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Characteristics of Age-discordant partnerships associated with HIV risk among young South African women (HPTN 068)

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Abstract

Objective—Sexual liaisons between older men and younger women have been linked to greater risk of HIV acquisition. This study aims to: 1) identify psychosocial and behavioral factors associated with age-discordant (partner ≥ 5 years older) versus age-concordant partnerships ($-1 < \text{partner} < 5$); and 2) examine the association between partner age discordance and young South African women's sexual behavior.

Methods—We used generalized estimating equations to analyze responses from 656 sexually-experienced females (aged 13-20 years) from rural Mpumalanga province.

Results—Partner age discordance was associated with greater odds of reporting both more frequent sex (adjusted odd ratio [aOR] = 1.77, 95% CI 1.20-2.60) and having a partner with concurrent partnerships (aOR = 1.77, 95% CI 1.22-2.57). Age-discordant partnerships were associated with greater odds of: casual partnerships (aOR 1.50, 95% CI 1.06-2.13), having a

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partner with concurrent partnerships (aOR 1.71, 95% CI 1.19-2.46) and more frequent intercourse (i.e., having sex at least 2 or 3 times per month) (aOR 2.04, 95% CI 1.39-3.00). They were associated with lower odds of reporting condom use at last sex (aOR 0.70, 95% CI 0.50-0.98) and always using condoms (aOR 0.53, 95% CI 0.32-0.88) in age-discordant partnerships.

Conclusion—Our findings suggest that a history of age-discordant partnerships, and to a lesser extent having an age-discordant partner, is linked to HIV risk among young South African women; however, the link between partner age discordance and HIV risk may be more strongly related to the characteristics of age-discordant partnerships than to characteristics of young women who form such partnerships.

Keywords

HIV; South Africa; young women; age discordance; sexual risk; age-disparate

Introduction

AIDS is the leading cause of death among youth within sub-Saharan Africa, with South Africa reporting more new cases of HIV, than any other country in the world. There are significant gender inequities in HIV infection within South Africa and young women aged 15-24 have HIV rates that are three times higher than their male counterparts. Moreover, young South African women are infected at earlier ages than their male peers. While it is clear that a combination of socio-behavioral, structural, and biological factors contribute to the African epidemic, there has been increasing attention given to young women's sexual behaviors within age-discordant partnerships. Understanding the impact of age discordant partnerships is critical given that approximately 1 in every 3 sexually active, young South African women is involved in a sexual relationship with a man who is 5 or more years older. In fact, age gaps between young women and their sexual partners tend to be greatest in countries most affected by HIV and for those reporting casual partnerships, with the latter being linked to transactional sex.

For the purposes of this study, partnerships are described as age-discordant when the male partner is 5 or more years older than the young woman and age-concordant if they were less than 5 years older but no more than one year younger than the young woman. Age mixing is concerning for young South African women for several reasons. First, HIV prevalence is higher among older male sexual partners than among those closer to their own age, which could lead to increased risk of HIV infection among young women. Second, young women with older sexual partners may be particularly vulnerable to HIV acquisition due to power differentials within the partnership, which has been associated with difficulty negotiating condom use, increased risk for intimate partner violence (IPV) and other unsafe sexual practices. Third, young women may perceive older male sexual partners to be more stable and responsible and thus less likely to be HIV positive. This could lead to greater vulnerability to HIV acquisition, as they may be less likely to use condoms with such partners. Alternatively, due to a number of public health campaigns aimed at increasing young women's awareness of potential risks of engaging in sexual relationships with substantially older men, it is possible that young women are now more likely to engage in protected sex to offset perceived risk. In 2012, for example, the Department of Health in

Kwa-Zulu Natal (KZN), South Africa launched a campaign entitled, “Sugar Daddies Destroy Lives,” that warned young women to avoid sexual relationships with significantly older men.

Despite the evidence linking age-discordant partnerships to greater risk for HIV infection among young South African women, more recent studies have raised questions regarding this relationship. Using longitudinal data, Harling and colleagues (2014) did not find an association between partner age discordance and young women's HIV incidence (aged 15-29 years). Similarly, Balkus and colleagues (2014) reported that there was no association between partner age discordance and HIV incidence among South African women, even when stratified by age (aged 18-45 years). Conflicting findings could be related to differences in outcomes examined considering that more recent studies focused on HIV incidence, while earlier studies focused on HIV risk behaviors. Though related, these outcomes are quite different. Studies showing that young women in age-discordant partnerships engage in more HIV risk behaviors, which are precursors to HIV acquisition, require more dissection. Few studies have examined individual- and partner-level characteristics that distinguish young women in age-discordant partnerships from those in age-concordant partnerships. Identifying such characteristics could fill key gaps that might further explain conflicting findings. Therefore, the purpose of the current study is to identify psychosocial and behavioral factors associated with age-discordant versus age-concordant partnerships and to describe the association between partner age discordance and young women's sexual risk.

Methods

Sample

Between March 2011 and December 2012, 2533 young South African women between the ages of 13-20 years were recruited from rural Mpumalanga province within the Agincourt Health and Socio-Demographic Surveillance System (HDSS) in northeastern South Africa to participate in a phase III randomized controlled trial (RCT) sponsored by the HIV Prevention Trials Network (HPTN), referred to as HPTN 068. The purpose of HPTN 068 was to determine whether the use of cash transfers conditioned on school attendance resulted in reduced sexual risk and HIV incidence. Participants resided in one of 28 villages, had to be enrolled in school and currently in grades 8-11 and could not be married or pregnant at the time of enrollment. The current study uses baseline data and focuses only on participants who reported ever having sex. Less than 4% of participants were HIV-positive at baseline and were excluded from the current study.

Procedure

The study team used information available from the Agincourt HDSS to identify households with young women meeting study criteria. We obtained consent/assent from parents and youth to participate. Only one young woman per household was able to enroll in the study. Soon after consent, young women completed the baseline questionnaire using ACASI (audio computer-assisted interviewing) and CAPI (computer-assisted personal interviewing) during “weekend camps.” During these camps, young women completed the interview, underwent

group pre-test counseling for HIV and HSV-2, completed blood draw and rapid tests for HIV, and completed individual post-test counseling. They were also randomized to the intervention or control arm during the camp. All young women received an incentive worth approximately 3 USD. The University of North Carolina at Chapel Hill Institutional Review Board, the University of the Witwatersrand's Human Research Ethics Committee, and the Mpumalanga Province Health Research and Ethics Committee approved the HPTN 068 study. More detailed information about study procedures has been reported elsewhere.

Measures

The primary study variable was partner age discordance. Partners were age-discordant if they were 5 or more years older than the young woman. There were three categories for explanatory variables: socio-demographic, general risk and relationship factors, and partner-level. Socio-demographic variables included young woman's age, guardianship status (i.e., living with a parent, relative, or other), source of income (i.e., job, family/friends, boyfriend/partner, or other (i.e., sex work, selling drugs, begging, or stealing)), and food insecurity, which represents a state in which an individual lacks access to a sufficient amount of nutritious food, (yes/no). Partner-level variables focused on behaviors or experiences that occurred during the course of a partnership and included relationship was ongoing (yes/no), partnership status (i.e., main, casual, other), partner enrolled in school (yes/no), sex frequency (infrequent = once a month or less; frequent = 2-3 time per month or more), condom use frequency (always used a condom/did not always use a condom), condom use at last sex (yes/no), were cohabiting with a partner, partner has concurrent partners (yes/no), talked about HIV testing (yes/no), and talked about HIV prevention (yes/no). Relationship duration was calculated by subtracting the date of the first time the young woman had sex with a specified partner from the last reported date of sexual intercourse. The sexual relationship power scale (SRPS) (low/med/high), which is grounded in the Theory of Gender and Power and was developed to measure the relationship control and decision-making dominance in intimate partner relationships, assessed whether young women perceived that they had decision-making power during interactions with their current/most recent partner. Transactional sex was a composite variable composed of four items that assessed the degree to which young women reported receiving gifts or money from their sexual partner in exchange for sex. General risk and relationship factors included current alcohol frequency (infrequent/frequent), ever had sex for money (yes/no), age of sexual debut (≥ 14 years, < 14 years), number of lifetime sexual partners, lifetime experience of IPV (yes/no), and condom use self-efficacy (high/low). Exact definitions are available in the supplemental digital content.

Analyses

In bivariate analyses, we used chi-square tests for categorical variables and *t* tests for continuous variables when the young woman was the unit of analysis (comparing young women with any age-discordant partnership to those with no age-discordant partnerships) and generalized estimating equations (clustering on young woman) when the partnership was the unit of analysis (comparing age-discordant partnerships to age concordant partnerships). We used the results of our bivariate analyses, as well as priori hypotheses, to select variables ($p < 0.20$) for inclusion in our multivariable models. Generalized estimating

equations (GEE; logit link, Binomial distribution, robust variance, independent working correlation) were used to construct multivariable models to examine the differences in the characteristics of age-discordant and age-concordant partnerships. A separate multivariable model was fitted for each factor that was carried forward from the bivariate analysis with adjustment for young woman's age, primary source of income, and experience of food insecurity to identify independent associations between each factor and the outcome of age-discordance. GEE was also used to examine the impact of partner age discordance on sexual behavior (i.e., sex frequency, condom use frequency, condom at last sex, partner's concurrent partnerships, and transactional sex) within partnerships (agediscordance as a predictor). Covariates included young woman's age, partnership status, partner enrolled in school, relationship ongoing, cohabiting, and relationship duration. SAS Version 9.3 was used for all analyses.

Results

656 young women, with a mean age of 16.5 years, who were HIV-negative and reported ever having vaginal or anal sex, were included in the current study. Most reported that their primary guardian was a biological parent (74.2%), their primary source of income was family/friends (34.5%), and 39.2% reported food insecurity. The median number of sexual partners in their lifetime was 1. Over 1/3 reported experiencing IPV (35.1%) and approximately 18% reported age-discordant partnerships, with a median age gap of 6 years.

Bivariate analyses

No significant differences in socio-demographic variables existed between young women reporting age discordant partnerships compared to those reporting age concordant partnerships (Table 1). Regarding partner-specific variables, young women reporting age discordant partnerships were more likely to report having other types of partners (e.g., casual) rather than main partners, less likely to have partners who were enrolled in school and reported more frequent intercourse. Moreover, they were more likely to have partners with concurrent partnerships, more likely to report always using condoms, though less likely to report condom use at last sex. Regarding general risk and relationship factors, we found that young women with age-discordant partners were more likely to report 3 or more lifetime sexual partners than their peers in age-concordant partnerships. Variables significant at $p < .20$ and those with theoretical significance (i.e., condom use self-efficacy) were included in the multivariable models.

Multivariable models

We fit a series of GEE models to determine whether psychosocial and behavioral differences exist between age-discordant and age-concordant partnerships, adjusting for young woman's age, primary source of income, and food insecurity (Table 2). Our results indicated that age-discordant partnerships were more likely to be casual (adjusted odd ratio [aOR] = 1.50, 95% CI 1.06-2.13); less likely to involve partners who were enrolled in school (aOR = 0.20, 95% CI 0.14-0.30); more likely to involve frequent intercourse (i.e., having sex at least 2 or 3 times per month) (aOR = 2.04, 95% CI 1.39-3.00); less likely involve always using condoms (aOR = 0.53, 95% CI 0.32-0.88); less likely to involve condom use at last intercourse (aOR

= 0.70, 95% CI 0.50-0.98); and more likely to involve partners with concurrent partnerships (aOR = 1.71, 95% CI 1.19-2.46). Young women with age-discordant partners were more likely to report having 3 or more lifetime partners (aOR = 2.29, 95% CI 1.52-3.45); and less likely to report high sexual relationship power (aOR = 0.54, 95% CI 0.32-0.93). All other variables, including whether the young woman spoke with her sexual partner about HIV or had low condom use self-efficacy, were not significantly associated with the probability of being in age discordant partnerships.

We also fit a series of GEE models to examine the impact of partner age discordance on young women's sexual behaviors. Our results indicated that partner age discordance was associated with greater odds of reporting both more frequent sex (adjusted odd ratio [aOR] = 1.77, 95% CI 1.20-2.60) and having a partner with concurrent partnerships (aOR = 1.77, 95% CI 1.22, 2.57). There were no other significant associations (Table 3).

Discussion

The purpose of the current study was twofold: 1) to explore characteristics associated with reporting age-discordant partnerships among young South African women from a rural province, and 2) to examine the relationship between partner age discordance and young women's sexual behavior. To begin with, we divided variables into two categories: partner-level and general risk and relationship factors. For partner-level factors, young women reporting age-discordant partnerships were more likely to report having casual sexual partners, having a partner who is not enrolled in school, more frequent sex, and having a partner with concurrent partnerships. They were less likely to report always using condoms, condom use at last sex, and were less likely to report high relationship power. Regarding general risk and relationship factors, young women with age-discordant partnerships were more likely to report three or more lifetime partners and less likely to report having high relationship power. Regarding the examination of the impact of partner age discordance on young women's sexual behavior, we found that partner age discordance was associated with greater odds of reporting both more frequent sex and having a partner with concurrent partnerships. Though not statistically significant, partner age discordance was also associated with being less likely to always use condoms and using a condom at last sex. Concordance between these findings support previous results indicating that partnerships between young women and significantly older men are associated with greater engagement in sexual risk behaviors.

Though the current study is cross-sectional and focuses on behavioral risk, these findings are in contrast to those of two recent longitudinal studies suggesting that there is no relation between partner age discordance and HIV incidence. There are potential reasons for this discrepancy. Namely, the current sample focuses on a much younger cohort; therefore, the effects of partner age discordance may be more pronounced amongst younger women than those who are older. Consistent with this view, we found that young women reporting age-discordant partnerships were less likely to report high relationship power than their peers in age-concordant partnerships. This finding is expected and consistent with previous research. While previous research has suggested that young women have more control over partnership formation during courtship, this finding may be more applicable to women who

are slightly older. Moreover, young women's power may decrease significantly once a partnership becomes established. This shift in power from the young woman to her older male partner may impact her ability to negotiate safer sexual practices. For example, the young women in our cohort were aware that their age-discordant partners also had other sexual partners. Such awareness of and willingness to engage in a sexual relationship with partners with concurrent partners could suggest that they lack the power to insist on monogamous partnerships for many reasons, including due to the existence of cultural beliefs supporting multiple partnerships among men, which could further hamper efforts to negotiate safer sexual practices. Partner concurrency among older male partners is particularly concerning, as it could connect young women to more risky sexual networks thereby increasing her risk of HIV infection.

There are several limitations of the current study. First, it relied upon the young woman's report of her male partners' ages, school status, and report of concurrent partners. Previous research has indicated that young women were more accurate in identifying age-concordant partnerships than they were in identifying age-discordant partnerships, leading to an underestimation of the impact of age-discordant partnerships on HIV risk behavior. Second, it is possible that young women in our study underestimated age differences between themselves and their sexual partners, which would lead to conservative estimates of the impact of partner age discordance on their sexual behavior, as well as underestimations of the differences in characteristics of those reporting discordant partners when compared with those reporting concordant partnerships. Third, as the results of the current study focus only on cross-sectional reports, we are unable to determine whether our findings are stable over time. Relatedly, we are unable to determine whether there is a causal relationship between age-discordant partnerships and HIV-risk. Therefore, longitudinal analyses could significantly inform research on this topic.

Despite these limitations, this study makes important contributions to the literature on the effect of partner age discordance on young women's sexual risk. First, this study supports previous research that suggested that there is an association between partner age discordance and HIV-risk behaviors. Moreover, this study extends previous research by suggesting that the link between partner age discordance and HIV risk may be more strongly associated with characteristics of age-discordant partnerships than to characteristics of young women who form such partnerships. Having a greater understanding of socio-structural determinants of age-discordant partnerships within the population provide interventionists with key information that could facilitate the development of efficacious, structural-level programs that could lead to significant reductions in HIV transmission and acquisition.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Bivariate analysis examining between-group differences among predictors in sexually experienced young rural South Africa women (n=656)

	Age discordant N (%)	Age concordant N (%)	Total	P-value
Socio-demographics				
Age, in years (years)				0.27
Median	16	17	17	
25th, 75th %tile	16, 18	16, 18	16, 18	
Primary care				0.78
Parent (father/mother)	106/138 (76.8%)	383/518 (73.9%)	489/656 (74.5%)	
Other relative	31/138 (22.5%)	130/518 (25.1%)	161/656 (24.5%)	
Non-relative	1/138 (0.7%)	5/518 (1.0%)	6/656 (0.9%)	
Primary source of money				0.28
Job	40/138 (29.0%)	125/518 (24.1%)	165/656 (25.2%)	
Family/friends	45/138 (32.6%)	179/518 (34.6%)	224/656 (34.1%)	
Boyfriend or partner	14/138 (10.1%)	37/518 (7.1%)	51/656 (7.8%)	
Sex work, selling drugs, begging, shoplifting	21/138 (15.2%)	72/518 (13.9%)	93/656 (14.2%)	
Other	13/138 (9.4%)	128/542 (15.3%)	92/656 (14.0%)	
Food insecurity				0.62
Yes	51/138 (37.0%)	204/518 (39.4%)	255/656 (38.9%)	
Partner-specific variables				
Partnership status				0.02
Main	117/205 (57.1%)	605/916 (66.0%)	722/1121 (64.4%)	
Other	85/205 (41.5%)	303/916 (33.1%)	388/1121 (34.6%)	
Enrolled in school				<0.001
Yes	52/205 (25.4%)	528/916 (57.6%)	580/1121 (51.7%)	
Cohabiting				0.36
Yes	19/205 (9.3%)	67/916 (7.3%)	86/1121 (7.7%)	
Sex frequency				<0.001
Frequent	152/205 (74.1%)	558/916 (60.9%)	710/1121 (63.3%)	
Infrequent	51/205 (24.9%)	346/916 (37.8%)	397/1121 (35.4%)	
Condom use frequency				0.02
Not always	176/205 (85.9%)	721/916 (78.7%)	897/1121 (80.0%)	
Always, every time	28/205 (13.7%)	188/916 (20.5%)	218/1121 (19.3%)	
Condom at last sex				0.04
Yes	104/205 (50.7%)	532/916 (58.1%)	636/1121 (56.7%)	
Partner concurrent partnerships				0.003
Yes	84/205 (41.0%)	276/916 (30.1%)	360/1121 (32.1%)	
Transactional sex				0.49
Yes	23/205 (11.2%)	88/916 (9.6%)	111/1121 (9.9%)	
Talked about HIV prevention				0.08
Yes	147/205 (71.7%)	698/916 (76.5%)	848/1121 (74.1%)	

	Age discordant N (%)	Age concordant N (%)	Total	P-value
Talked about HIV testing				0.75
Yes	145/205 (70.7%)	701/916 (76.5%)	846/1121 (75.4%)	
General risk and relationship behaviors				
Alcohol frequency				0.80
Infrequent	131/138 (94.9%)	494/518 (95.4%)	625/656 (95.3%)	
Frequent	6/138 (4.3%)	20/518 (3.9%)	26/656 (4.0%)	
Age of Sexual Debut				0.07
14	42/138 (30.4%)	117/518 (22.6%)	159/656 (29.0%)	
> 14	94/138 (68.1%)	385/518 (74.3%)	479/656 (70.0%)	
Sex for money				0.52
Yes	13/138 (9.4%)	39/518 (7.5%)	52/656 (7.9%)	
IPV				0.50
Yes	50/138 (36.2%)	173/518 (33.4%)	223/656 (34.0%)	
Lifetime partners				<0.001
2 or fewer	77/138 (55.8%)	422/518 (81.5%)	499/656 (76.1%)	
3 or more	61/138 (44.2%)	96/518 (18.5%)	159/656 (23.9%)	
Condom use self-efficacy				0.72
High	81/138 (58.7%)	315/518 (60.8%)	396/656 (60.4%)	
Low	53/138 (38.4%)	192/518 (37.1%)	245/656 (37.3%)	
SRPS				0.05
Low	55/138 (39.9%)	171/518 (33.0%)	226/656 (34.5%)	
Medium	49/138 (35.5%)	167/518 (32.2%)	216/656 (32.9%)	
High	29/138 (21.0%)	163/518 (31.5%)	192/656 (29.3%)	

Note: Values do not equal 100% due to missing data

Table 2

Generalized Estimating Equations predicting the probability of being in an age-discordant partnership among sexually experienced young rural South African women (n=656)

Variable	Adjusted Odds Ratio (95% CI)	p-value
Partnership status (ref: main)	1.50 (1.06, 2.13)	0.02*
Partner enrolled in school (ref: no)	0.20 (0.14, 0.30)	<0.001*
Sex frequency (ref: infrequent)	2.04 (1.39, 3.00)	<0.001*
Condom use frequency (ref: not always)	0.53 (0.32, 0.88)	0.01*
Condom at last sex (ref: no)	0.70 (0.50, 0.98)	0.04*
Partner concurrent partnerships (ref: no)	1.71 (1.19, 2.46)	<0.01*
Talked about HIV prevention (ref: no)	0.75 (0.50, 1.11)	0.15
Lifetime sexual partners (ref: 2 or less)	2.29 (1.52, 3.45)	<0.001*
Age of sexual debut (ref: > 14 years old)	1.24 (0.76, 2.01)	0.39
SRPS medium (ref: low)	0.79 (0.50, 1.25)	0.31
SRPS high (ref: low)	0.54 (0.32, 0.93)	0.03*
Condom use self-efficacy (ref: high)	1.20 (0.79, 1.83)	0.39

Note: Each line corresponds to a separate multivariable model with age-discordance as the outcome. Analyses adjusted for young woman's age, primary source of income, and food insecurity.

* Indicates that $p < .05$.

Table 3

GEE models predicting sexual behavior from partner age discordance

Variable	Adjusted Odds Ratio (95% CI)	p-value
Sex frequency (ref: infrequent)	1.77 (1.20, 2.60)	<0.01*
Condom use frequency (ref: not always)	0.62 (0.36, 1.05)	0.08
Condom at last sex (ref: no)	0.77 (0.54, 1.09)	0.14
Partner concurrent partnerships (ref: no)	1.77 (1.22, 2.57)	<0.01*
Transactional Sex (ref: no)	1.22 (0.66, 2.25)	0.52

Note: Each line corresponds to a separate multivariable model with the indicated outcome and partner age discordance as a predictor (reference group = partner age between (-1) and 5 years older). Analyses adjusted for young woman's age, partnership status, partner enrolled in school, relationship ongoing, cohabiting, and relationship duration.

* Indicates that $p < .05$.