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African American Adolescent Females: Mother-Involved HIV Risk-Reduction Intervention

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Abstract

African American adolescent females continue to be at disproportionate high risk for HIV infection. A repeated measures quasi-experimental comparison group design compared an HIV risk-reduction intervention delivered by mothers with an HIV risk-reduction intervention delivered by health professionals and with a health promotion intervention delivered by mothers. The three interventions were randomly assigned to one of three geographical distinct sites. A convenience sample of 553 low-income African American adolescent girls with a baseline age of 11 to 14 years participated in the study. The results revealed that over a 6-month period, compared to girls in the health promotion intervention, the girls in the HIV risk-reduction interventions had significant higher scores on HIV transmission knowledge, condom attitudes, and self-efficacy to use condoms. The implication is mothers who receive appropriate training may be able to deliver HIV risk reduction to their daughters as well as health professionals.

Keywords

adolescent females; African American; HIV risk reduction; mother involvement

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African American adolescent females between 13 and 19 years continue to be disproportionately at high risk for HIV infection; in 2004, of the 13- to 19-year-old females with HIV infection, 72% were African Americans (Centers for Disease Control and Prevention, 2004). The continued high HIV risk for African American female adolescents necessitates sustained efforts to develop innovative HIV risk-reduction (RR) interventions for this population.

Several studies have developed innovative HIV RR interventions that involved mothers in reducing HIV risk for African American adolescents between 10 and 19 years old (DiIorio et al., 2006; Flay, Graumlich, Segawa, Burns, & Holliday, 2004; Kennedy, Mizuno, Hoffman, Baume, & Strand, 2000; Stanton, Cole, Galbraith, Xiaoming, Pendleton, Cottrel, et al. 2004a; Stanton, Xiaoming, Galbraith, Cornick, Feigelman, Kaljee, et al., 2004b; Wu et al., 2003). These HIV RR programs involved mothers as recipients of HIV RR training but did not actively train mothers to be their daughters' primary HIV RR educators. These programs have not yielded encouraging results related to adolescent girls' initiation of sexual intercourse (DiIorio et al., 2006), self-efficacy for abstinence (DiIorio et al., 2006), or sexual activity (Flay el al., 2004; Kennedy et al., 2000; Stanton et al., 2004a; Stanton et al., 2004b; Wu et al., 2003). Conflicting results have been reported for condom use. DiIorio et al. (2006) found significant increase in condom use, whereas Wu et al. (2003), Stanton et al. (2004a), Stanton et al. (2004b), Flay el al. (2004), and Kennedy et al. (2000) did not. Significant increases were however found for HIV knowledge (DiIorio et al., 2006; Kennedy et al., 2000) and self-efficacy for safer sex (Stanton et al., 2004a).

An intervention that trains African American mothers to be their daughters' HIV RR educators may be successful because of mothers' presence and influence with their daughters (Andrew, Hops, & Duncan, 1997; Baldwin, Cotanch, Johnson, & Williams, 1996; Usmiani & Daniluk, 1997), We proposed the Mother/Daughter HIV Risk Reduction intervention (MDRR), an innovative, community-based approach that trains mothers to teach their daughters HIV RR knowledge and skills. The MDRR is based on an integration of Bandura's (1977, 1982, 1994) self-efficacy and behavioral skills acquired through modeling and behavioral rehearsal with constructive feedback and Fishbein and Ajzen's (1975) Theory of Reasoned Action and Ajzen's (1985) Theory of Planned Behavior measuring the relationship of attitude to behavioral intention and behavior. A thorough description of the MDRR intervention can be found in Dancy, Crittenden, and Talashek (2006) and in Dancy (2003).

The purpose of the research is to determine the effectiveness of the MDRR intervention from baseline (T1) to the immediate post-test (T2) to 6 months (T3) on these outcomes: adolescent females' sexual activity, HIV transmission knowledge, self-efficacy to refuse sex, intention to refuse sex, condom attitudes, self-efficacy to use condoms, and intention to use condoms. Sexual activity is defined as engaging in sex in the last 6 months. The MDRR intervention is compared to two control interventions: the mother/daughter health promotion intervention (MDHP) and the health expert HIV RR intervention (HERR). The MDRR intervention and the HERR intervention are the RR interventions (RR). They cover the same HIV RR content but differ in that mothers deliver the HIV RR content in the MDRR intervention, and female health professionals deliver the HIV RR content in the HERR intervention. The comparison between the MDRR and HERR interventions allows us to determine the impact of mothers' teaching on the dependent variables. The MDHP intervention, delivered by mothers, covers content related to nutrition and exercise. A comparison between MDRR and MDHP allows us to determine the impact of the HIV RR content on the dependent variables (Dancy, Crittenden, & Talashek, 2006). All three interventions consisted of six sessions delivered weekly in a group setting where an average of nine daughters attended. However, before daughters in the MDRR and MDHP interventions received their assigned intervention, their mothers received 12 weeks of training in the content and behavioral skills that they would teach their daughters.

HYPOTHESES

We hypothesize that compared with daughters in the HERR intervention, daughters in the MDRR intervention will more often report not engaging in sex in the last 6 months and will have higher scores on HIV transmission knowledge, self-efficacy to refuse sex, intention to refuse sex, condom attitudes, self-efficacy to use condoms, and intention to use condoms at T2 and T3. We also hypothesize that compared with daughters in the MDHP intervention, daughters in the RR intervention will more often report not engaging in sex in the last 6 months and will have higher scores on the remaining outcomes at T2 and T3.

METHODS

Research Design and Study Setting

We used a repeated measures quasi-experimental comparison group design with randomization of three geographically distinct but environmentally and demographically similar sites to one of the three interventions. The geographic separation minimized potential cross-contamination of the interventions. All three sites contained large numbers of African American girls from low-income/single-mother–headed homes and had similar poor health indicators related to teen birth rates and sexually transmitted illnesses, including HIV/AIDS. These sites had these indicators of poor health to a greater degree than practically anywhere else in Chicago. Characterized by extreme poverty, these three sites were populated predominantly by African Americans (City of Chicago Department of Public Health, 2000a, 2000b).

Sample

A convenience sample of 553 low-income African American daughters was recruited from the three intervention sites. All African American daughters met these selection criteria: live with their mothers who reported having income below the federal poverty line and be between 11 and 14 years of age at baseline (Dancy, Crittenden, & Talashek, 2006). At T3, 423 (76.5%) daughters remained in the study with an attrition rate of 23.5%, a loss of 130 daughters. Attrition rates for the three intervention groups were 23.6% for MDRR, 23.6% for MDHP, and 23.3% for HERR.

Procedure

This research was approved by the University of Illinois at Chicago Office for Protection of Research Subjects. Mothers and daughters completed the baseline assessment (T1), participated in the intervention followed by the immediate posttest (T2), and 6 months later completed the 6-month assessment (T3). All assessments were conducted with the audio computer-assisted self-interview (A-CASI).

Instruments

The Adolescent Questionnaire consists of the HIV transmission knowledge scale, the self-efficacy to refuse sex scale, the intention to refuse sex scale, the condom attitudes scale, the self-efficacy to use condoms scale, the intention to use condoms scale, a reported sexual intercourse question, and a series of daughter demographic questions.

The seven-item HIV transmission knowledge scale is a sum of Likert-type items about ways of transmitting HIV, such as sharing needles and syringes, having sex with a person who does not look sick but has the AIDS virus, and having multiple partners. Each item has four response categories—very likely, somewhat likely, somewhat unlikely, and very unlikely—scored from most correct (4) to least (1) (Dancy, Crittenden, & Talashek, 2006). Cronbach alpha (α) values for the scale at T1, T2, and T3 were .85, .84, and .89, respectively. The test-retest correlations for the scale were 0.40, 0.27, and 0.40 for T1–T2, T1–T3, and T2–T3, respectively (all $p<.01$).

The two-item self-efficacy to refuse sex scale, developed by Stanton et al. (1995), measures the adolescent's confidence in her ability to say no to sex to someone she is going with and with someone she is going with for a long time. Response categories are agree/disagree, and the scale score is a count of agreements with the two items (Dancy, Crittenden, & Talashek, 2006). Kuder-Richardson internal reliability assessments were 0.62 at T1, 0.61 at T2, and 0.68 at T3. The test–retest correlations were 0.42 for T1-T2, 0.28 for T1–T3, and 0.34 for T2–T3 (all $p<.01$).

The intention to refuse sex scale, a measure of the adolescent's plans not to have sex, is based on four dichotomous agree/disagree items. The scale score is a count of agree responses to the following items: to decide not to have sex, to plan to say no to sex, to adhere to her decision not to have sex, and to state clearly that sex is not what she wants (Dancy, Crittenden, & Talashek, 2006). Kuder-Richardson coefficients for the scale at T1, T2, and T3 were 0.82, 0.85, and 0.86, respectively. Test-retest correlations ranged from 0.20 for T1–T3 to 0.36 for T1–T2 (all $p<.01$).

The condom attitudes scale, developed by Stanton et al. (1995), is the count of positive responses on four yes/no dichotomous items: condoms reduce the sexual feelings for girls, condoms reduce the sexual feelings for boys, condoms make sex hurt for girls, and condoms take away feelings boys have doing sex. Kuder-Richardson coefficients were 0.73 at T1, 0.73 at T2, and 0.76 at T3. Test-retest correlations were 0.42 for T1–T2, 0.28 for T1–T3, and 0.40 for T2–T3 (all $p<.01$).

The self-efficacy to use condoms scale measures the adolescent's confidence in her ability to convince her partner to use a condom if he does not want to use a condom and to refuse sex if the partner will not use a condom. The scale score is the count of agreements for the two agree/disagree items. Kuder-Richardson internal consistencies for the scale were 0.63, 0.57, and 0.53 for T1, T2, and T3, respectively. Test–retest correlations were 0.34 between T1 and T2, 0.32 for T1–T3, and 0.23 for T2–T3 (all $p<.01$).

The intention to use condoms scale is a count of affirmative responses to four items: if you have sex, have you decided to use condoms, will you stick to your decision, will you use condoms with every partner, and will you use them for every sex act? Kuder-Richardson reliabilities were 0.89 at T1, 0.87 at T2, and 0.92 at T3. Test–retest correlations were 0.46 between T1 and T2, 0.33 between T1 and T3, and 0.53 between T2 and T3 (all $p<.01$).

Sexual activity or engaging in sex in the last 6 months is based on a single item, the adolescent's report of having vaginal, anal, or oral sex in the last 6 months. Responses are scored as follows: 1 for yes, don't know, or refuse to answer or 0 for not engaging in sex in the last 6 months (no).

ANALYSIS OF DATA

Missing Data and Initial Group Differences

Listwise deletion was used to handle missing data, except for sexual activity. Using *t*-tests, we compared the 403 adolescents with the 150 dropped due to selective attrition ($n=130$) or listwise deletion ($n=20$) at T1. No preexisting differences existed between the two groups (data not shown) on the dependent and independent variables. The two groups' initial comparability indicates no selective panel attrition and supports the findings' generalizability (Acock, 2005). Table 1 presents the demographic characteristics of the 403 daughters: 135 in MDRR, 141 in MDHP, and 127 in HERR. They were from low-income families; 78.6% of their mothers reported monthly income of $1,499 or less.

Missing responses to engaged in sex in the last 6 months were related to the other outcomes (Northridge, Levin, Feinleib, & Susser, 1997; Schafer & Graham, 2002). At each measurement point, a small fraction of the adolescents failed to answer whether they had ever had sex. Nonresponse was not random (Acock, 2005; Schaefer & Graham, 2002) because, compared with adolescents who answered at each time point, the adolescents who declined to answer (n=36) had significantly poorer outcomes and were overrepresented in the MDHP group, even at T1, and because nonresponse interacted with intervention condition to predict some outcomes. Consistent with an intent-to-treat approach (Northridge et al., 1997), we treated this small group conservatively as having sex and as a control used a dummy variable for "response group": "the missing response group" included those declining to answer at T1, T2, or T3 and the "valid response group" included those who answered at all three times.

Using analyses of variance on T1 outcomes to determine any initial differences among the three intervention groups (data not shown), we found that the groups differed only on sexual activity in the last 6 months (5% for MDRR, 12% for MDHP, and 4% for HERR). For the adolescents who answered the ever had sex question at T1, we found no preexisting differences on the dependent and independent variables (data not shown). Thus, the response group dummy is an adequate control for initial differences between the intervention groups.

Analyses for Testing Hypotheses

To test Hypotheses 1 and 2, we began by using two orthogonal contrast *t*-tests between means for each outcome to summarize descriptively the comparisons among the three intervention groups on T2 and T3 outcomes. The first contrast, relevant to Hypothesis 1, was a comparison between the MDRR and HERR interventions; the second, related to Hypothesis 2, compared the combined RR interventions with MDHP.

We have minimized treatment of hierarchical linear models (HLM) that had been conducted in this study, because the results did not contribute to our better understanding of the issues raised in this article. As a next step in testing these hypotheses, we used a nested series of regression models to predict each outcome. Because the three interventions were delivered in small groups (20 groups in each of the HERR and MDHP interventions and 21 in the MDRR intervention), we used multilevel analyses to evaluate the possibility that members of the same group may be similar on characteristics unmeasured in our study. However, our outcomes either showed no such intragroup clustering, or they had no significant intervention effect once the clustering was controlled. Therefore, in this article we report only logistic or OLS regression results. In models for testing our hypotheses, we first predicted each outcome on the basis of intervention assignment, daughter's age, and the missingness dummy.

Age was used because daughter's age is positively related to daughter's engaging in sex and negatively related to her intention to refuse sex (Dancy, Crittenden, & Freels, 2006). Missingness was included to control both for possibly motivated differences in willingness to answer and for preexisting (T1) differences on outcomes related to missingness. Then, to evaluate possible confounding of missingness with the independent variable, we added a term for the interaction of missingness with intervention assignment. In the event of a significant interaction effect, we evaluated the model separately for the missing and nonmissing subgroups and report the intervention effect separately for them. In the case of a nonsignificant interaction effect, we report the overall intervention effect, controlling for missingness, which can be generalized to both subgroups. Either way, we avoid the problem, noted in Schafer and Graham (2002), of redefining the parameters of the models such that coefficients for the intervention effect apply only to respondents on the sexual activity question.

RESULTS

Effectiveness of the MDRR Intervention Compared to the HERR Intervention

Table 2 summarizes the orthogonal contrasts related to Hypothesis 1 for postintervention outcomes at T2 and T3 without controls. At T2, no differences existed between girls receiving the MDRR and HERR interventions on HIV transmission knowledge, self-efficacy to refuse sex, intention to refuse sex, condom attitudes, self-efficacy to use condoms, intention to use condoms, and engaging in sex in the last 6 months. At T3, the contrasts again showed no difference between the girls receiving the MDRR and the girls receiving the HERR intervention, except for favorable condom attitude contrary to Hypothesis 1. At T3, HERR had a more favorable condom attitude than MDRR. Because Hypothesis 1 was not supported, we decided to conduct no further tests of this hypothesis and to collapse the MDRR and HERR intervention groups into a single RR group in all regression analyses.

Effectiveness of the RR Intervention Compared to the MDHP Intervention

Table 2 also summarizes the orthogonal contrasts related to Hypothesis 2 for postintervention outcomes at T2 and T3 without controls. At T2, girls receiving the RR interventions had significantly better scores on HIV transmission knowledge, condom attitudes, self-efficacy to use condoms, and intention to use condoms. In addition, compared to girls receiving the MDHP intervention, girls receiving the RR interventions reported not engaging in sex in the last 6 months significantly more often. At T3, compared to girls receiving the MDHP intervention, girls receiving the RR intervention had significantly better scores on HIV transmission knowledge, condom attitudes, self-efficacy to use condoms, and intention to use condoms. When no variables were controlled, Hypothesis 2 was supported for five of the outcomes at T2 and four outcomes at T3.

As a next step in testing Hypothesis 2, we used a nested series of regression models to predict each outcome: logistic regression for the dichotomous sexual activity outcome and linear regression for interval-measured outcomes. For each outcome, model 1 includes age, intervention group (RR), and the missingness variable as predictors and model 2 adds the intervention group-by-missingness interaction term.

Risk-Reduction Intervention Results

The RR intervention had no effect on self-efficacy to refuse sex, intention to refuse sex, and engaging in sex in the last 6 months. Hypothesis 2 is not supported for these outcomes. T2 and T3 models for HIV transmission knowledge and condom attitude are summarized in Table 3, and the same is done for self-efficacy to use condoms and intention to use condoms in Table 4. The girl's age was positively related to HIV transmission knowledge, condom attitude, self-efficacy to use condoms, intention to use condoms, and engaging in sex in the last 6 months at T2 and T3.

HIV TRANSMISSION KNOWLEDGE—At T2, the first model shows that, controlling for daughter's age and missingness, the RR intervention enhanced HIV transmission knowledge for the combined MDRR and HERR group (see Table 3). However, the significant interaction effect for RR with missing response in model 2 indicates that the valid and missing response groups differed in the effect that the intervention had on this outcome. Estimating the model separately for these two response groups, we found that the favorable effect of the RR intervention on HIV transmission knowledge at T2 was larger for the missing response group (B=4.4=1.0 + 3.35, sum of RR effect + interaction effect, respectively) than for those with valid responses (B=1.0), but significant (p<.05) for both groups. At T3, the RR intervention retained its positive effects on HIV transmission knowledge for the entire sample, as indicated by the significant intervention effect in model 1 (B=1.48) and the absence of a significant

interaction effect in model 2. Adolescents in an RR intervention had greater HIV transmission knowledge at both T2 and T3 than those in the health promotion intervention.

CONDOM ATTITUDE—The RR intervention had positive effects overall on condom attitude at T2 and T3 (Table 3). In the absence of interaction effects in model 2 for each time, the significant effects of the RR intervention in model 1 can be generalized to the entire sample. Adolescents in an RR intervention were consistently more favorable to the use of condoms than those in the health promotion intervention.

Self-Efficacy to Use Condoms—The RR intervention interacted with missingness in its effects on self-efficacy to use condoms at T2 (Table 4), and the intervention had a favorable effect on self-efficacy to use condoms for missing response group (not shown). However, the table shows that the intervention enhanced self-efficacy to use condoms for the entire sample at T3.

INTENTION TO USE CONDOMS—Table 4 also shows that the RR intervention interacted with missingness in its effects on intention to use condoms at both T2 and T3. Evaluating the two response groups separately revealed that the intervention effect on intention to use condoms at T2 was stronger for the missing response group (B=1.03 versus 0.19 for the valid response group), but the intervention significantly enhanced intention to use condoms for both response groups (each one-tailed $p<.05$). However, by T3, this favorable effect on intention to use condoms held only for the missing response group (not shown).

DISCUSSION

The MDRR and the HERR interventions had similar effects on the adolescent girls' HIV transmission knowledge, self-efficacy to refuse sex, intention to refuse sex, condom attitudes, self-efficacy to use condoms, intention to use condoms, and engaging in sex in the last 6 months, indicating that mothers were as effective as health professionals in the delivery of the HIV RR intervention. At both T2 and T3, the RR group, the combined MDRR and HERR girls, had significantly better scores on HIV transmission knowledge and condom attitudes than girls in the MDHP intervention. The girls in the RR intervention had at T2 significantly better scores on intention to use condoms and at T3 significantly better scores on self-efficacy to use condom than girls in the MDPH intervention. Due to the small number of girls who reported engaging in sex in the last 6 months at T2 and T3, we were unable to analyze differences between the girls in the RR and MDHP interventions on condom use and multiple partners.

Self-efficacy to use condoms, condom attitudes, and intention to use condoms have been found to be positively associated with condom use (Albarracin, Johnson, Fishbein, & Muellerleile, 2001). Not only did self-efficacy to use condoms predict intention to use condoms (Armitage & Conner, 2001; Boer & Mashamba, 2005; Heeren, Jemmott, Mandeya, & Tyler, 2007), it also predicted condom use (Armitage & Conner, 2001; Adih & Alexander, 1999; Meekers & Klein, 2002). Condom attitudes predicted intention to use condoms (Albarracin et al., 2001; Boer & Mashamba, 2005; Heeren et al., 2007; Molla, Astrom, & Brehane, 2007). Last, intention to use condom predicted condom use (Heeren et al., 2007) and mediated the effects of condom attitudes and self-efficacy on condom use (Albarracin et al., 2001). Although HIV transmission knowledge is necessary (Ajzen, 1985), it is not sufficient by itself to effect behavior change; no direct relationship has been found between HIV/AIDS knowledge and intention to use condoms (Boer & Mashamba, 2005) or initiation of sexual activity (Bachanas et al., 2002).

Based on prior findings supporting the importance of self-efficacy to use condoms, condom attitudes, and intention to use condoms as determinants of condom use, the RR positive effect

on these determinants may prove beneficial in supporting safer sex practices when the girls become sexually active. As such, enhancing these determinants may be a valuable strategy for the practice of safer sex, especially given that as girls age their intention to refuse sex tends to decrease. The girls will need to be followed for an extended period of time to assess if these determinants indeed promote the practice of safer sex when they become sexually active.

The failure of the RR interventions (MDRR and HERR) to promote self-efficacy to refuse sex and intention to refuse sex and to reduce engagement in sex in the last 6 months may be related to the social influences in urban poverty-stricken areas to encourage sexual activity (Basow & Rubin, 1999; Miller, Benson, & Galbraith, 2001; Ramirez-Valles, Zimmerman, & Newcomb, 1998; Sells & Blum, 1996) and to the increased tendency to engage in sex as the adolescent girl advances in age (Li, Stanton, & Feigelman, 2000; Paradise, Cote, Minsky, Lourenco, & Howland, 2001; Ramirez-Valles, Zimmerman & Juarez, 2002). HIV RR interventions may need to help mothers develop mechanisms to monitor their daughters' activities consistently. Research has indicated that maternal monitoring had a positive effect on practicing safer sex, including the initiation of sex at a later age (Dittus, Miller, Kotchick, & Forehand, 2004; Mandara, Murray, & Bangi, 2003), the reduction in the frequency of sexual activity (Rai et al., 2003), and the use of condoms (Li et al., 2000).

Limitations

The use of self-reported data on sexual behavior has presented challenges for researchers (Lauritsen & Swicegood, 1997; Orr, Fortenberry, & Blythe, 1997). The overall validity of self-reported data related to sexual behavior has been shown to be high, especially with the use of the A-CASI (Romer et al., 1997). Another limitation is the inability to assess the effects of the RR intervention on safer sex practices, such as consistent condom use, limited number of sexual partners, and reduced frequency of sexual activity. The number of girls reporting engaging in sex in the last 6 months was too small to allow a comparison among the intervention groups. A third limitation is the use of a single item to measure sexual activity. A fourth limitation is the retention rate of 76.50%. Some may question this rate, but according to Burns and Grove (1993), a retention rate above 70% is acceptable.

Implications of the Study

Mothers who receive appropriate training may be able to deliver an HIV RR intervention to promote their daughters' HIV RR behavior as well as health professionals. Accepting that mothers may be valuable resources in promoting adolescents' HIV RR behaviors, health professionals should provide training for mothers to enhance their ability to teach HIV RR knowledge and skills to their daughters. Equally important is the health professionals' joint collaboration with mothers and other key people in the community to craft and implement strategies to create nontoxic environments that would engender safer sex practices for all adolescents in their community. More research, especially community-based participatory research, is needed to develop and assess innovative interventions that include mothers and other key community people (ministers, police officers, teachers, etc.) in the effort to reduce health disparities African American adolescent girls continue to experience related to HIV.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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TABLE 1

Daughters' Demographics at T1 and Intervention Group Assignments (*N*=412)

	Range	Mean (SD)	Percent
Age (yr)	11 to 14	12.29 (1.17)	
Number of siblings	0 to 16	4.06 (2.77)	
Number of siblings in household	0 to 13	2.15 (1.75)	
Grade level	4th to 10th	7 (1.25)	
Grade earned (%)			
As			28.75
Bs			44.47
Cs			22.36
Ds			3.44
Fs			0.98
Plan to attend college (%)			95.4
Participate in after school activity (%)			73.2
Intervention group (%)[a]			
MDRR (*n*=135)			33.5
MDRR (*n*=141)			35.0
HERR (*n*=127)			31.5

[a]MDRR=mother/daughter risk reduction; MDHP=mother/daughter health promotion; HERR=health expert risk reduction.

TABLE 2

Contrast *t*-Tests at Different Time Points by Intervention Group (*N*=412)[a]

		T	
Variable	**Contrast test**	**Time 2 (*n*=403)**	**Time 3 (*n*=412)**
Daughter's age	MDRR with HERR	1.62	1.89†
	RR with MDHP[b]	0.74	1.52
HIV transmission knowledge	MDRR with HERR	0.98	−0.84
	RR with MDHP	3.79**	3.51**
Self-efficacy to refuse sex	MDRR with HERR	0.26	0.23
	RR with MDHP	1.23	−0.33
Intention to refuse sex	MDRR with HERR	0.36	0.20
	RR with MDHP	1.50	0.41
Condom attitude	MDRR with HERR	−0.12	−2.45*
	RR with MDHP	2.83**	3.24**
Self-efficacy to use condoms	MDRR with HERR	−0.23	0.44
	RR with MDHP	2.49*	2.55*
Intention to use condoms	MDRR with HERR	0.33	0.64
	RR with MDHP	3.23**	2.48*
Had sex in last 6 months	MDRR with HERR	−0.56	−0.46
(conservative) (1=yes)	RR with MDHP	−2.63**	−0.71

[a] There are 9 cases who skipped their T2 assessment but still stayed in the panel at T3; therefore, the total *N* at T2 equals 403.

[b] MDRR=mother/daughter risk reduction; MDHP=mother/daughter health promotion; HERR=health expert risk reduction; RR=risk reduction, combining MDRR and HERR.

All *p* values are two tailed,

† $p<.1$,

* $p<.05$,

** $p<.01$.

TABLE 3

Regressions for HIV Transmission Knowledge and Condom Attitude at Times 2 and 3

	T2[a]				T3[a]			
	Model 1		Model 2		Model 1		Model 2	
	B	SE	B	SE	B	SE	B	SE
HIV Transmission Knowledge								
Intercept	19.52**	2.29	19.54**	2.27	16.62**	2.36	16.43**	2.36
Age	0.32†	0.18	0.33†	0.18	0.52**	0.18	0.53**	0.18
RR[b]	1.33**	0.43	1.00*	0.45	1.48**	0.46	1.68**	0.49
Missing response	−2.03**	0.73	−3.85**	1.07	−2.82**	0.77	−1.69	1.14
RR × missing	…	…	3.35*	1.45	…	…	−2.10	1.54
Adjusted R^2	0.045		0.055		0.077		0.079	
Condom attitude								
Intercept	−0.17	0.79	−0.16	0.79	−0.20	0.80	−0.12	0.80
Age	0.17**	0.06	0.17**	0.06	0.16*	0.06	0.15*	0.06
RR	0.39*	0.15	0.36*	0.16	0.43**	0.16	0.35*	0.16
Missing response	−0.50*	0.25	−0.65†	0.37	−0.35	0.26	−0.81*	0.38
RR × missing	…	…	0.27	0.50	…	…	0.85	0.52
Adjusted R^2	0.039		0.037		0.037		0.041	

[a] Multiple linear regressions are reported.

[b] Risk reduction intervention.

All p values are two tailed,

† $p<.1$,

* $p<.05$,

** $p<.01$.

TABLE 4

Regressions for Self-Efficacy to Use Condoms and Intention to Use Condoms at Time 2 and Time 3

	T2[a]				T3[a]			
	Model 1		Model 2		Model 1		Model 2	
	B	SE	B	SE	B	SE	B	SE
Self-Efficacy to Use Condoms								
Intercept	0.97**	0.27	0.98**	0.27	1.01**	0.28	1.02**	0.28
Age	0.06**	0.02	0.06**	0.02	0.05*	0.02	0.05*	0.02
RR[b]	0.13*	0.05	0.07	0.05	0.12*	0.05	0.11†	0.06
Missing response	−0.30**	0.09	−0.60**	0.13	−0.23*	0.09	−0.28*	0.13
RR × missing	…	…	0.55**	0.17	…	…	0.09	0.18
Adjusted R^2	0.06		0.08		0.041		0.039	
Intention to Use Condoms								
Intercept	2.33**	0.52	2.34**	0.52	2.78**	0.49	2.86**	0.48
Age	0.09*	0.04	0.10*	0.04	0.07†	0.04	0.06†	0.04
RR	0.27**	0.10	0.19†	0.10	0.17†	0.10	0.08	0.10
Missing response	−0.64**	0.16	−1.10**	0.24	−1.09*	0.16	−1.57**	0.23
RR × missing	…	…	0.84*	0.33	…	…	0.88**	0.32
Adjusted R^2	0.062		0.075		0.117		0.132	

[a] Multiple linear regressions are reported.

[b] Risk reduction intervention.

All p values are two tailed,

† $p<.1$,

* $p<.05$,

** $p<.01$.