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Acceptability of Couples' Voluntary HIV Testing Among HIV-infected Patients in Care and Their HIV-negative Partners in the United States

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Abstract:

Introduction:

Couples' voluntary HIV counseling and testing (CHTC) is an HIV risk reduction strategy not widely available in the US.

Methods:

We assessed willingness to participate in CHTC among US HIV-infected clinic patients *via* tablet-based survey and among HIV-negative persons with HIV-infected partners in care *via* mixed-method phone interviews.

Results:

Most of the N=64 HIV-infected partners surveyed were men (89%), on antiretroviral treatment (ART) (92%), and many self-identified homosexual (62%). We observed high levels of willingness to participate in CHTC (64%) among HIV-infected partners. Reasons for not wanting to participate included perceived lack of need (26%), desire to self-disclose their status (26%), and fear of being asked sensitive questions with their partner present (17%). HIV-infected partners were interested in discussing ART (48%), other sexually transmitted infections (STIs) (44%), and relationship agreements like monogamy (31%) during CHTC sessions. All N=15 HIV-negative partners interviewed were men, most identified as homosexual (73%), and about half (54%) reported consistent condom use with HIV-infected partners. We observed high levels of willingness to participate in CHTC (87%) among HIV-negative partners, who were also interested in discussing ART (47%), other STIs (47%), mental health services (40%), and relationship agreements (33%). Most negative partners (93%) indicated that they believed their HIV-infected partner was virally suppressed, but in the event that they were not, many (73%) were willing to take pre-exposure prophylaxis (PrEP).

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Conclusion:

These results indicate that CHTC for serodiscordant couples is acceptable and should emphasize aspects most pertinent to these couples, such as discussion of ART/PrEP, STIs, and relationship agreements.

Keywords: Acceptability, combination prevention, couples' voluntary HIV counseling and testing, discordant couples, HIV prevention, United States.

INTRODUCTION

Couples' voluntary HIV counseling and testing (CVCT, or more commonly CHTC in the United States) is a couple-level HIV testing intervention that includes HIV testing, facilitated serostatus disclosure and HIV prevention counseling with discussion of sexual agreements, condom use, and linkage to care [1]. CHTC is an evidence-based intervention shown primarily in high prevalence settings in Africa to decrease rates of unprotected sex, sexually transmitted infections, and HIV transmission between heterosexual couples [2 - 6]. There are no published data on the efficacy or effectiveness of CHTC to decrease HIV transmission in same-sex couples; however, CHTC has been demonstrated to be acceptable to men who have sex with men (MSM) couples in the United States [7 - 9]. Additionally, high levels of undiagnosed serodiscordance have been observed in this population [10].

The 2012 World Health Organization "Guidance on Couples HIV Testing and Counselling Including Antiretroviral therapy for Treatment and Prevention in Serodiscordant Couples" recommends that CHTC be offered to all couples regardless of serostatus or gender and highlights the potential benefit of CHTC for discordant couples to increase uptake and adherence to antiretroviral treatment (ART) amongst other health services [11]. Though most of the evidences driving these recommendations come from studies of heterosexual couples in sub-Saharan Africa, the importance of this intervention for other high-risk populations in the United States and other countries is recognized [12].

In the United States, CHTC has yet to be widely implemented in testing facilities, and CHTC is not available as a standard service for couples of all genders or sexual orientations in most cities. The safety and acceptability of this service for MSM has been evaluated in multiple community-based testing facilities in the United States [9, 13, 14]. These services recruit from the general population and have been successful in identifying new prevalent positives and discordant couples [10].

Less data supporting CHTC effectiveness among heterosexual couples in the United States have been collected, with the exception of studies among drug-using couples [15 - 17] and African American discordant couples [18 - 21]. Few studies have assessed the acceptability of this service among the general heterosexual population, with one internet survey of 526 HIV-negative and HIV-infected respondents indicating that about half of respondents were willing to participate, with women being more likely than men. Low HIV-risk perception was the main reason for lack of willingness to participate in the service [22, 23].

No current data exists on the acceptability of CHTC among HIV-infected clinic patients, heterosexual or MSM, who are either newly diagnosed or already established in care. Additionally, the willingness of partners of HIV-negative persons to participate in CHTC with their positive partners has not been evaluated. Studies have demonstrated that main partners are the source of the majority of infections in multiple settings [24, 25]. High levels of undiagnosed serodiscordance and the benefits of CHTC in reducing sexual risk behavior [10] highlight the need for increasing the availability of CHTC services.

Offering CHTC for known HIV-infected persons in care and their partners, whether MSM or heterosexual, is a potentially high impact strategy to 1) identify discordant couples and reduce sexual risk behaviors among these couples, where the majority of HIV transmissions occur [6], 2) identify new positives, 3) facilitate partner disclosure for known HIV-infected persons in care, 4) increase treatment adherence for all eligible HIV-infected partners, and 5) identify couples eligible for pre-exposure prophylaxis (PrEP) demonstration projects and use [11]. PrEP is a biomedical HIV prevention intervention in which HIV-negative individuals at risk for HIV acquisition take antiretroviral medications to prevent seroconversion following HIV exposure. The Centers for Disease Control and Prevention recommends PrEP for all HIV-negative individuals in serodiscordant relationships [26].

The objectives of this study were to determine the willingness of known HIV-infected patients already engaged in care to participate in CHTC with their sexual partners. We also evaluated how HIV-negative or serostatus unknown partners of such HIV-infected patients in care support the health of their HIV-infected partners, their willingness to participate in CHTC with their known positive partners, and their willingness to take PrEP in the event that they were

eligible and their positive partners were not virally suppressed.

METHODS

Survey Participants and Recruitment We recruited participants from the Emory Midtown Infectious Disease Clinic in Atlanta, Georgia over three weeks in March of 2014. Flyers describing the nature of the study were given to clients attending HIV clinic services at a scheduled appointment time by the clinic intake manager at check-in. Interested patients were referred to study staff who were present in the waiting room. These study staff explained the nature of the study and provided participants with self-administered iPad surveys which included eligibility screening questions, an informed consent, a short video explaining CHTC, and survey measures. Eligible participants were at least 18 years of age, self-reported HIV-infected, and had at least one sexual partner in the past 12 months. Participants who chose not to consent or who were not eligible were not able to proceed to the survey measures. Participants received a \$5 Target gift card for completion of the survey.

Survey Measures The survey was hosted on a HIPAA-compliant server by SurveyGizmo (Boulder, CO) and could be completed in 15-20 minutes. An option to refuse to answer any sensitive question was included. No names or identifiers were collected. Demographic characteristics included age, race, gender identity, sexual orientation, education, insurance status, income, and ART status. Clients with main sexual partners (defined as a partner the participant felt committed to above other sexual partners) provided information on the length of that relationship, partner race, partner HIV status, use of condoms with main partners, main partner knowledge of the participants HIV-infected status, questions about disclosure, partner facilitated HIV management, and sexual agreements. Similar questions were asked about other/casual partners. CHTC-related questions used in previous willingness surveys [9, 13, 27, 28] included willingness to participate with a partner, who participants would use the service with (main and/or casual partners), reasons for getting tested together, and other services that would be of interest during a couples' counseling session.

Survey Analyses The online survey was accessed *via* a secure, password-protected Emory wireless internet connection. Encrypted data from the online survey was stored on a secure, HIPAA-compliant server at the SurveyGizmo[®] servers in Boulder, Colorado. Descriptive statistics were used (counts and percentages) to describe respondent demographic data stratified by willingness to participate in CHTC (likely/very likely *versus* unlikely/don't know/no opinion). Measures related to couples' testing and measures related to the subset of respondents with main partners are presented using descriptive statistics.

Mixed-Method Interview Participants and Recruitment To recruit HIV-negative partners of HIV-infected clients, clinicians at Emory Midtown Infectious Disease Clinic distributed flyers along with a 2-page information sheet containing the elements of an informed consent document to their eligible HIV-infected clients. Eligible clients were those who were 18 years or older who had an HIV negative/unknown sexual partner 18 years or older and who had already disclosed to this partner. Eligible positive partners were instructed to give the flyer and information sheet to their eligible HIV negative/unknown partner. The flyer contained information on how to contact the study PI to participate in a 30 minute mixed-method phone interview at the time of their choice. Partners desiring to participate called the study PI and were read an oral consent script. Verbally consenting participants were asked study eligibility questions (aged 18 or over, sexually active with the HIV-infected partner in care at the Emory Midtown Infectious Disease Clinic in the past 12 months, HIV-/serostatus unknown), and eligible participants were interviewed. All participants were interviewed by the first author. Participants received a \$20 Target or Wal-Mart gift card which was either mailed or emailed to the study participant at their discretion.

Mixed-Method Interview Content Interview information was entered into a secure, HIPAA-compliant, password-protected Emory database. Data was accessed for monitoring study enrollment and data quality several times weekly, through a secure access portal. Once eligible study participants consented to participate over the phone, participants were interviewed by phone by the first author. The information collected from participants included demographic characteristics such as gender, age, race, educational attainment, insurance status and household income. Participants were also asked to provide information on their HIV-infected partner which included questions regarding how long they had been in a relationship with their HIV-infected partner, gender, race, condom use in the relationship and current agreements about sexual encounters outside of the relationship. The CHTC related questions addressed how participants helped managed their partner's HIV, willingness to participate in CHTC related services, reasons why they and their partner would and would not get tested together and reasons they would and would not take pre-exposure prophylaxis medication if their HIV-infected partner were not virally suppressed.

Mixed-Method Interview Analyses Descriptive statistics were used (counts and percentages) to describe both respondent and partner demographic data. Data pertaining to CHTC services was stratified categorically (likely/very likely/unlikely/don't know/no opinion). Three co-authors reviewed the open-ended responses to the qualitative questions to identify common themes. Respondent statements representing the most commonly voiced positive and negative responses are presented.

ETHICS

This study was determined to be exempt by the Emory University Institutional Review Board.

RESULTS

HIV+ participant survey: Demographics and willingness to participate in CHTC (Table 1)

Table 1. Demographic characteristics by willingness to participate in CVCT among HIV+ participants.

	Total (N = 64)	Likely or very likely to participate in CVCT (N = 41)	Unlikely/Don't know/No opinion (N = 23) ¹
	N/mean (%), (SD)	N/mean (%), (SD)	N/mean (%), (SD)
Age (mean, SD)	42.3 (10.4)	40.5 (9.5)	45.7 (11.2)
Gender			
Man	57 (89)	36 (88)	21 (91)
Woman	7 (11)	5 (12)	2 (9)
Race			
Black or African American	49 (78)	32 (80)	17 (74)
White	14 (22)	8 (20)	6 (26)
Sexual orientation			
Heterosexual	12 (19)	8 (20)	4 (18)
Homosexual	39 (62)	27 (66)	12 (55)
Bisexual	9 (14)	6 (15)	3 (14)
Don't know/Other	3 (5)	0 (0)	3 (14)
Transgender			
Yes	4 (6)	3 (7)	1 (5)
No	59 (94)	38 (93)	21 (95)
Highest level of education			
Some high school or less than high school	4 (6)	3 (7)	1 (5)
High school diploma or GED	13 (21)	9 (22)	4 (18)
Some college, Associate's degree, and/or Technical School	29 (46)	17 (41)	12 (55)
College, post graduate, or professional school	17 (27)	12 (29)	5 (23)
Insurance²			
Private health insurance or HMO	33 (52)	22 (54)	11 (48)
Medicaid	11 (17)	7 (17)	4 (17)
Medicare	13 (20)	9 (22)	4 (17)
Out of pocket	3 (5)	3 (7)	0 (0)
Ryan White	13 (20)	9 (22)	4 (17)
Don't know/Other	7 (11)	3 (7)	4 (17)
Household income			
0 to \$19,999	30 (48)	18 (44)	12 (55)
\$20,000 to \$39,999	15 (24)	10 (24)	5 (23)
\$40,000 to \$74,999	9 (14)	6 (15)	3 (14)
\$75,000 or more	7 (11)	5 (12)	2 (9)
Don't know	2 (3)	2 (5)	0 (0)
Current antiretroviral medication use			
Yes	58 (92)	38 (93)	20 (91)
No	5 (8)	3 (7)	2 (9)

(Table 3) contd....

	Total (N = 64)	Likely or very likely to participate in CVCT (N = 41)	Unlikely/Don't know/No opinion (N = 23) ¹
	N/mean (%), (SD)	N/mean (%), (SD)	N/mean (%), (SD)
Would you be interested in discussing any of the following services during a counseling session with a sex partner?²			
Anti-retroviral therapy (ART)	31 (48)	25 (61)	6 (26)
Family planning/birth control	4 (6)	3 (7)	1 (4)
Other sexually transmitted infections (STIs)	28 (44)	22 (54)	6 (26)
Injection drug use	8 (13)	6 (15)	2 (9)
Health post-incarceration	12 (19)	9 (22)	3 (13)
Relationship status (monogamy, "open," etc.)	20 (31)	15 (37)	5 (22)
Other	2 (3)	2 (5)	0 (0)
None of the above	22 (34)	8 (20)	14 (61)
Who do you think you would use this service with?³			
My main partner	--	34 (83)	--
Both my main partner and other partners	--	6 (15)	--
Neither my main partner or other partners	--	1 (2)	--
What are the reasons why you and your main sex partner would not get tested together and get your results back together?^{2,4}			
Afraid my partner might be positive	--	--	3 (13)
Don't need to be tested	--	--	6 (26)
My partner would not want to be tested together, even if I wanted to be tested together	--	--	2 (9)
I don't want my partner to know my HIV status	--	--	0 (0)
The counselor could ask me questions that I wouldn't want to answer with my partner there	--	--	4 (17)
I am in a monogamous relationship	--	--	1 (4)
I don't want to know my partner's HIV status	--	--	1 (4)
I would tell my partner myself	--	--	7 (30)
My partner is not at risk for HIV	--	--	2 (9)
Would be hard to schedule time together	--	--	2 (9)
Some other reason	--	--	4 (17)

1. *p*-values for differences between likely and unlikely groups all non-significant ($p > 0.05$) from Fisher exact tests.

2. Participants were asked to select all that apply.

3. Only asked of participants who reported being likely or very likely to participate in CVCT.

4. Only asked of participants who reported being unlikely/don't know/no opinion to participate in CVCT

During the two week recruitment, N=107 HIV clinic patients attending a clinic visit were provided flyers while waiting for their appointment and agreed to participate. Of those 107, 31 were disqualified because they had not had sex in the past year, and 12 were not eligible because they had not previously tested HIV-infected.

Of the N=64 HIV-infected respondents in the analysis, most were men (89%), black or African American (78%), self-identified as homosexual (62%), and were on antiretroviral medication (92%). Our sample was relatively educated, with 73% of participants reporting some college or higher. Approximately half of participants reported having private health insurance or HMO; Medicaid, Medicare, and Ryan White were each used by a roughly one-fifth of respondents. Just under half of participants reported a before-tax household income from all sources of less than \$20,000.

Of all respondents, 41 (64%) said that they were likely or very likely to participate in CHTC with their sexual partner, 15 (23%) reported that they did not know, and 8 (13%) reported that they were unlikely or very unlikely to participate in CHTC. The majority (83%) reported that if they were to use the service they would use it with their main partner (defined as someone you feel committed to above all others), and 15% would use the service with main and casual/other sexual partners.

Among respondents, 23 (36%) who reported that they were unlikely, did not know, or had no opinion if they would participate in CHTC with their sexual partner, 3 (13%) reported that they were afraid their partner would be positive, 6 (26%) reported that they do not need to be tested, 7 (17%) reported that the counselor could ask them questions that they wouldn't want to answer with their partner there and 6 (26%) reported that they would rather learn their own HIV status first, then tell their partner.

HIV+ participant survey: Main sexual partners (N=33) (Table 2)

Table 2. Characteristics of main partners of HIV-positive respondents.

	Total (N = 33)
	N/mean (%), (SD)
Main partner age (mean, SD)	39.2 (11.1)
Length of relationship	
Less than 3 months	3 (9)
3-6 months	4 (12)
7-12 months	4 (12)
More than 12 months	22 (67)
Main partner gender	
Male	28 (85)
Female	5 (15)
Main partner race	
Black or African American	27 (82)
White	6 (18)
Main partner HIV status	
Positive	19 (58)
Negative	11 (33)
Don't know	3 (9)
Condom use frequency with main partner during vaginal or anal sex	
Never/Rarely	11 (34)
Occasionally/Most of the time	7 (22)
Always	14 (44)
Condom use frequency with main partner during vaginal or anal sex²	
Never/Rarely	4 (29)
Occasionally/Most of the time	1 (7)
Always	9 (64)
Does main partner know you are HIV positive?	
Yes	32 (97)
No	1 (3)
How did the conversation go when you told them that you are HIV+?	
Average	5 (16)
Well	26 (84)
What happened after you told them your HIV status?	
We stopped having sex	2 (6)
We continued having sex and always used condoms	13 (41)
We continued having sex and used condoms sometimes	11 (34)
We continued having sex and never used condoms	6 (19)
Looking back, how do you feel now about having told them your HIV status?	
I am glad I shared my HIV status	27 (84)
I regret having shared my HIV status	2 (6)
Don't know/no strong feelings	3 (9)
How does your main partner help you manage your HIV?¹	
Makes sure I take my medicine	17 (52)
Comes with me to the clinic	5 (15)
Helps me try to stay healthy	17 (52)
Other	2 (6)
He/she doesn't help me manage my HIV	4 (12)
Current sexual agreement with main partner	
Neither of us can have any sex with an outside partner	22 (67)
We can have sex with outside partners, without any conditions or restrictions	0 (0)

(Table 4) contd....

	Total (N = 33)
	N/mean (%), (SD)
We can have sex with outside partners, but with some conditions or restrictions	5 (15)
We do not have an agreement	3 (9)
Don't know	3 (9)

1. Participants were asked to select all that apply.

2. Among HIV-positive respondents with HIV serostatus negative/unknown partners

Of the N=33 HIV-infected respondents with a main partner, the majority (67%) were in relationships longer than 12 months. Most partners were men (85%), and were black or African American (82%). A third (33%) reported that their main partner was HIV-negative, and roughly a tenth (9%) reported that they did not know their partner's HIV status.

Nearly all (97%) of respondents with main partners reported having disclosed their positive HIV status; the majority (84%) of those indicated that the conversation went well at the time of disclosure and most (84%) reported they were glad they shared their status. Most respondents indicated that after telling their partner their status, they continued having sex and used condoms always (41%) or sometimes (34%). The plurality (44%) of respondents said they currently always used condoms with their main partner during anal or vaginal intercourse; approximately a fifth (22%) reported using condoms with their main partner sometimes, and a third (34%) reported using condoms with their main partner rarely or never. Roughly half (52%) of respondents indicated that their partner helps them to manage their HIV by making sure they take their medication and helping them to stay healthy. Most (67%) participants indicated that they had an agreement with their main partner to not have sex with outside partners. Under a fifth (18%) of respondents said that they did not have an agreement or did not know of an agreement with their main partner regarding outside partners.

HIV- partner mixed-method interviews: Quantitative findings (Tables 3 - 4)

Table 3. Demographic and relationship characteristics of HIV-negative respondents in serodiscordant relationships.

	Total (N = 15)
	N (%)
Gender	
Male	15 (100)
Gender of sex partners, past 12 months	
Men	13 (86)
Women	1 (7)
Both men and women	1 (7)
Race¹	
Black or African American	10 (67)
White	3 (20)
Other	2 (13)
Sexual Orientation	
Heterosexual	1 (7)
Homosexual	11 (73)
Bisexual	2 (13)
Other	1 (7)
Don't know	0 (0)
Education	
Less than high school	0 (0)
Some high school	0 (0)
High school diploma or GED	4 (27)
Some college, Associate's degree, and/or Technical School	6 (40)
College, post graduate, or professional school	5 (33)
Health Insurance Status¹	
Private health insurance or HMO	9 (60)
Medicaid	1 (7)
Medicare	4 (27)
Out of pocket	2 (13)

(Table 5) contd.....

	Total (N = 15)
	N (%)
Ryan White	0 (0)
Don't know	0 (0)
Other	0 (0)
Household Income	
0 to \$19,999	6 (41)
\$20,000 to \$39,999	2 (13)
\$40,000 to \$74,999	3 (20)
\$75,000 or more	2 (13)
Don't know	2 (13)
Length of Relationship	
Less than one month	0 (0)
1-2 months	0 (0)
3-6 months	0 (0)
7-12 months	1 (7)
More than 12 months	14 (93)
Partner Gender	
Male	14 (93)
Female	1 (7)
Partner Transgender	(0)
Yes	1 (7)
No	14 (93)
Partner Race¹	
Black or African American	10 (67)
White	4 (27)
Other	1 (6)
Condom Use with Partner	
Never	1 (7)
Rarely	2 (13)
Occasionally	2 (13)
Most of the time	2 (13)
Always	8 (54)
Current Relationship Agreement	
Neither of us can have any sex with an outside partner	12 (80)
We can have sex with outside partners, without any conditions or restrictions	0 (0)
We can have sex with outside partners, but with some conditions or restrictions	1 (7)
We do not have an agreement	3 (20)
Don't know	0 (0)
	Mean, SD
Age	48.1 (10.1)

1. Participants were asked to report all that apply.

Of the N=15 HIV-negative respondents with a positive partner, the majority (93%) were in a relationship for more than 12 months. Most partners were men (86%), identified as black or African American (67%) and considered themselves to be homosexual (73%). In regards to educational attainment, most respondents had completed some college, obtained an Associate's degree, and/or attended Technical school (40%); attended college, post graduate, or professional school (33%); or obtained a high school diploma or GED (27%). Many respondents paid for healthcare services with private health insurance (60%) and had a household income less than \$20,000 before taxes (41%).

Most respondents reported that their positive partner was male (93%) and considered themselves to be black or African American (67%). About half of respondents (54%) reported they always use condoms when having vaginal or anal sex with their main partner. When asked about any current agreements with their positive partner regarding sexual encounters outside of the relationship, the majority (80%) reported that neither of them can have sex with an outside partner, while 20% reported that they do not have an agreement.

Of all respondents (15), the majority (60%) reported that they would be very likely to participate in CHTC services with their HIV-infected partner if it was available to them. Most (60%) also reported that there would be no reason not to participate in CHTC services with their positive partner. Most respondents were interested in both the discussion of anti-retroviral therapy (47%) and other STIs (47%) during a CHTC session with their partner. When asked about being aware of whether their partner was virally suppressed, the majority (93%) reported that their partner was suppressed. Most respondents reported that they would take pre-exposure prophylaxis (PrEP) medication if their partner were not virally suppressed. When asked about reasons why they would not take PrEP, the majority (53%) reported a concern regarding side effects. When asked why they would be open to taking PrEP, most respondents (80%) asserted that they wanted to stay healthy/prevent acquiring HIV.

HIV- partner mixed-method interviews: qualitative findings

Fifteen mixed-method interviews of HIV-negative persons with HIV-infected partners were completed. Though participants were given the opportunity to provide additional comments concerning CHTC, PrEP and/or other related matters, the majority only discussed PrEP. The majority (13/15) expressed an interest in the use of PrEP medication. Of those who were interested, the common themes focused on being willing to try a new treatment based on either their own health condition or their partner's viral load status. Participants who mentioned that they were not interested in PrEP declared that they thought PrEP was an irresponsible use of medication and could perhaps lead to increased risky sexual behaviors and unprotected sex.

Positive Views A number of positive views of PrEP were expressed by the participants. When considering a partner who was either recently diagnosed with HIV or who was not virally suppressed, HIV-negative participants expressed a high level of interest in PrEP. One participant noted that he is always looking for new and better treatments and is willing to try new things. Another participant who had previously undergone cancer treatment speculated that PrEP could not be worse than chemotherapy; he also noted that due to a weakened immune system he is particularly concerned with preventing seroconversion and would definitely take PrEP.

Negative Views Negative views about PrEP primarily focused on the use of antiretroviral medication as a means for prophylaxis. One participant noted that it "seems like a very irresponsible use of drugs." Another participant expressed concern about risk compensation and increasing rates of condomless sex. In this participant's opinion, taking PrEP for the purposes of engaging in casual sex is "a misuse of the drug." Finally, one respondent felt that there was too much focus on HIV and that this is detracting focus from other sexual risks such as transmission of other STIs. He noted that he is more worried about the other STIs that he could acquire from risky sexual encounters than HIV seroconversion.

DISCUSSION

We sought to assess the willingness of HIV-infected patients already engaged in care to participate in CHTC with their HIV-negative or serostatus unknown sexual partners. Among the sexual partners of these patients, we sought to assess the ways in which they support the health of their HIV-infected partner, their willingness to participate in CHTC with their known positive partner, and their willingness to take PrEP. Overall, the majority of participants, both HIV-infected (64%) and HIV-negative (87%) expressed willingness to participate in CHTC.

It is important to distinguish between the importance of CHCT for identifying discordant couples who did not know they were discordant and the added value of CHCT even after disclosure has occurred. Among HIV-infected partners who were unsure or unwilling to participate in CHTC, the main reasons for not wanting to participate in CHTC was a perceived lack of a need (26%). This could be due to the relatively high levels of disclosure reported by the HIV-infected participants in the current study, which suggest that self-disclosure may already be occurring outside of the context of CHTC within stable relationships. Low perceived risk has been found to be a barrier in other studies [22, 23] and highlights the significance of emphasizing the other benefits of CHTC beyond serostatus disclosure (such as those identified by the participants themselves, including discussion of care for positive partners, other STI prevention, discussions about ART/PrEP, and relationship agreements), as well as the opportunity for HIV-negative/unknown status partners in known serodiscordant relationships to be regularly tested for HIV.

CHTC can also be used to discuss prevention of transmission - regular condom use was low in this analytic group, and HIV-negative partners commonly reported believing their HIV-positive partners to be virally suppressed. The confidence that may come with perceived viral suppression could be addressed during CHTC. These discussions are important in reducing the transmission of HIV to the HIV-negative partner and reducing condomless sex with outside partners and the possibility of superinfection. The cumulative probability of HIV transmission has been estimated to be

13% in heterosexual couples and 76% in same-sex male couples over a 10-year period when relying on condoms alone [29]. When relying on antiretroviral therapy (ART) for the HIV-infected partner alone the 10-year risk is estimated to be 3% and 25% for heterosexual and same-sex male couples, respectively [29]. Regular CHTC could be an important component in sustaining risk reduction practices in serodiscordant couples. Further, though we did not recruit concordant positive couples in this study, it could be valuable to use CHTC to provide education about the need to continue to use condoms to prevent ART resistance and other STI's.

Another frequently cited reason among HIV-infected partners for not participating in CHTC was that the counselor might ask questions that the participant would not want to answer in the presence of their partner (17%). This important finding highlights the need for promotional messaging around the fact that unwanted disclosure of other sensitive/personal information is not a part of CHTC programs. CHTC focuses on future relationship goals and expectations rather than asking participants to have potentially uncomfortable discussions about past behavior [8].

Table 4. Opinions about CVCT and PrEP willingness among HIV-negative participants in serodiscordant relationships.

	Total (N = 15)
	N (%)
How do you help your partner manage their HIV?¹	
Make sure they take their medicine	12 (80)
Come to the clinic	12 (80)
Help them try to stay healthy	12 (80)
I don't help them manage their HIV	1 (7)
If couples HIV testing was available to you (where you and a sex partner got tested together and received your results and counseling together), how likely would be to participate?	
Very unlikely	1 (7)
Unlikely	1 (7)
I don't know/no opinion	0 (0)
Likely	4 (26)
Very likely	9 (60)
What are the reasons why you and your partner would not get tested together and get your results back together?¹	
Don't need to be tested	1 (7)
My partner would not want to be tested together, even if I wanted to be tested together	1 (7)
I don't want my partner to know my HIV status	0 (0)
The counselor could ask me questions that I wouldn't want to answer with my partner there	0 (0)
I am in a monogamous relationship	0 (0)
I don't want to know my partner's HIV status	1 (7)
Afraid I might be positive	1 (7)
I would rather learn my own status first, then tell my partner	1 (7)
Would be hard to schedule time together	0 (0)
No reason not to	9 (60)
Would you be interested in discussing any of the following services during a counseling session with a sex partner?¹	
Anti-retroviral therapy (ART)	7 (47)
Family planning/birth control	0 (0)
Other sexually transmitted infections (STIs)	7 (47)
Injection drug use	3 (20)
Non- injection drug use	3 (20)
Health post-incarceration	4 (27)
Relationship status (monogamy, "open," etc.)	5 (33)
Alcohol use	4 (27)
Mental health services	6 (40)
None of the above	5 (33)
Do you know if your partner is virally suppressed?	
Yes, they are	14 (93)
No, they are not	1 (7)
Don't know	1 (7)

(Table 6) contd....

	Total (N = 15)
	N (%)
If your partner were not virally suppressed (meaning that their HIV virus was high and capable of onward sexual transmission) would you take Pre-exposure prophylaxis until your partner started medication and had a low viral count (about 3 months)?	
Very unlikely	4 (27)
Unlikely	0 (0)
I don't know/no opinion	0 (0)
Likely	2 (13)
Very likely	9 (60)
What are the reasons why you would NOT take pre-exposure prophylaxis if your partner were not virally suppressed?	
Side effects	8 (53)
Not necessary - we don't/wouldn't have unprotected sex	5 (33)
What are the reasons why you WOULD take pre-exposure prophylaxis if your partner were not virally suppressed?	
To stay healthy/prevent acquiring HIV	12 (80)
If we wanted to have unprotected sex	4 (27)

1. Participants were asked to report all that apply.

We observed a high prevalence of serodiscordance among HIV-infected persons with primary sexual partners. Of HIV-infected patients with a main partner, 42% had a HIV-negative or serostatus unknown main partner. CHTC has the potential to identify new HIV-infected individuals and serodiscordant couples. The latter are a critical prevention group - CDC estimates that 14% of HIV-infected people in the United States are unaware of their infection [30], and it has been estimated that individuals unaware of their infection are 3.5 times more likely to transmit HIV to their sexual partners [31].

Among HIV-negative partners, willingness to participate in CHTC with their known HIV-infected partners was even higher, perhaps in part because HIV-negative partners in discordant relationships have higher risk perception - only 7% of HIV-negative partners reported that a reason to not seek CHTC was that they didn't need to be tested and 60% did not cite any reason not to test with their positive partner.

HIV-negative partners were similarly interested in discussing ART (47%), other STIs (47%), and relationship agreements (33%) during CHTC sessions. One notable difference was that mental health services (40%) were also of interest. Additionally, the majority of negative partners (93%) indicated that they believed their positive partner to be virally suppressed, but in the event that they were not, most (73%) were willing to take PrEP. The most common reason for wanting to take PrEP was to stay healthy and prevent HIV acquisition (80%) followed by the desire to more safely have unprotected sex (27%). Side effects (53%) and willingness to abstain from sex/use condoms (33%) were reported reasons to not use PrEP.

This study has limitations. This is a convenience sample of HIV-infected patients from an urban clinic and HIV-negative and serostatus unknown partners of HIV-infected patients and the participants may not be representative of all HIV-infected patients and their partners. Therefore, the generalizability of these results may be limited to more educated MSM. The HIV-infected survey respondents were recruited separately from the HIV-negative and unknown serostatus mixed-method interview respondents; thus, they do not represent couples. Just under one fifth of respondents were heterosexual; stratified analyses of heterosexual and MSM might yield different results. Further, because the HIV-infected participants were recruited from a clinic setting they had been in care for an unknown amount of time. It is possible that newly diagnosed individuals would be more or less likely to be interested in CHTC or PrEP. The mixed-method interviews were conducted by phone, so there is the possibility that some participants' responses were biased due to social desirability.

Despite these limitations, our results indicate that CHTC for serodiscordant couples is acceptable and should emphasize aspects most pertinent to these couples, such as discussion about ART/PrEP, STIs, relationship agreements, and how to best support the partner in care. It may be necessary to highlight the benefits of CHTC beyond serostatus disclosure to this population, and dispel myths about what sensitive information may be elicited during CHTC. Expansions of CHTC service should consider the needs of known serodiscordant couples in both marketing and service provision.

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CONFLICT OF INTEREST

The authors confirm that this article content has no conflict of interest.

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REFERENCES

- [1] Centers for Disease Control and Prevention. Couples HIV counseling and testing intervention and training curriculum. Atlanta, GA: CDC 2011.
- [2] Allen S, Tice J, Van de Perre P, *et al.* Effect of serotesting with counselling on condom use and seroconversion among HIV discordant couples in Africa. *BMJ* 1992; 304(6842): 1605-9. [<http://dx.doi.org/10.1136/bmj.304.6842.1605>] [PMID: 1628088]
- [3] Allen S, Meizen-Derr J, Kautzman M, *et al.* Sexual behavior of HIV discordant couples after HIV counseling and testing. *AIDS* 2003; 17(5): 733-40. [<http://dx.doi.org/10.1097/00002030-200303280-00012>] [PMID: 12646797]
- [4] Allen SA, Musonda R, Trask S, *et al.* Virologic and immunologic determinants of heterosexual transmission of human immunodeficiency virus type 1 in Africa. *AIDS Res Hum Retroviruses* 2001; 17(10): 901-10. [<http://dx.doi.org/10.1089/088922201750290023>] [PMID: 11461676]
- [5] Guthrie BL, de Bruyn G, Farquhar C. HIV-1-discordant couples in sub-Saharan Africa: explanations and implications for high rates of discordancy. *Curr HIV Res* 2007; 5(4): 416-29. [<http://dx.doi.org/10.2174/157016207781023992>] [PMID: 17627505]
- [6] Kamenga M, Ryder RW, Jingu M, *et al.* Evidence of marked sexual behavior change associated with low HIV-1 seroconversion in 149 married couples with discordant HIV-1 serostatus: experience at an HIV counselling center in Zaire. *AIDS* 1991; 5(1): 61-7. [<http://dx.doi.org/10.1097/00002030-199101000-00009>] [PMID: 2059362]
- [7] Neme S, Goldenberg T, Stekler JD, Sullivan PS, Stephenson R. Attitudes towards couples HIV testing and counseling among Latino men who have sex with men in the Seattle area. *AIDS Care* 2015; 27(10): 1354-9. [<http://dx.doi.org/10.1080/09540121.2015.1058894>] [PMID: 26272715]
- [8] Sullivan PS, Stephenson R, Gratzter B, *et al.* Adaptation of the African couples HIV testing and counseling model for men who have sex with men in the United States: an application of the ADAPT-ITT framework. *Springerplus* 2014; 3: 249. [<http://dx.doi.org/10.1186/2193-1801-3-249>] [PMID: 24877036]
- [9] Sullivan PS, White D, Rosenberg ES, *et al.* Safety and acceptability of couples HIV testing and counseling for US men who have sex with men: a randomized prevention study. *J Int Assoc Provid AIDS Care* 2014; 13(2): 135-44. [<http://dx.doi.org/10.1177/2325957413500534>] [PMID: 23995295]
- [10] Sullivan PS, Wall KM, O'Hara B, *et al.* The prevalence of undiagnosed HIV serodiscordance among male couples presenting for HIV testing. *Arch Sex Behav* 2014; 43(1): 173-80. [<http://dx.doi.org/10.1007/s10508-013-0214-x>] [PMID: 24233391]
- [11] World Health Organization. Guidance on couples HIV testing and counselling - including antiretroviral therapy for treatment and prevention in serodiscordant couples. Geneva, Switzerland: WHO Press 2012.
- [12] El-Bassel N, Gilbert L, Witte S, Wu E, Hunt T, Remien RH. Couple-based HIV prevention in the United States: advantages, gaps, and future directions. *J Acquir Immune Defic Syndr* 2010; 55(Suppl. 2): S98-101. [<http://dx.doi.org/10.1097/QAI.0b013e3181fbf407>] [PMID: 21406997]
- [13] Stephenson R, Sullivan PS, Salazar LF, Gratzter B, Allen S, Seelbach E. Attitudes towards couples-based HIV testing among MSM in three US cities. *AIDS Behav* 2011; 15(Suppl. 1): S80-7. [<http://dx.doi.org/10.1007/s10461-011-9893-2>] [PMID: 21336607]
- [14] Wagenaar BH, Christiansen-Lindquist L, Khosropour C, *et al.* Willingness of US men who have sex with men (MSM) to participate in Couples HIV Voluntary Counseling and Testing (CVCT). *PLoS One* 2012; 7(8): e42953. [<http://dx.doi.org/10.1371/journal.pone.0042953>] [PMID: 22905191]
- [15] Remien RH, Stirratt MJ, Dolezal C, *et al.* Couple-focused support to improve HIV medication adherence: a randomized controlled trial. *AIDS* 2005; 19(8): 807-14. [<http://dx.doi.org/10.1097/01.aids.0000168975.44219.45>] [PMID: 15867495]
- [16] McMahon JM, Tortu S, Pouget ER, Torres L, Rodriguez W, Hamid R. Effectiveness of couple-based HIV counseling and testing for women substance users and their primary male partners: a randomized trial. *Adv Prev Med* 2013; 2013: 286207. [<http://dx.doi.org/10.1155/2013/286207>] [PMID: 23555059]

- [17] El-Bassel N, Gilbert L, Wu E, *et al.* Couple-based HIV prevention for low-income drug users from New York City: a randomized controlled trial to reduce dual risks. *J Acquir Immune Defic Syndr* 2011; 58(2): 198-206. [<http://dx.doi.org/10.1097/QAI.0b013e318229eab1>] [PMID: 21725249]
- [18] NIMH Multisite HIV/STD Prevention Trial for African American Couples Group. Methodological overview of an African American couple-based HIV/STD prevention trial. *J Acquir Immune Defic Syndr* 2008; 49(Suppl. 1): S3-14. [<http://dx.doi.org/10.1097/QAI.0b013e3181842570>] [PMID: 18724188]
- [19] NIMH Multisite HIV/STD Prevention Trial for African American Couples Group. Risky sexual behavior and correlates of STD prevalence among African American HIV serodiscordant couples. *AIDS Behav* 2010; 14(5): 1023-31. [<http://dx.doi.org/10.1007/s10461-010-9698-8>] [PMID: 20499152]
- [20] El-Bassel N, Jemmott JB, Landis JR, *et al.* National institute of mental health multisite Eban HIV/STD prevention intervention for African American HIV serodiscordant couples: a cluster randomized trial. *Arch Intern Med* 2010; 170(17): 1594-601. [<http://dx.doi.org/10.1001/archinternmed.2010.261>] [PMID: 20625011]
- [21] Williams DR, Allen S, Padian N. Project Eban: a giant step forward. *J Acquir Immune Defic Syndr* 2008; 49(Suppl. 1): S1-2. [<http://dx.doi.org/10.1097/QAI.0b013e318186d2d8>] [PMID: 18724185]
- [22] Jones JS, Stephenson R, Wall KM, Sullivan PS. Relationship agreements and willingness to participate in couples HIV testing and counseling among heterosexuals in the U.S. *Open AIDS J* 2014; 8: 50-7.
- [23] Stephenson R, Finneran C, Goldenberg T, *et al.* Willingness to use couples HIV testing and discussion of sexual agreements among heterosexuals. *Springerplus* 2015; 4: 169. [<http://dx.doi.org/10.1186/s40064-015-0939-1>] [PMID: 25897413]
- [24] Dunkle KL, Stephenson R, Karita E, *et al.* New heterosexually transmitted HIV infections in married or cohabiting couples in urban Zambia and Rwanda: an analysis of survey and clinical data. *Lancet* 2008; 371(9631): 2183-91. [[http://dx.doi.org/10.1016/S0140-6736\(08\)60953-8](http://dx.doi.org/10.1016/S0140-6736(08)60953-8)] [PMID: 18586173]
- [25] Sullivan PS, Salazar L, Buchbinder S, Sanchez TH. Estimating the proportion of HIV transmissions from main sex partners among men who have sex with men in five US cities. *AIDS* 2009; 23(9): 1153-62. [<http://dx.doi.org/10.1097/QAD.0b013e32832baa34>] [PMID: 19417579]
- [26] U.S. Public Health Service. Preexposure prophylaxis for the prevention of HIV infection in the United States - 2014: A clinical practice guideline 2014. Available at: www.cdc.gov/hiv/pdf/prep/guidelines2014.pdf
- [27] Stephenson R, Chard A, Finneran C, Sullivan P. Willingness to use couples voluntary counseling and testing services among men who have sex with men in seven countries. *AIDS Care* 2014; 26(2): 191-8. [<http://dx.doi.org/10.1080/09540121.2013.808731>] [PMID: 23786340]
- [28] Stephenson R, Rentsch C, Sullivan P. High levels of acceptability of couples-based HIV testing among MSM in South Africa. *AIDS Care* 2012; 24(4): 529-35. [PMID: 22007940]
- [29] Lasry A, Sansom SL, Wolitski RJ, *et al.* HIV sexual transmission risk among serodiscordant couples: assessing the effects of combining prevention strategies. *AIDS* 2014; 28(10): 1521-9. [<http://dx.doi.org/10.1097/QAD.0000000000000307>] [PMID: 24804859]
- [30] Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data-United States and 6 dependent areas-2012. HIV Surveillance Supplemental Report 19. Available at: <http://www.cdc.gov/hiv/library/reports/surveillance/>
- [31] Marks G, Crepaz N, Janssen RS. Estimating sexual transmission of HIV from persons aware and unaware that they are infected with the virus in the USA. *AIDS* 2006; 20(10): 1447-50. [<http://dx.doi.org/10.1097/01.aids.0000233579.79714.8d>] [PMID: 16791020]

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