A Comparison of the Sociodemographic, Risk-Behavior, and Substance-Abuse Profile of Young vs Older HIV-Infected Puerto Rican Patients

Diana M. Fernández, MS; María de los A. Gómez, PhD;
Wanda Figueroa, MD; Miriam Velázquez, MS; Doris V. Báez, MS;
Eddy Ríos-Olivares, PhD, MS; Robert F. Hunter, MD, FACP

Introduction: As of May 2003, 17% of all reported AIDS cases in Puerto Rico had occurred among those 20–29 years of age. These individuals were likely initially infected with HIV in adolescence. The objectives of this study are to describe and compare the prevalence of the sociodemographic, risk-behavior, and substance-use profile among patients infected with HIV during their adolescence (early) and compare them with patients infected at an older age (non-early).

Methods: This is a cross-sectional study of 3151 HIV/AIDS patients admitted to the retrovirus research center of our institution between 1992 and 2002. The variables we studied include the presence or absence of early infection, sociodemographic variables, risk-behavior variables, and substance-use variables. An early-infected patient was defined as a patient with HIV/AIDS that reported his or her first positive HIV test result before the age of 21 years. Descriptive and differential analyses were performed.

Results: Five percent of our patients were early-infected (157/3151). A significantly higher proportion ($P \leq .05$) among the early-infected patients as compared to the older group was females, required inpatient hospital care at the time of study entry, and had less than a 12th-grade education. In the interview a significantly higher proportion had antisocial behavior, had been in prison at some point in their life, and had used crack-cocaine.

Conclusions: The early HIV-infected patients showed a different sociodemographic, risk-behavior, and substance-use profile. Knowledge of the specific characteristics of early HIV-infected patients could be used to develop primary prevention programs directed toward reducing HIV infection among young Puerto Ricans. (*Ethn Dis.* 2005;15 [suppl 5]:S5-25–S5-29)

Key Words: HIV/AIDS, Early Infection, Puerto Ricans

From the Internal Medicine Department, Universidad Central del Caribe (DMF, MAG, WF, MV, DVB, ERO, RFH), Bayamon, Puerto Rico.

Address correspondence and reprint requests to Diana M. Fernández, MS; Retrovirus Research Center, Internal Medicine Department, Universidad Central del Caribe; P.O. Box 60327; Bayamon Puerto Rico 00960-6032. 787-787-8710; 787-787-8733; dfernandez@uccaribe.edu

INTRODUCTION

For most individuals, sexual relations begin in adolescence. For many individuals in this phase of human development, the presence of high-risk sexual practices is directly responsible for a number of sexually transmitted diseases, including HIV infection. In the United States, high-risk sexual practices account for most new HIV infections for patients under the age of 24. For most countries around the world, most new HIV infections are in young people between the ages of 15 and 24.[1] The factors that contribute to increase the HIV vulnerability among young people are: risky sexual behavior, substance use and the lack of access to HIV information and prevention services.[1] An estimated 10.3 million young people between the ages of 13–24 are living with HIV/AIDS in the world.[2] A total of 7000 new HIV infections are diagnosed among young people on a daily basis.[2] An estimated 3897 young people in United States were diagnosed with HIV/AIDS, representing 12% of the persons given a diagnosis during 2003.[3] The Office of National AIDS Policy (2000) reports that in the United States, one fourth of all new infections occur in people under the age of 21.

As of May 2003, 17% of all reported AIDS cases in Puerto Rico had occurred among those 20–29 years of age.[4] In Puerto Rico, 45% of reported AIDS cases occurred among those 30–39 years old, with injection drug use as the predominant risk factor.[5] This fact indicates that many of these young adults with AIDS were infected during adolescence or early adulthood, considering that the average time from initial HIV infection and development of AIDS is 10 years.[6] The Puerto Rico Health Department reported an increase in fertility rates for girls between the ages of 15 and 19, from 64.9 to 72 per 1000 between 1984 and 1998.[7] Unprotected sexual intercourse puts young people at risk not only for HIV infection but also for other sexually transmitted diseases.

Adolescents are susceptible to a number of diseases and particular predicaments from the standpoint of healthcare delivery. These diseases require study and evaluation since they represent a major dilemma from the perspective of public health. Teenagers are one of the fastest growing groups of newly HIV-infected persons. Increasing drug use practices along with an increase in sexually transmitted diseases (STD) represent some of the issues in the healthcare scenario for this age group.[8] Many adolescents start drug use by curiosity, peer pressure, or the desire to feel like adults. Alcohol, cannabis, and tobacco are the three most prevalent drugs among adolescents, and in recent years a drug named ecstasy has emerged. A characteristic of many of these drugs is that they unlock the inhibition effect in human behavior.

Risk-taking is seen as a way of coping with the normal developmental tasks adolescents face, such as exploring and defining their identity and making

difficult decisions. Adolescence is a high risk group because of the following: 1) they are in an age of sexual identity exploration, and they experiment with illicit drugs; 2) they are impulsive, and they are influenced by peer group; and 3) they don't feel vulnerable since they are unable to foresee long-term consequences.[9] Young people reject the possibility of HIV infection and AIDS development as a real risk. Experimentation is a normal part of adolescence development, which unfortunately exposes them to a number of health risks. Mason, Olson, and Parish showed that adolescent attitudes toward risk behaviors often include the denial of any chance of contamination and the adoption of the belief that they are invulnerable.[10] Since many adolescents don't perceive themselves at risk for HIV infection, they engage in sexual and drug-using behaviors that put them at risk not only for HIV infection, but also for unwelcome pregnancies, and/or sexually transmitted diseases.[11]

The sexual behavior of young people is highly influenced by the use of alcohol and drugs.[12] These agents decrease decision-making skills and have a negative effect on behavior. This study found that an estimated 3 million teenagers were alcoholics. Another study found a relationship between alcohol consumption and sexual behavior among adolescents.[13] Alcohol and drug use are the most important predictors for STDs and HIV infection among high school students; they also have a strong effect on the age of sexual debut.[14] A recent study showed that young people with substance-abuse problems are more likely to engage in high-risk sexual behaviors during adolescence and to continue engaging in high-risk sexual behaviors to the extent that substance problems persist.[15] Among adolescents surveyed in New Zealand, alcohol misuse was significantly associated with unprotected intercourse and sexual activity before age 16.[16] Forty-four percent of sexually active Massachusetts teenagers said they were more likely to have sexual intercourse if they had been drinking, and 17% said they were less likely to use condoms after drinking.[17] Young people identified with substance problems are more likely to engage in high-risk sexual behavior during adolescence.[15] In 2001, 45.6% of high school students had at some point experimented with sexual intercourse, 42.1% of sexually active students had not used a condom during their last sexual intercourse, and 2.3% had used intravenous illicit drugs.[18]

We were unable to find any study profiling HIV infection among Puerto Rican adolescents and young adults. In this paper we describe and compare the sociodemographic, risk-behavior, and substance-abuse profile among patients who were infected with HIV in the adolescent or early adult ages (early infected [EI]) and compare them with individuals infected at an older age (non-early HIV-infected patients [non-EI]).

METHODS

This is a cross-sectional study of 3151 HIV/AIDS patients admitted to the retrovirus center of our institution between 1992 and 2002. The Retrovirus Research Center at Universidad Central del Caribe (UCC) has enrolled HIV and AIDS cases for care and study since 1992. The UCC cohort entrants are diagnosed in the Hospital Ramon Ruiz Arnau or in the Bayamón Health Region immunology clinic; both are administered by the Puerto Rico Health Department. Data collected on cohort participants include psychological and clinical information in addition to standard surveillance information. The date of HIV/AIDS diagnosis is the date the cohort participant was first diagnosed with HIV or AIDS in one of the two facilities mentioned. An additional variable is included that estab-lishes the date the patient first knew that the HIV test was positive.

All patients visiting the facilities for the first time as HIV-positive subjects are asked to participate in the study. If the patient agrees, a written informed consent is discussed and obtained. A baseline instrument is completed, and data obtained from an interview complements the patient's medical record. Follow-up interviews are scheduled at six-month intervals in order to complete a follow-up assessment with the relevant medical data. The baseline and follow-up questionnaires include sociodemographic, risk-related, psychosocial, clinical, and immunologic data. This program has allowed us to build an HIV database within the Retrovirus Research Center in an effort to enhance comprehension of the multidimensional spectrum of HIV/AIDS in Puerto Rico.

The variables studied were early infection (yes/no), sociodemographic variables, risk-behavior variables, and substance-use variables. An early-infected patient was defined as an HIV infected patient that reported his or her first positive test at $\leq$21 years of age. The sociodemographic variables evaluated included gender, last grade completed ($<$12 or $\geq$12), professional status (employee or unemployed), first visit setting (clinic or hospital), and living with family (yes or no). The substance-use variables included use at any time in the past of tobacco, alcohol, cannabis, heroin, cocaine, speedball, amphetamines, and crack; use was explored by interview. The risk-behavior variables included psychoactive substance use, antisocial behavior, history of incarceration, homosexual relations, bisexual relations, heterosexual relations, and injection drug user.

Statistics

A descriptive analysis using frequencies and percents was performed. Differences in proportions were assessed by using chi-squared test and Fisher exact test. The overall significance level

(alpha) was set to .05. The statistical package used was SPSS 11.5 for Windows (SPSS Inc., Chicago, Ill).

RESULTS

A total of 3151 patients are included in this study. A total of 157 (5%) patients were EI, and 2994 were non-EI.

The sociodemographic profile of the patients is shown in Table 1. The proportion of females in the EI group was significantly higher than in the non-EI group (43.3% vs 26.5%, $P<.05$). At the time of study entry, a larger proportion of EI had not completed a high school education (75.9% vs 66.1%, $P<.05$). Similar proportions of employment status were seen in both groups (84.6% vs 81.9%). In addition, a non-significant but somewhat lower number of patients were living with their family at the time of study entry was seen in the EI group (61.6% vs 66.5%). The point of entry into the study was different between the groups; a number of EI patients initially arrived at our healthcare system as an inpatient at the university hospital. (49% vs 37.3%, $P<.05$).

In Table 2 we present the risk-behavior profile in the two groups. A high proportion of patients infected at an early age had been in prison at some point in their lives (54.5% vs 38.4%, $P<.05$). The risk practices for HIV infection were explored, and similar proportions of patients gave a history of homosexual relations, bisexual relations, and heterosexual relations. A nonsignificant trend toward less injection drug use was seen in those infected at an early age. (49.3% vs 56.9%).

Table 3 shows the substance-abuse profile between the two groups. The most frequent substances reported by the EI patients were tobacco (84.1%), cocaine (56.3%), and heroin (52.2%). A higher proportion of the EI reported crack use (34.8% vs 25.2%) and cannabis use (52.2% vs 42.0%, $P<.05$).

Table 1. Sociodemographic profile among early and non-early infected HIV/AIDS Puerto Rican patients

	Early Infected		Non-Early Infected	
	Frequency	%	Frequency	%
Gender*				
Male	89	56.7	2201	73.5
Female	68	43.3	793	26.5
Last school year enrolled*				
<12th grade	101	75.9	1764	66.1
≥12th grade	32	24.1	905	33.9
Professional status				
Unemployed	115	84.6	2211	81.9
Employed	21	15.4	487	18.1
First visit setting*				
Hospital	77	49.0	1114	37.3
Clinic	80	51.0	1873	62.7
Living with family				
Yes	61	61.6	1261	66.5
No	38	38.4	634	33.5

  * *P* value ≤.05

DISCUSSION

We present a profile of the patients who were initially infected with HIV before 21 years of age. An important component in a planning strategy for the control of the HIV epidemic is to understand the profile of individuals infected during their adolescence. Our study reveals that 5% of the patients in

Table 2. Risk behavior profile among early and non-early infected HIV/AIDS Puerto Rican patients

	Early Infected		Non-Early Infected	
Risk Behavior	Frequency	%	Frequency	%
Psychoactive substance use				
Yes	17	23.0	414	28.5
No	57	77.0	1038	71.5
Antisocial behavior*				
Yes	37	54.4	493	35.5
No	31	45.6	894	64.5
Had been in prison*				
Yes	42	52.5	565	38.4
No	38	47.5	906	61.6
Homosexual relation				
Yes	17	12.6	348	13.0
No	118	87.4	2325	87.0
Bisexual relation				
Yes	9	6.7	189	7.1
No	125	93.3	2482	92.9
Heterosexual relation				
Yes	122	84.7	2384	84.0
No	22	15.3	454	16.0
Injection drug use				
Yes	75	49.3	1673	56.9
No	77	50.7	1269	43.1

  * *P* value ≤.05

Table 3. Substance use profile among early and non-early infected HIV/AIDS Puerto Rican patients

Substance Use	Early Infected		Non-Early Infected	
	Frequency	%	Frequency	%
Tobacco				
Yes	74	84.1	1379	77.3
No	14	15.9	405	22.7
Alcohol				
Yes	42	49.4	877	51.0
No	43	50.6	844	49.0
Heroin				
Yes	72	49.3	1536	54.5
No	74	50.7	1281	45.5
Cocaine				
Yes	81	56.3	1627	57.9
No	63	43.8	1181	42.1
Heroin + cocaine				
Yes	41	30.1	920	35.5
No	95	69.9	1670	64.5
Amphetamines				
Yes	14	10.2	333	13.0
No	123	89.8	2222	87.0
Crack-cocaine*				
Yes	32	34.8	404	25.2
No	60	65.2	1198	74.8
Cannabis*				
Yes	48	52.2	676	42.0
No	44	47.8	933	58.0

* *P* value ≤.05

our cohort were infected before 21 years of age. This figure is likely an underestimate because 22.5% of the patients in our data bank are between the ages of 21–29. In addition, data from the Puerto Rico Central Program for AIDS Surveillance showed that the proportion of new AIDS cases in persons between the ages of 13 and 19 years has increased from 4% (1992–1994) to 7% (1998–2000).[19] Mann stated, "Societies around the world have ambivalent attitudes towards youth, seeing them simultaneously as small adults and as immature, inexperienced and untrustworthy children (large children). Consequently, it is not surprising that public health is conflicted and confused in its approach to young people and HIV prevention."[20] The figures in our study suggest that strategies to prevent HIV infection among our young people need to be improved.

The profile we constructed shows a difference in the proportion of patients who are female, and most do not complete high school. This finding is consistent with a number of reports that suggest that within the HIV epidemic, a marked proportional increase in females is occurring. Although the number of new AIDS cases in the United States has decreased 40.9% from 1992 to 2000, the proportion of females with new HIV infection in this same period has increased 48.1%.[21] In Puerto Rico, the proportion of females with newly diagnosed HIV increased 22.2% from 1992 to 2000.[21] The data included in this paper provide information regarding one of the healthcare districts in Puerto Rico and may not be generalized to the rest of the island.

Most patients in the EI group had not completed high school at the time of study entry. Puerto Rican schools represent an important site in which correct and appropriate knowledge of HIV infection, transmission and prevention is communicated. In the absence of this source of information, patients may be more likely to engage in sexual and drug-related HIV risk behaviors.

Most of the EI patients are unemployed, and 61.6% live with their families. This scenario is additionally burdened by the fact that nearly half of the patients in the study required hospital admission because of a complication related to their HIV infection. Additionally, many of these patients were diagnosed with HIV infection during their inpatient stay. Efforts at early diagnosis and treatment need to be continued.

Adolescents are more likely to engage in high-risk behavior, which makes this population particularly vulnerable to HIV infection.[11] Some of the characteristics commonly found among adolescents are impulsiveness, the denial of any chance of infection, the belief that they are invulnerable, and the use of alcohol and drugs.[8–10,13–17] These theoretical issues could explain why a higher proportion of the EI patients arrive at our center requiring inpatient tertiary medical care.

Reducing early HIV infection is one way to eliminate health disparities experienced by minority communities. The knowledge of these specific characteristics of EI patients could be used to develop appropriate policies, primary prevention programs, and outreach activities directed toward reducing HIV infection among young Puerto Ricans.

Several limitations are present in our study. The small sample of this study is not necessarily representative of all Puerto Rican HIV-infected patients residing on the island. It is only representative of patients that have presented for health care at the ambulatory or inpatient facilities at our institution. In addition, while we cannot be certain of the exact date of HIV infection, we are reasonably certain that the patients included in this study were infected in adolescence.

REFERENCES

1. Jointed United Nations Program on HIV/AIDS (UNAIDS). 2004 Report on the Global AIDS Epidemic – Executive Summary. Available at: http://www.unaids.org/en/default.asp. Date accessed: 8/10/05.
2. World Health Organization. HIV/AIDS. Available at: http://www.who.int/child-adolescent-health/hiv.htm. Date accessed: 3/15/04.
3. Centers for Disease Control and Prevention (CDC). HIV/AIDS among youth, May 2005. Available at: http://www.cdc.gov/hiv/pubs/facts/youth.pdf. Date accessed: 8/10/05.
4. Commonwealth of Puerto Rico, Health Department. Puerto Rico AIDS Surveillance System. AIDS Surveillance Report. 2003.
5. Gomez MA, Fernández DM, Otero JF, Miranda S, Hunter RF. The shape of the HIV/AIDS epidemic in Puerto Rico. *Pan Am J Public Health.* 2000;7(6):377–383.
6. Centers for Disease Control and Prevention. AIDS and human immunodeficiency virus infection in the United State—1988 update. *Morb Mortal Wkly Rep.* 1989;38(S-4):1.
7. Commonwealth of Puerto Rico, Health Department. Vital Statistics Report. 1998.
8. Papalia DE, Wendkos S, eds. *Human Development.* Bogota, Colombia: McGraw-Hill; 1997.
9. McCormic K. *Reducing the Risk: A School Leader's Guide to AIDS Education.* Alexandria, Virginia: National School Boards Association; 1989.
10. Mason PJ, Olson RA, Parish KL. AIDS, hemophilia, and prevention efforts within a comprehensive care program. *Am Psychol.* 1988;43(11):971–976.
11. Kipke MD, Futterman D, Hein K. HIV infection and AIDS during adolescence. *Med Clin North Am.* 1990;74(5):1149–1165.
12. American Federation of AIDS Research. Keeping count: HIV/AIDS and young people. Available at: http://www.thebody.com/amfar/keeping_count.html. Date accessed: 8/11/05.
13. Kraft P, Rise J. The relationship between sensation seeking and smoking, alcohol consumption and sexual behavior among Norwegian adolescents. *Health Educ Res.* 1994;9:193–200.
14. Schafer MA, Boyer CB. Psychosocial and behavioral factors associated with risk of sexually transmitted diseases, including human immunodeficiency virus infection, among urban high school students. *J Pediatric.* 1991;119(5):826–833.
15. Tarpert SF, Aarons GA, Sedlar GR, Brown SA. Adolescents' substance use and sexual risk-taking behavior. *J Adolesc Health.* 2001;28(3):181–189.
16. Fergusson DM, Lynskey MT. Alcohol misuse and adolescent sexual behaviors and risk taking. *Pediatrics.* 1996;98(1):91–96.
17. Strunin L, Hingson R. Alcohol, drugs and adolescent sexual behavior. *Int J Addictions.* 1992;27(2):129–146.
18. Grunbaum JA, Kann L, Kinchen SA, et al. Youth risk behavior surveillance-United States, 2001. *Morb Mortal Wkly Rep.* 2002;51(4):1–62.
19. Commonwealth of Puerto Rico, Health Department. AIDS Surveillance Program. AIDS confirmed cases in Puerto Rico until December 2000. Health Protection and Promotion Auxiliary Secretary (PASET). San Juan, Puerto Rico; 2001.
20. Mann J, Tarantola D, eds. Youth and HIV/AIDS. In: *AIDS and the World II.* Oxford: Oxford University Press. 1996.
21. Baez D, Thomas J, Gomez, et al. Changes in the AIDS epidemiologic situation in Puerto Rico following health care reform and the introduction of HAART. *Pan Am J Public Health.* 2005;17(2):92–100.