The perceived likelihood of HIV-positive status will not affect wanting to have a child soon versus wanting to stop childbearing.

Our conceptual model will be validated only if all three hypotheses are supported. If either of the first two hypotheses is supported but the other is not, then the position of one of the two main research “camps” will be confirmed. If both H1 and H2 are supported but H3 is rejected, then again we do not have sufficient grounds to hypothesize that the “soon” and “never” intentions are equally feasible responses to perceived HIV status. Finally, if none of the hypotheses are supported, then we will conclude that our data do not provide any basis for linking perceived HIV status and fertility intentions.

Setting

This analysis tests these hypotheses using data from Mozambique, a country in southeast Africa with 23 million inhabitants. Like other Portuguese colonies, Mozambique gained independence relatively late, in 1975. A destructive civil war followed. Since 1992, when the war ended, Mozambique has experienced rapid economic growth. Nonetheless, given the low starting point of the economy, the country remains one of the poorest and least economically developed in the world. Mozambique’s annual gross national income per capita is only \$440, life expectancy is 49 years, and the adult literacy rate is 55 percent (World Bank 2012).

Mozambique is among the countries worst affected by the HIV/AIDS epidemic. Based on HIV sentinel surveillance data, the national prevalence rate among adults aged 15–49 increased from 8 percent in 1998 to 16 percent in 2007 (MOH 2008). In Gaza Province, where our data were collected, estimated HIV prevalence rose from 19 percent in 2001 to 27 percent in 2007, the highest level of any of Mozambique’s provinces (MOH 2005 and 2008). The 2009 National HIV Prevalence Survey estimated adult prevalence at 12 percent, substantially lower than the figures produced by sentinel surveillance data. Population-based prevalence estimates for Gaza Province, at 25 percent, were much closer to the sentinel surveillance-based figure (MOH 2010). The high HIV prevalence in Gaza is often attributed to its proximity to South Africa and massive seasonal migration to that country, among other factors (Agadjanian, Arnaldo, and Cau 2011).

Some evidence indicates that fertility transition has begun in Gaza Province. According to the 2003 Mozambique Demographic and Health Survey (DHS), the most recent DHS for which data are available, virtually all women surveyed in Gaza reported knowing at least one modern method of contraception. At the time of the DHS, about 15 percent of women of reproductive age were using some form of modern contraceptive, primarily hormonal methods, and more than three-quarters of nonusers reported planning future use. Yet desired family size is high (mean of 4.3 children), and contraception is largely practiced for spacing at low parities. Birthrates also remain high, with an estimated total fertility rate in Gaza of 5.4 children per woman (Instituto Nacional de Estatística and Ministério da Saúde 2005).

Data and Methods

Our data are drawn from a population-based survey of rural ever-married women of reproductive age conducted in July 2009. The survey was conducted in 56 villages in four contiguous districts (total area 5,900 square miles; population 625,000) of Gaza Province in

southern Mozambique. The sample was based on an earlier survey of 1,680 married women aged 18–40 conducted in 2006. For the 2006 survey, in each district 14 villages were selected with probability proportional to size. Households were randomly selected in each village, with stratified sampling to produce equal numbers of women married to migrants and nonmigrants. Eligible women were randomly sampled within households. Weights were constructed to adjust for the stratified sample. The 2009 survey represented a second wave of data collection that was conducted among women still living within the study area ($n = 1,314$; 78 percent of the 2006 sample). A refresher sample was randomly selected to replace women lost to follow-up. The total sample of 1,638 women is therefore representative of the population of ever-married women living in sample villages in 2009. Because childbearing primarily takes place within marriage in this context, we excluded unmarried women ($n = 131$) from the analyses. We also excluded women with no living children ($n = 73$), because virtually all of these women wanted to have a child as soon as possible. After dropping women with missing values for the dependent and independent variables, the analytic sample consisted of 1,260 women.

The survey collected detailed demographic and socioeconomic information, including pregnancy history, reproductive intentions, husband's migration history, and household economic status. Information concerning HIV/AIDS awareness and prevention in the survey included perceived HIV risk, past testing experience, and knowledge and experience of highly active antiretroviral therapy (HAART) and PMTCT treatments. Geographic coordinates of the residence of each respondent were also recorded. In parallel with the individual women's survey, a survey with community leaders was conducted in each of the villages included in the sample. The community survey focused on village economic and social life, out-migration, and HIV/AIDS issues.

Reflecting our “now or never” conceptual framework and the corresponding hypotheses, the dependent variable in this analysis is a three-category variable describing whether a woman wants to have a child in the next two years, whether she wants to have a child but not within the next two years, or whether she wants to stop child-bearing. Two years is the standard measure for “short term” used in developing country surveys such as the Demographic and Health Surveys. The variable is constructed based on two questions. Women were first asked whether they wanted another child at any time in the future. (For pregnant respondents, the question referred to their desires to have children after the birth of the child they were carrying.) Women who did not want more children were classified as wanting to stop childbearing. Those who did want children were asked how soon they wanted to have their next child. Possible responses were: immediately, within two years, more than two years from now, and a set of “don't know” responses (don't know, up to God, up to husband). Women who responded to this question with “immediately” or “within two years” (67 percent of the women who wanted more children) were classified as wanting more children soon. Women who gave any other response to the question about timing were classified as wanting children later. Women who gave “don't know” answers to the question about desired future fertility ($n = 89$) were excluded from the analysis.

The main independent variable is a measure of perceived likelihood of being HIV-positive. All women were asked a question that can be translated from Changana, the main language of most interviews, into English as, “Speaking about yourself, in your opinion, is it very likely, a little likely, or almost impossible that you already have the AIDS virus?” (The wording of this and similar questions was developed based on thorough preliminary ethnographic explorations.) In addition to the listed responses, “don't know” and “knows she is HIV-positive” (if a woman volunteered that information) were recorded. Women were also given the option to refuse to answer, but all women answered the question. Because in this cultural context the semantic difference between perceptions of “very likely” infected

and “a little likely” is subtle, we combine “very likely” and “a little likely” into a single response category: “probably HIV-positive.” Although women were never asked directly whether they ever tested positive for HIV or what their HIV status was, 19 women reported that they knew they were HIV-positive. In initial exploratory analyses, we analyzed this group separately but, because of its small size, estimates were not stable or precise. Moreover, because we did not explicitly ask about confirmed HIV status, women who volunteered their positive status may not be representative of all women who had tested positive. Based on the earlier mentioned misgivings that women with confirmed HIV diagnosis may have about their HIV status in a rural sub-Saharan setting like the one under study, these women are combined with “probably HIV-positive” into one category of “confirmed or probably HIV-positive.” In the following text, we refer to this category as “probable likelihood of being HIV-positive.” Reflecting the social uncertainty surrounding HIV infection, a large proportion of women responded “don’t know” when asked about their HIV status, even some women who had been tested recently. Previous research suggests that these responses are meaningful assessments of the uncertainty underlying all estimations of perceived risk, and that they indicate some likelihood of being HIV-positive (Bignami-Van Assche et al. 2007). “Don’t know” responses are therefore treated as a separate category. “Impossible” responses are also treated as a distinct category. The resulting variable of perceived HIV status thus consists of three categories: probable, impossible, and don’t know.

In addition to these main independent variables of interest, control variables associated with both perceived HIV status and fertility intentions are included in all models. The models control for recent HIV testing experience (within the past year) to account for its possible mediating effect. In exploratory analyses, we tested for interactions between perceived HIV risk and testing to assess whether perceived risk was more strongly associated with fertility intentions for women who had more recent biomedical information concerning their HIV status, but we found no statistically significant interactions. We also included a measure of self-rated health (good versus poor or fair) as a possible mediator of the perceived risk–intentions association. We control for the number of living children because family size is a strong predictor of future fertility intentions. To account for norms about child spacing, we also incorporate a measure of whether the woman has a living child aged two years or younger. Additional controls are age, educational level, household economic status, religion, and husband’s migration status. For the most part, these measures are straightforward and are taken directly from survey questions. Household wealth is notoriously difficult to measure in developing countries, however. Based on exploratory analyses and ethnographic observation in the study area, we constructed an index variable based on ownership of selected consumer goods (radio, bicycle, car, or motorcycle). The values in the index range from 1 to 4: 1 = respondent’s household owns none of the selected goods, 2 = household owns a radio only, 3 = household owns a radio and a bicycle, and 4 = household owns a car or motorcycle. Also, the effect of men’s migration status on both perceived HIV risk and fertility intentions is likely to vary depending on the husband’s experience of migration (Agadjanian, Yabiku, and Cau 2011). To identify some of this variation, husbands are classified as “successful” or “unsuccessful” migrants according to their wife’s response to a question about whether the household is better or worse off since the husband migrated.

Bivariate statistics use chi-square tests to assess whether distributions are independent. Multivariate analyses use multinomial logistic regression to model the trichotomous outcome (wanting a child soon versus later versus never). Both bivariate and multivariate analyses adjust standard errors for the complex survey design using Stata’s svy commands to incorporate weights and sample clusters. All descriptive statistics are weighted.

Results

Bivariate associations between perceived likelihood of being HIV-positive and desire to have another child in the next two years, at some later point, or never, are shown in Table 1. Most women in the sample want to have another child, but a substantial minority (44 percent) want to stop childbearing. This distribution is likely driven in part by the structure of the data; because the data were collected as the second wave of a longitudinal survey, women are older than the population of married women in 2009. Of the women who want another child, more want to have one soon. Almost two times as many women want a child in the next two years as want to postpone childbearing (37 percent versus 20 percent). As hypothesized, women who report a likely probability of being HIV-positive are most likely to want a child soon (40 percent) and least likely to want a child later (18 percent). Chi-square tests indicate, however, that differences in fertility intentions across perceived HIV risk categories are not statistically significant. Women who think they are likely infected are slightly less inclined to want to stop childbearing than women who do not think it is possible that they are HIV-positive (42 percent versus 44 percent). The difference between wanting to stop childbearing and wanting to postpone childbearing is greater in both absolute and relative terms for women who think it probable that they are infected than for women who think it impossible. Women who don't know whether they are HIV-positive are most likely to want to stop childbearing (45 percent).

Women who say they are likely to be HIV-positive differ in sociodemographic characteristics from women who believe their being HIV-positive is impossible or don't know their serostatus, in ways that may be associated with fertility intentions. Table 2 presents the distribution of perceived HIV status according to a range of economic and family status characteristics. Predictors of perceived HIV status have been studied in previous research (see, for example, Kengeya-Kayondo et al. 1999; Smith and Watkins 2005; Anglewicz and Kohler 2009). Associations in our sample are largely consistent with earlier studies, and we discuss Table 2 only briefly. Overall, 35 percent of women in the sample report being likely to be HIV-positive, 43 percent report that they do not know whether they are infected, and 22 percent assert that their being HIV-positive is impossible. As noted above, population-based estimates in Gaza Province find HIV infection levels to be 25 percent for those aged 15–49 (Ministry of Health 2010). Perceived risk levels are thus substantially higher than actual infection rates, and most of those who think it probable that they are infected or do not know their perceived risk are likely HIV-negative. The finding that perceived risks are overestimated is consistent with other research in high-prevalence regions in sub-Saharan Africa (Anglewicz and Kohler 2009). Differences in perceived HIV risk across sociodemographic characteristics are small and for the most part not statistically significant. Age is significantly associated with perceived risk, as is recent experience with HIV testing. The association between number of living children and perceived likelihood of being HIV-positive is marginally statistically significant ($p = 0.08$).

Multivariate Results

To assess the contribution of the variation shown in Table 2 to the associations shown in Table 1, we estimate multivariate models. Results from a multinomial logit regression of fertility intentions on perceived HIV status and other sociodemographic characteristics are shown in Table 3. Odds ratios from three comparisons are presented in Table 3: wanting to stop childbearing versus wanting children at some later point, wanting children soon (within the next two years) versus at some later point, and wanting to stop childbearing versus wanting children soon.

Hypothesis 1 is supported in these multivariate results: higher perceived risk is associated with greater odds of wanting to stop childbearing versus wanting to have a child later (OR =

1.53). The apparent difference between the bivariate and multivariate results is explained, in part, by the incorporation of demographic characteristics like age and fertility, but also by the examination of relative risks for each category rather than absolute distributions. As proposed by our “now or never” framework, women who think that it is probable that they are HIV-positive are also more likely to want to have a child in the next two years versus postponing childbearing than are women who think it is impossible (OR = 1.85). Thus, hypothesis 2 is supported as well. Finally, the difference between wanting to stop childbearing and wanting to have children soon for women who think they are likely to be HIV-positive and women who think it impossible is small and not statistically different from zero (OR = 0.82), supporting hypothesis 3. These results, therefore, support all three hypotheses. Women who do not know the likelihood of their being HIV-positive also have higher odds of wanting to stop childbearing or wanting to have children soon versus postponing (OR = 1.23 and 1.31, respectively), but these associations are not statistically significant.

Among control variables, the two fertility history variables are the strongest predictors of fertility intentions, as might be expected. Women with more living children are less likely to want a child soon and more likely to want to stop childbearing; women with a young child are less likely to want a child in the next two years. Women aged 31 and older are more likely to want a child soon than are women in their late twenties, perhaps because they think they will not be able to have a child if they wait. Older women are also more likely to want to stop childbearing.

Analyses show no statistically significant association between perceived HIV risk and the odds of wanting to stop versus accelerate childbearing; these two strategies appear to be of equal appeal. We tested for possible interactions between perceived risk and fertility intentions but found no moderators of the association (not shown). In particular, age, number of living children, and health status did not predict whether women who reported a high likelihood of being HIV-positive preferred having children soon over ceasing childbearing. We also assessed whether the association between perceived HIV risk and childbearing goals varied according to the availability of HIV testing and treatment services. These services might be expected to reduce associations between perceived HIV risk and plans for childbearing because they make it possible for seropositive individuals to live longer with the disease and to bear healthy children. We found no interactions, however, between perceived risk and access to PMTCT or HAART (as measured by distance to the nearest clinic with services, recent trips to a clinic with services, or familiarity with the services).

Discussion and Conclusions

Previous research examining the effects of HIV on fertility intentions has had mixed results, with some studies showing that perceived likelihood of being HIV-positive reduces desire for children and others finding that women who think they are seropositive want to speed up childbearing. We hypothesized that these two effects of perceived HIV status on fertility desires are, in fact, compatible. In this study we used a population-based sample from a rural sub-Saharan setting to formally test for both of these associations. Our findings confirm that perceived serostatus is indeed associated with both of these seemingly contradictory outcomes. These findings illustrate how individuals balance concerns about their own and their children's health, the belief that HIV will eventually be fatal, and a strong desire for childbearing. Decisions to limit or accelerate childbearing, although seemingly contradictory, are driven by a common logic that takes into account uncertainty about long-term outcomes.

Similar to other community-based studies, our analysis is potentially limited by its examination of a single country. Although Mozambique's experience of Portuguese colonization and civil war is distinct, the country shares key characteristics with other high-prevalence countries in southern and eastern Africa, such as reliance on an agricultural economy, high levels of male labor migration, and widespread rural poverty. Perhaps most salient, like other countries in sub-Saharan Africa, Mozambique is still in the early stages of fertility transition. Thus, our conclusions about the association between perceived HIV risk and childbearing intentions are generalizable to other sub-Saharan African countries with high HIV infection rates.

In recent years, rapid rollout of HIV testing and treatment has taken place in sub-Saharan Africa. In particular, PMTCT treatment and antiretroviral therapy to improve the health of infected individuals are increasingly available, even in rural areas. At the time our survey data were collected, about 30 percent of state maternal and child health clinics in our study area offered PMTCT, and about 20 percent of clinics provided HAART. We tested the possibility that the presence of these services would weaken the effect of HIV risk on fertility intentions, but found no moderating effects. Because of the recency of the introduction of these services, women may not yet know about the treatments, or the treatments may not yet be socially accepted. Social or administrative obstacles may also limit the effectiveness of PMTCT and HAART services. Observations in local clinics show that nurses providing HIV testing and treatment services routinely discourage seropositive women from having more children, even where PMTCT and HAART are readily available (Agadjanian and Hayford 2009; Hayford and Agadjanian 2010). Thus, these services may have limited impact on HIV-positive women's reproductive goals. An additional wave of data was collected from the same women in 2011; this additional information will allow us to analyze change in the association between perceived HIV risk and fertility intentions (and behavior) over time as HIV services become more widespread and more visible.

This analysis represents a snapshot of the cross-sectional association between perceived HIV risk and current fertility intentions. Over time, women become more aware of their HIV status, either through additional testing or through improved or declining health. If this awareness contradicts earlier perceptions, fertility intentions are likely to change in response (Yeatman 2009a). Given the aggregate-level overestimation of HIV risk in our sample, a decline in the level of perceived risk among women is likely, as is an accompanying increase in the proportion of women seeking to postpone childbearing.

For women who want to postpone childbearing and women who want to stop childbearing, carrying out these intentions will be challenging. Other research using these data shows that women's ability to limit fertility varies according to individual and household resources, but also according to social context, and suggests that women living in high HIV-prevalence communities may be more likely to carry out intentions to stop childbearing (Hayford and Agadjanian 2012). Still, rates of unintended births are high, and women's efforts to limit fertility are constrained by limited access to effective long-acting contraceptives and safe abortion, low autonomy, and the high social importance of childbearing. In addition, HIV-positive women who want to have children right away face obstacles to safe pregnancy and delivery.

This study points to the heterogeneity of reproductive goals among women who are, or fear they might be, HIV-positive and the range of resources necessary to help them achieve their goals. As both medical and social responses to the HIV epidemic evolve, individual reproductive responses to the epidemic will likely change as well. Reproductive health interventions cannot be one-size-fits-all; they must adapt to shifts in and complexities of fertility desires.

Acknowledgments

Data were collected and analyzed with support from the Eunice Kennedy Shriver National Institute of Child Health and Human Development. A previous version of this paper was presented at the Annual Meeting of the Population Association of America, Washington, DC, 31 March–2 April 2011.

References

- Agadjanian, Victor; Arnaldo, Carlos; Cau, Boaventura. Health costs of wealth gains: Labor migration and perceptions of HIV/ AIDS risks in Mozambique. *Social Forces*. 2011; 89(4):1097–1118.
- Agadjanian, Victor; Hayford, Sarah R. PMTCT, HAART, and childbearing in Mozambique: An institutional perspective. *AIDS and Behavior*. 2009; 13(Suppl 1):103–112. [PubMed: 19326206]
- Agadjanian, Victor; Yabiku, Scott T.; Cau, Boaventura. Men's migration and women's fertility in rural Mozambique. *Demography*. 2011; 48(3):1029–1048. [PubMed: 21691931]
- Aka-Dago-Akribi H, Desgrées du Loû A, Msellati Philippe, Dossou R, Welffens-Ekra C. Issues surrounding reproductive choice for women living with HIV in Abidjan, Cote d'Ivoire. *Reproductive Health Matters*. 1999; 7(13):20–29.
- Anglewicz, Philip; Kohler, Hans-Peter. Overestimating HIV infection: The construction and accuracy of subjective probabilities of HIV infection in rural Malawi. *Demographic Research*. 2009; 20(6): 65–96. [PubMed: 19672478]
- Baylies, Carolyn. The impact of HIV on family size preference in Zambia. *Reproductive Health Matters*. 2000; 8(15):77–86. [PubMed: 11424271]
- Bignami-Van Assche S, Chao LW, Anglewicz P, Chilongozi D, Bula A. The validity of self-reported likelihood of HIV infection among the general population in rural Malawi. *Sexually Transmitted Infections*. 2007; 83(1):35–40. [PubMed: 16790561]
- Cooper, Diane; Harries, Jane; Myer, Landon; Orner, Phyllis; Bracken, Hillary. 'Life is still going on': Reproductive intentions among HIV-positive women and men in South Africa. *Social Science and Medicine*. 2007; 65(2):274–283. [PubMed: 17451852]
- Cooper, Diane; Moodley, Jennifer; Zweigenthal, Virginia; Becker, Linda-Gail; Shah, Iqbal; Myer, Landon. Fertility intentions and reproductive health care needs of people living with HIV in Cape Town, South Africa: Implications for integrating reproductive health and HIV care services. *AIDS and Behavior*. 2009; 13(Suppl 1):S38–S46.
- DeRose, Laurie F. HIV prevalence, investment in education, and fertility trajectories. Paper presented at the Annual Meeting of the Population Association of America; Detroit, MI. 30 April–2 May; 2009.
- Grieser, Mira; Gittelsohn, Joel; Shankar, Anita V., et al. Reproductive decision making and the HIV/ AIDS epidemic in Zimbabwe. *Journal of Southern African Studies*. 2001; 27(2):225–243.
- Hayford, Sarah R.; Agadjanian, Victor. Providers' views concerning family planning service delivery to HIV-positive women in Mozambique. *Studies in Family Planning*. 2010; 41(4):291–300. [PubMed: 21258608]
- Hayford, Sarah R.; Agadjanian, Victor. From desires to behavior: Moderating factors in a fertility transition. *Demographic Research*. 2012; 26(20):511–542. [PubMed: 23626485]
- Instituto Nacional de Estatística and Ministério da Saúde. Mozambique Demographic and Health Survey 2003. Calverton, MD: ORC Macro; 2005. With technical assistance from Measure DHS and ORC Macro
- Kaida, Angelina; Andia, Irene; Maier, Marissa, et al. The potential impact of antiretroviral therapy on fertility in sub-Saharan Africa. *Current HIV/AIDS Reports*. 2006; 3(4):187–194. [PubMed: 17032579]
- Kengeya-Kayondo, Jane F.; Carpenter, Lucy M.; Kintu, Peter M., et al. Risk perception and HIV-1 prevalence in 15,000 adults in rural southwest Uganda. *AIDS*. 1999; 13(16):2295–2302. [PubMed: 10563715]
- Kohler, Hans-Peter; Behrman, Jere R.; Watkins, Susan Cotts. Social networks and HIV/AIDS risk perceptions. *Demography*. 2007; 44(1):1–33. [PubMed: 17461334]

- Lewis, James J.; Ronsmans, Carine; Ezeh, Alex; Gregson, Simon. The population impact of HIV on fertility in sub-Saharan Africa. *AIDS*. 2004; 18 (Suppl 2):S35–43. [PubMed: 15319742]
- Magadi, Monica Akinyi; Agwanda, Alfred O. Investigating the association between HIV/AIDS and recent fertility patterns in Kenya. *Social Science & Medicine*. 2010; 71(2):335–344. [PubMed: 20494502]
- Ministry of Health of Mozambique (MOH). Relatório sobre a revisão dos dados de vigilância epidemiológica do HIV—Ronda 2004. Maputo; Mozambique: 2005.
- Ministry of Health of Mozambique (MOH). Relatório sobre a revisão dos dados de vigilância epidemiológica do HIV—Ronda 2007. Maputo; Mozambique: 2008.
- Ministry of Health of Mozambique (MOH). Relatório final. Maputo; Mozambique: 2010. Inquérito nacional de prevalência, riscos comportamentais e informação sobre o HIV e SIDA (INSIDA) 2009.
- Moyo, Witness; Mbizvo, MT. Desire for a future pregnancy among women in Zimbabwe in relation to their self-perceived risk of HIV infection, child mortality, and spontaneous abortion. *AIDS and Behavior*. 2004; 8(1):9–15. [PubMed: 15146129]
- Nakayiwa, Sylvia; Abang, Betty; Packel, Laura, et al. Desire for children and pregnancy risk behavior among HIV-infected men and women in Uganda. *AIDS and Behavior*. 2006; 10(Suppl 4):S95–S104. [PubMed: 16715343]
- Rutenberg, Naomi; Biddlecom, Ann E.; Kaona, Frederick A. Reproductive decision-making in the context of HIV and AIDS: A qualitative study in Ndola, Zambia. *International Family Planning Perspectives*. 2000; 26(3):124–130.
- Smith, Kirsten P.; Watkins, Susan Cotts. Perceptions of risk and strategies for prevention: Responses to HIV/AIDS in rural Malawi. *Social Science and Medicine*. 2005; 60(3):649–660. [PubMed: 15550312]
- Trinitapoli J, Yeatman S. Uncertainty and fertility in a generalized AIDS Epidemic. *American Sociological Review*. 2011; 76(6):935–954. [PubMed: 22536003]
- UNAIDS. UNAIDS Report on the Global AIDS Epidemic. New York: Joint United Nations Programme on HIV/AIDS; 2010. <http://www.unaids.org/globalreport/Global_report.htm> [Accessed 11 June 2012]
- World Bank. [Accessed February 2012] World Development Indicators, 2009. 2012. <<http://data.worldbank.org/country/mozambique>>
- Yeatman, Sara. The impact of HIV status and perceived status on fertility desires in rural Malawi. *AIDS and Behavior*. 2009a; 13 (Suppl 1):S12–S19.
- Yeatman, Sara. HIV infection and fertility preferences in rural Malawi. *Studies in Family Planning*. 2009b; 40(4):261–276. [PubMed: 21151844]
- Yeatman, Sara. ‘HIV is an enemy of childbearers’: The construction of local epidemiology in rural Malawi. *Culture, Health & Sexuality*. 2011; 13(4):471–483.
- Zaba, Basia; Gregson, Simon. Measuring the impact of HIV on fertility in Africa. *AIDS*. 1998; 12(Suppl 1):S41–S50. [PubMed: 9677188]

Table 1

Percentage of married women, by perceived likelihood of being HIV-positive, according to fertility intention, rural Gaza Province, Mozambique, 2009

	(Weighted N)	Want child soon	Want child later	Want to stop childbearing
All women	(1,260)	36.5	19.8	43.7
Perceived likelihood of being HIV-positive				
Probable	(436)	40.1	17.5	42.4
Impossible	(273)	31.8	24.5	43.7
Don't know	(551)	35.9	19.3	44.8

Note: Chi-square tests indicate that differences across rows are not statistically significant.

Table 2

Percentage of married women, by sociodemographic characteristics, according to perceived likelihood of being HIV-positive, rural Gaza Province, Mozambique, 2009

Characteristic	(Weighted N)	Probable	Impossible	Don't know
All women	(1,260)	34.7	22.0	43.3
Age (years) *				
20 or younger	(16)	46.9	19.4	33.7
21–25	(270)	38.6	22.6	38.8
26–30	(396)	35.9	22.5	41.7
31+	(578)	31.8	21.5	46.8
Education (years)				
0	(347)	34.2	20.1	45.7
1–4	(525)	34.0	22.5	43.6
5+	(388)	36.2	23.0	40.8
Household wealth score				
1	(498)	34.8	19.8	45.5
2	(304)	32.4	21.6	46.1
3	(337)	36.4	23.1	40.5
4	(121)	36.4	28.1	35.5
Religion				
No religion	(89)	25.6	16.0	58.4
Mainline Protestant	(384)	34.7	20.0	45.3
Zionist	(476)	37.5	22.9	39.7
Other religion	(311)	33.2	24.8	42.0
Marriage				
In monogamous union	(982)	36.9	21.0	42.1
In polygamous union	(278)	32.0	22.7	45.4
Husband's migration status				
Husband not a migrant	(710)	35.8	22.8	41.3
Successful migrant	(321)	37.1	19.0	43.9
Unsuccessful migrant	(229)	33.3	20.9	45.9
Number of living children				
1–3	(760)	37.3	20.5	42.2
4+	(500)	30.9	24.1	45.0
Living children younger than age 2				
None	(769)	34.0	21.2	44.8
1+	(491)	37.3	23.2	39.5
Self-reported health				
Fair or poor	(296)	34.5	19.3	46.3
Good	(964)	34.8	22.8	42.4
Had HIV test in past year **				
No	(1,024)	35.3	19.5	45.2

Characteristic	(Weighted N)	Probable	Impossible	Don't know
Yes	(236)	32.1	32.8	35.2

*
Chi-square test significant at $p < .05$;

**
 $p < .01$.

Table 3

Odds ratios from multinomial logit regression of fertility intentions on perceived HIV status and other variables, rural Gaza Province, Mozambique, 2009

Characteristic	Wants to stop versus wants later	Wants soon versus wants later	Wants to stop versus wants soon
Perceived HIV status			
Probable HIV-positive	1.53 *	1.85 *	0.82
Impossible HIV-positive (r)	1.00	1.00	1.00
Don't know	1.23	1.31	0.94
Age			
20 or younger	0.35	0.46	0.77
21–25	1.38	1.27	1.08
26–30 (r)	1.00	1.00	1.00
31+	1.96 **	1.79 *	1.09
Education (years)			
0 (r)	1.00	1.00	1.00
1–4	1.03	0.86	1.20
5+	0.85	0.93	0.92
Household wealth score	1.00	1.04	0.96
Religion			
No religion (r)	1.00	1.00	1.00
Mainline Protestant	1.21	0.51	2.35 **
Zionist	1.00	0.51	1.94 *
Other religion	1.58	0.80	1.96 *
Marriage			
In monogamous union (r)	1.00	1.00	1.00
In polygamous union	0.88	1.06	0.82
Husband's migration status			
Husband not a migrant (r)	1.00	1.00	1.00
Successful migrant	0.93	1.56 *	0.59 *
Unsuccessful migrant	1.09	0.70	1.56 *
Number of living children	2.06 ***	0.74 **	2.78 ***
Living children younger than age 2			
None (r)	1.00	1.00	1.00
1+	0.80	0.37 ***	2.14 ***
Self-reported health			
Fair or poor (r)	1.00	1.00	1.00
Good	0.92	1.34	0.68 *
Had HIV test in past year			
No (r)	1.00	1.00	1.00
Yes	1.16	0.49 **	2.34 ***

* Significant at $p < .05$;

**
 $p < .01$;

 $p < .001$. (r) = Reference category.

Note: Models account for weights and complex survey design.