The Importance of Relationship Dynamics in HIV Transmission: Results from a Qualitative Case-Control Study in Rakai, Uganda

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ABSTRACT

Continuing HIV transmission among youth worldwide demands greater awareness of the contextual variables involved in seroconversion. But innovations are needed in combining the richness of qualitative methods with the explanatory power of epidemiologic approaches. We present results from life history interviews with 60 young adults from Southern Uganda. A novel "ethnographic case-control" design matched newly infected HIV-positive cases with HIV-negative controls by gender, marital status, and community. *Relationship dynamics*, *quality,* and *quantity* emerged as the most salient themes explaining differences in serostatus. Compared to HIV-negative participants, respondents who had recently seroconverted described relationships marked by poorer communication, greater suspicion and mistrust, and larger, more transitory sexual networks. Results highlight the importance of dyadic approaches to HIV, and possibly couples-based interventions, though relationship issues can reflect underlying structural factors such as gendered power dynamics and resource scarcity. Using HIV-matched pairs shed additional understandings of the factors influencing transmission, and this hybrid methodological approach holds promise for future studies of sexual health.

INTRODUCTION

Thirty years into the HIV pandemic, a tremendous need remains to understand the factors shaping HIV transmission among youth, especially in higher HIV prevalence settings. Though the annual number of global new HIV infections fell 21% between 1997 and 2010 (1), the shifting pandemic has been particularly burdensome to young adults. Among persons of reproductive age across the world, two out of five new HIV cases (40%) occur among 15-24 year-olds (2). Of those 15-24 year-olds who are infected, 63% live in Sub-Saharan Africa (3), and three-quarters (76%) are young women (4). A similar pattern is found in Uganda. After significant declines in HIV prevalence in the 1990s (5), HIV prevalence has stalled and even risen slightly in the past decade (6) and significant gender disparities in HIV acquisition remain, with young women upwards of three times as likely to be infected as young men (7, 8). Further progress in HIV prevention may benefit from a better understanding of the contextual factors influencing HIV transmission, particularly how young adults themselves understand and negotiate these HIV risk factors.

Mmari and Blum reviewed 61 articles on HIV "risk and protective factors" affecting adolescent health in developed countries (9). They noted the lack of contextual, ecological perspectives in these studies, arguing that research must move beyond individual-level factors to address interpersonal, community, cultural, and structural influences. Recent epidemiologic research with youth in Uganda, including our own quantitative research, has established important associations between HIV infection and biological and behavioral factors such as circumcision, multiple partnerships, STI symptoms, staying in school, and marital dissolution (8, 10). Locating these individual-level factors into the relationships, cultural norms, and structural constraints that young adults navigate every day of their lives could produce important new insights.

Qualitative and ethnographic research methods have been very helpful in illustrating the contextual influences on HIV transmission, both in and beyond Uganda. In their recent review of qualitative research and HIV/AIDS in West Africa, Samuelsen et al. emphasize the value of empirically-based qualitative studies in understanding *local* situations—understandings which enhance the national and regional-level patterns exhibited by clinical and epidemiological studies (11). Qualitative "thick description" of a human behavior aims to explain not just the behavior but its context such that the behavior becomes meaningful to an outsider (12). By adding such thick description to biological and behavioral "risk factors" surveyed on epidemiological studies, such research has added nuance to unexplained or confusing quantitative findings. Qualitative studies have been particularly helpful in explaining seemingly "irrational" behaviors such non-use of condoms by young people facing considerable risk of HIV infection; such research has used the perspectives of gender and sexuality theory to explore the psychological, relational, and financial benefits of unsafe sex for people, especially young women (13-17).

Along these lines, qualitative methodologies may be especially useful in explaining the vital ways that gendered power imbalances influences women's and men's sexual interactions, including multiple partnerships and opportunities for extramarital affairs (18, 19) condom and contraception negotiation, and sexual coercion and violence (20, 21). In her ethnographic work on HIV risk among married couples in northern Uganda, Parihk found that men's extramarital activities were ubiquitous, while local and national HIV prevention messages inadvertently increased the moral stigma of extramarital sex (22). Thus prevention efforts intensified men's motivations to keep these infidelities secret and thereby increased potential HIV risk to their wives. Likewise, qualitative work with young male motorbike taxi-riders in southern Uganda documents the ways in which local beliefs about ideal manhood are dependent upon men's sexual promiscuity, elevating the HIV risk of both these young men and their partners (23). Finally, focus group discussions and open-ended interviews with adolescent women in Rakai District revealed that sexual coercion was a common part of early sexual experiences and intimate partner relationships among young women in this region of Uganda (21).

Despite these substantial benefits of qualitative research methods in contextualizing and elucidating HIV risk factors, few have explored recent HIV infection or compared HIV-negative young people with their newly infected peers. When qualitative studies have attempted to collect data from HIV-infected respondents, such respondents commonly were not infected recently. In other words, existing studies have not elucidated real-time understandings of HIV transmission. The field stands to greatly benefit by combining the deeper contextual nuances of qualitative research with the explanatory potential of more traditional epidemiologic approaches.

In this study, we had the opportunity to recruit life-history participants from an annual community cohort study and to adapt an epidemiologic case-control approach in creating our qualitative sampling frame. As such, study participants who had seroconverted in the last year (cases) were compared with HIV-negative "controls" matched according to gender, marital status, age group, and community. We collected rich life-history data from these matched pairs to explore the contextual factors that helped explain why some young people had contracted HIV in the last year while some young people had remained virus-free.

METHODS

Rakai Youth Project study overview and design

The Rakai Youth Project (RYP) uses mixed methods to explore changing patterns of HIV incidence among 15 to 24 year-olds in Rakai, Uganda. Rakai, located in the southern part of Uganda near Lake Victoria, is a largely rural region with many peri-urban trading centers. A quantitative arm of the study, RYP investigators analyzed Rakai community cohort data from approximately 7500 young adults over nine years to explore changing behavioral, biological, and demographic risk factors (8). In another study arm, we conducted qualitative life history interviews—the focus of the current paper—to situate young people's "risk" or "protective"

factors within the context of their lives and relationships.

In recruiting life history participants, we created a nested "ethnographic case-control" design. Thirty incident HIV-positive participants were systematically selected from a larger cohort study and then matched to 30 HIV-negative "controls." Though respondents were interviewed separately, respondent pairs served as the unit of analysis. Investigators created a sampling frame based on the variables most likely to affect HIV transmission: gender, marital status (never married, currently married, and previously married), age (15-19 and 20-24 year-olds), and community. Our goal was to match HIV-positive and HIV-negative respondents while controlling for variables associated with HIV exposure.

Participants were selected from the Rakai Community Cohort Study (RCCS), an ongoing longitudinal epidemiological investigation of 15-49 year-old residents in Rakai (24, 25). RCCS participants are surveyed annually in their villages, at which time they also receive HIV prevention education and provide biological specimens for HIV and STI testing. Two separate ELISA tests determine HIV cases within the RCCS, and these results are confirmed by HIV-1 western blot (26). RCCS participants with positive HIV test results receive follow-up visits, counseling, and referrals to ARV-treatment at the Rakai Health Services Project. Using RCCS data, investigators located a total of 30 young adults between the ages of 15-24 who had tested negative for HIV in the prior year's RCCS census and positive in the latest RCCS round. These 30 incident cases were then matched with negative controls given the criteria outlined above.

We made small changes to the sampling frame as participant recruitment ensued. For example, HIV incidence among adolescents had dropped in Rakai by latest round of the RCCS (27); therefore, only two HIV-positive 19 year-olds were available for recruitment. Nor did many HIV incidence cases emerge among previously married young men. The final sample 60 life history informants included 34 women and 26 men, half of whom were HIV-negative, and approximately a third of whom fell into each marital category. Please see Table 1.

Table 1. Respondent Sampling Frame

HIV Status	**HIV-positive**						**HIV-negative**						**TOTAL**
Gender	Young women			Young men			Young women			Young men			
Marital Status	Never Marr	Marr	Prev Marr	Never Marr	Marr	Prev Marr	Never Marr	Marr	Prev Marr	Never Matt	Marr	Prev Marr	
Age 15-19	2						2						
Age 20-24	3	6	6	6	5	2	3	6	6	6	5	2	
TOTAL	5	6	6	6	5	2	5	6	6	6	5	2	60

Interview procedures and content

Once selected from the RCCS, potential participants were approached by members of the qualitative research team from the Rakai Health Services Project. To protect identities and reduce stigma, all potential participants were informed that investigators were interested in learning more about young people's lives, relationships, and goals in light of HIV/AIDS in Uganda. Consent forms did not discuss the sampling method based on HIV serostatus. Interviewers were not told respondents' HIV-serostatus; only the qualitative primary investigators (who did not conduct interviews themselves) had access to the master sampling frame. Interviews took place between 2010 and 2011.

The interview guide consisted of four main parts: 1) key life events and goals, which captured participants' aspirations and experiences with schooling, employment, and other factors, 2) pregnancy and parenthood, which included pregnancy desires, pregnancy histories, and family planning use, 3) HIV and reproductive health knowledge and attitudes, including self-assessment of personal HIV risk, and 4) sexual relationships, which explored participants' current relationship status and recent relationship history. Topics moved from less to more sensitive to enhance rapport and validity.

To both enhance rapport and cover all topics, life history interviews took place over the course of two meetings, with each half of the interview lasting around one hour. Interviewers were the same gender as interviewees, and they conducted interviews in private settings in or near participants' homes or workplaces, out of earshot of acquaintances and family members. Each participant received 3,000 Ugandan Shillings (approximately $1.30) per interview, for a total of 6,000 Ugandan shillings for the completed life history.

Interviews were conducted in Luganda and tape-recorded for subsequent transcription. Interviewers wrote summaries of their reflections and observations in English immediately following each interview, and these summaries were included in the body of data analyzed. Interviewers translated their own verbatim transcripts from Luganda to English.

Data analysis

Led by the first author, a team of three qualitative investigators developed a codebook based on the research questions of interest and preliminary transcript readings and discussions. The final list of 37 codes included axial umbrella categories such as "life goals and transitions," "relationships and marriage," "HIV knowledge, attitudes, and behaviors," and "multiple partners." The coding scheme also incorporated partner blocks so that analysts could label and subsequently examine codes based on each of the sexual partnerships in which respondents were engaged (partner one, partner two, etc.).

To ensure consistent use of codes, team members individually coded four different interview transcripts, then met as a group until they reached consensus for every single code and partner block. During both preliminary and future analysis, all transcripts were coded in

pairs—that is, we coded the matched positive and negative respondent one after the other. Two team members coded each interview, then met to discuss until they reached agreement on all codes and partner blocks. One lead analyst was assigned to each interview pair; this team member entered the final set of agreed-upon codes into Atlas.ti, a software for managing and analyzing qualitative data. This analyst also took responsibility for writing up a two page memo for each interview pair, summarizing the main narratives, notable themes, and similarities and/or differences between the positive and negative case.

Matched-pair memos served as the primary focus of the present analysis, though coding reports added nuance and detail when necessary. The lead author carefully read through the memos and took systematic summary notes on the contextual differences and/or similarities that could help explain HIV transmission among the positive respondents in each pair. She then constructed a series of data display matrices—tables that help to organize and analyze qualitative data according to the research questions and comparison of interest. First, a "magnitude of difference" data display tracked the degree of difference between the positive and negative case. In many pairs, the positive respondent exhibited striking elevated contextual risk factors compared to the negative respondent, while in some cases, fewer differences emerged. She then created a data display matrix for each of the themes (e.g., HIV testing, condom refusal, or lack of knowledge of partner's partners) that surfaced during preliminary work with the memos. Matrices showcased the array of differences and similarities for that particular theme across all 30 positive and negative pairs. Organizing the tables with separate rows for women and men within each marital category also allowed the investigator to explore differences (if any) by gender and marital status. Coding reports and the interview transcripts themselves helped fill in details for these tables as needed.

Ethics

Institutional review board (IRB) approvals for the current analysis and RCCS were obtained from Uganda Virus Research Institute's Science and Ethics Committee, Uganda National Council for Science and Technology, and from IRBs at Columbia University and Johns Hopkins University and Western IRB in the U.S.

RESULTS

Overview

We were surprised to find few notable differences between positive and negative respondents in three of the four main interview themes: 1) key life events and goals, 2) pregnancy and parenthood, and 3) HIV and reproductive health knowledge and attitudes. For example, we had wondered if young people with aspirations for advanced schooling might be comparatively protected against HIV. Yet at least in this sample of young adults, both positive and negative respondents described life goals that had been truncated by factors such as death of a parent and/or other lack of family financial resources and school fees. Both positive and

negative young women described early pregnancies which also led to school drop-outs. HIV-related knowledge also seemed remarkably consistent across serostatus. Virtually all respondents had relatively good knowledge of how HIV could be transmitted and prevented. In terms of pregnancy and parenthood, positive and negative respondents did understandably differ in terms of their thoughts about having children in the future (27, 28); however, this phenomenon seemed more related to post-diagnosis differences than pre-transmission differences (28).

Sexual relationships were the only main interview theme that consistently highlighted pre-transmission differences. In the overwhelming majority of matched pairs, at least some notable degree difference regarding relationship quality and quantity helped explain why one respondent had contracted HIV in the last year while the other respondent had remained HIV-free. Intimate partnerships of HIV-positive respondents seemed qualitatively unlike those of HIV-negative respondents along lines of communication, trust, and suspicion. HIV-positive respondents were also more likely to describe multiple partnerships, as well as relationships with shorter term partners and/or with partners about whom they knew comparatively little.

However, these themes cannot be removed from the structural and cultural context in which they occurred. Undergirding these broad contrasts were even broader factors such as parental death or other early life upheavals, resource scarcity, work-related migration, and gendered power dynamics. In the remaining results section, we first share case studies from two respondent pairs, both to illustrate the interconnectedness of relationship-related themes and to situate them into lived cultural and structural contexts. We then overview the main relationship theme contrasts of 1) communication, 2) mistrust and suspicion, and 3) partnership number and type.

Two Pair Case Studies

The first case study captures a pair of 24 and 23 year-old previously married women, both of whom have two children. As a child, the negative respondent had hoped to become a nurse but had to leave school in her early adolescent years due to lack of school fees. She “ran away from home and got married” at the age of 14. Though she experienced domestic violence in this marriage, including a murder attempt, she managed to leave the relationship and create income for herself by running a small food shop. At the time of the interview, she was in a much stronger, far less tumultuous relationship with another man. “We are used to each other and we trust each other,” she said. “He is like my husband now.” Since she had “not yet earned enough to support a child,” she and her partner agreed to prevent pregnancy for the time being, and she was using injectable contraception. She and her partner had also sought couples-based HIV testing: “Before we started a relationship we first tested for HIV and we were told that we are HIV negative. After that we started our relationship.” She admitted she didn’t know if he had outside partners, but she expressed neither suspicion nor knowledge of damning rumors. She reported they were both concerned about HIV and committed to preventing pregnancy, indicating some degree of shared responsibility. Though this respondent

had experienced financial scarcity, subsequent school drop-out and early marriage, and gender-based violence, her current financial situation and partnership quality appeared to nurture a context in which she could remain free of HIV and unintended pregnancy.

Like her negative match, the positive respondent in this pair had also wanted to study nursing, but she, too, had dropped out of school in senior one. Her father had died when she was five years old, and her mother could not continue paying school fees. "There is nothing else but [lack of] money," she said; "The problem was [lack of] money." Her goal at the time of the interview was to make enough money to purchase land and build a house for her children, but due in part to her recent diagnosis with HIV, she said "time is running out." She reported two non-concurrent partners in the last year. Both men lived in neighboring communities about 25 kilometers away, both had jobs that involved travel, and both had provided her with living expenses and accommodations. She said she did not know the HIV status of either man.

Even though she had recently received HIV-positive test results, she had not shared these results with her current partner. "I tried to ask him [about HIV testing]," she said, and he refused to test, accusing her of thinking he was "sick." Condom negotiations with this partner had also failed. "I tried to ask him [to use a condom] and he told me that he does not know how to put it on," she reported. "Then I asked him whether I should help him to put it on and he said 'no.' He refused." When asked how many partners this man may have had in the last year, the respondent sighed audibly and said, "There are many. [..] There are about 15 or 20." At the time of the interview, she was using intrauterine contraception without her partner's knowledge; while he wanted her to become pregnant, she wanted avoid passing HIV onto a child. Compared to the partnership of her negative match, this respondent's partnership was marked by covert family planning use, a much larger suspected sexual network, condom refusal, a lack of HIV-related communication. This woman also appeared more financially dependent on her partner than her negative counterpart, which partly explained her acceptance of their disconnectedness.

The second case study comes from a pair of never-married men. The negative respondent, a 22 year-old technical-school student, lived with his mother and was protected by a strong family network as well as his academic aspirations and successes. He was one of the few respondents currently in school; almost all of the other participants had dropped out due to lack of school fees and/or early and unplanned pregnancies. At the time of his interview, the negative respondent was not in a relationship by choice, "because I am focused on school and a child would dramatically interfere with my studies." He reported being influenced by the guidance of his mother and teachers, who consistently advised him to abstain from sexual relationships, both for pregnancy and HIV prevention purposes, but primarily to keep him focused on and successful in his studies.

> *I still get ideas about getting a girlfriend these days, but I don't give them a lot of attention because I know there is nothing good in such ideas. [..] One might contract*

AIDS or even get someone's daughter pregnant when you have no financial support and you have a job to earn money.

In the past year, he had sexual relationship with a young woman from his school; he said he "used [his] leadership influence to get a girlfriend." But they reportedly used condoms without fail, and he said he "knew she was low risk because she was a school girl." Family support, money for school fees, and a promising academic trajectory all seemed to protect this young man from the kinds of relationships and sexual networks that might heighten his risk for HIV.

The positive respondent in this case, a 24 year-old peasant farmer, was orphaned at a young age and therefore did not enjoy the same family support or financial resources as his negative counterpart. He recalled scrambling for school money as a young boy: "I had to come back from school every evening and look for money, and at times I had to miss school because I had no pens. I had to look for an activity to earn money to buy pens." This resource scarcity shaped not only his (in)ability to stay in school, but also his choice of partners. He could not afford stable, long-term girlfriends, who would cost him money and gifts.

I wanted to get an official marriage, but because I lacked money I failed to get kind of marriage I wanted. I have only been able to get partners just for a night. [..] I wanted to marry a woman who had taken an HIV test but still I realize you need to have money. It is still a problem.

He described several brief relationships in the last year with women whose status he did not know and who often did not share HIV test results. He wondered in hindsight if the partner who declined testing she was also taking ARV pills—he knew she was taking medicine during their relationship, but he did not recognize the medicine as HIV-specific at the time.

At the time of the interview, his partner had recently learned she was (unexpectedly) pregnant. Though he "felt a lot of happiness" when he realized she would be having a baby, he worried about supporting the young woman and child-to-be. In contrast to his HIV-negative match, this respondent reported never using condoms—perhaps because he did not have the same motivation to avoid pregnancy and/or HIV. This case helps illustrate some of the ways in which poverty and masculinity could heighten HIV risk through partnership type and quality. Male respondents spoke frequently of not being able to "afford" long-term girlfriends, who could require significant financial upkeep. The positive respondent in this pair thus turned to more affordable, shorter term partners, few whom communicated openly with him about HIV.

These case studies illustrate that while relationship dynamics, quantity, and quality often emerged as the central "proximal" risk factors for HIV transmission, such relationship factors were immersed in more distal contexts of resource scarcity, gendered power dynamics, and other cultural and structural influences. They also suggest the tremendous interconnectness of various themes relating to relationship quality and quantity. The following section reviews the three main subthemes that emerged relating to relationships—differences

in 1) communication, 2) mistrust and suspicion, and 3) partnership number and type—highlighting differences by gender and marital status as appropriate.

Relationship Communication about HIV

Compared to HIV-positive respondents, HIV-negative matched interviewees were more likely to report speaking with their partners about a number of issues, most strikingly HIV prevention. (Negative respondents also seemed more likely to communicate about family planning with their partners, which we explore in another analysis of these data (29).) In the most persistent difference across all 30 pairs in the study, HIV-negative respondents were more like than their positive counterparts to have talked with their partner(s) about HIV status and testing, to be familiar with their partners' testing history, and/or to have sought couples-based HIV testing together with their partner(s).

For example, the married women in one pair were similar in a number of ways: both were in their early 20s, had been unable to fulfill their schooling and employment aspirations, reported stable relationships with their partners who travelled extensively for their jobs, and reported no condom use with their husbands. However, the negative respondent and her spouse had tested for HIV before they got married, with both receiving negative results, whereas the positive respondent had been trying to get her husband to take an HIV test, but he kept saying he did not have the time due to work and travel. She said that even on the day of the interview, "He [husband] was supposed to go for HIV testing today but he was called early in the morning because they had finished loading the agricultural produce. He does not have time." Other positive women reported more blatant testing refusal on their partner's behalf, such as this previously-married respondent:

> *[My husband] cautioned me never to participate in Rakai project activities. He told me that I should never test for HIV with Rakai project. When he told me so, I asked myself why he has refused me [to test]. This showed me that he is the one who infected me with the virus.*

At the time of the interview, this woman had not shared her positive results with her husband. In comparison, her negative match reported that she and her spouse had received HIV tests separately and shared their (negative) results.

Due to gender based power dynamics, women were more likely than men to describe partner unwillingness to test for HIV. HIV-positive men also reported comparatively fewer HIV-related discussions than their HIV-negative matches, but this contrast usually took the form of simply not knowing a partner's status versus having asked for test results and been refused. For example, in one pair of married men, the positive respondent said he did not know his wife's HIV status, nor had he spoken with her about HIV. In contrast, the negative respondent had talked with his wife not only about HIV status and prevention but also pregnancy prevention. In a pair of previously married men, the negative respondent related that his most

recent partner sought an HIV test and shared her negative results with him. By comparison, the positive respondent in this pair did not discuss HIV with either of his partners in the last year, including the woman to whom he had been married tumultuously for five months. As with women respondents, this pattern of greater communication among HIV-negative respondents' relationships seemed consistent across all three marital groups.

Relationship Mistrust, Suspicion, and Coercion

In a less common but still pervasive theme, compared to HIV-positive respondents, negative respondents tended to express greater trust when describing their relationships with both primary and secondary partners. Often negative respondents said they felt assured their main partner did not have other sexual partners. Far more frequently, positive respondents—particularly women—stated they did not trust their partners or know their partner's "movements"—a common term used to refer to sexual activity outside the realm of the primary relationship.

To be sure, reflecting sexual opportunity structures that provide Ugandan men with more access to multiple partners, women more frequently expressed mistrust regarding a partner's outside sexual relationships. Gender-based power differentials meant that women often tolerated such suspicion in order to redeem the social and financial benefits of being in relationships with men. Yet even under the guise of widespread male sexual privilege, relationship quality along the lines of trust, suspicion, and relatedness seemed particularly poor among HIV positive respondents.

For example, in a pair of married women, both respondents reported mutual monogamy as their present HIV prevention strategy. But the negative respondent reported feeling assured of her husband in this arrangement, while the positive respondent indicated she did *not* trust her partner to stick with one partner despite their discussions of mutual monogamy. The latter woman, who had not yet picked up her latest (positive) HIV test results, said "I think I will acquire HIV" because "men are not reliable." Several interrelated contributing factors are important to note in the positive woman's life and relationship in this case. Unlike the partner of her negative match, her husband traveled regularly for work from their home to Kampala, Uganda's urban capital several hours north of Rakai. She also reported experiencing sexual coercion with her husband, as well as having sex with him with the primary purpose of minimizing his interest in outside women. All of these factors may have understandably undermined her sense of connection and harmony with per partner. Finally, a pair of never-married women illustrates not the *lack* of trust among positive respondents, but rather the *presence* of trust among some negative respondents. The negative member of this pair, who took an HIV test with her current partner at the beginning of their relationship, said "we both trust each other so that HIV is no longer a big concern in our lives." Though her

positive match did not speak directly about lack of relationship trust, she did indicate that she had neither tested nor discussed HIV status with any of her three partners in the last year.

Though less frequently, men also mentioned disconnectedness with and/or mistrust of their partners, and more so among HIV-positive versus HIV-negative respondents. As expected, such discord was rarely connected to a man's experience of sexual coercion or having his partner refuse to use condoms. Though men certainly reported lack of financial resources, they never described being unable to leave an unhealthy relationship due to lack of money or social support. Nonetheless, HIV-positive men in particular could report partner mistrust, especially regarding women's HIV status. For example, in one pair of married men, both respondents reported one additional partner in the last year in addition to their wives. That said, the positive respondent, who suspected he was HIV-positive but had not yet confirmed his results, expressed suspicion about his outside partner. He had engaged in transactional sex with this woman, who had been visiting from out of town and who agreed to have sex with him after he gave her money. The used a condom during their first sexual encounter, but not subsequent encounters. He then "separated from her because [he] suspected she was HIV positive"; she allegedly had another sexual partner whom, due to weight loss, the respondent surmised was also seropositive. In comparison, the negative respondent reported a lack of concern about HIV since he "trusts [his wife]" and reported consistent condom use with his other partner.

Partnership Type and Number

In keeping with companion quantitative research from this project (8) as well as the pandemic more globally (30-32), positive respondents reported slightly more recent and concurrent partners than negative respondents. Some positive respondents' *partners* also appeared to have a greater number of outside partners. Finally, positive respondents were more likely than negative matches to report shorter-term relationships and/or partners with fewer known entities compared to partners in ongoing, long-term relationships.

Men were particularly likely to have had concurrent multiple partners in the last year, but a significant minority of women also reported two or more partners (though the overwhelming majority of women reported a *primary* partner, unlike some men). For example, in one married pair of women, the negative respondent reported one partner in the last year, whereas the positive respondent reported three, two of whom were concurrent, and one of whom may have had syphilis ("He used to fall sick and also his penis would swell sometimes; he could even infect me with diseases like syphilis"). At the time of the interview, the positive respondent was married to a man with three other wives, and she did not know the HIV status of her husband nor any of her co-wives. "I suspect I have HIV," she said. "My husband has many wives, so I don't know—he may have started a relationship with me when he already had HIV."

Although, compared to women, men tended to report a larger overall number of prior and concurrent partners in the last year, the discrepancies between positive and negative

respondents were very similar to those among women. For example, in one pair of married men, the negative respondent said he was faithful to his wife, and he emphasized the importance of staying with one's partner as an HIV risk reduction strategy. He said:

> *I have one sexual partner and I have to stick on her. The reason is that what is it that I am going to get out of the extra sexual relationship which I cannot get with my primary partner? It is imperative for me to make my spouse look smart and more beautiful and nice as the one who I would admire outside my marriage.*

In contrast, the positive respondent in this pair reported four concurrent partners in the last year, including his wife. Due to work in another community, his wife came to his house only on the weekends, and his other partners lived both in and out of his community. He said he had not discussed HIV prevention or status with his wife or outside partners. Positive respondents were more likely to describe relationships that were more transitory in nature and thus potentially riskier in terms of HIV exposure. Frank discussions about HIV were also less likely to occur among such relationships.

DISCUSSION AND IMPLICATIONS

In this study of HIV transmission among young adults, our ethnographic case-control methodology accentuated notable differences between HIV-positive and negative respondents, the overwhelming magnitude of which pertained in some way to relationships factors. Compared to HIV-negative life history informants, respondents who had seroconverted in the last year described relationships marked by poorer communication, greater suspicion and mistrust, and larger and more transitory sexual networks. However, in the spirit of the multilayered context of qualitative research, we cannot extricate these relationship differences from other underlying factors that help explain seroconversion. Scarcity of financial and social resources and asymmetrical gendered power dynamics in particular seemed to fuel poorer relationship quality and different types of intimate partners. So while this study emphasizes the importance of relational, dyadic approaches to HIV transmission, such relationship issues undoubtedly work in conjunction with cultural and structural factors.

We found that using pairs of demographically similar HIV-positive and HIV-negative respondents as the unit of analysis helped underscore differences to a far greater degree than if we had analyzed respondents individually. This hybrid methodological approach may hold promise for future studies of HIV transmission, unintended pregnancy, or other sexual health issues. Qualitative case-control studies may also serve as a useful meeting ground for otherwise methodologically distinct health professionals—for example, epidemiologists and anthropologists, or health economists and qualitative sociologists.

Thematic contributions of the study are closely related to methodological contributions. Results highlight the importance of dyadic approaches to HIV—namely, that relationship dynamics appeared strongly linked to HIV-related communication, testing, and prevention

practices. Our study is hardly the first to find associations between relationship dynamics, communication, and sexual health among young people (33-37). A significant body of research also examines how gendered power dynamics and financial scarcity can all elevate HIV risk, particularly for women. Moreover, our findings add to the growing literature examining the ways in which masculinity and sexual partnerships can increase men's HIV risk (22, 23), particularly when combined with financial scarcity, social disadvantage, and/or other structural factors (38-40). However, our findings take on new shape when placed with the methodological framework of our study. Given our unique sampling frame of HIV incident cases and demographically similar HIV negative matches, these relationship differences do appear to help explain seroconversion among some young adults but not others.

Due to the multilayered contextual nature of the study findings (i.e., dyadic, cultural, and structural), potential implications must be approached cautiously. For example, programs that focus on couple-based testing or communication may indeed be warranted—and such programs are in keeping with efforts in both Rakai District and many other parts of the world (41, 42). However, dual testing is more likely to be an outgrowth than a root cause of lowered HIV risk; those couples who share test results or seek testing together are already more protected by communication skills, negotiation abilities, and/or joint prevention practices. Interventions that encourage couples-based testing may thus be limited in their ability to change underlying relationship dynamics. Similarly, communication programs may do little to address fundamental issues such as gendered power dynamics that may exacerbate poor communication to begin with. Thus, any dual testing and/or communication programs must be conducted hand-in-hand with structural efforts to such as educational reform, alleviation of poverty, and gender transformation.

Findings and potential implications must be considered in light of study limitations. Despite the richness of the data garnered from the life-history interviews, lack of ongoing ethnographic work limits our ability to tie our findings to larger political, demographic, or cultural changes in region over time. Our hope is that our combination of qualitative methods with HIV-incidence data makes up for that that methodological limitation in other ways. Despite the methodological innovation of the study, another potential limitation may have been our persistence in finding differences between cases and controls. Using pairs as the unit of analysis could have led to possible exaggeration of contrasts between matched respondents in some cases. We attenuated this limitation by noting when the difference between the pair was highly pronounced, notable, or minimal or even counter-intuitive, then making sure that a sufficient number of highly pronounced differences could support our findings.

In conclusion, this study highlights the importance of relational approaches to HIV transmission about young adults. The majority of differences between HIV-positive and HIV-negative respondents in our study pertained in some way to relationship dynamics, quality, and quantity, which in turn were connected to gendered power dynamics and resource scarcity. Results suggest the potential utility of dual testing programs and/or communication skill-building, though such programs must occur in conjunction with larger efforts to alleviate

poverty and transform gender relations. Finally, the methodological combination of qualitative interviews with an adapted case-control approach may have great utility in understanding HIV transmission and other behavioral health issues.

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