

# A tailored minimal self-help intervention to promote condom use in young women: results from a randomized trial

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**Objective:** To evaluate the efficacy of a theory-based tailored minimal self-help intervention to increase condom use among young women at risk for HIV/sexually transmitted disease (STD).

**Design:** Randomized controlled trial on an intent-to-treat basis in two managed care plans, in Washington state and North Carolina, with follow-up at 3 and 6 months.

**Participants:** A proactively recruited sample of 1210 heterosexually active, non-monogamous, non-pregnant women, aged 18–24 years recruited June 1999–April 2000; 85% completed the 6-month follow-up.

**Method:** Arm 1 received usual care. Arm 2 received a mailed computer-generated self-help magazine, individually tailored on survey items including stage of readiness to use condoms, barriers to condom use, partner type; condom samples and a condom-carrying case were included in the packet; this was followed 3 months later by a tailored 'booster' newsletter. The *a priori* 6-month main outcomes were percentage of women using condoms during the previous 3 months (overall and by partner type) and proportion of total episodes of intercourse during which condoms were used in the previous 3 months.

**Results:** Relative to usual care, intervention group women reported significantly more condom use overall [adjusted odds ratio (OR), 1.86; 95% confidence interval (CI), 1.32–2.65;  $P = 0.0005$ ] and with recent primary partners (OR, 1.97; 95% CI, 1.37–2.86;  $P = 0.0003$ ). They also reported using condoms for a higher proportion of intercourse episodes (52.7% versus 47.9%;  $P = 0.05$ ). Significantly more intervention women carried condoms, discussed condoms with partners, and had higher self-efficacy to use condoms with primary partners.

**Conclusions:** Tailored cognitive/behavioral minimal self-help interventions hold promise as HIV/STD prevention strategies for diverse populations of young at-risk women.

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**Keywords:** randomized trial, prevention intervention, women's health, heterosexual transmission, condom use, HIV/AIDS, sexually transmitted diseases

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## Introduction

Young sexually active women are an increasingly important risk group for HIV and sexually transmitted disease (STD) acquisition and transmission. While there has been a decline in new cases of AIDS in the United States, the proportion occurring in women has increased threefold from 7% of cases in 1983 to 23% in 1999 [1,2]. The greatest proportionate increase in AIDS cases occurred among women under the age of 25 years. Women account for 30% of new HIV infections, almost three-quarters of which are heterosexually acquired [3,4]. The United States also continues to lead other industrialized nations in rates of non-HIV sexually transmitted infections, with morbidity occurring disproportionately among young women [5,6]. Despite these trends, effective prevention interventions targeting this growing risk group are needed [2,7,8].

Interventions promoting adoption of safer sex practices remain central to the success of HIV/STD prevention efforts [9]. The efficacy of theory-driven prevention interventions to promote risk-reducing behaviors has been demonstrated in randomized trials with a number of populations in community, clinic and other settings [2,4,10–24]. Several studies, most notably Project RESPECT, have demonstrated the efficacy of brief counseling interventions delivered to individuals, including young women [20,21,24]. Adapting key features of these successful interventions to self-help intervention modalities offers the additional advantages of being self-directed, portable, and more suited to broader public health applications.

Recent innovations in the domain of print communications now allow written self-help materials to be customized or 'tailored' at the individual level, based on characteristics unique to the person and relevant to the outcome of interest [25]. The brevity and personal relevance of these materials have the potential to be more analogous to individual counseling sessions than conventional health education materials. Tailored print interventions have promoted behavioral change in other health contexts [25–38] but have yet to be evaluated in the context of motivating condom use and other safer sex practices. An individually tailored self-help strategy could replace or extend upon brief in-person interventions by providing very personalized messages to a heterogeneous target population via mail or internet. Given this extended reach, an intervention of even minimal intensity and modest efficacy can achieve considerable public health benefit [29,33].

The randomized trial reported here evaluates whether a tailored minimal self-help intervention, based in social science theory, increased condom use in a sample of sexually active young women.

## Methods

### Study participants

This study was conducted in two United States managed care settings: Group Health Cooperative (GHC), a mixed-model health care system located in Washington state, and the Duke Health System (DHS), a network of affiliated practices, clinics and hospitals based in Durham, North Carolina.

The target population for the trial was non-monogamous sexually active women ages 18–24 years who were at risk for heterosexual HIV/STD acquisition. Between June 1999 and April 2000, age-eligible women who had made a clinic visit within the prior 6 months were identified monthly using the computerized databases of both health care systems. The Medicaid enrollees at GHC were oversampled and the student sample at DHS was adjusted to make these proportions roughly equivalent at both sites. The target sample size was 1200 participants.

Potential participants were sent an introductory letter describing the study and inviting participation. Women who did not call to decline were contacted by telephone for further screening. To be eligible, potential participants had to be unmarried, had to have had sexual intercourse with a male partner in the prior 6 months, and could not be pregnant or be in a monogamous relationship of greater than 12 months' duration.

For eligible women, the study was described further and verbal consent for participation was obtained. Participants were then surveyed and randomly assigned to either intervention or usual care groups, blocking by study site. All study methods were reviewed and approved by GHC and Duke University human subjects committees.

### Intervention

Participants randomized to the intervention received two rounds of individually tailored materials. Following the baseline survey, they received a tailored 12 page self-help magazine-style booklet entitled *Insights*. The intervention packet also included a 'safe sex kit' that contained male and female condoms, a condom carrying case, and instructions on using condoms. After the 3-month survey, intervention group participants received a tailored booster feedback newsletter, entitled *Extra Insights*, and condom packet. Because this was an initial evaluation of a minimal intervention strategy, the intervention focused specifically on increasing condom use over a 6-month period.

The use of 'tailored' communications, defined as 'any combination of strategies and information intended to reach one specific person, based on characteristics that

are unique to that person, related to the outcome of interest, and derived from an individual assessment', has grown rapidly in recent years [25,29]. The rationale for tailoring rests upon a number of assumptions [30]: (i) the information is a distillation of material that is personally relevant to the recipient, thereby eliminating irrelevant material and making the intervention briefer; (ii) the information is consequently given greater attention; and (iii) the greater attention given to this information, specifically designed to address individual needs and motivational attributes, enables behavior change by the recipient. These strategies may be particularly effective with lower women of lower socioeconomic status [32]. Tailored communications are most warranted when important factors in the desired behavior change vary widely within a given target population and when the outcome of interest is complex [25,31]: criteria that clearly apply to the adoption of condom use and other safer sex practices.

Intervention development proceeded in a series of steps: (i) key theoretical constructs specific to condom use were identified [39–42]; (ii) the assessment tools (baseline and follow-up surveys) were developed using measures of the constructs and other variables; (iii) a 'library' of tailored messages was created (i.e., a computer file containing the universe of individual elements (text and graphic) to be used in tailoring the materials); (iv) algorithms were developed that selected and formatted the appropriate tailored message based on varying responses to specific survey items; and (v) a computer-generated magazine-style template was designed to lay out the combined non-tailored (generic) and tailored elements. Focus groups at each site reviewed draft materials and messages. The tailoring program – the survey data file, final message library, accompanying algorithms, and design template – was then field-tested and finalized.

Tailored sections of the computer-generated booklet incorporated messages specific to each participant, using responses to selected survey tailoring items and other characteristics (such as study site). Constructs used in tailoring included stage of readiness to adopt condom use [43], beliefs and norms regarding condom use [40], intentions and efficacy to use condoms [40,43,44], perceived barriers/facilitators to condom use (decisional balance) [43,45], perceived STD risk [40], and type of partner (primary, defined as 'someone with whom you have an ongoing relationship and to whom you feel a special commitment', versus non-primary) [40]. The approach also tailored on ethnicity, binge drinking, STD history, number of partners, oral contraceptive use, and whether or not the participant had children.

The self-help booklet contained 11 sections and was accompanied by a site-specific cover letter informing participants that the materials contained 'information

especially selected for you based on your answers to a recent women's health survey'. Four booklet sections were generic and the remaining seven incorporated varying degrees of tailoring. The most extensively tailored 'articles' were the advice column and testimonial stories. The tailoring elements could be combined in many ways, creating a large 'universe' of booklets that could be generated.

Portions of the booster newsletter were tailored to 3-month survey responses, reinforcing messages from the first intervention round and any changes in condom use. The booster was briefer [an 8.5 inch by 14 inch (21 cm by 35 cm) folded sheet] and focused on removing barriers/enhancing facilitators to condom use.

### Measures

All survey data for both sites were collected by the Center for Health Studies Survey Program at Group Health. The baseline survey was a standardized survey conducted using computer-assisted telephone interviewing (CATI) techniques. The interviewers contacted potential participants, screened for eligibility, and administered the survey (average, 20 min). Follow-up surveys, also CATI-administered, were conducted 3 and 6 months after randomization. Questions about use of the self-help materials were asked in addition to updating the study outcomes and selected baseline survey items. Survey interviewers were not blinded to participants' status; they were also not part of the project staff.

### Retention/incentives

A 30-minute telephone calling card was included in the contact letters for the 3-month survey. Ten dollars (US) were sent after completion of the 6-month survey. In addition to these incentives, a number of other strategies aided study retention. At each contact, we obtained best times to call and telephone numbers for future contact, including cell phones and pagers. We also obtained e-mail addresses, if available, and requested 'out-of-household' contacts.

### Outcomes

Four primary study outcomes, selected *a priori*, were used to evaluate the intervention's efficacy: (i) at the 6-month data collection, the proportion of sexually active women who used condoms with any partner during the prior 3 months; (ii) this same outcome considered separately for primary partner status; (iii) this same outcome considered separately for non-primary partner status; and (iv) the average percentage of total episodes of intercourse during which condoms were used during the prior 3 months.

Additional information was collected on a number of goals and behaviors within the woman's control, including purchasing or carrying condoms, discussion

of condom use with partners, and self-efficacy to use condoms by partner type [10,46,47]. Consistent condom use (using condoms for 100% of intercourse episodes) was also evaluated.

### Statistical analysis

Upon completion of follow-up, the study cohort was characterized as a whole and then the baseline characteristics of those randomized to intervention and usual care arms were compared. Study outcomes were analyzed using an intent-to-treat approach. Logistic regression for binary outcomes (e.g., percentage with any use of condoms) was used to derive unadjusted and adjusted odds ratios (OR) and 95% confidence intervals (CI). For continuous outcomes (e.g., percentage of sexual encounters in which condoms were used), ordinary least squares regression was used to calculate adjusted differences and 95% CI. The adjusted models controlled for site and a number of baseline variables chosen prior to analyses (see Table 3, below).

Data on outcomes were collected after 3 and 6 months of follow-up. The 6-month outcomes (after delivery of all intervention materials) were used as the main determinants of intervention effectiveness. However, a longitudinal repeated measures analysis, which covered the entire follow-up interval and used data from both follow-up surveys, was also conducted. This analysis maximized the number of women who had had intercourse and who, thus, could be included in the analysis: a particular advantage for the partner-specific analyses. For the combined analyses, generalized estimating equations were used to account for the correlation introduced by having up to two records per woman, and logistic and least squares regression analyses identical to those for 6-month data were conducted. The OR values for outcomes in these analyses can be interpreted as estimating the average effect of the intervention over the entire 6-month follow-up.

## Results

### Participants

During recruitment, 5768 potential participants were contacted based on information contained in the automated databases (Fig. 1). On screening, 3728 (65%) were ineligible (principally because of longer-term monogamy or no intercourse in the prior 6 months); 830 (14%) declined participation, and 1210 participants [21%; 801 (66%) from GHC, 409 (34%) from DHS] were enrolled, surveyed and randomized into usual care (n = 614) or intervention (n = 596) arms.

Participants' mean age at baseline was 21 years; 31% were non-white, 32% reported a prior pregnancy (Table 1); 27% reported an STD history (11.5% within

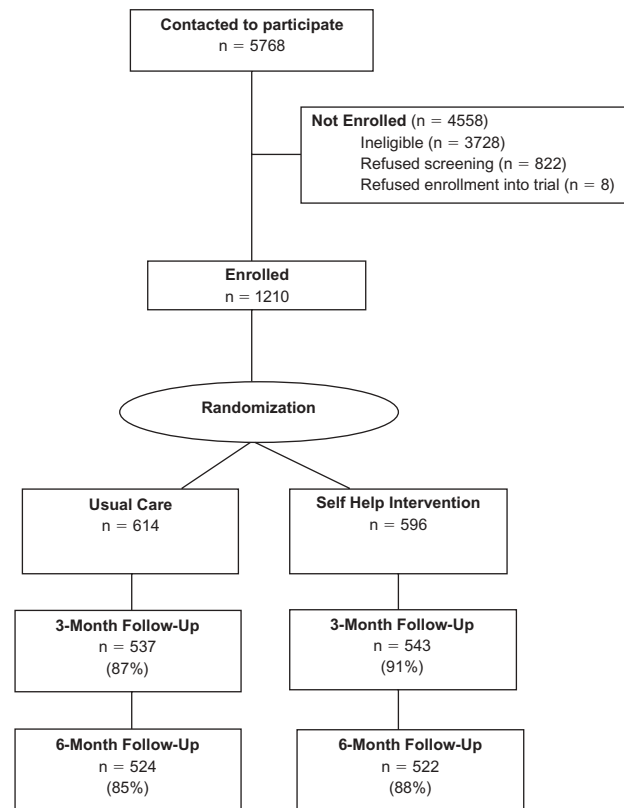


Fig. 1. Trial design and recruitment flow.

the past year), and 36% reported binge drinking in the past month. Over half (56.5%) reported two or more sex partners during the prior year; 91% reported having intercourse during the prior 3 months (mean, 20 episodes; median, 10), and 19% reported having a non-primary sex partner.

Almost all (98%) reported ever having used condoms. Of those who had had intercourse during the prior 3 months, 72% reported using condoms at least once. Only 41% reported consistent condom use.

The intervention and usual care groups did not differ significantly with respect to a wide variety of baseline variables (Table 1).

### Retention

The study achieved high follow-up: 88% of intervention and 85% of usual care participants at 6 months (Fig. 1). Complete data (both follow-ups) were available for 81% of participants (n = 978).

### Participation in the intervention

Nearly all participants (96%) randomized to the intervention group recalled receiving one or both tailored packets (Table 2). Of this group, 60% reported reading some/all of either the *Insights* magazine or the booster newsletter (another 33% said they 'skimmed' the materials). Sixty-nine percent reported they still had

**Table 1. Baseline characteristics of study participants according to intervention status.**

Characteristic	Usual care	Intervention	Total
No.	614	596	1210
Site (%)			
GHC	66	66	66
DHS	34	34	34
Age (%)			
18-20 years	49	47	48
21-25 years	51	53	52
Mean age (years)	21	21	21
Education (%)			
Student fulltime	39	37	38
Beyond high school	70	69	70
Race (%)			
White	69	69	69
Black	19	19	19
Other	12	12	12
Ever pregnant (%)	33	31	32
Employed fulltime (%)	42	43	42
Medicaid insurance (%)	15	16	15
Living with own child (%)	16	17	17
Binge drinking (> 5 drinks), past month (%)	41	40	40
Ever used condoms (%)	99	97	98
Any prior STD (%)	26	27	27
≥ 2 sex partners in past 12 months	19	17	18
Intercourse in past 3 months (%)			
Any partner	92	90	91
Primary partner	81	79	80
Non-primary partner	18	21	19
Used condoms in past 3 months (%) <sup>a</sup>			
Any partner	73	71	72
Primary partner	68	67	67
Non-primary partner	73	79	76
Proportion of intercourse episodes where condom was used, mean <sup>a</sup>			
Any partner	55	54	54
Primary partner	51	50	50
Non-primary partner	66	69	67
Number of episodes of intercourse in past 3 months, mean (median) <sup>a</sup>			
Any partner	19 (10)	21 (10)	20 (10)
Primary partner	23 (13)	23 (15)	23 (14)
Non-primary partner	5 (3)	5 (2)	5 (2)
Carried condoms, past 3 months (%)	54	51	52

GHC, group health cooperative; DHS, Duke Health System; STD, sexually transmitted disease.<sup>a</sup>Among women having intercourse during the prior 3 months, delimiting any partner, primary partner or non-primary partner, as appropriate.

**Table 2. Use of intervention components.**

Intervention component	No (including denominators)	Percentage
Use of any intervention materials		
Received either the magazine ( <i>Insights</i> ) or booster newsletter	550/572	96
Read part or all of any materials	332/550	60
Used any of the condoms provided by the project	261/445 <sup>a</sup>	59
Use of baseline intervention packet		
Received materials	478/543	88
Read part or all of the tailored magazine ( <i>Insights</i> )	248/478	52
Used condoms provided in packet	137/336 <sup>a</sup>	41
Use of 3-month booster packet		
Received materials	471/522	90
Read part or all of the tailored newsletter	232/471	49
Used condoms provided in newsletter	206/426 <sup>†</sup>	48

<sup>a</sup>Denominator is women who recall receiving materials, who report being sexually active in prior 3 months and who report condom use.

either the magazine or the newsletter (data not shown). Of those who read any of the materials, 66% reported that the materials were personally relevant, while 43% felt that the materials were 'written especially for me'; 62% felt that the materials encouraged them to use condoms (data not shown). Of the respondents who were sexually active, 59% reported using condoms included in their packet.

Table 2 also summarizes use of the study materials/condoms for each separate follow-up interval.

### Outcomes

Table 3 gives the study outcomes. As noted (Table 1), baseline rates of condom use were high and were higher for non-primary than for primary partners. During follow-up, intervention participants reported slightly increased condom use, while use decreased among usual care participants (Table 3). Intervention effects were stronger at month 6 than at month 3. At the 6-month follow-up, the odds of using condoms during the prior 3 months with any partner and with a primary partner were significantly higher for intervention than for usual care participants (any partner: OR, 1.86; 95% CI, 1.32–2.65;  $P = 0.0005$ ; primary partner: OR, 1.97; 95% CI, 1.37–2.86;  $P = 0.0003$ ; Table 3). This represents 10% greater overall use and 12% greater use with primary partners for the intervention group. A higher proportion of intervention participants also reported using condoms with non-primary partners, but this was a much smaller group ( $n = 155$ ) and the CI range included the null.

The intervention group used condoms in a higher proportion of episodes of sexual intercourse with any partner than did the usual care group [adjusted difference, 5.2% (95% CI, 0.4–10.4);  $P = 0.05$ ; Table 3].

In the repeated measures analysis, which examined condom use over the entire 6-month follow-up, intervention effects were similar but slightly lower, reflecting the trend toward stronger findings at 6 than at 3 months. Intervention effects on condom use with any partner and with a primary partner were similar to 6-month results, but there was little effect with non-primary partners. The between-group difference in mean proportion of times condoms were used with any partner was slightly lower (4.5%;  $P = 0.07$ ).

The need to consider site-specific results was evaluated by testing for treatment-by-site interaction in the models. There were no significant interactions for condom use during the prior 3 months, either overall or with primary/non-primary partners. Furthermore, the intervention effects on condom use overall and with primary partners were significant when evaluating each site separately. However, the interaction term was significant ( $P = 0.01$ ) for the mean proportion of

intercourse episodes with condom use: the mean proportions for intervention and usual care women were similar at GHC but differed significantly at DHS [adjusted difference 15.0% (95% CI, 6.3–23.8);  $P = 0.001$ ; data not shown]. Therefore, the marginally significant effect overall for this variable was caused by the effect at DHS.

A number of other behaviors were also examined at the 6-month follow-up (Table 3). Consistent condom use with all partners did not differ significantly between intervention and usual care participants (adjusted OR, 1.24; 95% CI, 0.89–1.73;  $P = 0.21$ ). However, there was a significant ( $P = 0.01$ ) treatment-by-site interaction for this outcome. Intervention and usual care groups at GHC did not differ in their reports of consistent condom use with all partners (OR, 0.92; 95% CI, 0.61–1.38;  $P = 0.68$ ), while consistent condom use in the DHS intervention group was nearly threefold greater than in the usual care group (OR, 2.94; 95% CI, 1.51–5.92;  $P = 0.002$ ; data not shown).

Our assessment of other behavioral outcomes found that intervention participants were significantly more likely to report having carried condoms or discussed condoms with a partner during the prior 3 months (Table 3). Intervention participants reported significantly higher self-efficacy to use condoms with primary, but not with non-primary, partners. Intervention and usual care groups were similar in their purchase of condoms.

### Discussion

This sizeable and well-followed randomized trial evaluated the efficacy of a tailored minimal self-help intervention to motivate condom use among young women at risk for HIV/STD. After 6 months, the intervention increased condom use overall and with short-term primary partners. Despite already-high rates of condom use, the proportion of intervention group women using condoms was 10% greater overall and 12% greater with primary partners than women in usual care. The significant ( $P = 0.0005$ ) between-group differences were significant at both study sites individually and after adjustment for covariates. Compared with women in the usual care group, women in the intervention group also reported a higher proportion of episodes of intercourse during which condoms were used, increased self-efficacy to use condoms, greater likelihood of carrying condoms and of having discussions about condoms with a partner. While it is possible that increased condom use confers additional protection, particularly if factors facilitating transmission (such as infectivity or prevalence) are low [48], intervention participants in North Carolina also were more likely to

**Table 3. Comparison of usual care and intervention groups on study outcomes.**

	Total No.	Usual care group	Intervention group	Odds ratio/difference (95% confidence interval)		P value Adjusted
				Unadjusted	Adjusted <sup>a</sup>	
Primary outcomes at month 6 follow-up						
Any use of condoms in prior 3 months <sup>b</sup> with:						
Any partner (%)	849	63.0	72.8	1.57 (1.18–2.10)	1.86 (1.32–2.65)	0.0005
A primary partner (%)	756	57.9	69.1	1.63 (1.21–2.19)	1.97 (1.37–2.86)	0.0003
A non-primary partner (%)	155	76.9	87.5	2.10 (0.87–5.10)	2.25 (0.91–6.07)	0.09
Average percentage of time condoms used (with any partner) <sup>b</sup>	842	47.9	52.7	4.8 (–1.2–10.7)	5.2 (0.4–10.4)	0.05
Primary outcomes for combined months 3 and 6 follow-ups						
Any use of condoms in prior 3 months <sup>b</sup> with:						
Any partner (%)	1707 <sup>c</sup>	64.0	71.7	1.42 (1.11–1.83)	1.65 (1.24–2.19)	0.0005
A primary partner (%)	1540	58.5	68.9	1.57 (1.22–2.03)	1.96 (1.46–2.65)	0.0001
A non-primary partner (%)	322	80.2	82.1	1.13 (0.63–2.03)	1.09 (0.61–2.41)	0.77
Average percentage of intercourse episodes during which condoms were used, past 3 months (with any partner) <sup>b</sup>	1692	49.2	52.0	2.8 (–2.4–8.0)	4.5 (–0.3 to 9.3)	0.07
Secondary outcomes at month 6 follow-up						
Consistent use of condoms in prior 3 months with all partners (%) <sup>b</sup>	849	33.5	36.8	1.16 (0.87–1.54)	1.24 (0.89–1.73)	0.21
Report carrying condoms in prior 3 months (%)	1046	49.9	60.3	1.52 (1.19–1.95)	1.83 (1.37–2.45)	< 0.0001
Report buying condoms in prior 3 months (%)	1046	27.8	27.8	0.998 (0.76–1.31)	0.99 (0.74–1.33)	0.94
Report discussing condom use with any male partner in prior 3 months (%) <sup>b</sup>	849	62.5	69.7	1.38 (1.07–1.79)	1.41 (1.07–1.85)	0.01
STD diagnosis in prior 3 months <sup>b</sup> (%)	849	3.6	3.5	0.95 (0.49–1.83)	0.97 (0.48–1.96)	0.93
Self-efficacy to use condoms (mean)	1046					
Primary partner	756	3.13	3.36	0.23 (0.02–0.44)	0.20 (0.02–0.38)	0.03
Non-primary partner	155	4.32	4.48	0.16 (–0.11–0.43)	0.09 (–0.16 to 0.35)	0.47
No partner	135	4.30	4.48	0.18 (–0.05–0.42)	0.18 (–0.05 to 0.42)	0.12

STD, sexually transmitted disease.

<sup>a</sup>Odds ratio adjusted for study site (Washington or North Carolina) and the following baseline variables: sexual activity (by partner type), condom use (by partner type), age, education, race, Medicaid status, proportion of time condoms used (by partner type), number of partners in past 12 months, desire to become pregnant, history of STD, importance of condom use to partner, ever use of condoms, bought, carried condoms or picked up condoms in past 3 months.

<sup>b</sup>Limited to participants who reported sexual intercourse with a male partner in the 3 months prior to the interview.

<sup>c</sup>The number of 1707 for the combined analysis is the sum of the numbers for the 3-month and 6-month interviews.

have used condoms consistently during follow-up. Intervention effects with non-primary partners, although not significant ( $P = 0.09$ ), also were higher for the intervention group.

Participants were generally receptive to this self-help intervention strategy. Very few intervention participants refused to receive mailed printed materials addressing safer sex practices, and participant follow-up was excellent ( $\geq 85\%$ ). Of those randomized to receive the intervention, 60% reported reading the materials. Nearly 60% of those who were sexually active used the condoms provided.

The intervention effect was strongest in the subgroup of women with primary partners, an encouraging finding for a minimal self-help intervention that sought to enroll non-monogamous women. Members of this target population may perceive relationships that they consider 'primary' as safer and, therefore, may be less likely to use condoms [15,49,50]. This was borne out in our study group, where baseline rates of recent condom use were substantially lower for primary than for non-primary partners (67% versus 76%; Table 1). During follow-up, the difference between primary and non-primary partners widened among usual care participants, largely because of decreased condom use with primary partners.

In considering these results, several features of the study population and intervention deserve comment. We implemented this intervention in a proactively recruited study population from two geographically and sociodemographically distinct communities. This target population met criteria placing them at risk for STD but is also likely to represent the characteristics and risk behaviors of a large proportion of sexually active young women. Even modest efficacy with such a target population may achieve substantial public health benefit, and small changes can result in significant shifts in the occurrence of disease [29,33].

Different intervention strategies may be of use in the heterogeneous and lower risk context of heterosexual HIV/STD transmission and acquisition. The efficacy of individually tailored minimal self-help print interventions has been demonstrated with other preventive health behaviors, including smoking cessation [26,34,35], dietary fat reduction [27,33,36], and cancer screening [32,37,38]. The many factors affecting adoption and maintenance of condom use are also conditions that favor tailored interventions over generic approaches [25,31], but their possible contribution to HIV/STD prevention has received little study [42,51]. The current intervention strategy sought to build on more intensive HIV/STD brief counseling interventions [20,21,24], sharing some of their features while offering the additional advantages of self-direction

(materials can be used, and re-used, at the individual's discretion) and portability (outreach can be independent of clinic/small group settings). In this way, a broad target population received very personalized messages.

The current results, while promising, have limitations and suggest areas for future research. We could not evaluate longer-term effects of the intervention. We also could not assess effects on biological outcomes (HIV/STD occurrence). Such an evaluation in this target population would have required a larger sample size and/or longer follow-up and would have posed considerable logistical challenge and expense. As this was a behavior change intervention, focus on a biological endpoint would have been premature [47]. Evaluation of the degree of tailoring, or targeting, needed is another potentially useful area of inquiry [30,52]. We noted, for example, that 66% of our intervention participants felt the materials were 'personally relevant' but only 43% felt that the materials were 'written especially for me'. Finally, the translation of tailored self-help interventions from efficacy to real-world effectiveness merit exploration [4,11,29,53]. Tailoring programs, once created, can economically address many real-world conditions through broad reach and flexibility. However, tailoring generally requires up-front data collection, computer graphics capacity, and database development. These demands can be mitigated by more efficient tailoring/targeting or through intervention delivery vehicles that can facilitate self-assessment and dissemination. For example, web-based approaches may be especially appropriate for some target groups and settings [29,54].

Young women at risk for heterosexual acquisition or transmission of HIV/STD are in need of effective interventions. Our purpose in undertaking this trial was to conduct an initial rigorous evaluation of tailored minimal self-help interventions as HIV/STD prevention strategies with this target population. The encouraging findings provide evidence of efficacy and of applicability to diverse communities and settings.

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