

Reduction in Human Immunodeficiency Virus Risk Among Youth in Developing Countries

Lynette Deveaux, BA; Bonita Stanton, MD; Sonya Lunn, MB,ChB; Leslie Cottrell, PhD; Shuli Yu, PhD; Nannette Brathwaite, MA; Xiamong Li, PhD; Hongjie Liu, PhD; Sharon Marshall, MD, MPH; Carole Harris, PhD

Objective: To address the 6-month efficacy of a human immunodeficiency virus (HIV) prevention intervention targeted to youth and delivered with and without a parental monitoring intervention in a developing country (the Bahamas).

Design: Randomized, controlled, 3-cell intervention trial with a 6-month postintervention follow-up.

Setting: Elementary schools in the Bahamas.

Participants: A total of 1282 Bahamian sixth-grade students (and 1175 parents) in 15 schools.

Interventions: Youth and parents were randomized at the level of the school to receive the following interventions: (1) Focus on Youth in the Caribbean (FOYC) plus Caribbean Informed Parents and Children Together (CImPACT), (2) FOYC plus an attention control for parents (Goal for It [GFI]), or (3) an attention control for the youth (Wonderous Wetlands [WW]) plus the GFI. The 10-session FOYC or WW curriculum was delivered as part of the elementary school curriculum. The GFI or

CImPACT was delivered to parents in the evenings or on weekends.

Main Outcome Measures: Risk and protective knowledge, condom use skills, perceptions, interventions, and self-reported behaviors.

Results: Compared with the WW, the FOYC significantly increased knowledge, condom use skills, protective perceptions, and intentions to engage in safer behaviors. Among youth, no differences were found in knowledge or condom use skills based on parent intervention; among parents, those receiving the CImPACT demonstrated superior condom use skills after the intervention.

Conclusions: Protective knowledge, skills, perceptions, and intentions of youth from 1 developing country can be significantly improved by youth intervention delivered through the schools. Longer follow-up is needed to determine if risk behaviors will be reduced and how long protective results will be sustained.

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Author Affiliations: Office of AIDS, Bahamas Ministry of Health, Nassau (Mss Deveaux, Lunn, and Brathwaite); The Carman and Ann Adams Department of Pediatrics, Wayne State University School of Medicine, Detroit, Michigan (Drs Stanton, Yu, Li, Liu, and Marshall); and Health Research Center, West Virginia University, Morgantown (Drs Cottrell and Harris).

AN ESTIMATED 39.5 MILLION persons are infected worldwide with human immunodeficiency virus (HIV). Most HIV-infected persons live in developing countries, with the highest rates in Africa, but disproportionate burdens span virtually all regions of the developing and transitional world.¹ The prominence of adolescents and young adults among newly infected people remains a consistent theme across the globe.²

Researchers in developed countries have been systematically reviewing, analyzing, and cataloging prevention efforts that target adolescents and young adults and identifying approaches and intervention components that appear to be asso-

ciated with reductions in HIV and sexually transmitted disease risk behaviors and/or infections.³⁻⁸ Critical factors associated with successful intervention programs are an underlying theoretical framework; an emphasis on skills development, communication, and negotiation; incorporation of peer and parental influences; and a factual foundation. Simultaneous with burgeoning evidence that these interventions can reduce sexual risk behaviors in developed countries, compelling evidence has accumulated to dispel the notion that safer sex interventions may increase the frequency of sexual behavior.⁹

Despite widespread recognition that most HIV infection occurs in developing countries, little research has been conducted that targets adolescents and young

adults in these settings.¹⁰ A systematic review of school-based behavioral interventions that target adolescents or young adults (age <24 years) in developing countries¹¹ included 22 studies that reported behavioral outcomes and used an experimental or quasi-experimental evaluation. The characteristics of effective programs in these settings were similar to those effective in developed countries. The authors concluded that although the evidence for effectiveness is sufficiently robust that curriculum-based HIV prevention interventions with characteristics similar to programs found to be effective in developed countries should be implemented in schools throughout developing countries, more well-designed studies need to be conducted with randomized designs and sufficient sample sizes.¹¹ Other researchers have also emphasized the need to simultaneously address adolescents who are and are not engaging in sexual intercourse³ and to target youth before their sexual initiation to ensure that condom use accompanies the first act of coitus.¹² Furthermore, although schools offer an ideal setting to reach wide numbers of children, early, intensive community cooperation will be needed to successfully compete for limited curricular space and to provide the resources necessary to adequately train those who will provide the education.³

Issues related to the need for community support of school-based initiatives are especially important and complex. Identifying all of the constituents within a community who desire input may be difficult, although in most settings, parents will be among them.¹³ Resources are scarce in developing countries, and frequently schools are underresourced and overcrowded.^{14,15} The government or external funding agencies may exert significant pressure regarding competing needs within the curriculum. Some community members may be resistant to a safer sex curriculum within the schools.¹⁶ Greater community involvement then might potentially result in increased resistance to the inclusion of such materials in the curriculum.^{17,18}

Nonetheless, the experience regarding parents and adolescents and adolescent HIV risk reduction and health promotion is vast. One of the most robust findings across multiple data sets has been the inverse relationship between parental monitoring (including parent-adolescent communication) and adolescent sexual risk behavior; youth who perceive that their parents usually know where and with whom the youth are and what they are doing are significantly less likely to be involved in a wide range of risk behaviors, including sexual risk behaviors.¹⁹⁻²² The phenomenon of parental monitoring and parent-adolescent communication appears to be protective across multiple ethnicities, nations, and cultures.²³⁻²⁷ Moreover, experience indicates that both parents and children want parents to talk with their children about sex.²⁸ Several investigators have explored the inclusion of programs designed to increase parental monitoring and/or communication with youth to determine if this factor can increase or sustain intervention impact; the findings from several of these studies have been positive.²⁹⁻³²

Accordingly, in the present study, we sought to address several of these emerging needs in HIV research and public health in developing countries: utilization of the

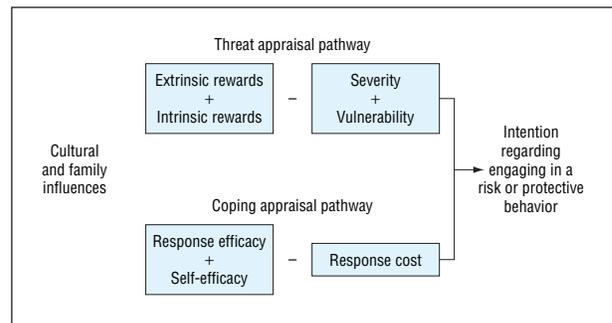


Figure 1. Cognitive processes involved in decision making in the Protection Motivation Theory. Two pathways lead to the intention to be involved in a risk or a protective behavior (see text for further description).

school system to reach large numbers of youth without having to develop a new infrastructure, methodologically rigorous evaluations of HIV prevention interventions that target adolescents in developing countries, community support both to allow these topics to be discussed in the schools and to devote school resources to HIV prevention in the face of competing demands, and inclusion of parents in adolescent risk and health behavior.

METHODS

DEVELOPING COUNTRY SITE

In the late 1990s, the time at which we began our work, the Bahamas had the second highest HIV seroprevalence rate in the Caribbean. The antenatal seroprevalence rate peaked during the 1990s at 4% and currently is approximately 2%, with an overall seroprevalence rate of 3%. Transmission is predominantly through heterosexual intercourse, and most new cases are among adolescents and young adults. Although the Bahamas includes more than 700 islands, approximately two-thirds of the population live on the island of New Providence, which hosts 82% of those infected with HIV and 86% of those with AIDS.³³⁻³⁵

The Bahamas has a population of approximately 321 000, 85% of whom are of African descent. Although the per capita income is approximately \$16 000, income is highly skewed. Although English is widely spoken, 7.1% are Haitian or Creole speaking.³³

PRELIMINARY WORK IN THE BAHAMAS

The collaboration between the US and Bahamian teams began at the request of the Bahamian Ministry of Health (MOH). The US research team had developed an adolescent risk reduction intervention, Focus on Kids (FOK),³⁶ an 8-chapter intervention that had been shown in a longitudinal evaluation to be effective in reducing unprotected sex.³⁷ Learning of this, the MOH had requested assistance with its adaptation for the Caribbean, in a 10-chapter program entitled Focus on Youth in the Caribbean (FOYC). The 2 additional sessions emphasized relationships and more basic factual material regarding substance abuse and sexual risk behavior, since the cocaine epidemic was fueling a rapid increase in HIV transmission.³⁸ (The curriculum is available from the authors.) The intervention was evaluated through a quasi-experimental design among 289 girls 9 to 17 years old. Condom use and protective perceptions were significantly higher among intervention youth.³⁸

Like its parent intervention, FOK, FOYC is based on the Protection Motivation Theory (PMT), a social cognitive theory.³⁹ As depicted in **Figure 1**, the PMT posits that environmental

and personal factors combine to create a potential health threat that activates 2 cognitive pathways. The threat-appraisal pathway evaluates the factors associated with the threat, including perceived intrinsic rewards and extrinsic rewards that accompany the behavior minus 2 other factors, the perceived severity of the threat and vulnerability. The coping-appraisal pathway evaluates an individual's ability to avert the threatened danger, including 2 factors, self-efficacy and response efficacy, balanced against the response cost. These 2 appraisal pathways combine to produce protection motivation, which if high enough may result in intention to take a protective action. The 10 chapters (each approximately 90 minutes long) of the FOYC address the 8 factors that comprise PMT through games and exercises that emphasize skill development, practice in negotiation, and communication and decision making using an interactive format.³⁸

WORKING WITH THE COMMUNITY

The Bahamian MOH and Ministry of Education (MOE) were interested in national implementation of the FOYC. Because school attendance is compulsory until the age of 16 years in the Bahamas and 75% of youth attend the public elementary schools (but fewer attend the public middle schools), the MOE recommended that the curriculum be administered at the sixth-grade level because this delivery approach would reach most Bahamian youth before they initiated sexual intercourse. Data from a survey conducted among 9th- and 11th-grade youth in the Bahamas indicate that 32% of youth ages 13 to 15 years were sexually experienced, as were 57% of those 16 years and older.³³ Since most youth in sixth grade are 11 and 12 years old, it was anticipated that most would be sexually inexperienced, although approaching sexual initiation. The MOE wanted to assess the effectiveness of the intervention but was concerned about exposing the control youth to an intervention of probable reduced efficacy. A series of community meetings with parents, the MOE, and the MOH were conducted to determine how to address these concerns. We sought an attention control (eg, equal time allotted to the curriculum) that would not be based on a theoretical model of behavioral change, would not emphasize skills in communication and negotiation or condom use, and would not emphasize personal decision making (all core elements of the FOYC).

A CONTROL OF EDUCATIONAL VALUE

The Bahamian government had recently articulated the importance of educating all Bahamian youth about conservation of natural resources, but the curriculum had not been prepared to address this need. Naturalists at the Bahamian National Trust who earlier had developed a conservation curriculum for youth groups, the Wondrous West Indian Wetlands,⁴⁰ developed a 10-chapter curriculum emphasizing the importance of water conservation, wildlife, and other natural resources in the Bahamas (the Wondrous Wetlands [WW]). The WW curriculum involved field trips, crafts projects, basic knowledge in conservation, and discussion. It was judged by the teachers to be meaningful and enjoyable, and it did not contain any of the core elements of the FOYC noted herein. It fulfilled the research criteria established by the investigators for the control condition.

MEETING COMMUNITY DESIRES

Focus group discussions among sixth grade students and parents revealed high levels of enthusiasm for HIV prevention education in the schools, including the FOYC curriculum. However, both parents and youth identified the need for more

education of parents generally about HIV, with a particular focus on communication between parents and youth and involvement of parents in helping youth to make healthy personal decisions. The US team had recently designed and evaluated a parental monitoring and communication intervention called Informed Parents and Children Together (ImpACT), which in combination with FOK had reduced HIV risk behaviors among US adolescents compared with youth receiving only FOK and a placebo-controlled parent intervention, Goal for It (GFI) (described later in this section).³²

The original ImpACT intervention, which was approximately 60 minutes long, included a 20-minute video (filmed in the United States) emphasizing parental monitoring and communication. The ImpACT intervention was delivered in the parent's home through a portable video player and was followed by an interactive role play describing a confrontational scenario. Subsequently, the interventionist presented a condom demonstration on a penile model, and then the parent and youth also practiced appropriate use of the condom on the model.³²

Feedback from the Bahamian community identified several necessary modifications for use in the Bahamas: (1) re-filming the video in the Bahamas; (2) delivery of the intervention in small groups (rather than one-on-one) and in community settings, such as the elementary schools (rather than homes, which would not be culturally acceptable); and (3) delivery only to parents (not parents and their youth). The revised intervention, Caribbean Informed Parents and Children Together (CImpACT), required approximately 50 minutes to administer: 20 minutes to view the film followed by a condom demonstration and discussion.

The GFI attention control consists of a 20-minute video that describes the process for establishing and implementing career goals, including preparatory fundamental schooling followed by a brief discussion scripted by a written text. The lessons in the video are applicable to individuals at any age.³² The Bahamian community believed that the existing video was adequate but requested small group delivery in a community (rather than home) setting.

SELECTION OF PARTICIPANTS

The island of New Providence (the location of Nassau) was selected as the study site. All 26 of the elementary schools on the island were invited to participate; the first 15 that responded were selected. Randomization was done at the level of the school by random number table; 5 schools each were randomly assigned to FOYC plus CImpACT, to FOYC plus GFI, and to WW plus GFI. The MOE had determined that both the FOYC and WW curricula were part of the sixth-grade academic curriculum; all youth would participate in the training to which their school had been assigned. However, to be included in the study (and for the parent to receive either CImpACT or GFI), parental consent and child assent were required. A child could participate if he or she provided assent and consent independent of parental participation. Numbers of students and parents and demographic characteristics in each intervention group are given in **Table 1**.

MEASURES

Youth Data

Data from 3 measures were used in these analyses. The youth completed the Bahamian Youth Health Risk Behavioral Inventory, a cultural adaptation of the Youth Health Risk Behavioral Inventory.⁴¹ The first section of this inventory assesses demographic characteristics of the youth, and the second sec-

Table 1. Baseline Characteristics of Youth and Description of Youth and Parent Baseline and Follow-up Study Samples According to Intervention Assignment

Characteristic	Overall	2 Groups ^a		3 Groups		
		FOYC or CImPACT	WW or GFI	FOYC Plus CImPACT	FOYC Plus GFI	WW Plus GFI
Youth						
Baseline, No.	1340	853	487	430	423	487
6 mo, No.	1282	822	460	417	405	460
Follow-up rate, %	95.67	96.37	94.46	96.98	95.74	94.46
Age, mean (SD), y	10.42 (0.69)	10.44 (0.72)	10.39 (0.62)	10.50 (0.77)	10.38 (0.66)	10.39 (0.62) ^b
Female, No. (%)	674 (52.6)	428 (52.1)	246 (53.5)	197 (47.2)	231 (57.0)	246 (53.5) ^b
One of the best students in the class, No. (%)	625 (49.0)	409 (50.1)	216 (47.1) ^b	214 (51.6)	195 (48.5)	216 (47.1)
Suspended, No. (%)	29 (2.3)	23 (2.9)	6 (1.3)	9 (2.2)	14 (3.5)	6 (1.3)
Played hooky, No. (%)	56 (4.5)	38 (4.7)	18 (4.0)	18 (4.5)	20 (5.0)	18 (4.0)
Parents						
Baseline, No.	1175	366	809	366	379	430
6 mo, No.	766	238	528	238	222	306
Follow-up rate, %	65.19	65.03	65.27	65.03	58.58	71.16

Abbreviations: CImPACT, Caribbean Informed Parents and Children Together; FOYC, Focus on Youth in the Caribbean; GFI, Goal for It; WW, Wonderous Wetlands.

^aThe FOYC and WW were given to the youth and the CImPACT and GFI to the parents.

^b $P < .05$.

tion assesses youth involvement in risk behaviors, including sexual, drug-related, and truant behaviors during the previous 6 months. Dichotomous responses (with 0 indicating no and 1 indicating yes) were used for these items. In the next section, youth were queried along a 5-point Likert scale about their perceptions of risk and protective behaviors according to the factors that constitute the PMT (**Figure 2**). **Table 2** and **Table 3** present the questions that address each of the factors in the PMT for both of the sexual protective behaviors being assessed (abstinence and condom use) and the Cronbach α for each subscale, which ranged from 0.30 to 0.76 for the abstinence subscales and 0.40 to 0.87 for the condom use subscales among the Bahamian cohort.

Knowledge was assessed through a 20-item HIV/AIDS knowledge true-false questionnaire (including a 7-item transmission scale and an 8-item prevention scale). Condom use skills were assessed through a 16-item condom use checklist (B.S., unpublished data, 2006).

Parent Data

Data used in the present analyses were obtained from the parents with the knowledge and condom use checklist administered to the youth except that both scales had 1 extra question (21 and 17, respectively).

ADMINISTRATION OF THE QUESTIONNAIRES

Questionnaires were administered at baseline (preintervention) and 6 months after intervention by paper and pencil to youth in the classroom setting and to parents in small groups. One interviewer read the questions to the participants, and other interviewers provided help as needed.

ANALYSIS

Analyses were conducted overall, for 2 group comparisons (FOYC vs WW) and for 3 group comparisons (FOYC and CImPACT, FOYC and GFI, and WW and GFI). Baseline equivalence of demographic characteristics was determined with the

χ^2 test (for categorical variables) or analysis of variance (for continuous variables). Baseline differences in perceptions, intentions, knowledge, condom use skills, and sexual behaviors (mean frequency) were examined with 1-way analysis of variance with post hoc comparisons. Adjusted means for perceptions, intentions, knowledge, condom use skills, and sexual behaviors were calculated at 6 months. Intervention effects on perceptions, intentions, knowledge, condom use skills, and sexual behaviors were examined using the general linear model controlling for potential confounders, including age, sex, and corresponding baseline variables. All statistical analyses were performed with SPSS statistical software, version 15.0 (SPSS Inc, Chicago, Illinois). A critical value of $P < .05$ was adopted for significance testing. For subscales with a Cronbach $\alpha < .60$, analyses were also performed at the item level.

RESULTS

Among the 1282 youth at baseline (representing about two-thirds of the approximately 1826 sixth-grade students in the 15 schools), 53% were females; sex distribution was roughly equal between the FOYC and the WW (Table 1). The mean age of all youth was approximately 10 years; the FOYC and ImPACT youth were somewhat older than youth in the other 2 groups. Other descriptive variables were comparable between the groups. Among the 1282 students who participated, 1175 of their parents participated in the baseline survey.

Tables 2 and 3 indicate that for the FOYC and the WW 2-group comparisons, overall knowledge and both transmission and prevention knowledge were significantly enhanced at 6 months among youth receiving FOYC. Condom use skills, comparable at baseline, were significantly higher among the FOYC youth. Among the 3-group comparisons, both FOYC groups showed greater knowledge and condom use skills at 6 months compared with the WW and GFI youth. No significant differences were found

Abstinence Constructs and Items**COPING APPRAISAL****Self-efficacy (0.32)**

1. Even if all my friends were having sex, I would not feel I had to have sex. (5—"Strongly agree" to 1—"Strongly disagree")
2. I can say no to the person going out with me if I don't want to have sex. (5—"Strongly agree" to 1—"Strongly disagree")
3. Sometimes sex just happens, and you can't control it. (1—"Strongly agree" to 5—"Strongly disagree")
4. I can go with a person for a long time and not have sex with them. (5—"Strongly agree" to 1—"Strongly disagree")

Response efficacy (0.48)

1. A guy and a girl can go together and not have sex. (5—"Strongly agree" to 1—"Strongly disagree")
2. Not having sex is the best way to protect yourself from getting pregnant. (5—"Strongly agree" to 1—"Strongly disagree")
3. I want to wait until I'm married before I have sex. (5—"Strongly agree" to 1—"Strongly disagree")

Response cost (0.30)

1. If a girl says she won't have sex, a boy would say okay. (1—"Strongly agree" to 5—"Strongly disagree")
2. A guy and a girl can go together and not have sex. (1—"Strongly agree" to 5—"Strongly disagree")
3. If a guy says no to having sex, a girl would say okay. (1—"Strongly agree" to 5—"Strongly disagree")
4. Kids my age respect a girl who is a virgin. (1—"Strongly agree" to 5—"Strongly disagree")

THREAT APPRAISAL**Extrinsic rewards (0.62)**

1. I want kids my age to think I'm having sex. (5—"Strongly agree" to 1—"Strongly disagree")
2. I want kids my age to think I'm a virgin. (1—"Strongly agree" to 5—"Strongly disagree")
3. How many of your close friends have sex? (5—"Most" 3—"Some" 1—"None")
4. How many boys that you know have sex? (5—"Most" 3—"Some" 1—"None")
5. How many girls that you know have sex? (5—"Most" 3—"Some" 1—"None")

Intrinsic rewards (NA)

1. How do you feel about having sex? (5—"Very good" to 1—"Very bad")

Severity (0.67)

1. How do you feel about getting an HIV infection? (1—"Very good" to 5—"Very bad")
2. How do you feel about getting an STD? (1—"Very good" to 5—"Very bad")
3. How do you feel about getting pregnant or getting a girl pregnant? (1—"Very good" to 5—"Very bad")

Vulnerability (0.76)

1. In the next 6 months, how likely is it that you will become infected with HIV? (1—"Very unlikely" to 5—"Very likely")
2. In the next 6 months, how likely is it that you will get an STD? (1—"Very unlikely" to 5—"Very likely")
3. In the next 6 months, how likely is it that you will become pregnant (get a girl pregnant)? (1—"Very unlikely" to 5—"Very likely")

Condom Use Constructs and Items**COPING APPRAISAL****Self-efficacy (0.87)**

1. I could get condoms. (5—"Strongly agree" to 1—"Strongly disagree")
2. I could put a condom on directly. (5—"Strongly agree" to 1—"Strongly disagree")
3. I could convince my sexual partner to use a condom. (5—"Strongly agree" to 1—"Strongly disagree")
4. I could ask for condoms in a store. (5—"Strongly agree" to 1—"Strongly disagree")
5. I could ask for condoms in a clinic. (5—"Strongly agree" to 1—"Strongly disagree")
6. I could refuse sex if the other person will not use a condom. (5—"Strongly agree" to 1—"Strongly disagree")

Response efficacy (0.71)

1. Condoms are an important way to prevent pregnancy. (5—"Strongly agree" to 1—"Strongly disagree")
2. Condoms prevent you from getting an STD. (5—"Strongly agree" to 1—"Strongly disagree")
3. Condoms prevent you from getting AIDS. (5—"Strongly agree" to 1—"Strongly disagree")

Response cost (0.40)

1. When a guy and a girl are in a serious relationship they don't use condoms. (5—"Strongly agree" to 1—"Strongly disagree")
2. When a girl carries condoms people think she is having sex. (5—"Strongly agree" to 1—"Strongly disagree")
3. Condoms make sex hurt for a girl. (5—"Strongly agree" to 1—"Strongly disagree")
4. Condoms take away the feeling a guy has during sex. (5—"Strongly agree" to 1—"Strongly disagree")
5. Kids don't want other kids to think they are using condoms. (5—"Strongly agree" to 1—"Strongly disagree")
6. It would be difficult for a young girl/boy to ask an older man to use a condom. (5—"Strongly agree" to 1—"Strongly disagree")

THREAT APPRAISAL**Extrinsic rewards (NA)**

1. Of the boys I know who have sex, how many of them use condoms? (5—"Most" 3—"Some" 1—"None")

Intrinsic rewards (NA)

1. Condoms make sex feel better. (1—"Strongly agree" to 5—"Strongly disagree")

Severity (0.67)

1. How would you feel about getting an HIV infection? (1—"Very good" to 5—"Very bad")
2. How would you feel about getting an STD? (1—"Very good" to 5—"Very bad")
3. How would you feel about getting pregnant or getting a girl pregnant? (1—"Very good" to 5—"Very bad")

Vulnerability (0.76)

1. In the next 6 months, how likely is it that you will become infected with HIV? (1—"Very unlikely" to 5—"Very likely")
2. In the next 6 months, how likely is it that you will get an STD? (1—"Very unlikely" to 5—"Very likely")
3. In the next 6 months, how likely is it that you will become pregnant (get a girl pregnant)? (1—"Very unlikely" to 5—"Very likely")

Figure 2. Protection motivation theory constructs and items regarding abstinence and condom use among Bahamian youth. The α values are in parentheses. NA indicates not applicable; STD, sexually transmitted disease.

among the FOYC youth as a result of the parental intervention component assignment (CImPACT or GFI). No significant differences were found in condom use or sexual activity as a result of intervention status; rates of these behaviors remained low in all groups.

Table 4 and **Table 5** indicate the baseline and 6-month adjusted values for perceptions according to the PMT subscales for abstinence and condom use. In the 2-group comparisons of the abstinence subscales, youth randomized to the FOYC were more likely than youth

Table 2. Baseline Values According to Intervention Assignment: HIV/AIDS Knowledge, Condom Use Skills, and Sexual Behaviors of Youth and Knowledge and Condom Use Skills of Parents

Variable	Overall	2 Groups ^a		3 Groups		
		FOYC or ImPACT	WW or GFI	FOYC Plus CImPACT	FOYC Plus GFI	WW Plus GFI
Youth						
HIV/AIDS knowledge, mean						
Overall, score 0-20	12.49	12.71	12.11 ^b	12.77	12.65	12.11 ^c
Transmission, score 0-7	4.62	4.66	4.56	4.71	4.60	4.56
Prevention, score 0-8	4.83	4.98	4.57 ^b	4.93	5.03	4.57 ^b
Condom use skills mean, score 0-15	8.31	8.30	8.32	8.28	8.33	8.32
Sexual behaviors, mean frequency						
Had ever have sex	0.04	0.04	0.04	0.05	0.03	0.04
Had sex in last 6 mo	0.01	0.02	0.004 ^c	0.02	0.01	0.004
Unprotected sex	0.02	0.02	0.03	0.02	0.01	0.03
Parents						
HIV/AIDS knowledge, mean						
Overall, score 0-21	18.53	18.10	18.72 ^d	18.10	18.87	18.61 ^d
Transmission, score 0-8	6.80	6.71	6.84	6.71	6.93	6.77
Prevention, score 0-8	7.29	7.10	7.37 ^d	7.10	7.41	7.34 ^d
Condom use skills mean, score 0-17	12.63	12.32	12.77 ^c	12.32	13.02	12.59 ^c

Abbreviations: CImPACT, Caribbean Informed Parents and Children Together; FOYC, Focus on Youth in the Caribbean; GFI, Goal for It; HIV, human immunodeficiency virus; WW, Wonderous Wetlands.

^aThe FOYC and WW were given to the youth and the CImPACT and GFI to the parents.

^b $P \leq .001$.

^c $P \leq .05$.

^d $P \leq .01$.

Table 3. Six-Month Adjusted Intervention Effect on HIV/AIDS Knowledge, Condom Use Skills, and Sexual Behaviors of Youth and Knowledge and Condom Use Skills of Parents^a

Variable	Overall	2 Groups ^b		3 Groups		
		FOYC or ImPACT	WW or GFI	FOYC Plus CImPACT	FOYC Plus GFI	WW Plus GFI
Youth						
HIV/AIDS knowledge, mean						
Overall, score 0-20	14.04	14.65	12.94 ^c	14.27	15.04	12.95 ^c
Transmission, score 0-7	5.19	5.40	4.82 ^c	5.35	5.45	4.82 ^c
Prevention, score 0-8	5.48	5.77	4.94 ^c	5.59	5.97	4.94 ^c
Condom use skills mean, score 0-15	8.93	9.19	8.33 ^c	9.10	9.28	8.33 ^c
Sexual behaviors, mean frequency						
Had ever have sex	0.07	0.07	0.08	0.08	0.07	0.08
Had sex in last 6 mo	0.02	0.02	0.02	0.02	0.02	0.02
Unprotected sex	0.02	0.02	0.02	0.03	0.02	0.02
Parents						
HIV/AIDS knowledge, mean						
Overall, score 0-21	18.81	18.81	18.81	18.81	18.80	18.82
Transmission, score 0-8	6.86	6.87	6.86	6.87	6.83	6.88
Prevention, score 0-8	7.42	7.40	7.43	7.40	7.42	7.43
Condom use skills mean, score 0-17	13.26	13.59	13.12 ^d	13.59	13.20	13.06 ^e

Abbreviations: CImPACT, Caribbean Informed Parents and Children Together; FOYC, Focus on Youth in the Caribbean; GFI, Goal for It; HIV, human immunodeficiency virus; WW, Wonderous Wetlands.

^aFor youth, adjusted for age, sex, and corresponding baseline variable; for parents, adjusted for the corresponding baseline variable.

^bThe FOYC and WW were given to the youth and the CImPACT and GFI to the parents.

^c $P \leq .001$.

^d $P \leq .01$.

^e $P \leq .05$.

in the WW group to perceive enhanced response efficacy of abstinence to reduce the risk of HIV/AIDS. Intervention effects were more pronounced for the condom use subscales; the FOYC youth were significantly more likely than the WW youth to perceive themselves

as efficacious in aspects of condom use and acquisition, to view condoms as effective in preventing HIV/AIDS, and to intend to use a condom the next time they had sex. For both abstinence and condom use, the same subscales were used to assess severity and vulnerability to

Table 4. Baseline Values According to Intervention Assignment: Youth Perception of Sexual Behaviors Based on Protection Motivation Theory Constructs for Both Abstinence and Condom Use (Mean Likert Scale Scores)^a

	Overall	2 Groups		3 Groups		
		FOYC	WW	FOYC Plus CImPACT	FOYC Plus GFI	WW Plus GFI
Abstinence						
Coping appraisal						
Self-efficacy	3.40	3.41	3.39	3.32	3.50	3.39 ^b
Even if all my friends were having sex, I would not feel I had to have sex.	3.08	3.13	3.00	3.01	3.25	3.00 ^c
I can say no to the person going out with me if I don't want to have sex.	3.89	3.89	3.88	3.72	4.07	3.88 ^d
Sometimes sex just happens, and you really can't control it.	2.73	2.66	2.83	2.64	2.69	2.83
I can go with a person for a long time and not have sex with them.	3.91	3.93	3.87	3.88	3.98	3.87
Response efficacy						
A guy and a girl can go together and not have sex.	4.07	4.04	4.12	3.99	4.09	4.12
Not having sex is the best way of protecting yourself from getting pregnant.	4.02	3.97	4.10	3.87	4.07	4.10 ^c
I want to wait until I'm married before I have sex.	4.05	4.02	4.10	3.91	4.13	4.10
Response cost						
If a girl says she won't have sex, a boy would say okay.	4.15	4.14	4.16	4.19	4.08	4.16
A guy and a girl can go together and not have sex.	2.64	2.65	2.63	2.68	2.61	2.63
If a guy says no to having sex, a girl would say okay.	2.92	2.91	2.94	2.93	2.90	2.94
Kids my age respect a girl who is a virgin.	1.98	2.03	1.90	2.12	1.93	1.90 ^c
	3.15	3.15	3.17	3.24	3.06	3.17
	2.55	2.56	2.51	2.50	2.62	2.51
Threat appraisal						
Extrinsic rewards	2.78	2.79	2.76	2.80	2.78	2.76
Intrinsic rewards	1.55	1.59	1.47	1.55	1.63	1.47
Severity	4.69	4.68	4.70	4.63	4.73	4.70
Vulnerability	1.66	1.65	1.68	1.73	1.57	1.68 ^c
Condom use						
Coping appraisal						
Self-efficacy	2.40	2.42	2.36	2.27	2.57	2.36 ^d
Response efficacy	3.91	3.94	3.85	3.93	3.96	3.85
Response cost	3.28	3.32	3.23 ^b	3.29	3.35	3.23 ^b
When a guy and a girl are in a serious relationship, they don't use condoms.	3.17	3.23	3.07 ^c	3.24	3.23	3.07
If a girl carries condoms, people think she is having sex.	4.06	4.11	3.98 ^c	4.13	4.10	3.98
Condoms make sex hurt for a girl.	3.07	3.06	3.08	3.05	3.08	3.08
Condoms take away the feeling a guy has during sex.	3.01	3.01	3.00	2.97	3.06	3.00
Kids don't want other kids to think they are using condoms.	3.06	3.08	3.03	2.98	3.19	3.03 ^c
It would be difficult for a young girl/boy to ask an older man to use a condom.	3.32	3.38	3.21 ^c	3.35	3.41	3.21 ^c
Threat appraisal						
Extrinsic rewards	3.48	3.41	3.62	3.31	3.52	3.62
Intrinsic rewards	3.08	3.02	3.18 ^b	3.07	2.97	3.18 ^c
Severity	4.69	4.68	4.70	4.63	4.73	4.70
Vulnerability	1.66	1.65	1.68	1.73	1.57	1.68 ^c
Intentions in the next 6 mo						
Have sex	4.22	4.20	4.24	4.16	4.25	4.24
Use a condom if you have sex	2.91	2.99	2.76 ^c	3.13	2.85	2.76 ^b

Abbreviations: CImPACT, Caribbean Informed Parents and Children Together; FOYC, Focus on Youth in the Caribbean; GFI, Goal for It; WW, Wonderous Wetlands.

^aScores are based on a range of 1 for strongly disagree to 5 for strongly agree, except for the "Have sex" and "Use a condom if you have sex" variable, which are based on a scale of 1 for very likely to 5 for very unlikely.

^b $P \leq .01$.

^c $P \leq .05$.

^d $P \leq .001$.

HIV/AIDS; the FOYC youth at 6 months perceived themselves as less vulnerable than the WW youth.

Among the 3-group comparisons for which differences occurred, groups receiving FOYC regardless of parent intervention were superior to those receiving WW. In the 2 situations in which significant differences were found between the FOYC groups, those receiving GFI compared with CImPACT demonstrated greater protec-

tion (self-efficacy with regard to abstinence and intention to use a condom).

Tables 3 and 4 also depict parent knowledge and condom use skills at baseline and at 6 months overall, by parent intervention group (CImPACT vs GFI) and by the 3 youth-parent intervention groups. The CImPACT intervention was associated with significantly higher parent condom skills after intervention; the combination of CImPACT

Table 5. Six-Month Adjusted Intervention Effect on Youth Perception of Sexual Behaviors Based on Protection Motivation Theory Constructs for Both Abstinence and Condom Use (Mean Likert Scale Scores)^a

	Overall	2 Groups		3 Groups		
		FOYC	WW	FOYC and ClmPACT	FOYC and GFI	WW Plus GFI
Abstinence						
Coping appraisal						
Self-efficacy	3.55	3.58	3.51	3.52	3.64	3.51 ^b
Even if all my friends were having sex, I would not feel I had to have sex.	3.57	3.52	3.64	3.34	3.71	3.64 ^c
I can say no to the person going out with me if I don't want to have sex.	4.07	4.11	3.99	4.09	4.12	3.99
Sometimes sex just happens, and you really can't control it.	2.67	2.75	2.53 ^d	2.71	2.78	2.53 ^b
I can go with a person for a long time and not have sex with them.	3.93	3.95	3.88	3.90	4.01	3.88
Response efficacy						
A guy and a girl can go together and not have sex.	4.22	4.27	4.12 ^c	4.27	4.28	4.12 ^d
Not having sex is the best way of protecting yourself from getting pregnant.	4.16	4.21	4.06 ^b	4.17	4.25	4.06
I want to wait until I'm married before I have sex.	4.33	4.40	4.20 ^d	4.41	4.39	4.20 ^d
Response cost						
If a girl says she won't have sex, a boy would say okay.	4.19	4.22	4.13	4.21	4.23	4.13
A guy and a girl can go together and not have sex.	2.50	2.50	2.50	2.53	2.47	2.50
If a guy says no to having sex, a girl would say okay.	2.90	2.95	2.82	2.91	2.98	2.82
Kids my age respect a girl who is a virgin.	1.85	1.79	1.94 ^b	1.83	1.75	1.94
	2.83	2.85	2.80	2.96	2.73	2.80
	2.41	2.40	2.41	2.44	2.37	2.41
Threat appraisal						
Extrinsic rewards	2.74	2.72	2.76	2.71	2.73	2.76
Intrinsic rewards	1.75	1.77	1.71	1.74	1.80	1.71
Severity	4.69	4.69	4.70	4.67	4.71	4.70
Vulnerability	1.51	1.47	1.59 ^d	1.48	1.46	1.59 ^b
Condom use						
Coping appraisal						
Self-efficacy	3.08	3.21	2.86 ^c	3.23	3.18	2.86 ^c
Response efficacy	4.15	4.24	3.98 ^c	4.24	4.24	3.98 ^c
Response cost	3.30	3.28	3.33	3.26	3.29	3.33 ^b
When a guy and a girl are in a serious relationship they don't use condoms.	3.25	3.23	3.29	3.23	3.23	3.29
If a girl carries condoms, people think she is having sex.	4.02	3.99	4.07	3.99	3.99	4.07
Condoms make sex hurt for a girl.	2.88	2.81	3.02 ^c	2.80	2.82	3.02 ^c
Condoms take away the feeling a guy has during sex.	3.06	3.03	3.11	3.03	3.03	3.11
Kids don't want other kids to think they are using condoms.	3.12	3.13	3.09	3.01	3.26	3.10 ^d
It would be difficult for a young girl/boy to ask an older man to use a condom.	3.45	3.49	3.39	3.44	3.54	3.39
Threat appraisal						
Extrinsic rewards	3.20	3.16	3.27	3.29	2.99	3.27
Intrinsic rewards	2.98	2.96	3.00	2.89	3.03	3.00
Severity	4.69	4.69	4.70	4.67	4.71	4.70
Vulnerability	1.51	1.47	1.59 ^d	1.48	1.46	1.59 ^b
Intentions in the next 6 mo						
Have sex	4.20	4.23	4.13	4.25	4.22	4.13
Use a condom if you have sex	3.59	3.70	3.39 ^d	3.47	3.92	3.39 ^c

Abbreviations: ClmPACT, Caribbean Informed Parents and Children Together; FOYC, Focus on Youth in the Caribbean; GFI, Goal for It; WW, Wonderous Wetlands.

^aScores are based on a range of 1 for strongly disagree to 5 for strongly agree, except for the "Have sex" and "Use a condom if you have sex" variable, which are based on a scale of 1 for very likely to 5 for very unlikely. Scores were adjusted for age, sex, and corresponding baseline variable.

^b $P \leq .05$.

^c $P \leq .001$.

^d $P \leq .01$.

with FOYC was associated with significantly higher condom use skills among parents compared with parents who received GFI and whose children received WW.

COMMENT

This randomized controlled trial conducted in a developing country, the Bahamas, demonstrates that a youth

sexual risk reduction intervention (FOYC) compared with an attention control (WW) increased knowledge, condom use skills, some protective perceptions, and intentions to engage in some safer behaviors, especially those related to condom use. Among youth, there was no difference in knowledge or condom use skills based on parent intervention; however, among parents, those receiving ClmPACT demonstrated superior condom use skills

after intervention. In the analyses that examined the combined interventions, either parent intervention with FOYC was generally superior to either parent intervention with WW. In the 2 instances in which differences were found on the basis of parent intervention among youth receiving FOYC, GFI was superior to CImPACT.

The high rates of participation by parents and youth in the program with good rates of follow-up at 6 months indicate community support. That the MOE incorporated both curricula into the official sixth-grade curriculum indicated their belief in the importance of the issues being addressed and their comfort with the curricular approaches. This endorsement by the MOE contributed to parental support and participation.

Our basic hypothesis that a theory-based, culturally appropriate HIV prevention intervention such as FOYC would increase HIV knowledge and skills and protective perceptions and intentions was supported by the data. The stronger effect on condom-related items compared with abstinence items may reflect the emphasis in FOYC on the skills needed for condom use and negotiation and the overall strong support at baseline among both FOYC and WW for abstinence. Thus, there may have more of a ceiling effect for abstinence-related perceptions. The overall low involvement in risk behaviors prevented any assessment of efficacy of the intervention on behaviors; continued monitoring of these youth as risk behaviors increase will be crucial.

The apparent lack of effect of additional benefit from CImPACT compared with GFI was unanticipated given our previous experience with GFI and ImPACT^{31,32} and could result from several factors. As noted, delivery of CImPACT differed from that of ImPACT in several ways. First, it was delivered in community settings to groups, whereas ImPACT had been delivered in private settings to the individual parents. The group setting had attendant distractions, particularly since many parents brought small children. Parents did not have to be engaged as they did in a one-on-one setting, and there was limited opportunity for personal discussion. Second, with ImPACT the adolescent youth had been present, whereas in CImPACT they were not. Thus, the parent-youth interaction that was a significant portion of ImPACT was not present in the CImPACT intervention process. The GFI control was therefore less distinct from CImPACT than it had been from ImPACT. The lessons from GFI—establishing goals and identifying specific discrete steps to attain goals—have broad implications for communicable disease prevention as well, and thus CImPACT and GFI may not have been sufficiently distinct. Parent knowledge was already high at baseline, whereas parent condom use skills were not. Thus, knowledge may have experienced a ceiling effect, but condom use skills showed significant improvement among parents randomized to CImPACT compared with GFI.

Limitations of this study include the self-reported nature of responses; the low rates of risk behaviors at baseline and 6 months, which prevented assessment of intervention effect on behaviors; and the low Cronbach α values for several of the subscales (although analyses at the item level were consistent with those at the subscale level).

In conclusion, our experience indicates that a theory-based HIV prevention program delivered through the schools can garner community and governmental support. These efforts can involve parents and produce increases in health-sustaining knowledge, skills, perceptions, and intentions among youth and their parents. Further follow-up and time will be necessary to determine if these effects will influence behaviors and/or if the effects will be sustained over time.

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Correspondence: Bonita Stanton, MD, The Carman and Ann Adams Department of Pediatrics, Wayne State University School of Medicine, Children's Hospital of Michigan, 3901 Beaubien St, Suite 1K40, Detroit, MI 48201 (BStanton@dmc.org).

Author Contributions: *Study concept and design:* Deveaux, Stanton, Lunn, Li, Marshall, and Harris. *Acquisition of data:* Deveaux, Stanton, Lunn, Cottrell, Brathwaite, Marshall, and Harris. *Analysis and interpretation of data:* Stanton, Cottrell, Yu, Li, Liu, and Harris. *Drafting of the manuscript:* Deveaux, Stanton, Lunn, Cottrell, Yu, Liu, and Marshall. *Critical revision of the manuscript for important intellectual content:* Deveaux, Stanton, Lunn, Brathwaite, Li, Liu, and Harris. *Statistical analysis:* Brathwaite, Li, Liu, and Harris. *Obtained funding:* Stanton, Yu, and Li. *Administrative, technical, and material support:* Deveaux, Lunn, Brathwaite, and Harris. *Study supervision:* Deveaux, Stanton, Lunn, Li, and Liu.

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