

Heterosexual Behavioral Maintenance and Change Following HIV Counseling and Testing

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Abstract

This study investigated heterosexual HIV risk behaviors, changes in stage of change for safer sex and factors associated with such changes, among a diverse sample of 560 heterosexually active individuals presenting at publicly funded HIV C&T sites. Questionnaires were administered before HIV C&T, and three months afterwards. Positive serostatus was the most significant predictor of safer behavior after C&T. Many seronegative participants stopped sex with non-main partners. Behaviors with main partners were particularly resistant to change. Predictors of change varied by stage at pre-test. C&T services should tailor approaches and referrals based on stage of change and other client characteristics.

Keywords

*counseling and testing,
heterosexual, HIV/AIDS,
predictors of behavior change,
stage of change*

Introduction

THERE HAS been consistent and wide support for the role that counseling and testing programs (hereafter, C&T) can play in HIV prevention strategies. Between 1990 and 1998 the number of reported publicly funded HIV tests increased from 1.5 million to 2.2 million (CDC, 2001). Based on findings from an HIV counseling trial of RESPECT, which compared three approaches and found significantly more condom use at three and six months post-intervention in counseling using enhanced counseling vs. didactic messages (Kamb et al., 1997), CDC elected to place greater emphasis on testing as a cornerstone of its prevention activities (CDC, 2003a). As treatment options have increased since the earlier phase of the epidemic, and HIV has become a chronic disease, C&T has become increasingly important for screening because it also provides an avenue for directing persons diagnosed with HIV into treatment.

Yet, despite the privilege placed on C&T programs, research conducted to assess whether they have met their goals has been both limited and inconclusive (Higgins et al., 1991). There is evidence to suggest that C&T can reduce the sexual and drug risk-taking practices (Des Jarlais et al., 2000; Roffman et al., 1995; Wenger, Linn, Epstein, & Shapiro, 1991). However, some studies indicate that the provision of C&T does not necessarily engender corresponding reductions in risk behavior (Calsyn, Saxon, Freeman, & Whittaker, 1992; Ickovics, Morrill, Beren, Walsh, & Rodin, 1994; Landis, Earp, & Koch, 1992; Wenger et al., 1992). Even when clients do alter their practices, change may be incomplete or inconsistent (Clark, Brasseur, Richmond, Getson, & D'Angelo, 1998); Roffman et al. (1995) found that among men attending C&T, those who were more consistent in their condom use also reported more partners in the past two months.

Such differences in findings may reflect the influence that knowledge of serostatus, rather than C&T, has on behavior (Higgins et al., 1991). Knowledge of HIV-positive serostatus may result in risk reduction behavior among men and injection drug users of differing sexual orientation (Higgins et al., 1991; Zapka, Stoddard, Zorn, McCusker, & Mayer, 1991) and ethnicity

(Magura et al., 1991; Otten, Zaidi, Wroten, Witte, & Peterman, 1993). Researchers have found that women who test positive reduce their sexually unsafe practices (Marx, Hirozawa, Chu, Bolan, Katz, 1999; Wolitski, MacGowan, Higgins, & Jorgensen, 1997; but see Wilson, Jaccard, Levinson, Minkoff, & Endias, 1996, who assert the contrary), and that testing accelerates access to treatment and services.

Both women and men who receive HIV-negative reports appear to resist any change in their practices (Johnson, Stanford, Douglas, Botwinick, Marino, 2001; St-Lawrence, Eldridge, Brasfield, 1998; Weinhardt, Carey, Johnson, & Bickham, 1999), perhaps seeing the testing program as a preventative strategy in itself (Exner, Hoffman, Parikh, Leu, Ehrhardt, 2002; Fernyak, Page-Shafer, Kellogg, McFarland, & Katz, 2002), and may in fact subsequently take greater risks (Clark et al., 1998; Wilson et al., 1996; Zenilman, Erickson, Fox, Reichart, & Hook, 1992).

The studies that were reviewed have several limitations that must be taken into consideration when drawing conclusions about the efficacy of C&T programs. Many were conducted within a specific population (e.g. male injection-drug users (IDU)), so the results may not hold true for the general population seeking C&T. Furthermore, some studies had high attrition rates (which introduce a bias in the sample) and small sample sizes, both of which may limit the power to observe actual changes in behaviors. It is also possible that more subtle changes were missed by the outcome measures used in most studies. For example, C&T may assist clients in progressing through earlier stages of behavior change (Prochaska, Redding, Harlow, Rossi, & Velicar, 1994), which involve changes in intentions to implement risk reduction strategies rather than producing observable changes in risk behavior. Furthermore, studies often did not provide information on the protocol for C&T. If testing were taking place at a publicly funded site, it would be reasonable to assume that CDC guidelines were followed; however, many of the studies did not specify whether they had followed these or other guidelines. The variations in the types of C&T to which subjects were exposed make it difficult to draw conclusions regarding the relative efficacy of different programs.

This study sought to investigate changes in heterosexual risk behavior with both main and non-main partners following HIV C&T. To capture more subtle change, we also examined stages of change for safer sexual behavior. Unlike many previous studies, this study drew participants from a diverse sample of clients presenting at publicly funded C&T sites, all of which followed a standardized protocol (i.e. that recommended by the CDC). In addition, we sought to identify sociodemographic, behavioral and HIV counseling services-related factors associated with changes in stage of behavior change.

Method

The study was conducted from May 1996 to February 1997 in 13 C&T sites funded through the Massachusetts Department of Public Health (MDPH). C&T in MDPH-funded sites is based on a counselor certification program that follows a general CDC-recommended standard protocol, which guides the information and approaches used in HIV C&T sessions.

Sample

Thirteen study sites were selected from 136 MDPH-funded HIV C&T sites as follows: 39 sites were identified as high volume (i.e. sites that conduct at least 200 HIV-antibody tests per year). These sites accounted for 71 percent of all persons tested statewide. Based on the proportion of clients testing HIV-positive, sites were categorized as high-risk (seroprevalence of 2% or higher) or low-risk (seroprevalence lower than 2%). To reflect the distribution of clients across the five geographic regions of the state, one high-risk and one low-risk site were selected from each of four regions, and two high-risk and two low-risk sites were selected from the Boston/Metro Boston area, plus one additional site to ensure a sufficiently large sample of IDUs. Within each geographic area and high or low level of seroprevalence, sites were selected randomly and according to a probability of selection proportionate to the number of HIV tests performed in the year prior to the study.

Eligibility for the study included the following criteria: age 18 years or older, speaker of English or Spanish and ability to give informed consent. Of 1286 clients approached, 939 (73%) enrolled in the study and completed the

Pre-Test Questionnaire, and 672 respondents completed the Post-Test Questionnaire (72% follow-up rate). Participants lost to follow-up were comparable to those who completed both questionnaires in terms of most demographic characteristics and HIV risk behaviors. Those lost to follow-up were more likely to be male ($p < .001$), Hispanic/Latino ($p < .01$) and to have less than a high school education ($p < .001$).

Participants were diverse with respect to gender, race/ethnicity, age, education, relationship status and history of HIV risk (see Table 1). Of the 672 retained, 560 reported heterosexual behavior at either time point. Due to the small number of study participants reporting homosexual behavior, this study focuses on heterosexual behavior, and the 172 participants who reported only homosexual behavior were excluded.

Procedures

Trained research assistants matched to client population on race/ethnicity and language approached clients presenting for C&T at the 13 study sites. Clients who agreed to participate in the study completed a Pre-Test Questionnaire prior to the counseling session preceding HIV testing. In order to facilitate the participation of individuals with low literacy, clients were given the option of self-administration or having the instrument administered via a face-to-face interview by a research assistant. At baseline, near half of participants (278 out of 560) chose to have the survey administered by the research assistant. At the 3-month follow-up there was no significant difference in mode of administration with approximately 90 percent (or 445) of participants having the same method of administration as at baseline, excluding those interviewed via telephone (12% of all clients, or 67). Those who had surveys administered by the interviewer were more likely to be male ($p < 0.01$), older ($p < 0.001$), African-American or Hispanic ($p < 0.001$) and to have a high school or lower education ($p < 0.001$) and a lower household income ($p < 0.001$).

Measures

The Pre-Test and Post-Test Questionnaires were developed for use in this study. Outcomes of interest were heterosexual risk behaviors. Participants were asked to report the number of

Table 1. Characteristics of the sample who completed both pre-HIV-test and post-HIV-test surveys, by gender

Characteristics	Male (n = 274)		Female (n = 286)		p (t) < 0.001
	Mean (SD)		Mean (SD)		
Age	35.9 (9.74)		31.5 (9.23)		
Race/ethnicity	No.	%	No.	%	p (χ ²)
White, non-Hispanic	106	38.7	152	53.2	< 0.001
Black, non-Hispanic	87	31.7	47	16.4	
Hispanic	67	24.5	63	22.0	
Other	13	5	23	8	
Educational level					
Less than high school	74	27.0	65	22.7	0.01
High school graduate	91	33.2	69	24.1	
At least some college	109	39.8	148	51.8	
Annual household income (\$) ^a					
Less than \$20,000	177	64.6	194	67.8	0.13
\$20,001–\$49,999	40	14.6	49	17.1	
\$50,000 or more	22	8.0	12	4.2	
Current relationship status					
Legally married	35	(12.8)	33	(11.5)	0.14
Partner of the same sex	11	(4.0)	9	(3.1)	
Partner of different sex	105	(38.3)	137	(47.9)	
Not a special relationship	121	(44.2)	104	(36.4)	
History of partners' HIV risk ^b	151	(55.1)	178	(62.2)	0.09
Exchanged sex for drugs or money ^c	8	(2.9)	22	(7.7)	0.01
History of injecting drugs	89	(32.5)	51	(17.8)	<0.001
Previous HIV test	168	(61.3)	183	(64.0)	0.51
HIV test results					
Positive	13	(4.7)	3	(1.0)	0.007
Negative	201	(73.4)	226	(79.0)	
Did not pick up results	60	(21.9)	56	(19.6)	

^a 11.5 percent unknown

^b Reported any sex partner in last five years who was IDU, or had sex outside their relationship, or was HIV-positive, or had an STD

^c 35 percent unknown

main and non-main sexual partners in the previous 30 days. A 'main' partner was defined as a 'boyfriend, girlfriend, lover, mate, wife or husband'. A 'non-main' partner was defined as 'people other than your main partner(s)', and using a five-point Likert-type scale ranging from 'never' (1) to 'every time' (5), the frequency of condom use for each sex type. Participants reported the number of acts of vaginal and anal sex with main and non-main partners during the previous 30 days, and frequency of condom use for each type of sex.

Participants who did not use condoms every time for a type of sex were asked how sure they were that in the next three months they would start using one every time, on a 4-point response scale ranging from 'very sure I will' (1) to 'very sure I won't' (4).

Stage of change for condom use was assessed among those heterosexually active with main and non-main partners at each time point, according to an algorithm applying the Trans-theoretical Model (Rhodes & Malotte, 1996). Given the importance of stratification by main

and non-main partner and by gender, and the longitudinal dimension of the study, power considerations impelled us to collapse some of the categories. The following three categories preserved distinctions between stages characterized by behavior and stages characterized by intentions: participants who did not practice safer behavior every time were classified according to their intentions as follows: (I) Precontemplation: somewhat sure or very sure they will *not* perform the behavior within the next three months; (II) Contemplation/Preparation: somewhat sure or very sure they will perform the behavior within the next three months. Those who practiced safer behavior every time were classified as; (III) Action/Maintenance. Data concerning intention to start using a condom every time were not collected for participants who had not engaged in any intercourse in the past 30 days. Therefore, a fourth category, 'No Sex', was used.

Independent background variables included sociodemographic characteristics (gender, age, racial/ethnic group, education and relationship status), HIV serostatus, history of previous tests for HIV and history of partners with HIV risk factors ('yes' if any sex partner in the last five years ever injected drugs, had sex with other people during the relationship, was infected with HIV or had any other sexually transmitted disease).

A series of 18 questions asked about counseling services, with responses 'yes' (1) 'somewhat' (2) or 'no' (3). Factor analysis yielded three factors, and responses were summed to create three index measures: the counselor's explanation of HIV result (five items, Cronbach's $\alpha = .77$), how sensitive the counselor was to the client's feelings (three items, Cronbach's $\alpha = .65$) and whether the counselor provided the client with appropriate referrals, such as health, mental health, housing or legal services (three items, Cronbach's $\alpha = .67$).

Statistical analyses

Preliminary bivariate analyses (using *t*-test for continuous variables and Pearson chi-square test for categorical variables) compared participants who completed the study (both Pre- and Post-Test Questionnaires) to those who were lost to follow-up (i.e. did not complete the Post-Test Questionnaire), and

examined gender differences in demographic characteristics.

In order to examine stability and change in sexual behavior and stage of change as well as whether significant changes had occurred between pre-test and post-test in each measure of sexual behavior and stage of change for condom use, Wilcoxon Signed Rank test was used for ordinal variables (e.g. stage of change, condom use) and McNemar's chi-square analyses were used for categorical variables. Analyses were conducted separately for behavior with main partners and with non-main partners.

Multinomial logistic regression analysis was used to examine the effects of HIV serostatus and counseling services, as well as sociodemographic and behavioral predictors, on post-HIV-test stage of change for condom use with main partners, stratified by stage of change for condom use at pre-test. The 'Precontemplation' stage at post-test was the referent group. Wald χ^2 test was used to assess the significance of each individual independent variable. Before fitting the final models, interactions between demographic predictors, three counseling services indexes and HIV status were checked, and no significant two-way interaction was found.

Multinomial logistical regression analysis was also used to examine predictors of transition in behavioral risk from pre-HIV-test to post-HIV-test with respect to non-main partners, among those who had sex with a non-main partner either at pre-test or at post-test, or both. Because of the smaller sample size, two models were tested—(1) becoming safer by abstaining from sex with a non-main partner at post-test, and (2) becoming riskier by initiating sex with a non-main partner—both using as the referent group those who had sex with a non-main partner at both time points.

Site was not entered as a factor or covariate in the analyses because there were too many sites (13) given the sample size. Moreover, the model already incorporated the main variables that one might expect to vary by site: client sociodemographic characteristics and aspects of the C&T services provided (even though state guidelines attempt to standardize the C&T procedures across sites).

Results

Gender differences

There were significant gender differences in age, ethnicity and education (see Table 1). Average age was higher for men than for women, and more of the men than women were Black. More of the women than men had attended college, although there was no difference in annual household income, with nearly two-thirds reporting less than US\$20,000/year. More women than men had exchanged sex for drugs or money, and more men than women reported a history of injecting drugs.

Heterosexual behavior

At pre-test, close to two-thirds of men and women reported having had heterosexual sex in the last 30 days (see Table 2). The majority reported having one partner. Among those sexually active with a main partner at either time point, more than half reported vaginal sex, and, approximately 15–16% reported using a condom ‘every time.’ There was no significant change in sexual behavior with a main partner except that among women, fewer had more than one partner after C&T than before.

With regard to sexual behavior with non-main partners, on the other hand, vaginal sex with non-main partner(s) in the previous 30 days was reported by fewer men and women at post-test. A slight decrease in anal sex with

Table 2. Heterosexual behavior of men and women in past 30 days at pre-HIV test and post-HIV test^a

Behavior	Men (n = 274)		p	Women (n = 286)		p
	Pre-test n (%)	Post-test n (%)		Pre-test n (%)	Post-test n (%)	
Sexually active	179 (65.3%)	187 (68.3%)	0.39 ^b	184 (64.3%)	180 (62.9%)	0.65 ^b
Number of heterosexual partners						
None at this time	95 (34.7%)	87 (31.8%)	0.39 ^b	102 (35.7%)	106 (37.1%)	0.05 ^b
One	131 (47.8%)	154 (56.2%)		144 (50.4%)	151 (52.8%)	
More than one	48 (17.5%)	33 (12.0%)		40 (14.0%)	29 (10.1%)	
Sexual activity with main partner						
No vaginal/anal sex	130 (47.5%)	113 (41.2%)	0.08 ^b	126 (44.1%)	124 (43.4%)	0.83 ^b
Vaginal intercourse	144 (52.6%)	160 (58.4%)	0.11 ^b	159 (55.6%)	162 (56.6%)	0.75 ^b
Anal intercourse	45 (16.4%)	44 (16.1%)	0.90 ^b	33 (11.5%)	26 (9.09%)	0.25 ^b
Condom use with main partner (sexually active at either time)						
No vaginal/anal sex	57 (28.4%)	40 (19.9%)	0.09 ^c	46 (22.3%)	44 (21.4%)	0.90 ^c
Every time	31 (15.4%)	41 (20.4%)		33 (16.0%)	42 (20.4%)	
Some–most times	42 (20.9%)	29 (14.4%)		30 (14.6%)	21 (10.2%)	
Never	71 (35.3%)	91 (45.3%)		97 (47.1%)	99 (48.0%)	
Sexual activity with non-main partner						
No vaginal/anal sex	214 (78.1%)	240 (87.6%)	<0.00 ^b	235 (82.2%)	253 (88.5%)	0.0 ^b
Vaginal intercourse	59 (21.5%)	34 (12.4%)	0.00 ^b	50 (17.5%)	33 (11.5%)	0.02 ^b
Anal intercourse	17 (6.2%)	8 (2.9%)	0.05 ^b	12 (4.2%)	5 (1.8%)	0.07 ^b
Condom use with non-main partner (sexually active at either time)						
No vaginal/anal sex	15 (20.0%)	41 (54.7%)	<0.001 ^c	16 (23.9%)	34 (50.8%)	0.01 ^c
Every time	22 (29.3%)	19 (25.3%)		17 (25.4%)	14 (20.9%)	
Some–most times	15 (20.0%)	8 (10.7%)		13 (19.4%)	8 (11.9%)	
Never	23 (30.7%)	7 (9.3%)		21 (31.3%)	11 (16.4%)	

^a Among the 560 reporting heterosexual behavior

^b p-value from McNemar’s test

^c p-value from Wilcoxon rank test

non-main partners was not significant, given the relatively infrequent reporting of this behavior. In addition, there was a significant drop among both men and women in the number of sexually active participants who never used condoms with their non-main partners.

Stage of change for condom use

Table 3 displays the number of participants in each stage of change for condom use at pre-HIV test and post-HIV test, stratified by behavior with main and non-main partners. Because transition patterns of men and women were similar, data were collapsed across genders.

For sex with main partners, results showed no significant progression or regression in stage. Overall, 48 percent of these respondents remained in the same stage of change. However, their patterns of transition varied by stage at pre-test. The most stable behavior was 'no sex', with 60 percent of participants in that category at pre-test remaining in that category at post-test; nevertheless, 17 percent of them regressed to Precontemplation. The second most stable group was those in Precontemplation at pre-test. At post-test, 51 percent of them remained in this stage. Their most common movement at post-test was to 'no sex' (27%). Participants in Contemplation/Preparation and Action/Maintenance at pre-test displayed more forward and backward movement at post-test, although very few moved between these stages. Among those in Contemplation/Preparation at pre-test, the most frequent paths were to Precontemplation (35%) or 'no sex' (25%), and 25% remained in this stage at post-test. Among those in Action/Maintenance, the most frequent paths were to Precontemplation (30%) or 'no sex' (33%), while 31 percent stayed in this stage at post-test.

Unlike sex with main partners, significant improvement in stage of change for condom use during sex with non-main partner(s) was identified by Wilcoxon Signed Rank tests. Most of the improvement came from fewer people having sex with non-main partners at post-test. As with main partners, 'no sex' was the most stable stage for sex with non-main partners. Of those who reported no sex with non-main partner(s) at pre-test, 93 percent still had no sex with non-main partner(s) at post-test. However, unlike with main partners, the majority of

respondents in all other categories moved to no sex at post-test (Precontemplation 71%, Contemplation/Preparation 69% and Action/Maintenance 64%). These changes contributed significantly to the stage progression finding.

Factors associated with changes in stage of change for condom use with main partners

All HIV-positive participants ($n = 16$) adopted safer behavior (no sex or Action or Maintenance) with main and non-main partners at post-test, which indicates that HIV status was the most significant factor determining the stage of change for condom use at post-test. Because of the consistent change among these HIV positive individuals, they were excluded from the multivariate analyses. The serostatus of those remaining in the analyses was either negative or unknown.

Among those in *Precontemplation* stage at pre-test ($n = 137$), participants who received a negative HIV test result, and those who received more referral services from the HIV counselor, were more likely to have no sex with a main partner. Among those in *Contemplation/Preparation* stage at pre-test ($n = 103$), Hispanic participants were more likely to regress to Precontemplation at post-test, and participants with at least some college education were more likely to move forward to Action/Maintenance or 'no sex' at post-test.

Because there were only 64 participants in the *Action/Maintenance* stage at pre-test, and they were relatively homogeneous in several characteristics (race/ethnicity, education, number of main partners and HIV serostatus), these factors were excluded from the modeling fitting. Participants who had no partners with HIV risk factors were more likely to either stay in Action/Maintenance or regress only to Contemplation/Preparation. Participants with a previous HIV test were more likely to stay in Action/Maintenance at post-test. Younger participants were more likely to have no sex with a main partner at post-test.

Among those having *No Sex* with a main partner at pre-test ($n = 256$), Black participants were more likely to move to Contemplation/Preparation or Action/Maintenance stage at post-test, whereas Whites were more likely to move to Precontemplation stage. As with

Table 3. Stage of change for heterosexual behavior with main and non-main partners at pre-HIV-test and post-HIV-test

Post-HIV-test →	Pre-contemplation	Contemplation/ Preparation	Action/ Maintenance	No sex	Total
Pre-HIV test ↓	n (%)	n (%)	n (%)	n (%)	n
<i>With main partners</i>					
Precontemplation	70 (51.1%)	16 (11.7%)	14 (10.2%)	137 (27.0%)	13
Contemplation/ Preparation	36 (35.0%)	26 (25.2%)	15 (14.6%)	26 (25.2%)	103
Action/Maintenance	19 (29.7%)	4 (6.2%)	20 (31.3%)	21 (32.8%)	64
No sex	43 (16.8%)	26 (10.1%)	34 (13.3%)	153 (59.8%)	256
Total	168	72	83	237	560
<i>p</i> ^a			0.189		
<i>With non-main partners</i>					
Pre-contemplation	3 (14.3%)	1 (4.8%)	2 (9.5%)	15 (71.4%)	21
Contemplation/ Preparation	3 (5.9%)	8 (15.7%)	5 (9.8%)	35 (68.6%)	51
Action/Maintenance	1 (2.6%)	4 (10.2%)	9 (23.1%)	25 (64.1%)	39
No sex	3 (0.7%)	11 (2.4%)	17 (3.8%)	418 (93.1%)	449
Total	10	24	33	493	560
<i>p</i> ^a			<0.001		

^a *p*-value from Wilcoxon rank test

those in Contemplation/Preparation at pre-test, participants with at least some college education were more likely at post-test to either continue having no sex with a main partner, or move to Contemplation/Preparation stage.

Factors associated with behavior change with non-main partners

Only a negative HIV test result (versus unknown status) was found to be significantly associated with behavior change with non-main partner(s). Among participants who had sex with a non-main partner at pre-test, those who learned they were HIV-negative were more likely than those who did not get their test result to become safer at post-test, i.e. to abstain from sex with a non-main partner.

Discussion

HIV Counseling and Testing (C&T) has been a major component of American HIV prevention efforts since 1985, when the HIV-antibody test first became available to the public. Its importance for screening has grown and, with advances in drug therapies that are effective in managing HIV disease as a chronic health condition, its role in early identification and referral of

HIV-positive persons to medical care grows in importance. Nevertheless, the efficacy of C&T programs in reducing risk behaviors has been established only for specific populations (e.g. sexually active gay or bisexual men (MSM), injection-drug users (IDU) and family-planning patients), rather than the diverse population of testers as a whole. Most previous studies have found HIV-positive serostatus to be associated with behavior change, but reported little evidence of behavior change among HIV-negative or HIV-unknown women or men as a result of C&T.

This study investigated changes in heterosexual behaviors with main and non-main partner(s), stage of change and the factors associated with change in a diverse sample of persons presenting to publicly funded C&T sites in Massachusetts. Upon presentation for HIV C&T, a majority of sexually active participants demonstrated multiple risk factors for HIV as evidenced by: history of risky sexual partners, multiple sexual partners, rates of unprotected vaginal and anal sex and drug-injection-related risk behaviors. As in previous studies, our findings indicate that effects of C&T vary according to the test results, behavior of men and women with main versus non-main partners and stage of change at the time of testing.

Serostatus

As in previous studies (see Wolitski et al., 1997 review), we found that all participants with HIV-positive serostatus reported significantly safer behavior at post-test. Given that 13 of these participants received referral to one or more health care services for managing HIV disease, it is possible that those referrals played a part in the behavior change we observed. However, some research has documented delays in seeking health care (Lebow, Retondon, Samet, Freedberg, & Libman, 1992) and avoidance coping strategies (Chesney & Folkman, 1994). Therefore, such an explanation would warrant further research. In our sample, 21 percent of clients did not pick up test results after HIV C&T. It has been estimated that 31 percent of those who test positive do not receive their results (CDC, 2003b). The availability of Rapid HIV testing could greatly help to reduce the number of persons that do not learn their results and will also play an important role in facilitating the counseling services to provide more specific and objective educational and referral services to clients.

Negative serostatus, compared to failing to return for results, led to more abstinence with non-main partners, and with main partners among participants in the Precontemplation stage before testing. Abstinence with non-main partners is probably a realistic method of maintaining one's negative serostatus. With main partners, on the other hand, if Precontemplation indicates that condoms are not an option for the couple, then abstinence is the only remaining safe option. One wonders whether those who failed to return for their test result did so in order to avoid facing such a difficult quandary.

Main and non-main partners

Heterosexual behavior changes with main partners after C&T were different from those with non-main partners. A large proportion of participants stopped sexual activity with non-main partners after C&T, and fewer had only unprotected intercourse with non-main partners. Although studies of HIV C&T have not typically looked separately at sex with main and non-main partners, most examined number of sexual partners following HIV C&T, but found no change (except Wenger et al., 1991

found a decrease in both the tested and untested groups). Based on this finding, however, if C&T counselors identify that a client has more than one partner, there would be a good probability of success in encouraging that person to either abstain from sex or use condoms consistently with non-main partners.

Similar changes were not found with main partners. Also, no significant progression in stage of change in condom use with main partners was found after C&T. It has been well documented that unprotected intercourse is more common with main partners than non-main partners, across diverse populations (see review in Misovich, Fisher, & Fisher, 1997). Individuals in close relationships face unique psychological and cognitive processes in safer sex decision making that are distinctly different from those in casual relationships, and may in fact increase their risk (Misovich et al., 1997). They worry that discussion of HIV risk and negotiation of safer sex could threaten the relationship (Bowen & Michal-Johnson, 1989; Wingood, Hunter-Gamble, & DiClemente, 1993). They tend to believe that they are unlikely to become infected by a trusted partner (Kline, Kline, & Oken, 1992; O'Donnell, San Doval, Vornfett, & DeJong, 1994). Nevertheless, evidence suggests that the risk of infection is higher from having unprotected sex exclusively with one partner whose serostatus is unknown, than from having protected sex with more than one partner (Pinkerton & Abramson, 1993; Reiss & Leik, 1989). Yet, HIV prevention efforts have not placed great emphasis on risk reduction within main-partner relationships. Further, discussions with providers indicate that great ambiguity exists among counselors with regard to the advice they should give clients pertaining to safer sex with main partners. Public health messages have often stressed 'knowing your partner' and that 'monogamous sex is safe sex'. These simplistic, incorrect AIDS-prevention heuristics have contributed to risk behaviors within main-partner relationships (Misovich et al., 1997).

Our findings support the suggestion that, in order to change heterosexual risk behaviors with main partners, interventions may need to target couples, or at least their particular concerns and circumstances (Misovich et al., 1997). Yet, most effective HIV interventions with non-substance abusing heterosexual adults (CDC, 1999b) have

been individually based. A review of preventive interventions involving couples showed a higher condom usage rate and a lower discontinuation rate when compared with women-only interventions (Becker, 1996). And, although there are not couple-based studies indicating intervention effectiveness for seronegative couples, a study conducted by Padian, O'Brien, Chang, Glass and Francis (1993) found that intervention with serodiscordant couples resulted in greater risk reduction.

Stage of change

Examination of the transition among stages found that the patterns vary depending on participants' stage of change before C&T, and that C&T services currently provided have very limited effects on intention to adopt safer behavior, or in helping those who have intention to implement the safer behavior. Only a small proportion of participants in the Precontemplation stage improved in intention or adopting safer behavior. The largest proportion of those in the Contemplation/Preparation stage, who expressed an intention to change, regressed to Precontemplation, indicating that their intention dissipated, and only a small proportion progressed to safer behavior (Action or Maintenance). These findings suggest that counseling services should be restructured to target participants differently based on their stage of change, and provide stage-specific services to participants. A CDC study found that after a multi-year stage-based intervention, respondents recently exposed to the intervention were more likely to carry condoms, received a higher stage-of-change 'score' for condom use (CDC, 1999a), and condom use with non-main partners (Collins, Kohler, Diclemente, & Wang, 1999).

We also found that movement cannot easily be characterized as only progressive or regressive. For instance, although both 'no sex' (which was considered to be safe) and Precontemplation (unsafe) were relatively stable categories, the most typical movement for each group was between the two (rather than between no sex and Action/Maintenance or between Precontemplation and Contemplation/Preparation). Thus, it would be a mistake to assume that non-sexually active C&T clients would choose safer sex if they were to become active. Furthermore, although abstinence may not be viable as a

long-term strategy within a steady relationship, it might be worthy of greater consideration as part of a range of short-term strategies that can be followed with longer-range approaches with couples.

The analysis of predictors of stage of change for condom use with main partners suggests some possibly fruitful approaches to customizing C&T. For instance, those in Precontemplation at pre-test were more likely to abstain at post-test when counselors provided appropriate referral services. Among those in Contemplation/Preparation, given that Hispanics were more likely to backslide to Precontemplation, C&T services might do well to target this group, by using culturally appropriate messages designed to bolster intentions (Amaro, Raj, Vega, Mangione, & Norville Perez, 2001; Amaro, Vega, & Valencia, 2001; Raj et al., 2002; Raj, Amaro, & Reed, 2001) as currently required by the CDC (CDC, 2003a). Although counselors' explanation of HIV test results, HIV infection, transmission and risk reduction helped participants maintain their intention to change, these aspects of C&T had no discernible effects on changing behavior. Progression to action may require more intensive approaches focused on communication and behavioral skills. Among participants who engaged in safer behavior before C&T (Action/Maintenance), those without a recent risky partner, and those who had previously tested, were more likely to stay safe. For such testers, C&T seems to be part of a broader safety plan (i.e. safer partners, safer sex and testing). If so, encouraging regular testing could help to maintain safer sex. Conversely, those who have not tested before, or who have had a risky partner, might benefit from further support to stay safe.

Taken together, these findings indicate that risk behaviors and behavior change are dependent on complex interaction of factors that include personal characteristics, HIV status, HIV risk history and stage of change, as well as C&T services. The study findings support previous assertions in the literature pointing to the complex nature of changing heterosexual risk behaviors, which are embedded in a host of social, psychological and personal-history factors that need to be targeted in individualized prevention efforts (Amaro, 1995; Amaro & Raj, 2000; Amaro, Navarro, Conron, & Raj, 2002;

Logan, Cole, & Leukefeld, 2002; Pulerwitz, Amaro, DeJong, Gortmaker, & Rudd, 2002). Indeed, counselors at HIV test sites have expressed frustration about their attempts to provide services to clients with complex psychosocial histories and relationship situations requiring interventions of greater depth and duration than the counselors are able to provide within HIV C&T sessions.

Limitations

As with other research, the findings of this study need to be interpreted with caution. Without a comparison group, it is not possible to attribute the observed changes in stages of change for sexual risk behaviors solely to the intervention of C&T rather than to other factors such as readiness to make such changes among individuals who seek C&T. Alternatively, it is also possible that a lack of change in behavior observed for most variables is due not to the intervention but to some other factor introduced during the study period such as news of breakthroughs in treatment of HIV and AIDS with protease inhibitors. Although the research did not collect information on this topic, MDPH staff indicated that at the time of the study, knowledge of treatment with protease inhibitors was not widespread among the testing population. Hence, it is unlikely to explain the largely negative findings on behavior change with main partners. In addition, because this was not a randomly selected sample, and those who completed follow-up questionnaires differed from those who did not in gender, ethnicity and education, the extent to which these results can be generalized remains to be demonstrated. Finally, as with most studies of behavior change, this study relied on self-reporting of sexual-related risk behaviors, which are likely to yield underestimates and socially desirable responses because they are highly sensitive topics.

The limitations of this study are tempered by the fact that main results concerning the strong effects of HIV-positive serostatus and otherwise limited effects of C&T are similar to those of other studies on the effects of HIV C&T on behavior change.

Conclusions

In summary, the findings of this study on the factors predictive of behavior and intention

change add important information that can be used to improve effectiveness of C&T. HIV C&T's most important role may be to facilitate entry of individuals who are infected into medical care for the management of HIV disease. For individuals who are not infected, C&T in its current form has limited sustainable prevention value. Although it has a critical role in early identification and referral of persons living with HIV, an important question remains whether HIV C&T can be utilized as an effective entry point for the identification and triage of clients to prevention programs that can more appropriately meet the multifaceted behavioral risk reduction needs of diverse groups. This would require effective screening and a corresponding mechanism for effective triage of high-risk clients into tailored interventions as well as a variety of referral resources available for individual, couples and group interventions.

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