

Randomized Trial of a Parent Intervention

Parents Can Make a Difference in Long-term Adolescent Risk Behaviors, Perceptions, and Knowledge

Bonita Stanton, MD; Matthew Cole, MA; Jennifer Galbraith, PhD; Xiaoming Li, PhD; Sara Pendleton, MD; Lesley Cottrel, PhD; Sharon Marshall, MD; Ying Wu, PhD; Linda Kaljee, PhD

Background: Although numerous interventions have been demonstrated to reduce targeted adolescent risk behaviors for brief periods, sustained behavior changes covering multiple risk behaviors have been elusive.

Objective: To determine whether a parental monitoring intervention (Informed Parents and Children Together [ImPACT]) with and without boosters can further reduce adolescent truancy, substance abuse, and sexual risk behaviors and can alter related perceptions 24 months after intervention among youth who have all received an adolescent risk-reduction intervention, Focus on Kids (FOK).

Design: Randomized, controlled, 3-celled longitudinal trial.

Setting: Thirty-five low-income, urban community sites.

Participants: Eight hundred seventeen African American youth aged 13 to 16 at baseline.

Intervention: All youth participated in FOK, an 8-session, theory-based, small group, face-to-face risk-reduction intervention, 496 youth and parents received the 1-session ImPACT intervention (a videotape and discussion), 238 of the ImPACT youth also received four 90-minute FOK boosters delivered in small groups.

Main Outcome Measures: Responses at baseline and 24 months after intervention to a questionnaire assessing risk and protective behaviors and perceptions. Analyses used General Linear Modeling, intraclass correlation coefficient, analysis of covariance, and multiple comparisons with least significant difference test adjustment.

Results: After adjusting for the intraclass correlation coefficient, 6 of 16 risk behaviors were significantly reduced ($P \leq .05$) among youth receiving ImPACT compared with youth who only received FOK (respectively, mean number of days suspended, 0.65 vs 1.17; carry a bat as a weapon, 4.1% vs 9.6%; smoked cigarettes, 12.5% vs 22.7%; used marijuana, 18.3% vs 26.8%; used other illicit drugs, 1.4% vs 5.6%; and, asked sexual partner if condom always used, 77.9% vs 64.9%). Four of the 7 theory-based subscales reflected significant protective changes among youth who received ImPACT. ImPACT did not produce any significant adverse effects on behaviors or perceptions.

Conclusion: A parent monitoring intervention can significantly broaden and sustain protection beyond that conferred through an adolescent risk-reduction intervention.

Arch Pediatr Adolesc Med. 2004;158:947-955

Author Affiliations:

Departments of Pediatrics, Children's Hospital of Michigan, Wayne State University, Detroit (Drs Stanton, Li, Pendleton, and Marshall, and Mr Cole), University of Maryland, Baltimore (Drs Galbraith and Kaljee), and West Virginia University, Morgantown (Drs Cottrel and Wu).

THE PAST DECADE HAS ENJOYED the emergence of several adolescent risk-prevention programs of demonstrated efficacy toward the reduction of sexual risk behaviors,¹ substance abuse,² and tobacco use prevention.¹ Consensus, with some evidence base, provides a template for the shared characteristics of these successful programs: theory-based, practice in skills, attentive to personal values and social norms, narrowly focused on specific risk behaviors, and using multiple delivery formats.³⁻⁵ The process of developing and evaluating these efforts has led to a richer

understanding of adolescent behavior and its determinants.⁶ The importance of peer influence has been consistently demonstrated in multiple studies.⁷⁻¹⁰ The continued importance of parental influences has emerged as an equally strong determinant of not only just childhood but also adolescent behavior.¹⁰⁻¹⁴

As substantial as these efforts have been, their transient influence on risk behavior has been disappointing for those interventionists who have attempted to follow up youths through the adolescent years. Few interventions have been assessed beyond 12 months; among those which have, most have found negligible effects.¹⁵

GENERAL

To test the hypothesis that the reinforcing effects of peer networks might alternatively strengthen or weaken an intervention effect, almost a decade ago we elected to provide a risk-reduction intervention, “Focus on Kids” (FOK), to naturally occurring peer (rather than investigator-formed) groups.¹⁶ While the short-term effects of this intervention approach were significant and, after boosters, there was a resurgence of intervention effect at 18 months, intervention effect waned over time.¹⁷ We observed that the friendship groups were not stable over time and speculated that this breakdown of reference group may have contributed to the lessening effect of the intervention.

Different from friends, parents are, more or less, permanent in an adolescent’s life. As our data and that of other investigators suggest,^{13,18,19} parents retain their roles as important determinants of risk and protective behaviors among adolescents, competing admirably with the influence of peers.^{10,14} The role of monitoring (defined as parental communication and supervision of their children) seems to be especially important in reducing risk and increasing protective actions.^{13,20} We, therefore, hypothesized that a parental-monitoring intervention might sustain—and perhaps broaden—intervention effects. In a preliminary study, we demonstrated that a parental-monitoring intervention, “Informed Parents and Children Together” (ImPACT), did increase parent-youth communication and perceptions of parental monitoring; although as the sole intervention, it did not reduce adolescent self-reports of risk behavior.²¹ Intriguingly, intervention effect on parent-child communication increased over time, supporting the aforementioned hypothesis that for interventions addressing skill sets, effects might be augmented rather than diminished over time.

Given the ethical imperative of the state of uncertainty or “equipose” to justify a control or placebo group in a clinical trial²² and the demonstrated efficacy of FOK and similar adolescent risk-prevention interventions in our target population,¹⁶ we could not justify a trial using a control group against adolescent risk behavior. However, we could offer FOK to all youth and augment it with a parental-monitoring intervention, ImPACT, to determine if this intervention component sustained and/or broadened the intervention effect. We hypothesized that in the short-term (6 months) and moderate-term (12 months), intervention effects would be stronger in youth assigned to FOK combined with ImPACT and include multiple risk behaviors (as opposed to only sexual risk behaviors, the primary target of FOK). Indeed, we have reported that among youth who received FOK, those youths whose parents had been randomized to receive ImPACT demonstrated reduced rates of sexual risk behaviors and substance use at 6 months and reduced rates of substance use and overall risk intent at 12 months.²³ These results left unanswered whether such effects would be robust across time and across normal adolescent developmental changes. We report herein on the long-term (24-month) results with regard to behaviors and putatively influential perceptions.

This randomized, longitudinal trial was conducted among 817 youth located in 35 low-income urban sites in Baltimore, Md. Youths were recruited over 3 waves in 1999 and 2000; wave 1 included youth from 8 sites, wave 2 from 10 sites, and wave 3 from 17 sites. Randomization occurred at the level of the site. As given in **Table 1**, 39% of youth were randomized to receive FOK only (eg, youth received FOK and parents received the attention-control “Goal for IT”), 32% received FOK+ImPACT (without FOK boosters), and 29% received FOK+ImPACT+boosters. The median age of the group was 14 years and 58% were female; intervention groups were similar for sex and age at baseline. Follow-up assessments were conducted at 6, 12, 18, and 24 months after intervention. The research was approved by the institutional review board at the University of Maryland, Baltimore. Written, informed consent/assent was obtained from parents and youths.

PARTICIPANTS

Recruitment sites were selected to access the youths living in low-income communities including all public housing development. Housing development tenant association members and local recreation center staff were invited to work as community recruiters. These recruiters assisted in establishing strategies for identifying and recruiting eligible youth and parents within their particular community. Randomization occurred at the level of the 35 sites and was conducted by a random numbers table after all youths at all sites within the recruitment wave had been identified. Thirteen sites were randomized to receive FOK only, 11 to FOK+ImPACT, and 11 to FOK+ImPACT+ boosters.

The local facilitators identified eligible youths, described the program to the youths and their parents, and established an appointment time for enrollment and baseline data collection from those who were interested. Appointments occurred in the youth’s home or at a designated community site. During the initial appointment, the youths and their parent completed assent/consent forms and a baseline questionnaire in separate rooms. Immediately following completion of baseline surveys, parents and youths participated in either the ImPACT program or the parent attention-control according to the predetermined randomization status of the community. The interventionist closed the appointment by giving the youth and parent information about the FOK sessions scheduled for the youth. Although youths were eligible to enroll even if their parent or guardian was unwilling to participate in the study, all invited parents did participate in their assigned interventions.

GUIDING MODEL OF BEHAVIORAL CHANGE

The interventions in this study were based on a social cognitive model, Protection Motivation Theory (PMT).²⁴ According to PMT (**Figure**), environmental and personal factors combine to create a potential health threat. The perceived threat initiates 2 cognitive pathways, a threat-appraisal pathway and a coping-appraisal pathway. The *threat-appraisal pathway* evaluates the factors associated with the threat including perceived intrinsic and extrinsic rewards accompanying the behavior minus the perceived severity of the threat and one’s vulnerability to the threat. The *coping-appraisal pathway* evaluates one’s ability to avert the threatened danger including both self-efficacy and efficacy of the response balanced against the cost of the response. These 2 appraisal pathways combine to produce protection motivation, which, if high enough, may result in protective action.

Table 1. Intergroup Analysis of Characteristics at Baseline for Study Cohort and According to Presence and Absence at 24-Month Follow-up*

Categories and Status	Overall	Intervention Group			
		1	2	3	2 and 3
Baseline					
All youths	817 (100)	321 (39)	258 (32)	238 (29)	496 (61)
Male	345 (42)	145 (45)	99 (38)	101 (42)	200 (40)
Median age, y	14	14	14	14	14
Baseline Characteristics for Youths at 24-mo Follow-up					
All youths					
P	494 (61)	199 (40)	154 (31)	141 (29)	295 (60)
A	323 (39)	122 (38)	104 (32)	97 (30)	201 (62)
Male					
P	194 (39)	79 (40)	59 (38)	56 (40)	115 (39)
A	151 (47)†	66 (54)†	40 (38)	45 (46)	85 (42)
Ever had sex					
P	183 (37)	75 (38)	54 (35)	54 (38)	108 (37)
A	157 (49)‡	62 (51)‡	51 (49)†	44 (45)	95 (49)†
Ever had anal sex					
P	35 (7)	14 (7)	15 (10)	6 (4)	21 (7)
A	36 (11)†	15 (12)	10 (10)	11 (11)†	21 (10)
Ever smoked cigarettes					
P	120 (24)	53 (27)	39 (25)	28 (20)	67 (23)
A	103 (32)†	38 (31)	35 (34)	30 (31)	65 (32)†
Ever drank alcohol					
P	193 (39)	70 (35)	68 (44)	55 (39)	123 (42)
A	154 (48)†	59 (48)‡	47 (45)	48 (49)	95 (47)
Ever smoked marijuana					
P	122 (25)	48 (24)	38 (25)	36 (26)	74 (25)
A	110 (34)‡	43 (35)†	36 (35)	31 (32)	67 (33)†

Abbreviations: A, absent; FOK, Focus on Kids; ImPACT, Informed Parents and Children Together; P, present.

*Data are given as number (percentage) of participants. Group 1 participated in FOK alone, that is, an 8-session theory-based, small group, face-to-face risk-reduction intervention; group 2, participated in FOK and ImPACT, that is, in addition to FOK, they received 1 ImPACT session that consisted of a videotape and discussion; group 3, participated in FOK, ImPACT, and FOK boosters, that is, in addition to FOK and ImPACT, they received four 90-minute FOK boosters delivered in small groups; and group 4, combined the data of participants from groups 2 and 3 who received or did not receive FOK boosters.

†Baseline characteristic of youths present vs absent at 24-month follow-up different at $P \leq .05$ according to χ^2 test.

‡Baseline characteristic of youths present vs absent at 24-month follow-up at $P \leq .01$ according to χ^2 test.

INTERVENTION COMPONENTS

Because the 3 intervention components (FOK, ImPACT, and FOK boosters) have been described in detail previously,^{16,17,21} only a brief summary is provided herein. Focus on Kids is an 8-session (each approximately 1.5 hours) risk-reduction intervention that emphasizes decision making, goal setting, communicating, negotiating, and consensual relationships and information regarding abstinence and safe sex, drugs, alcohol, and drug selling. Intervention format includes games, discussions, homework assignments, and videotapes and is delivered to groups of 5 to 12 youth by a pair of interventionists. ImPACT includes a 20-minute videotape (designed for the targeted communities) emphasizing several concepts of parental monitoring and communication. ImPACT is delivered by a pair of interventionists through a portable videotape player and is followed by an interactive role-play describing a confrontational scenario. After the role-play between the parent and the youth is completed, the interventionist critiques it according to the main talking points of the videotape and conducts a condom demonstration.

For ImPACT communities that were randomized to the FOK booster sessions' arm of the study, youths were invited to a 90-minute booster session that occurred at the same community site where the original FOK program was completed. If an invited youth did not attend the booster session, an attempt was made to complete the booster session during a home visit with

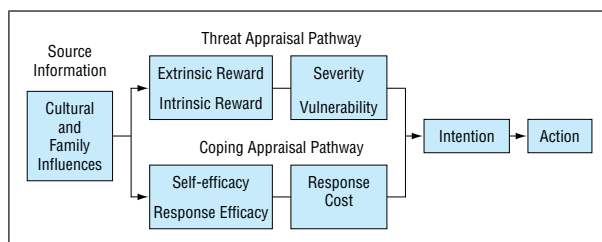


Figure. Protection motivation theory.

the youth. The booster sessions, delivered at 7, 10, 13, and 16 months after intervention, reviewed material regarding decision making and communicating regarding sexual and other risk-protective behaviors, and include both repeat activities from the original sessions as well as new activities emphasizing the same principles and content. The attention control (“Goal for IT”) for ImPACT consists of a 20-minute videotape describing the process for establishing and implementing career goals, followed by a brief discussion scripted by a written text. Control boosters were not offered.

MEASURES

Youth risk behaviors were assessed by youth self-report, using the Youth Health Risk Behavior Inventory. Originally devel-

Table 2. Between-Group Analysis of Behaviors at 24 Months After Intervention: Percentage of Involvement in Risk/Protective Behavior and P Value of Significance Testing*

Youth's Report: Risk Behaviors Over the Past 6 mo	ICC†	Intervention Group‡				Pairwise Comparison§			
		1	2	3	2 and 3	1 vs 2	1 vs 3	2 vs 3	1 vs 2 and 3
Mean No. of days suspended	0.0007	1.17	0.60	0.69	0.65	0.098	0.174	0.665	0.046
Carried a knife or razor to use as a weapon	0.0052	14.6	10.8	14.3	12.5	.322	.930	.401	.519
Carried a bat or stick to use as a weapon	0.0042	9.6	4.7	3.6	4.1	.102	.042	.648	.021
Been in a physical fight with a male or female friend	0.0000	13.1	8.7	14.3	11.4	.214	.749	.149	.570
Smoked cigarettes	0.0000	22.7	12.1	12.9	12.5	.008	.016	.859	.003
Drank alcoholic beverages	0.0203	27.3	26.2	26.4	26.3	.850	.887	.968	.844
Used marijuana	0.0164	26.8	22.1	14.3	18.3	.401	.019	.141	.056
Used other illicit drugs	0.0075	5.6	1.3	1.4	1.4	.059	.073	.954	.015
Sold or delivered drugs	0.0081	5.0	2.7	4.3	3.5	.309	.765	.496	.426
Talked with family or other adults about AIDS or HIV	0.0000	42.1	40.9	56.0	48.2	.830	.017	.015	.209
Engaged in sexual intercourse	0.0264	41.0	40.1	48.9	44.4	.896	.258	.238	.562
Engaged in anal sex	0.0250	10.1	3.4	7.2	5.2	.054	.462	.243	.101
Asked recent sexual partner if condom always used	0.0150	64.9	71.4	85.2	77.9	.393	.006	.060	.037
Been pregnant or gotten a girl pregnant	0.0000	16.7	4.6	15.0	9.6	.012	.732	.040	.086
Used birth control during last sexual encounter	0.0035	20.4	25.6	32.9	29.0	.428	.076	.341	.142
Used condom during last sexual encounter	0.0044	72.0	75.9	76.9	76.4	.561	.471	.879	.439

Abbreviations: FOK, Focus on Kids; HIV, human immunodeficiency virus; ICC, intraclass correlation coefficient; ImPACT, Informed Parents and Children Together; VIF, variance inflation factor.

*Data are given as percentages of participants unless otherwise indicated. P values are after adjusting for ICC. See Table 1 asterisk footnote for an explanation of groups.

†Interclass correlation coefficient: $ICC = \{(MS_b - MS_w) / [MS_b + (m_0 - 1)MS_w]\}$. $m_0 = \{[1 / (k - 1)] [n - (\sum m_j^2 / n)]\}$. Where MS_b indicates mean square between clusters; MS_w , mean square within clusters; m_0 , adjusted mean cluster sized; k , number of clusters; m , the cluster size in the "jth" cluster with j ranging from 1 to k; and n , sample size.

‡Percentage of respondents reporting behavior (except item "suspected").

§P value of least significant difference test's multiple comparison procedure (when ICC = 0.0000) or P value of adjusted t statistic (when ICC > 0.0000). Adjusted t statistic equals original t statistic / \sqrt{VIF} . $VIF = 1 + (m_0 - 1)ICC$.

oped for urban African American youth in Baltimore,²⁵ the first section of the Youth Health Risk Behavior Inventory assesses demographic characteristics of the youth. The second section assesses the youth's involvement in risk behaviors including delinquent behaviors, drug-related behaviors, and sexual risk behaviors during the previous 6 months. Dichotomous responses (0, no; 1, yes) were used for these items. In the next section, youths are queried along a 5-point Likert scale about their perceptions of risk and protective behaviors according to the 7 constructs of PMT. The Youth Health Risk Behavior Inventory questions were designed based on qualitative research and theoretic considerations and were subsequently subjected to reliability testing and assessment of internal consistency (Cronbach α), face validity (a type of commonsense appraisal that is beyond any mathematical formulas), and criterion-related validity.²⁵ In this study, because we are interested in the overall effect of the interventions on the broad area of risk perception, the specific risk scales were collapsed into single PMT construct subscales. Potential items were backed out of the construct subscale in an effort to reach or exceed an α value of 0.70. α Values exceeded 0.70 for 6 of the subscales (exceeding 0.80 for 3 subscales) with the seventh, response efficacy, having an α of 0.69. Consistent with PMT, higher mean values on the self-efficacy, response efficacy, severity, and vulnerability subscales and lower values for intrinsic rewards, extrinsic rewards, and response cost subscales are protective.

ADMINISTRATION OF QUESTIONNAIRES

The questionnaires were administered orally and visually by computer. This method is described in greater detail elsewhere.²⁶ Questionnaires required approximately 45 minutes to administer.

ANALYSIS

We assessed baseline equivalence of demographic characteristics using χ^2 and Kruskal-Wallis tests. Baseline differences in behaviors and perceptions among the different intervention groups (ie, FOK only, FOK + ImPACT, and FOK + ImPACT + boosters) were assessed using the General Linear Model. Any baseline variables that differed significantly among the groups were controlled for in subsequent analysis of covariance analyses of intervention effect on perceptions, knowledge, and behaviors.

Three types of intervention effects at 24 months were assessed among the intervention groups: the overall intervention effect (ie, difference among FOK only vs FOK + ImPACT, and FOK only vs FOK + ImPACT + boosters); the overall additive effect of parental intervention to the FOK (difference between FOK only and FOK + ImPACT with/without boosters); and, the additive effect of FOK boosters to the parental intervention (difference between FOK + ImPACT groups by the presence or absence of boosters). We used the least significant differences (LSDs) multiple comparisons procedure to control for type I error.²⁷

To adjust for the strategy of cluster (rather than individual) randomization, the intraclass correlation coefficient (ICC) was determined for each behavior and construct subscale score (and are contained within **Tables 2, 3, and 4**). A corrected independent sample t test, which was adjusted for the ICC,²⁸ was performed to adjust the test statistics for the group difference.

RESULTS

GENERAL

As given in Table 1, at 24 months after intervention, follow-up rates were comparable among intervention groups,

Table 3. Between-Group Analysis of Youths' Responses at 24 Months: Coping Appraisal Pathway*

Youth's Report	Intervention Group		LSD Value
	1	2 and 3	
Self-efficacy (Cronbach α = 0.88†; ICC = 0.0023‡)	73.56	78.24	.001§
I could stop having sex until I'm older. ^{5(agree)-1(disagree)}	3.58	4.01	.005
I could get condoms. ^{5(agree)-1(disagree)}	4.18	4.46	.012
I could ask for condoms in a clinic. ^{5(agree)-1(disagree)}	4.20	4.39	.053
I could ask for condoms in a store. ^{5(agree)-1(disagree)}	4.13	4.29	.144
I could put a condom on correctly. ^{5(agree)-1(disagree)}	4.31	4.45	.135
I could refuse sex if condom is not used. ^{5(agree)-1(disagree)}	4.00	4.33	.003
I could refuse sex if asked by partner. ^{5(agree)-1(disagree)}	3.77	3.97	.030
I don't need to have sex with a long-time partner. ^{5(agree)-1(disagree)}	3.59	3.79	.034
I don't need to have sex even if all my friends are having sex. ^{5(agree)-1(disagree)}	3.62	3.83	.041
I could convince the person I am having sex with that we should use a condom even if she/he doesn't want to. ^{5(agree)-1(disagree)}	4.12	4.27	.194
I could ask the person I am having sex with about relationships that she/he has had in the past. ^{5(agree)-1(disagree)}	4.05	4.25	.057
I want to wait until I'm older until I have sex again. ^{5(agree)-1(disagree)}	2.93	3.04	.477
If I use drugs, I could always stop using them. ^{5(agree)-1(disagree)}	3.15	3.18	.761
If I was going out with someone who was using drugs, I would not have to use drugs. ^{5(agree)-1(disagree)}	3.54	3.69	.168
If all my friends were drinking, I would not have to. ^{5(agree)-1(disagree)}	3.49	3.62	.285
If my friends start using drugs I would not hang out with them anymore. ^{5(agree)-1(disagree)}	3.24	3.16	.405
I could refuse to deliver drugs for friend. ^{5(agree)-1(disagree)}	3.75	4.07	.000
If someone on the street asked me to deliver drugs, I could say no. ^{5(agree)-1(disagree)}	3.85	4.01	.122
If my friends start dealing drugs, I would not hang out with them anymore. ^{5(agree)-1(disagree)}	3.20	3.23	.781
I could say no if asked by relative to deliver drugs. ^{5(agree)-1(disagree)}	3.88	3.98	.259
Response efficacy (Cronbach α = 0.69†; ICC = 0.0000‡)	44.20	45.97	.021§
Condoms prevent AIDS during sex. ^{5(agree)-1(disagree)}	3.73	4.00	.048
Kids my age respect a girl who is a virgin. ^{5(agree)-1(disagree)}	3.11	3.25	.125
Sometimes sex just happens without your control. ^{5(disagree)-1(agree)}	2.94	2.95	.968
A guy and a girl can go together and not have sex. ^{5(agree)-1(disagree)}	3.85	3.99	.108
If a girl says she won't have sex, a boy would say okay. ^{5(agree)-1(disagree)}	3.09	3.17	.362
If you are going to have sex, condoms are an important way to prevent a pregnancy. ^{5(agree)-1(disagree)}	4.02	4.16	.229
If you are going to have sex, condoms are the best way to prevent you from getting an STD. ^{5(agree)-1(disagree)}	3.87	3.89	.887
Friends who take drugs will think it's okay that I don't take drugs. ^{5(agree)-1(disagree)}	3.53	3.66	.189
A person who decides to stop using drugs can stop. ^{5(agree)-1(disagree)}	3.30	3.38	.383
If kids have interesting activities to do, they won't sell drugs. ^{5(agree)-1(disagree)}	3.61	3.58	.808
A person does not have to keep delivering drugs even if they have done it before. ^{5(agree)-1(disagree)}	3.29	3.42	.117
If my friends stay away from selling drugs, I will stay away from selling drugs. ^{5(agree)-1(disagree)}	3.01	2.99	.825
If I refuse to deliver drugs, drug dealers will not bother me. ^{5(agree)-1(disagree)}	3.44	3.50	.704
Response cost (Cronbach α = 0.82†; ICC = 0.0000‡)	57.20	55.23	.099§
Condoms remove feeling a guy has during sex. ^{5(agree)-1(disagree)}	2.92	2.89	.845
People in a serious relationship don't use condoms. ^{5(agree)-1(disagree)}	2.80	2.79	.944
A girl would be fine with a guy refusing sex. ^{5(disagree)-1(agree)}	2.76	2.55	.012
Sex feels good for girls. ^{5(agree)-1(disagree)}	3.22	3.39	.026
Sex feels good for boys. ^{5(agree)-1(disagree)}	3.43	3.53	.188
A girl my age who is a virgin is probably scared. ^{5(agree)-1(disagree)}	3.07	2.94	.150
A guy my age who is a virgin is probably scared. ^{5(agree)-1(disagree)}	2.95	2.94	.878
Boys think its important to have sex to feel like a man. ^{5(agree)-1(disagree)}	3.11	3.27	.057
Girls think its important to have sex to feel like a woman. ^{5(agree)-1(disagree)}	2.94	2.94	.986
Condoms make sex hurt for a girl. ^{5(agree)-1(disagree)}	2.48	2.58	.468
Kids don't want other kids to think they are using condoms. ^{5(agree)-1(disagree)}	2.61	2.72	.347
Someone my age would want to have sex to see how it feels. ^{5(agree)-1(disagree)}	3.44	3.56	.149
If a girl carries a condom, people will think she is having sex. ^{5(agree)-1(disagree)}	3.11	3.26	.282
Delivering/selling drugs is main way to make money. ^{5(agree)-1(disagree)}	2.37	2.13	.014
I need to sell drugs to get money for myself. ^{5(agree)-1(disagree)}	2.10	1.86	.010
I need to sell drugs to get money for my family. ^{5(agree)-1(disagree)}	2.06	1.80	.003
Boys need to sell drugs to get money for girlfriends. ^{5(agree)-1(disagree)}	2.09	1.89	.023
Friends would think I was scared if I didn't try drugs. ^{5(agree)-1(disagree)}	2.36	2.14	.020
My friends expect me to take drugs. ^{5(agree)-1(disagree)}	2.06	1.89	.061
I would miss out if I never tried drugs. ^{5(agree)-1(disagree)}	2.14	1.99	.142
If I refused to sell/deliver drugs, I would get beat up. ^{5(agree)-1(disagree)}	2.09	1.95	.110

Abbreviations: ICC, intraclass correlation coefficient; LSD, least significant difference; STD, sexually transmitted disease; VIF, variance inflation factor.

*See Table 1 asterisk footnote for an explanation of the groups.

†Cronbach α for internal consistency.

‡Intraclass correlation coefficient: $ICC = \{(MS_b - MS_w) / [MS_b + (m_0 - 1)MS_w]\}$. $m_0 = \{[1 / (k - 1)] [n - (\epsilon m^2 / n)]\}$. See table 2 dagger footnote for an explanation of the equation.

§P value of least significant difference test's multiple comparison procedure (when ICC = 0.0000) or P value of adjusted t statistic (when ICC > 0.0000). Adjusted t statistic = original t statistic / \sqrt{VIF} . $VIF = [1 + (m_0 - 1)ICC]$.

Table 4. Between-Group Analysis of Youths' Responses at 24 Months: Threat Appraisal Pathway*

Youth's Report	Intervention Group		LSD Value
	1	2 and 3	
Intrinsic rewards (Cronbach α = 0.79†; ICC = 0.0000‡)	23.91	22.68	.029§
I feel very good to get put out of school. ^{5(good)-1(bad)}	1.90	1.76	.143
I feel very good to have sex. ^{5(good)-1(bad)}	2.93	2.91	.812
I'm curious what it feels like to take drugs. ^{5(agree)-1(disagree)}	2.15	2.00	.108
Sex feels better when you are high on drugs. ^{5(agree)-1(disagree)}	2.78	2.82	.598
I feel good about smoking marijuana. ^{5(good)-1(bad)}	2.59	2.24	.001
I feel good about drinking alcohol. ^{5(good)-1(bad)}	2.24	2.21	.788
I feel good about using cocaine/crack. ^{5(good)-1(bad)}	1.58	1.6	.133
I feel good about dealing drugs. ^{5(good)-1(bad)}	2.09	1.81	.004
I feel good about delivering drugs. ^{5(good)-1(bad)}	2.03	1.76	.005
Dealing or selling drugs is exciting. ^{5(good)-1(bad)}	2.54	2.48	.515
Extrinsic rewards (Cronbach α = 0.71†; ICC = 0.0000‡)	53.77	53.77	.998‡
None of the sexually active boys I know use condoms. ^{5(none)-1(most)}	2.28	2.03	.031
None of the sexually active girls I know use condoms. ^{5(none)-1(most)}	2.16	2.08	.469
None of my sexually active friends use condoms. ^{5(none)-1(most)}	2.13	2.13	.993
Most of the girls I know have sex. ^{5(most)-1(none)}	3.54	3.85	.009
Most of the boys I know have sex. ^{5(most)-1(none)}	3.88	4.05	.156
Most of my close friends are having sex. ^{5(most)-1(none)}	3.61	3.66	.691
I want kids my age to think I am having sex. ^{5(agree)-1(disagree)}	2.19	2.24	.530
Most of my friends have gotten pregnant. ^{5(most)-1(none)}	2.67	2.93	.028
Most of my friends have gotten someone pregnant. ^{5(most)-1(none)}	2.56	2.82	.030
Getting burned (an STD) proves that a boy is a man. ^{5(agree)-1(disagree)}	1.97	1.69	.001
Being high on a drug makes a person feel good. ^{5(agree)-1(disagree)}	2.94	2.94	.946
Most of my friends drink alcohol. ^{5(most)-1(none)}	2.80	2.96	.219
Most of my friends smoke marijuana. ^{5(most)-1(none)}	2.76	2.85	.533
Most of my friends use cocaine/crack. ^{5(most)-1(none)}	1.23	1.19	.619
Most of my friends use drugs with needles. ^{5(most)-1(none)}	1.20	1.12	.213
People who sell drugs are fun to be around. ^{5(are)-1(are not)}	2.47	2.40	.554
People who sell drugs are cool. ^{5(are)-1(are not)}	2.21	2.29	.502
Most of my friends sell drugs. ^{5(most)-1(none)}	2.06	2.04	.859
People who sell drugs are happier than people who don't sell drugs. ^{5(are)-1(are not)}	2.66	2.54	.276
Kids respect a guy who has been picked up by the police. ^{5(agree)-1(disagree)}	2.46	2.30	.058
Guys need to have money to get respect. ^{5(agree)-1(disagree)}	2.43	2.41	.883

(continued)

proportionate to the original intervention assignments as outlined earlier in the “General” subsection of the “Methods” section. From the 817 youth at baseline, 494 (60%) were present at 24 months; distribution across intervention groups among those present at 24 months was proportionate to the original assignment among the full (baseline) study population. Baseline data on youths absent at 24 months compared with those present reveal that the former were older, more likely to be male, and had higher rates of risk behaviors. However, the baseline demographic and risk-protective behaviors of youths absent at 24 months were comparable across intervention groups. That is, despite the dropout rate, the baseline risk profile remained equivalent across intervention groups.

INTERVENTION EFFECT ON RISK BEHAVIORS

In Table 2, we display the 24-month results according to intervention status for behaviors. Data are presented for the 16 main risk-protective behaviors assessed in the Youth Health Risk Behavior Inventory, including 4 delinquent, 5 substance use, and 7 sexual risk behaviors. In the first 5 columns of the table, we display the ICC for each behavior, followed by the mean value for

youth who received each of the intervention conditions. In the next 4 columns we display the significance level of the pairwise differences among the various intervention conditions, after adjusting for ICC (when the ICC>0.00).

After adjusting for the ICC, 6 of the behaviors differed significantly on the basis of intervention assignment to FOK only vs FOK + ImPACT (with or without boosters) and in all cases risk behaviors were lower among those youth whose parents had been assigned to ImPACT. Specifically, 2 of the general risk behaviors (days suspended and carrying a bat as a weapon), 3 of the substance abuse behaviors (use of cigarettes, marijuana, and other illicit drugs), and 1 of the sexual risk behaviors (partner notification) differed according to randomization to FOK only vs FOK + ImPACT youth. The difference in 2 additional sexual behaviors were marginally significant ($P \leq .10$) and again favored the addition of ImPACT.

The difference of 2 behaviors between FOK only and FOK + ImPACT youth were significant or marginally significant; in all cases, risk behaviors were lower among the ImPACT-enhanced group. Seven behaviors differed in a protective fashion (significantly or marginally significant) among those who had also received FOK + ImPACT + boosters compared with FOK only.

Table 4. Between-Group Analysis of Youths' Responses at 24 Months: Threat Appraisal Pathway* (cont)

Youth's Report	Intervention Group		LSD Value
	1	2 and 3	
Severity (Cronbach $\alpha = 0.77$, ICC = 0.0087†)	61.64	62.14	.556
If two people are going together and one of them gets an STD, they would break up. ^{5(agree)-1(disagree)}	3.19	3.18	.941
If my mother knew I had an STD, she would be upset. ^{5(agree)-1(disagree)}	3.65	3.72	.555
I feel very bad to get an HIV infection. ^{5(very bad)-1(very good)}	4.35	4.53	.070
I feel very bad to get an STD. ^{5(very bad)-1(very good)}	4.33	4.44	.264
I feel very bad to get pregnant or get a girl pregnant. ^{5(very bad)-1(very good)}	3.94	3.99	.645
People who use drugs die early. ^{5(agree)-1(disagree)}	3.32	3.19	.162
People who use drugs spend all of their money on drugs. ^{5(agree)-1(disagree)}	3.48	3.46	.805
People who use drugs are not good parents. ^{5(agree)-1(disagree)}	2.79	2.84	.666
People who use drugs get AIDS. ^{5(agree)-1(disagree)}	3.11	3.02	.349
People who use drugs become addicts. ^{5(agree)-1(disagree)}	3.39	3.48	.341
Going to prison would ruin my life. ^{5(agree)-1(disagree)}	3.74	3.93	.085
Bad things happen to families of kids who sell drugs. ^{5(agree)-1(disagree)}	3.14	3.21	.389
Kids who sell drugs will get hurt. ^{5(agree)-1(disagree)}	3.37	3.35	.817
Vulnerability (Cronbach $\alpha = 0.81$†; ICC = 0.0264‡)	29.61	31.12	.192
In the next 6 months I will get an STD. ^{5(likely)-1(unlikely)}	1.90	1.73	.115
In the next 6 months I will get an HIV infection. ^{5(likely)-1(unlikely)}	1.81	1.73	.436
In the next 6 months I will get/or get a girl pregnant. ^{5(likely)-1(unlikely)}	2.00	1.97	.854
In the next 6 months I will have a baby. ^{5(likely)-1(unlikely)}	2.05	2.04	.959
I often see relatives drink alcohol. ^{5(often)-1(never)}	2.57	2.54	.814
I often see relatives smoke marijuana. ^{5(often)-1(never)}	1.90	1.96	.675
I often see relatives use crack cocaine. ^{5(often)-1(never)}	1.29	1.33	.692
I often see relatives use drugs with needles. ^{5(often)-1(never)}	1.25	1.26	.964
I often see my neighbors drink alcohol. ^{5(often)-1(never)}	2.55	2.65	.583
I often see my neighbors smoke marijuana. ^{5(often)-1(never)}	2.50	2.84	.077
I often see my neighbors use crack cocaine. ^{5(often)-1(never)}	1.66	1.83	.303
I often see my neighbors use drugs with needles. ^{5(often)-1(never)}	1.63	1.72	.543
I often see my neighbors sell or run drugs. ^{5(often)-1(never)}	2.39	2.65	.168
I often see my relatives sell or run drugs. ^{5(often)-1(never)}	1.51	1.73	.099
People who sell drugs usually take drugs. ^{5(usually take)-1(usually do not take)}	2.74	3.10	.027

Abbreviations: HIV, human immunodeficiency virus; ICC, intraclass correlation; LSD, least significant difference; STD, sexually transmitted disease.

*See Table 1 asterisk footnote for an explanation of the groups.

†Cronbach α for internal consistency.

‡Intraclass correlation coefficient: $ICC = \{(MS_b - MS_w) / [MS_b + (m_0 - 1)MS_w]\}$. $m_0 = \{[1 / (k - 1)][n - (\epsilon m^2 / n)]\}$. See Table 2 dagger footnote for an explanation of the equation.

§P value of LSD multiple comparison procedure (when $ICC = 0.0000$) or P value of adjusted t statistic (when $ICC > 0.0000$). Adjusted t statistic = original t statistic / \sqrt{VIF} . $VIF = [1 + (m_0 - 1)ICC]$.

Finally, 3 behaviors differed (significantly and marginally significant) between the 2 ImPACT groups. For 2 of these behaviors, the addition of boosters offered further significant protection. For 1 behavior, the addition of the booster was associated with greater risk.

INTERVENTION EFFECT ON PMT PERCEPTIONS

Overall

Tables 3 and 4 display perceptions of risk and protective behaviors at the 24-month follow-up according to intervention status and organized by the constructs in the 2 PMT pathways, coping-appraisal and threat-appraisal (see the "Guiding Model of Behavioral Change" subsection of the "Methods" section). For each construct subscale, the construct name, ICC, Cronbach α value for the subscale, and mean values by the 2 main intervention groups (FOK only vs FOK + ImPACT with or without FOK boosters) and significance thereof (after adjusting for ICC where $ICC > 0.00$) are indicated in boldfaced type, below which are the items composing that subscale.

Coping-Appraisal Pathway

Overall, as shown in Table 3, Cronbach α values exceeded 0.80 for 2 of the subscales and was 0.69 for the third. Mean self-efficacy values were significantly higher among youth who received FOK + ImPACT compared with youths who received FOK only. Of the 20 items included in the self-efficacy subscale, 9 demonstrated a significant difference based on intervention assignment; all differences reflected increased perceptions of self-efficacy among youths receiving FOK + ImPACT with or without FOK boosters.

The mean values of the response efficacy subscale also demonstrated a significant protective effect among youths receiving FOK + ImPACT compared with youth receiving FOK only. Of the 13 items composing the subscale, 1 item differed significantly, reflecting enhanced protection through the addition of ImPACT to FOK.

The final coping-appraisal construct, response cost, demonstrated marginally significant enhancement of protection (eg, lowered perceptions of response cost for en-

What This Study Adds

The past decade has enjoyed the emergence of several adolescent risk prevention programs of demonstrated efficacy toward the reduction of sexual risk behaviors, substance abuse use, and tobacco use prevention. As substantial as these efforts have been, their relatively transient influence on a narrow array of risk behavior has been disappointing for those interventionists who have attempted to follow up youths through the adolescent years. Intervention efforts that sustain and broaden risk prevention effects among adolescents are needed.

This study demonstrates the ability of a supplemental intervention among parents to substantially enhance and sustain the intervention effect enjoyed from an adolescent risk-reduction intervention. Intervention effect on behaviors, perceptions and knowledge was demonstrated 2 years after intervention.

acting the protective behavior) among youths who received FOK + ImPACT compared with youths who received FOK only. Not shown in this table, youths receiving FOK + ImPACT without the FOK boosters demonstrated significantly lower perceptions of response cost compared with FOK only youths (54.08 vs 57.48, $P = .02$). Among the 21 items in the response cost subscale, 8 perceptions differed significantly, 6 of which demonstrated protection conferred from ImPACT.

Threat-Appraisal Pathway

The α values exceeded 0.70 for all 4 subscales assessing this pathway. Only 1 subscale, intrinsic rewards, demonstrated a significant difference in mean values between intervention groups; values were significantly lower (eg, showed a protective effect) among youths receiving FOK + ImPACT (with and without FOK boosters) compared with youths receiving FOK only. Of the 10 items included in the subscale, 3 showed a statistically significant difference, all of which reflected enhanced protection among youths receiving ImPACT. The overall scores for the other 3 subscales (extrinsic rewards, vulnerability, and severity) did not differ significantly between intervention groups.

COMMENT

These results demonstrate the ability of a supplemental intervention among parents to enhance and sustain the intervention effect enjoyed from an adolescent risk-reduction intervention. The results are consistent with the substantial data that demonstrate the importance of parents throughout the adolescent years.^{13,18} In some instances, the addition of the FOK boosters also conferred added protection. Both the parent intervention and the FOK booster intervention are consistent with developmental theory that suggests that youths will need to reassess situations as they age and assimilate new experiences.^{29,30} This finding offers some respite from the polarizing arguments of the last decade over the relative roles of parents vs extrafamilial interventions in educat-

ing children about sexual and other risk-reduction efforts.³¹⁻³⁴ Parent and community sources of information can be reinforcing and even augmenting.

The strong intervention effect on the coping-appraisal pathway, with a less consistent effect on the threat-appraisal pathway, is also consistent with the literature. Perceptions of self-efficacy and their relation to enactment of a wide array of protective maneuvers have been a relatively robust finding in the literature³⁵⁻³⁷ as have been perceptions of response cost as motivators of both risky and protective behaviors.^{38,39} Constructs from the threat-appraisal pathway, in particular vulnerability, have a long history of conflicting, at times apparently contradictory, associations. Thus, for example, both perceptions of vulnerability and invulnerability have been associated with increased participation in risk behavior. Likewise perceptions of severity are problematic, confounded by proximate and distal outcomes that often have little meaning to an adolescent.⁴⁰

POTENTIAL LIMITATIONS

First, all youths received a risk-reduction intervention previously demonstrated to be effective (FOK) because we felt that not to do so would have been offering less than standard of care.²² Thus, while we have demonstrated that FOK + ImPACT is superior to FOK only, we are presuming that FOK was better than a control based on past rather than concurrent data. Second, these data are based on self-report, without biologic or other confirmation. Third, while these data suggest that in some situations the boosters may have enhanced protection, but in others reduced protection, and because we did not have a cell in which only the boosters were added to FOK, no definitive statement can be made regarding their role. Fourth, in enrolling this community-based convenience sample, data were not maintained regarding potentially eligible youths who refused or were not approached. Fifth, there was a substantial attrition of youths at 24 months, whose baseline characteristics indicated greater risk than those youths remaining for follow-up. However, the baseline demographic and risk characteristics did not differ across intervention groups, thus reducing the likelihood that attrition bias influenced the outcome of this study.

IMPLICATIONS OF THE FINDINGS FOR FUTURE RESEARCH

ImPACT resulted in multiple significant differences demonstrating protection in long-term outcomes, including behaviors and perceptions that are posited to influence behavior.⁴¹ These findings demonstrate both that a broad range of risk behaviors can be reduced over time and that the underlying factors presumed to be contributing to these changes were altered in a fashion consistent with the observed behavioral changes. These data suggest that properly designed risk-reduction interventions can exert sustained effects over a broad array of behaviors. However, the evidence from this study suggests that to have this effect, interventions will require multiple delivery approaches. In this study, we used face-to-face strate-

gies addressing youths and their parents. Other approaches (including the mass media which might change social norms^{9,42}) might also be effective, but further research will be needed to assess such combinations.

These data underscore the importance of looking to parents in our efforts to minimize risk exposure among adolescents. Parents really do make a difference in the lives of their adolescents.

Accepted for Publication: April 22, 2004.

Correspondence: Bonita Stanton, MD, Department of Pediatrics, Children's Hospital of Michigan, Suite 1k40, Wayne State University, 3901 Beaubien St, Detroit, MI 48201 (bstanton@dmc.org).

Funding/Support: This study was supported by grant R01MH54983 from the National Institute of Mental Health, Bethesda, Md.

Acknowledgments: We thank the many community members and leaders, interventionists, data collectors, other faculty and staff who worked with us on this project, especially Yvonne Summers. We thank the University of Maryland and West Virginia University for their support of our efforts. Finally, we thank Philtrice Ervin for help in preparing the manuscript.

REFERENCES

- Centers for Disease Control and Prevention. *Compendium of HIV Prevention Interventions With Evidence of Effectiveness*. Atlanta, Ga: Centers for Disease Control and Prevention; November 1999.
- Brounstein PJ, Zweig JM. *Understanding Substance Abuse Prevention: Toward the 21st Century, a Primer on Effective Programs*. Rockville, Md: US Dept of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Prevention; 1999.
- Kirby D. *Emerging Answers: Research Findings on Programs to Reduce Teen Pregnancy*. Washington, DC: National Campaign to Prevent Teen Pregnancy; 2001.
- Kirby D. Understanding what works and what doesn't in reducing adolescent sexual risk-taking. *Fam Plann Perspect*. 2001;33:276-281.
- Kim N, Stanton B, Li X, Dickerson K, Galbraith J. Effectiveness of 40 adolescent AIDS-risk reduction interventions: a quantitative review. *J Adolesc Health*. 1997; 20:204-215.
- Jamieson KH, Romer D. Findings and future directions. In: Romer D, ed. *Reducing Adolescent Risk: Toward an Integrated Approach*. Thousand Oaks, Calif: Sage Publications Inc; 2003.
- Alexander CN, Campbell EQ. Peer influences on adolescent drinking. *Q J Stud Alcohol*. 1967;28:444-453.
- Jessor R, Costa F, Jessor SL, Donovan JE. Time of first intercourse: a prospective study. *J Pers Soc Psychol*. 1983;44:608-626.
- Romer D, Black M, Ricardo I, et al. Social influences on the sexual behavior of youth at risk for HIV exposure. *Am J Public Health*. 1994;84:977-985.
- Stanton B, Li X, Pack R, Cottrell L, Harris CV, Burns JM. Longitudinal influences of perceptions of peer and parental factors on African-American adolescent risk involvement. *J Urban Health*. 2002;79:536-548.
- Steinberg L, Mounts NS, Lamborn S. Authoritative parenting and adolescent adjustment across varied ecological niches. *J Res Adolesc*. 1991;1:19-36.
- Steinberg L, Dornbusch SM, Brown BB. Ethnic differences in adolescent achievement: an ecological perspective. *Am Psychol*. 1992;47:723-729.
- Steinberg L, Fletcher A, Darling N. Parental monitoring and peer influences on adolescent substance use. *Pediatrics*. 1994;93:1060-1064.
- Stanton B, Li X, Galbraith J, et al. Parental underestimates of adolescent risk behavior: a randomized controlled trial of a parental monitoring intervention. *J Adolesc Health*. 2000;26:18-26.
- Stanton B, Li X, Ricardo I, Galbraith J, Feigelman S, Kaljee L. A randomized, controlled effectiveness trial of an AIDS prevention program for low-income African-American youths. *Arch Pediatr Adolesc Med*. 1996;150:363-372.
- Stanton B, Fang X, Li X, Feigelman S, Galbraith J, Ricardo I. Evolution of risk behaviors over 2 years among a cohort of urban African-American adolescents. *Arch Pediatr Adolesc Med*. 1997;151:398-406.
- Jacard J, Dittus P. *Parent-Teen Communication: Toward the Prevention of Unintended Pregnancies*. New York, NY: Springer-Verlag NY Inc; 1991.
- Blake SM, Simkin L, Ledsy R, Perkins C, Calabrese JM. Effects of a parent-child communications intervention on young adolescent risk for early onset of sexual intercourse. *Fam Plann Perspect*. 2001;33:52-61.
- Li X, Stanton B, Feigelman S. Impact of perceived parental monitoring on adolescent risk behavior over four years. *J Adolesc Health*. 2000;27:49-56.
- Stanton B, Li X, Galbraith MA, et al. Parental underestimates of adolescent risk behavior: a randomized, controlled trial of a parental monitoring intervention. *J Adolesc Health*. 2000;26:18-26.
- Gilford F. Community-equipose and the ethics of randomized clinical trials. *Bioethics*. 1995;9:127-148.
- Wu Y, Stanton B, Galbraith J, et al. Sustaining and broadening intervention impact: a longitudinal randomized trial of 3 adolescent risk reduction approaches. *Pediatrics* [serial online]. 2003;111:e32. Available at: <http://www.pediatrics.org>. Accessed June 28, 2004.
- Rogers RW. Cognitive and physiological processes in fear appeals and attitude change: a revised Theory of Protection Motivation. In: Cacioppi T, Petty RE, eds. *Social Psychology*. New York, NY: Guilford Press; 1983.
- Stanton B, Li X, Black M, et al. Development of a culturally, theoretically and developmentally based survey instrument for assessing risk behaviors among inner city African-American early adolescents. *AIDS Educ Prev*. 1995;7:160-177.
- Romer D, Hornik R, Stanton B, et al. "Talking" computers: an efficient and private method to conduct interviews on sensitive health topics. *J Sex Res*. 1997; 34:3-9.
- Ramsey PH. Comparison of closed testing procedures for pairwise testing of means. *Psychol Methods*. 2002;7:504-523.
- Wears RL. Advanced statistics: statistical methods for analyzing cluster and cluster-randomized data. *Acad Emerg Med*. 2002;9:330-341.
- Graber JA, Brooks-Gunn J. Developmental transitions: linking human development with tobacco prevention research. *Nicotine Tob Res*. 1999;1(suppl 1): S73-S77.
- Lefkowitz ES, Romo LF, Corona R, Au TK, Sigman M. How Latino American and European American adolescents discuss conflicts, sexuality, and AIDS with their mothers. *Dev Psychol*. 2000;36:315-325.
- Middleman AB. Review of sexuality education in the United States for health professionals working with adolescents. *Curr Opin Pediatr*. 1999;11:283-286.
- Sather L, Zinn K. Effects of abstinence-only education on adolescent attitudes and values concerning premarital sexual intercourse. *Fam Community Health*. 2002;25:1-15.
- McElderry DH, Omar HA. Sex education in the schools: what role does it play? *Int J Adolesc Med Health*. 2003;15:3-9.
- Kirby D. The impact of schools and school programs upon adolescent sexual behavior. *J Sex Res*. 2002;39:27-33.
- Garcia K, Mann T. From "I Wish" to "I Will": social-cognitive predictors of behavioral intentions. *J Health Psychol*. 2003;8:347-360.
- Hagger MS, Chatzisarantis N, Biddle SJ. The influence of self-efficacy and past behaviour on the physical activity intentions of young people. *J Sports Sci*. 2001; 19:711-725.
- Jemmott JB III, Jemmott LW, Spears H, Hewitt N, Cruz-Collins M. Self-efficacy, hedonistic expectancies, and condom-use intentions among inner-city black adolescent women: a social cognitive approach to AIDS risk behavior. *J Adolesc Health*. 1992;13:512-519.
- Houlding C, Davidson R. Beliefs as predictors of condom use by injecting drug users in treatment. *Health Educ Res*. 2003;18:145-155.
- Christiansen B, Smith GT, Roehling PV, Goldman MS. Using alcohol expectancies to predict adolescent drinking behavior after one year. *J Consult Clin Psychol*. 1989;57:93-99.
- Fortenberry JD. Adolescent sex and the rhetoric of risk. In: *Reducing Adolescent Risk: Toward an Integrated Approach*. Thousand Oaks, Calif: Sage Publications, Inc; 2003:293-300.
- Corrigan PW. On the battle between behavior and cognition: lesson from Physicists and pragmatists. *J Behav Ther Exp Psychiatry*. 1995;26:209-214.
- Agha S. The impact of a mass media campaign on personal risk perception, perceived self-efficacy and on other behavioural predictors. *AIDS Care*. 2003;15: 749-762.