

# CHANGES IN DEVELOPMENTAL FACTORS AND HIV RISK BEHAVIORS AMONG EARLY ADOLESCENTS IN PUERTO RICO

**Introduction:** Teenagers are the fastest growing group of newly HIV-infected persons. Consequently, a support model for HIV risk reduction was designed and implemented for early adolescents in Puerto Rico.

**Objective:** The purpose of this article is to assess changes in developmental factors and HIV risk behaviors among early adolescents after three years of follow-up of an intervention and a non-intervention group.

**Methods:** This prospective cohort study followed 135 early adolescents who were enrolled in the ASUMA (A Supportive Model for HIV Risk Reduction in Early Adolescents) Project. The study was performed in two public and two private junior schools. Baseline and three follow-up self-administered questionnaires were given. We examined sociodemographic factors, HIV risk behavior and developmental factors.

**Results:** 48% were in the intervention group and 51.1% were controls. Most adolescents were aged 12 years; 47.4% were males; 75.6% reported not having risk behaviors and 24.4% reported having risk behaviors at anytime in their lifespan. A significant decrease in the HIV risk behaviors median was observed among the intervention group ( $P < .05$ ), while a non-significant increase was found among adolescents in the control group. At the end of the implementation phase, positive improvement in the developmental factors were observed in the intervention group ( $P < .05$ ).

**Conclusions:** Our study suggests that the ASUMA project curriculum had a positive effect on developmental factors and HIV risk behaviors, as proposed in our conceptual framework. Also, this study illustrates the importance of the creation of culturally appropriate instruments and interventions to reach the goal of HIV/AIDS reduction. (*Ethn Dis.* 2010;20[Suppl 1]:S1-122–S1-126)

**Key Words:** HIV Risk Factors, Adolescents, Puerto Ricans

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## INTRODUCTION

Despite HIV prevention efforts during the last decades, young people aged 15–24 years account for an estimated 45% of new HIV infections worldwide.<sup>1</sup> An increase in the estimated number of persons living with HIV/AIDS aged 15–19 years was reported by the CDC from 3,298 in 2003 to 4,539 in 2006.<sup>2</sup> Until January 2009, a third of all reported AIDS cases in Puerto Rico had occurred among those aged 25–34 years.<sup>3</sup> Since the median incubation of HIV infection is around 10 years, it is likely that many of these young adults were infected during adolescence, primarily because of sexual contact.<sup>4</sup>

McCormic<sup>5</sup> suggests that adolescents are a high risk group for HIV transmission because they are: 1) in an age of sexual identity exploration; 2) experimenting with illicit drugs; 3) impulsive; 4) influenced by peer group; and 5) don't feel vulnerable since they are unable to foresee long-term consequences. Other studies have also indicated that adolescents who perceived that they can be infected with HIV are more likely to engage in less risky sexual behaviors.<sup>4</sup>

In a 1994 study, Moscoso et al found a high rate of sexually active Puerto Rican youth: 28%.<sup>6</sup> Subsequent-

ly, Robles et al reported adolescents were having their first sexual experience at an early age: 26.8% of the students were aged 15 years and the percentage of adolescents having sex nearly doubles from elementary to intermediate school and from intermediate to high school.<sup>7</sup>

According to a study by the American Federation of AIDS Research (2001), the sexual behavior of young people is highly influenced by the use of alcohol and drugs.<sup>8</sup> In a 2004 study of Puerto Rican youth, Moscoso et al found that 43.7% of Puerto Rican 7<sup>th</sup> to 9<sup>th</sup> grade students reported using alcohol.<sup>9</sup> Furthermore, 7.2% of adolescents indicated the use of illicit drugs.<sup>9</sup> Also, 22.6% of high school students reported that they used alcohol for the first time when they were aged 11 years or younger.<sup>9</sup>

A lack of HIV/AIDS knowledge and incorrect HIV/AIDS information are factors that lead to infection with HIV.<sup>10</sup> In Puerto Rico, Cunningham found that 7<sup>th</sup> grade students did not have enough knowledge about transmission modes and preventive behaviors.<sup>11</sup> In a 2006 descriptive study conducted by Fernandez, lower HIV/AIDS knowledge and high sensation-seeking behaviors were related to sexual HIV risk for Puerto Rican high school students.<sup>12</sup>

Another factor that affects HIV prevention among adolescents is sensation-seeking activities, associated with adolescent risk behaviors such as alcohol, tobacco and other drugs.<sup>13</sup> Some researchers have found that sensation seeking declines from the adolescent years onward; others affirm a rise and decline during the adolescent years.<sup>13</sup>

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The influence of peers is another factor that contributes to adolescent risky sexual behaviors. DiClemente indicated that the perception that adolescents have about the sexual behaviors of their peers can have a greater influence on his/her decision about sex.<sup>4</sup> Peer pressure affects the early onset and prevalence of sexual behavior.<sup>14</sup> In contrast, peer pressure can also be linked with some positive behaviors, such as postponed sexual initiation, condom use and smoking cessation.<sup>15</sup>

An adolescent's risky sexual behavior has also been associated with parental support. DiClemente points out that perceived family support, family cohesiveness, parental monitoring and parent-adolescent communication can prevent the adolescent from performing risky sexual behaviors.<sup>4</sup> Furthermore, Robles found that Puerto Rican adolescents whose parents reported poor or little communication, monitoring, or control over their children were almost three times more likely to engage in early sexual activity.<sup>7</sup>

Programs that incorporate a self-regulative model can produce a significant reduction in risky sexual behaviors in adolescents.<sup>16,17</sup> Providers and educators must understand what motivates youth to engage in early sexual activity in order to develop effective interventions.<sup>18</sup> Studies have not shown a significant relationship between the duration of an intervention and its effectiveness.<sup>4</sup>

To our knowledge, culturally appropriate interventions designed to affect developmental factors and HIV risk behaviors among early adolescents in Puerto Rico have not been published. In this article, we present an analysis after three years of our intervention ASUMA (A Supportive Model for HIV Risk Reduction in Early Adolescents). Our focus is to present data pertinent to the following objectives: 1) describe the sociodemographic profile, developmental factors and HIV risk behaviors among adolescents participating at the

first year of the ASUMA Project intervention group; and 2) assess changes in developmental factors and HIV risk behaviors among early adolescents after three years of follow up in an interventional and a non-interventional group.

## METHODS

ASUMA project, conducted between August 2004 and May 2008, is a pilot intervention based on a theoretic framework of a parent and adolescent supportive model. The goal of this pilot study was to develop, implement and evaluate an adolescent and parent support pilot intervention to modify HIV risk behaviors among early adolescents in Puerto Rico. The proposed intervention considers cultural aspects and coping skills. The setting of the study was four conveniently selected junior schools. Participants from 7<sup>th</sup> grade were invited to participate; informed consent was obtained from a parent or guardian. Schools were randomly assigned to the intervention or control group (one public school and one private school in each group). From 173 adolescents enrolled at baseline, 135 (78%) were monitored through all three implementation academic years, until they reached ninth grade. Sixty-nine students were enrolled in the control group (no interventions) and 66 students participated in the intervention group.

Using our uniquely designed curriculum of interventions, a total of eight workshops were conducted: 4 workshops in year 1, 2 in year 2, and 2 in year 3. The workshop topics of the first 2 years were designed to affect developmental and HIV risk related factors, whereas the focus in the last year was designed to reinforce previous messages and behaviors. Also a parent support workshop was given to 35 parents of the intervention group. The parent's curriculum was adapted from the program

**Table 1. Sociodemographic and risk behavior profile of Puerto Rican early adolescents who completed the ASUMA project (N=135)**

Variable	n	%
Risk behavior		
Yes	33	24.4
No	102	75.6
Sex		
Male	64	47.4
Female	71	52.6
Parents' civil status		
Married	84	63.2
Divorced	26	19.5
Single	13	9.8
Living together	7	5.3
Group		
Control	69	51.1
Intervention	66	48.9

“Talking with Kids about AIDS: A Program for Parents and Other Adults Who Care.”<sup>20</sup> A 4-hour workshop adaptation that included effective communication skills with kids, HIV knowledge and attitudes was given. Strategies used were: group discussions, role play, use of audiovisual resources, debates, brainstorming, patient testimony, reflections and critical thinking. The control group received written HIV/AIDS educational material.

The measurement instrument was a self-administered questionnaire. Instrument validations were performed in terms of face, content validity and construct validity, as described elsewhere.<sup>19</sup> The final questionnaire was approved by the institutional review board at the Universidad Central del Caribe. Baseline and follow-up self-administered questionnaires were given to study groups.

We examined several variables in this study: study group behaviors (control/intervention), sociodemographic (age, sex, marital status of parents, those who believe that they could have a good conversation with their parents), developmental factors (self esteem [Rosenberg Self-Esteem Scale],<sup>17</sup> HIV/AIDS

**Table 2. Changes in developmental factors among a cohort of Puerto Rican early adolescents: intervention and control**

Factor	Group	Follow Up	N	mean	SD	median	P value*
Self esteem	Intervention	1	66	2.7	1.2	3	-
		3	66	3.4	1.2	3	.000
		4	66	3.1	1.3	3	.066
	Control	1	69	3.1	0.8	3	-
		3	69	3.1	1.2	3	.451
		4	69	3.1	1.1	3	.874
Knowledge	Intervention	1	66	22.2	7.6	23	-
		3	66	29.8	7.4	31	.000
		4	66	30.7	7.2	31.5	.000
	Control	1	69	23.7	6.3	24	-
		3	69	26.5	6.9	28	.000
		4	69	30.0	5.8	31	.000
Self efficacy	Intervention	1	65	3.0	1.5	4	-
		3	65	2.6	1.7	4	.458
		4	66	2.9	1.5	4	1.000
	Control	1	69	2.7	1.7	4	-
		3	66	2.9	1.5	4	1.000
		4	69	3.0	1.4	4	1.000
Attitude	Intervention	1	65	28.7	6.6	30	-
		3	66	33.9	7.1	35	.000
		4	66	34.6	7.7	36	.000
	Control	1	69	29.9	7.1	29	-
		3	69	33.4	6.4	33	.000
		4	69	35.6	4.8	36	.000
Sensation seeking	Intervention	1	66	16.0	5.4	17	-
		3	66	17.8	6.8	18	.010
		4	66	17.5	6.7	19	.137
	Control	1	69	16.1	5.9	17	-
		3	69	18.7	6.2	19	.014
		4	69	18.7	7.1	19	.031
Parent Support	Intervention	1	66	13.4	1.9	14	-
		3	66	12.6	2.2	13	.153
		4	66	12.2	2.5	13	.016
	Control	1	69	13.2	1.8	14	-
		3	69	12.5	1.9	13	.001
		4	69	12.5	2.2	13	.006
Invulnerability	Intervention	1	65	4.7	2.5	5	-
		3	66	2.9	2.5	3	.000
		4	66	2.5	2.1	3	.000
	Control	1	69	4.6	2.6	4	-
		3	67	3.4	2.5	3	.010
		4	69	2.8	2.2	3	.000
Peer pressure	Intervention	1	66	0.8	1.3	0	-
		3	66	1.2	1.7	1	.040
		4	66	1.1	1.7	0	.188
	Control	1	69	0.7	1.2	0	-
		3	69	0.7	1.0	0	1.000
		4	69	0.9	1.4	0	.472

\* Sign test comparison between current and initial follow-up

knowledge,<sup>10</sup> self-efficacy, peer pressure, invulnerability, parent support, sensation-seeking [scale by Zuckerman et al adapted by Gomà i Freixanet] and HIV risk behavior [alcohol use, drugs use and/or sexual relations]).<sup>19</sup> The con-

struct validity was assessed by internal consistency using Cronbach  $\alpha$ , the correlation coefficient used to estimate the degree of equivalence between answers to sets of questions about a specific topic.<sup>21</sup>

Descriptive (frequencies and percentages) and inferential analysis (non-parametric paired comparisons using Sign Test) were performed using SPSS 14.0. The overall significance level was set to  $P=.05$ .

## RESULTS

Table 1 provides sociodemographic and HIV risk behavior data for adolescents at the beginning of the study. From 173 initially enrolled students, a total of 135 from 7th grade (51.1% control group and 48.9% in the intervention group) completed all three years of ASUMA project and were included in this study. Similar proportions were seen among males (52.6%) and females (47.4%) and the mean age was 12 years at study entry. The most frequent marital status reported for the adolescents' parents was married (63.2%), followed by divorced (19.5%), singles (9.8%), live together (5.3%) and widows (2.3%).

A good internal consistency was obtained from developmental factors scales as followed: self esteem (Cronbach alpha =0.60), peer pressure (Cronbach alpha=0.66), invulnerability (Cronbach alpha=0.46), parent support (Cronbach alpha=0.62), sensation seeking (Cronbach alpha=0.77), HIV/AIDS knowledge (Cronbach alpha=0.86) and HIV/AIDS attitudes (Cronbach alpha=0.70).

As shown on Table 2, median comparison between baseline with a third measurement shows greatest positive changes in the developmental factors median (self-esteem, HIV/AIDS knowledge, peer pressure, HIV/AIDS attitudes and sensation seeking) in the intervention group ( $P<.05$ ). When comparing baseline and fourth measurements (3<sup>rd</sup> year), both groups showed an improvement on developmental factors.

Table 3 shows proportion comparison of reported high risk behavior at baseline vs fourth measurement. A significant decrease in HIV risk behaviors

**Table 3. Changes in HIV risk behaviors among a cohort of Puerto Rican early adolescents: Intervention and control**

Group		n	Initial Risk Behavior	n	Final Risk Behavior	*P value
Control	Yes	21	30.4%	12	17.4%	.0799
	No	48	69.6%	57	82.6%	
Intervention	Yes	12	18.2%	4	6.1%	.0296
	no	54	81.8%	62	93.9%	

\* Chi-square

was observed among intervention group participants (18.2% vs 6.1%;  $P < .05$ ).

## DISCUSSION

We present an evaluation of changes in developmental factors and HIV risk behaviors among early adolescents in Puerto Rico who have participated in a culturally appropriate intervention. ASUMA's curriculum and intervention activities were based on the theoretical constructs of Bandura's Social Learning Theory and it also included HIV risk behaviors based on the developmental factors that influence adolescents' decision-making.

Our study found a decrease in the percentage of participants of the intervention group reporting any HIV risk behavior, including use of drugs and alcohol, which is a major risk behavior since it may reduce inhibitions and impair decision making.

Also, a higher increase in HIV/AIDS knowledge, positive HIV attitudes, self-esteem, and self-efficacy was found among the intervention group through the first two years (7<sup>th</sup> through 8<sup>th</sup> grade). As previously cited, studies have found that adolescents with low self-esteem, psychological distress, sexual abuse, and depression are more likely to engage in behaviors associated with HIV transmission.<sup>4</sup> Adolescents who perceived that they can be infected with HIV are more likely to engage in less risky sexual behaviors.<sup>4-5</sup>

When we compared the last measure with the previous measure, no significant differences in developmental factors were found among

groups. This finding could be explained by the fact that in 9<sup>th</sup> grade every school incorporated HIV prevention activities.

Our study suggests that the ASUMA project is effective in its impact on developmental factors and HIV risk behaviors proposed in our conceptual framework. Successful programs are those that use a theoretical framework and are specifically tailored to a particular subgroup of adolescents.<sup>4</sup> In addition, interventions that focus on self-concept, self-esteem, and social competency skills are also effective in the reduction of risky sexual behaviors in adolescents.<sup>4</sup>

As risk and protective factors may affect children at different times in their lives, studies directed at identifying these factors earlier may be more effective in modifying risk behavior and ultimately preventing disease. Therefore, intrapersonal, interpersonal and social risks should be taken into account to define intervention and prevention strategies. By increasing safety practices and knowledge among adolescents, we can reduce HIV infection and improve health disparities often experienced in minority communities.

A limitation of this study is that the sample is not probabilistic but it represented both public and private schools in Puerto Rico.

In conclusion, early adolescents are more likely to engage in high-risk behaviors, which make this population particularly vulnerable to HIV infection. Preventive programs designed for adolescents should include activities and workshops that provide HIV/AIDS

knowledge content and pragmatic strategies to facilitate the process of active learning. This study illustrates the importance of culturally appropriate instruments and interventions in the communities at particular risk for HIV infection.

## ACKNOWLEDGMENTS

This study was sponsored by grant number 2G12RR03035 from the National Center for Health Resources (NCRR), a component of the National Institutes of Health. We thank Mrs. Magaly Torres, Mrs. Wanda Marin, Dr. Margarita Moscoso and Dr. Sonia Napravnik.

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