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Paediatric and Perinatal HIV/AIDS in Jamaica

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Professor Paul A Krogstad, UCLA and David Geffen School of Medicine, California

The Pan American Health Organization

Congratulates

*Paediatric and Perinatal
HIV/AIDS in Jamaica*

for its

Excellent Work

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Prevention of Mother-to-Child HIV Transmission and Management of Paediatric HIV Infection in Jamaica

SH Vermund¹, PA Krogstad²

The acquired immunodeficiency syndrome (AIDS) was first recognized in children in 1982 in the United States of America and documented clearly in 1986 in Jamaica (1). Neither nation responded aggressively to the crisis of the human immunodeficiency virus (HIV) in its earliest years and many infections occurred that could have been prevented. Nonetheless, by 1994, the AIDS Clinical Trials Group 076 study had documented the benefits of antiretroviral therapy to a pregnant woman and her newborn infant for the prevention of mother-to-child transmission of HIV (PMTCT). We then knew that to reduce the risk of HIV transmission from mother to infant, outreach, counselling and testing of pregnant women were essential. This was of special urgency in the Caribbean, a region with the highest seroprevalence rates for HIV outside sub-Saharan Africa. By 2004, Jamaica had overcome obstacles of financing, logistics and improved on stigma offering HIV testing to all willing pregnant women (2). Coverage was high and the paediatric epidemic began to decline as women availed themselves of the opportunity to take antiretroviral medications. Much damage had already been done, however, and Jamaica's response to paediatric HIV/AIDS, described in these pages, was an imperative for the health of the nation's children and their families. We also believe that it holds promising lessons for other developing nations on how to tackle aggressively PMTCT and paediatric care challenges.

In this special issue of the West Indian Medical Journal (WIMJ), Professor Celia Christie has recruited authors of scientific articles, clinical observations and editorial commentaries on nearly every facet of paediatric HIV/AIDS and related topics in Jamaica. Drawing from academia, the Ministry of Health, healthcare providers and others, Professor Christie and her colleagues have provided a broad variety of studies and clinical observations that stem from work supported by the Elizabeth Glaser Paediatric AIDS Foundation, the Jamaican Ministry of Health, the National Institutes of Health, the University of the West Indies, the Centers for

Disease Control and Prevention, and from Jamaican philanthropic sources. This amazing array of supporters is a testament to the competitiveness of Jamaican clinical scientists and programme developers in securing research support and clinical service funds. While the products of the investments must be seen to be fully appreciated, with new paediatric HIV/AIDS services and nearly universal HIV testing for pregnant women islandwide, the manuscripts in this WIMJ issue do provide insight into the substantial programmatic impact of the work.

This special WIMJ issue does not shy away from topics that remain bedeviling for Jamaica, as for other nations. Disease manifestations in infants and children are protean, as in adults, and the WIMJ authors report disseminated BCG infection, isoniazid-resistant tuberculosis and renal complications of HIV disease in children. HIV orphans are a new challenge for Jamaica, including both HIV-infected and uninfected children. Stigma inhibits full coverage with HIV counselling and testing. Adherence rates both to PMTCT measures and to paediatric HIV antiretroviral therapies are suboptimal. Treatment options remain limited by fiscal limitations, and emergence of resistance to antiretroviral agents is certain to threaten this region, as it has elsewhere. Yet the successes highlighted and the lessons learnt are indigenous ones; Jamaicans confronted the epidemic and are winning the fight against paediatric HIV/AIDS.

It is rare for a clinician like Professor Christie (and the guest editors) to have lived through the advent of a new disease, its inexorable expansion in the 1980s, its peaking in the 1990s and its rapid reduction in the 2000s. Child health providers have seen this exact phenomenon *vis-à-vis* the HIV/AIDS epidemic in the Western Hemisphere (with the exception of Haiti where the paediatric epidemic continues). Jamaica's 2008 population is 2.8 million persons on an island smaller than the US state of Connecticut. Jamaica has the fourth highest public debt per capita in the world and ranks only 101st of 177 nations in the health expenditure per capita as estimated in 2007–2008 (3, 4). That Jamaica should have made such progress in the fight against paediatric HIV is a testament to the authors who have contributed to this issue, to their mentors and to the Jamaican health leaders and activists who have confronted this plague. Clinicians, scientists and policy activists elsewhere will learn from you. And the mothers, fathers and children of Jamaica thank you.

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Paediatric and Perinatal HIV/AIDS in Jamaica

CM Wilfert

The Elizabeth Glaser Paediatric AIDS Foundation (EGPAF) proudly applauds Professor Celia Christie and her colleagues who have assembled an impressive array of papers detailing their work in Jamaica. Professor Christie leads with inspiration and effectiveness as the recipient of the Elizabeth Glaser International Leadership Award. She has developed a team of both academic and government healthcare personnel in Jamaica to collaboratively treat women and children with HIV/AIDS. They have implemented a programme to prevent mother-to-child transmission of HIV and supported more than 69 000 women in five years who came to the clinics for antenatal care. Counselling reaches 80% women and the acceptance of testing is now 100%. They observed a decrease in transmission of HIV from infected women to their infants from 25% to 4.75%. It is estimated that between 100 and 200 infections in infants were averted. Evaluation of more than 1570 children for HIV resulted in appropriate

antiretroviral therapy for 79% of the infected children. Additionally, the team has built the capacity to do outcomes research and Professor Christie has mentored 31 healthcare professionals including 12 paediatricians.

This issue of the *West Indian Medical Journal* is the second time a complete issue of the Journal has reported the work of Professor Christie and her colleagues. This compendium has had the benefit of two devoted and superb Editors, Professor Paul Krogstad and Professor Sten Vermund.

The support of EGPAF to Professor Christie has prevented significant numbers of Jamaican children from acquiring HIV, provided treatment for those who are infected and care for their families. Professor Christie has succeeded in training others to sustain and continue this work. We express our sincere gratitude and admiration for these accomplishments.

From: The Elizabeth Glaser Paediatric AIDS Foundation, 2950 31st St, Suite 125, Santa Monica, California 90405, USA.

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Chancellor's Message

I am pleased to endorse formally this collection of twenty operational research manuscripts on "Paediatric and Perinatal HIV/AIDS in Jamaica". This work emanated from the unique five-year collaboration between The University of the West Indies (UWI) and the Jamaican Ministry of Health. The UWI remains grateful to and appreciative of the international guest editors, Professors Sten Vermund and Paul Krogstad, the West Indian Medical Journal, the many authors, external sponsors, patients and their families, who contributed to make this programme a success.

Worldwide, 2.1 million (1.9 to 2.4 million) children were living with HIV and 290 000 (270 000 to 320 000) children died from AIDS in 2007. Here in Jamaica, a total of 884 cases of HIV/AIDS and 388 deaths in children were reported from 1986 through December 2007. Due in large part to the work of this team throughout Jamaica, there has been a reduction in mother-to-child transmission of HIV/AIDS and HIV-attributable morbidity and mortality in children. This journal describes the many interventional strategies employed, outreach activities and strong collaborations that were forged in the preceding five years to achieve these objectives. There are many reports encompassing preventative interventions, clinical manifestations of HIV in women and children, psychosocial issues, case series and viewpoints.

Much work remains to be done to ensure that the scourge of HIV/AIDS is completely removed, not only from Jamaica, but also from the Caribbean region and the entire world. In reaching for this goal, this team clearly embodies the adage from one of South Africa's longest surviving children with HIV/AIDS, which we should all embrace: "Do all you can, with what you have, in the time you have, in the place you are." (Nkosi Johnson, 1989–2001).

*Sir George Alleyne
Chancellor
The University of the West Indies
Kingston 7, Jamaica*

Vice Chancellor's Message

At the end of 2007, there were 15.5 (14.2 to 16.9) million women living with HIV throughout the world. The Caribbean has the world's second highest HIV seroprevalence, behind Sub-Saharan Africa. In Jamaica, the HIV epidemic is predominantly heterosexual with a sero-prevalence of 1.6% in pregnant women.

The Kingston Paediatric and Perinatal HIV/AIDS (KPAIDS) Programme is a joint collaborative initiative between The University of the West Indies and the Jamaican Ministry of Health with funding from the Elizabeth Glaser Paediatric AIDS Foundation and other partners who all collaborated together to address the Paediatric and Perinatal HIV/AIDS epidemic in Greater Kingston as a model for Jamaica. This is the second issue of the West Indian Medical Journal in five years that is dedicated solely to reporting the work of the KPAIDS team in preventing HIV and reducing morbidity and mortality of HIV/AIDS in Jamaican women and children. Their collaborative initiatives have reduced mother-to-child transmission of HIV/AIDS from 29% to 6.6% with use of short course Zidovudine and more recently to 2–5% with use of highly active antiretroviral drugs.

Through the maxim "Together we can!" of Ophelia Haayama, an HIV-infected pregnant woman from Zambia, the KPAIDS team is clearly accomplishing its mission of "reducing mother-to-child transmission of HIV/AIDS, while improving the quality of life for children and families who are living and affected by HIV/AIDS". We applaud the patience, dedication, thoroughness and splendid work of our world-class external guest editorial team, Professor Sten Vermund, Professor Paul Krogstad and Ms Julie Lankford; the many international guest reviewers of the articles; Professor Everard Barton, Mrs Urcella Scott and their staff at the West Indian Medical Journal; Professor J Peter Figueroa and Jamaica's National AIDS Programme; the many co-authors, patients and their families, our sponsors, as well as the countless others who made this significant effort even possible.

Congratulations to all who continue to work assiduously in sustaining these efforts to keep this disease at bay.

*E Nigel Harris
Vice Chancellor
The University of the West Indies
Kingston 7, Jamaica*

Principal's Message

That the West Indian Medical Journal has dedicated this second special issue to publicizing the outcomes of the collaborative "Paediatric and Perinatal HIV/AIDS Leadership Initiative in Kingston, Jamaica" speaks to the success of the project and the significant amount of work accomplished over the five-year period of collaborative intervention.

Despite significant challenges, the healthcare team established since September 2002 and comprising the "Kingston Paediatric and Perinatal HIV/AIDS Programme" (KPAIDS) from The University of the West Indies (UWI) and the Jamaica Ministry of Health, functioned effectively to achieve the objectives of its five-point plan. As this special issue will attest, the plan's objectives to intervene through leadership and training, prevention of mother-to-child transmission (pMTCT) of HIV/AIDS, treatment and care of women, infants, children and families, outcomes-based research as well as regional and international outreach have been achieved so that during the five-year period between 2002 and 2007 there was significant reduction in the HIV-attributable morbidity and mortality as well as prolonged and improved quality of life in HIV-infected children.

The advocacy role that the team has played and the prestigious awards that it has received throughout the five-year programme period are indicative of the team's good standing internationally. This will enable them to continue the work towards achieving the ultimate mission to eliminate mother-to-child transmission of HIV in Jamaica and to provide the care to HIV-infected children that will ensure successful adult lives.

Sincerest and heartiest congratulations to the collaborative team, anchored by Professor J Peter Figueroa, for its outstanding contribution, through this programme, to the Jamaican people. The sponsorship provided to support their efforts has been tremendous. Without it, the work would have been stillborn. The UWI looks forward to sustained collaboration, exemplified in this project, to foster its work in promoting the health and wellbeing of the Caribbean people.

*Gordon Shirley
Pro Vice Chancellor and Principal
The University of the West Indies
Kingston 7, Jamaica*

Dean's Message

This collection of articles and case reports from the Kingston Paediatric and Perinatal HIV/AIDS Programme (KPAIDS) is a testament to the excellent work being done by clinicians and researchers to curb the HIV/AIDS epidemic in Jamaica and the Caribbean. Through their efforts, there has been a decline in the number of paediatric HIV/AIDS cases in Jamaica. A variety of interventions has resulted in a reduction in the number of mother-to-child transmission of the disease. The articles presented here do not only document the results of many of the interventions but also the clinical manifestations of the disease in the paediatric age group.

I congratulate the West Indian Medical Journal for publishing this issue and the many contributing co-authors for their excellent work. We are thankful to the editors, especially our international guest editors, Professors Sten Vermund and Paul Krogstad, as well as the many international guest reviewers for their expertise and timely reviews and edits. We again applaud the excellent collaboration that has been forged between The University of the West Indies and The National AIDS Programme of the Ministry of Health, Jamaica.

The Faculty of Medical Sciences, The University of the West Indies, is proud to be associated with this excellent work and thank the many sponsors and funding agencies for their support. This issue of the West Indian Medical Journal adds important information to the world literature and documents interventions which can be duplicated elsewhere to the benefit of HIV-infected populations especially in developing nations.

*Archibald McDonald
Dean
Faculty of Medical Sciences
The University of the West Indies
Kingston 7, Jamaica*

Chief Medical Officer's Message

Congratulations to the West Indian Medical Journal for this special compendium on HIV/AIDS.

The public health response to the HIV/AIDS pandemic has provided important lessons. Strategies so far have targeted vulnerable populations, persons living with HIV/AIDS and various sectors. However, despite significant gains, the Caribbean region continues to have the second highest prevalence of the disease. Since vaccine studies have not been very promising, greater attention must be paid to prevention. This requires the commitment of all stakeholders.

Children and young people are at greatest risk. This challenges us to work with other sectors to empower them to make the appropriate sexual and reproductive life choices. We must also ensure that the prevention of mother-to-child transmission programme leaves out no mother or child. Health is a basic human right and must be accessible to all. Let us meet the challenges head on so that HIV/AIDS can become history.

Best wishes.

*Sheila Campbell-Forrester
Chief Medical Officer
Ministry of Health
Kingston, Jamaica*

The HIV Epidemic in the Caribbean

Meeting the Challenges of Achieving Universal Access to Prevention, Treatment and Care

JP Figueroa

ABSTRACT

The HIV prevalence in the Caribbean is estimated at 1.0% (0.9% – 2%) with 230 000 persons living with HIV/AIDS. HIV rates vary among countries with the Bahamas, Guyana, Haiti and Trinidad and Tobago having HIV rates of 2% or above while Cuba's rate is less than 0.2%. However, throughout the Caribbean, HIV rates are significantly higher among those groups most at risk such as commercial sex workers, men who have sex with men and crack/cocaine users. The Caribbean Community (CARICOM) Heads of Governments declared AIDS to be a regional priority in 2001. The Pan Caribbean AIDS Partnership (PANCAP) was formed to lead the regional response to the HIV epidemic. National HIV Programmes have made definite progress in providing ARV treatment to persons with HIV/AIDS and reducing death rates due to AIDS, decreasing HIV mother-to-child transmission and providing a range of HIV prevention programmes. However, HIV stigma remains strong in the Caribbean and sexual and cultural practices put many youth, women and men at risk of HIV. The Caribbean has set itself the goal of achieving universal access to HIV prevention, treatment and care. Several challenges need to be addressed. These include reducing HIV stigma, strengthening national responses, scaling-up better quality prevention programmes with greater involvement of vulnerable populations, more supportive HIV policies and wider access to ARV treatment with better adherence. In addition, there needs to be improved coordination among PANCAP partners at the regional level and within countries.

La Epidemia del VIH en el Caribe

Enfrentando los Desafíos para Lograr un Acceso Universal a su Prevención, Tratamiento y Cuidado

JP Figueroa

RESUMEN

La prevalencia del VIH en el Caribe se estima en 1.0% (0.9%–1.2%) con 230 000 personas viviendo con VIH/SIDA. Las tasas de VIH varían de un país a otro, teniendo Bahamas, Guyana, Haití y Trinidad y Tobago tasas de VIH de 2% o por encima, mientras que la tasa en Cuba es menos de 0.2%. Sin embargo, en todo el Caribe, las tasas de VIH son significativamente más altas entre los grupos en riesgo, tales como las trabajadoras del comercio sexual, los hombres que tienen sexo con otros hombres, y los consumidores de crack/cocaína. Los Jefes de Gobierno de la Comunidad del Caribe (CARICOM) declararon el SIDA una prioridad regional en 2001. La Asociación Pancaribeña contra el SIDA (PANCAP) se formó con el propósito de dirigir la respuesta regional a la epidemia del VIH. Los programas nacional de VIH han progresado definitivamente en cuanto a ofrecer tratamiento ARV a personas con VIH/SIDA y reducir las tasas de muerte debido al SIDA, disminuir la transmisión del VIH madre a hijo, y brindar una variedad de programas de prevención del VIH. No obstante, el estigma del VIH sigue siendo fuerte en el Caribe y las prácticas culturales ponen a muchos jóvenes, mujeres y hombre en riesgo de contraer el virus. El Caribe se ha planteado el objetivo de lograr acceso universal

a la prevención, tratamiento y cuidado del VIH. Para ello, se hace necesario enfrentar ciertos retos. Los mismos incluyen reducir el estigma del VIH, fortalecer las respuestas nacionales, aumentar la calidad y el número de programas de prevención con mayor involucración de la población vulnerable, implementar políticas de mayor apoyo en relación con el VIH, y lograr un acceso más amplio a la terapia de ARV con mejor adhesión. Además, se hace necesario mejorar la coordinación entre los socios del PANCAP a nivel regional y dentro de los países.

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The Caribbean has the second highest HIV prevalence rate in the world after sub-Saharan Africa. In 2007, the HIV prevalence rate was estimated at 1.0% with a range of 0.9% to 1.2% (1). An estimated 230 000 persons in the Caribbean are living with HIV/AIDS which is one of the leading causes of death among persons aged 25–44 years (1). This paper presents an overview of the HIV epidemic in the Caribbean, the response by the countries and the challenges that remain.

The Caribbean includes 29 nations and territories stretching from Belize and Central America in the East to Guyana, Suriname and Cayenne, South America in the South West with an archipelago of islands forming an arc between these two points. The population of 39 million includes persons of African, European and Asian descent as well as indigenous populations. There is great cultural and religious diversity throughout the Caribbean though a shared colonial heritage and geographic space have forged an emergent Caribbean culture and cosmology. There is significant movement among the people within the region and outside of it especially to the North. There are an estimated 20 million visitors to the Caribbean annually most of whom are from the North.

The Epidemiology of HIV in the Caribbean

Reported AIDS cases from the 21 Caribbean countries affiliated to the Caribbean Epidemiology Centre (CAREC) have increased annually up to 2003 (except for 2000) (2). However, the AIDS epidemic curve appears to be flattening since 2000. These data must be interpreted with caution due to significant under-reporting from many countries as well as a considerable lag in reporting from some countries. In addition, reported AIDS cases are not an accurate reflection of the current status of the HIV epidemic due to a number of reasons including the long incubation period between HIV infection and the development of AIDS. Some Caribbean countries (eg Haiti) do not report AIDS cases and several of the larger Caribbean countries are not included in CAREC reports. On the other hand, new AIDS cases have shown a definite decline in Bermuda and the Bahamas.

The HIV epidemic in the Caribbean is due mainly to heterosexual transmission with approximately 60% of AIDS cases reported to CAREC being in this transmission category (2). Homo/bisexual transmission accounts for approximately 15% and vertical transmission 6% of cases. Injection drug use is less than 2% and is reported mainly among Caribbean men with AIDS deported from the USA. Injection drug use

is rare in most Caribbean countries with the exception of Bermuda and Puerto Rico. HIV transmission due to blood transfusion is rare in the Caribbean. However, the HIV transmission category of 17% of AIDS cases reported to CAREC is stated as unknown. This is due primarily to two reasons. Many of these cases are reported late or following death and cannot be properly investigated. On the other hand, some cases are investigated but the health provider is unable to rule out same sex behaviour among men. Thus, a proportion of AIDS cases classified as unknown are likely to be bisexual men. Despite the failure to classify some AIDS cases as due to homo/bisexual transmission, most persons in the Caribbean become HIV-infected due to heterosexual transmission.

In the early years of the epidemic, more men were reported with AIDS than women. This was primarily due to the greater risk behaviour of heterosexual men than women as well as HIV transmission among men who have sex with men (MSM). As the epidemic became generalized increasing numbers of women have become infected and approximately equal numbers of men and women are now reported with AIDS. More women than men are reported as HIV-positive (non-AIDS). However, this could be due, at least in part, to more women being HIV-tested than men.

Reported risk behaviour among persons with AIDS in Jamaica indicates that over 80% have two or more sexual partners in the past year, 24.5% participated in commercial sex (mainly men buying sex from a female sex worker), 46.1% have a history of a sexually transmitted infection, 8.3% report crack/cocaine use and 1.1% used injected drugs [mainly while abroad] (3). However, nearly 20% of persons with AIDS report no obvious risk factor. These are mainly women who are infected by their regular sex-partner or spouse.

Adult HIV prevalence rates do vary among Caribbean countries [Table 1] (1, 4). The Bahamas, Guyana, Haiti and Trinidad and Tobago are assessed as having HIV prevalence rates of 2% or above. HIV rates in Barbados and Jamaica are estimated to be approximately 1.5% while many Eastern Caribbean countries have rates under 1%. Cuba's HIV rate is the lowest in the Caribbean at under 0.2%. The Cuban government has taken a very proactive approach to HIV control including systematic HIV testing of their adult population during the 1990s. The early detection of persons living with HIV infection in Cuba has certainly contributed to the effective control of the HIV epidemic in that country.

Table 1: Adult HIV prevalence in selected Caribbean countries

Country	Adult HIV prevalence
Guyana	2.4%
Haiti	2.2% (DHS)
Bahamas	> 2 %
Trinidad and Tobago	> 2%
Suriname	1.9%
Jamaica	1.5%
Barbados	1.5%
Dominican Republic	1.1% (DHS)
Cuba	< 0.2%

Source: Caribbean Technical Expert Group 2004, UNAIDS 2006, Demographic Health Surveys (DHS)

Both Haiti and the Dominican Republic (DR) have conducted demographic health surveys that have included population-based samples on whom HIV testing was conducted (5). Their estimates of adult HIV prevalence (DR 1.1%, Haiti 2.2%) are relatively robust. Most of the other Caribbean countries estimate their adult HIV prevalence based on surveillance of pregnant women. A summary of estimates of HIV rates among pregnant women in different Caribbean countries is shown in Table 2. The surveys on

Table 2: HIV prevalence among pregnant women

Country	Prevalence	Year
Bahamas	3.0%	2002
Barbados	0.6%	2003
Belize	2.5%	2005
Cuba	0.0-0.4%	2000
Dominican Republic	2.0%	2002
Guyana	5.0%	2002-2003
Haiti	3.4%	2003-2004
Jamaica	1.5%	2005
Suriname	1.7%	2005
Trinidad and Tobago	1.2%	2002

Source: Caribbean Technical Expert Group 2004, UNAIDS 2006

which these HIV rates are based are not strictly comparable and knowledge of the specific country context is important in interpreting the results. For instance, in Jamaica, the rate of 1.5% is based on sentinel surveillance among pregnant women attending public clinics. HIV rates among pregnant women seeking private care (approximately 25% of total antenatal visits) are significantly lower. However, 1.5% is assessed as being a reasonable estimate of the HIV prevalence rate in the adult population in Jamaica. The HIV rates in pregnant women reported for the Dominican Republic and Haiti are higher than the HIV rates found among the adult population based on their demographic health surveys.

Several Caribbean countries have shown a decline in HIV prevalence rates among pregnant women in recent years. In Haiti, the HIV rate among pregnant women declined from 6.0% in 1996 and 5.1% in 2000 to 3.4% in 2004 (4). In the Dominican Republic, HIV prevalence among an-

tenatal clinic attendees aged 15–24 years was 0.5% in 1992, peaked at nearly 3% in 1995 and declined to 1.5% in 1998 and 0.5% in 2000. The rate of 2% reported in 2002 in Table 2 may refer to the HIV rate among all antenatal clinic attendees. In the Bahamas, HIV rates among pregnant women declined from 4.8% in 1993 to 3.0% in 2002. The rates in Barbados also appear to have declined while in Jamaica the HIV rates among pregnant women have been stable at approximately 1.5% since 1998. Thus, the data appear to indicate a slowing or stabilizing of the HIV epidemic in some Caribbean countries and probably a decline in a few countries such as the Bahamas and Haiti. In the Bahamas where the HIV epidemic was initially fueled by a crack/cocaine epidemic (6), new HIV infections have declined by over a half since 1994. However, the data to make a proper assessment of HIV trends are not available in most Caribbean countries.

While HIV rates among the general population in the Caribbean appear to have stabilized at levels significantly below those found in sub-Saharan Africa, surveys among vulnerable populations indicate HIV infection rates that are disturbingly high. Among female commercial sex workers (CSW) in the Dominican Republic, HIV rates in 2000 ranged from 4.5% to 12.4% [Table 3] (4). HIV rates among CSW in

Table 3: HIV prevalence among female sex workers

Country	City	Prevalence	Year
Dominican Republic	La Romana	4.5%	2000
Dominican Republic	St Domingo	9.5%	2000
Dominican Republic	Bani	12.4%	2000
Guyana	Georgetown	30.6%	2000
Jamaica	Kingston	9.0%	1997
Jamaica	Kgn and Mobay*	9.0%	2005
Suriname	Paramaribo	21.0%	2003

*Kgn and Mobay = Kingston and Montego Bay

Source: Caribbean Technical Expert Group 2004, UNAIDS 2006

Jamaica appear to have remained stable between 1997 and 2005 at 9%. Surveys conducted in Paramaribo, Suriname and Georgetown, Guyana have found HIV rates among CSW as high as 46% (1997) (7) and 30.6% [2000] (8), respectively. Clearly, more effective means need to be found to reduce HIV infection rates among CSW.

HIV rates among MSM appear to be high in the Caribbean although there are only a limited number of surveys reported in the literature [Table 4] (4). In the Dominican Republic, two surveys found HIV rates of 7.7% (1994) and 11.7% (1996). HIV rates among MSM appear to be higher in Suriname (18% in 1998) and Jamaica (33.6% in 1996). Due to the strong stigma associated with male homosexuality in the Caribbean, many MSM are not readily identified or reached by regular public health services. Special measures need to be taken by health authorities to build bridges with the MSM community and empower them to promote safe sex and reduce HIV infection rates.

Table 4: Prevalence among men who have sex with men

Country	City	Population	Prevalence	Year
Cuba	National	Contacts	5.2%	1986–88
Dominican Rep	St Dominica	Bisexual	7.7%	1994
Dominican Rep	St Dominica	Homosexual	11.7%	1996
Jamaica	Kingston	Homosexual	33.6%	1996
Jamaica	Kingston	Homo-bisexual	9.6%	1985–86
Suriname		Homosexual	18%	1998

Source: Caribbean Technical Expert Group 2004, UNAIDS 2006

Data on HIV rates among other vulnerable populations in the Caribbean are scarce. A survey of female substance abusers in Trinidad and Tobago found that 24 of 122 (19.7%) were HIV-infected (9). A survey of persons admitted to the rehabilitation unit of the University Hospital of the West Indies, Kingston, Jamaica, between 1991 and 2003 found 45 of 978 (4.6%) to be HIV-positive (10). Crack/cocaine use was an important risk factor driving the HIV epidemic in the Bahamas in the early 1990s (6). In Jamaica, 8.3% of reported AIDS cases admit to crack/cocaine use (3) although well under 1% of the adult population report ever using it (11). In the Caribbean, HIV rates are particularly high among CSW who use crack/cocaine (8, 9, 12, 13).

Among persons attending public clinics for the treatment of sexually transmitted infections (STI), HIV rates are generally high. For instance, among STI clinic attendees in Jamaica, HIV rates increased steadily to peak at 7% in 1999 and then declined to approximately 3.6% in 2007 (3, 14). Surveys in Guyana and Trinidad and Tobago have shown similar or higher HIV rates at public STI clinics. Prison inmates are also considered to be at higher risk of HIV infection. Previous surveys found high rates of 6% and 12% (14). A survey of 118 street persons in Jamaica, St Lucia and Trinidad and Tobago found self-reported HIV rates of 7%, 12% and 34%, respectively (12).

Overall, HIV surveillance data are generally limited in the Caribbean though there are enough studies to have a fair picture of the general scope of the epidemic. In many Caribbean countries, HIV rates in the general population appear to have stabilized and in a few countries such as the Bahamas, Bermuda and Haiti, HIV rates may have declined in recent years. Among vulnerable populations such as CSW, MSM, substance abusers and others, HIV rates are unacceptably high and could provide a reservoir for further and increased HIV spread among Caribbean people.

The Regional Response to the HIV Epidemic

The Caribbean Community (CARICOM) Heads of Government declared AIDS to be a regional priority at their meeting of 2001 in the Nassau Declaration on Health. The Pan-Caribbean Partnership against AIDS (PANCAP) was established within CARICOM in 2001 to lead the regional response to the HIV epidemic. A Caribbean Regional Strategic Framework (CRSF) 2002–2006 was prepared and significant funds were raised by PANCAP to support the regional

response including grants from the European Union, World Bank and Global Fund as well as other international donors (Table 5). PANCAP has grown to include over 80 partners –

Table 5: International funding commitment to the Caribbean, 2001–06

	US\$ million	%
Global Fund for AIDS, TB, Malaria	223.1	44
World Bank	141.4	27
PEPFAR	89.6	17
Bilateral Agencies	49.2	9
UNAIDS	14.9	3

TB = Tuberculosis

Source: UNAIDS 2006

Caribbean countries, regional organizations, AIDS associations and NGOs representing all sectors of Caribbean society as well as UN agencies and international donors. A smaller representative group of PANCAP chaired by the Minister of Health who chairs The Council for Human and Social Development (COHSOD) meets twice annually as the Regional Coordinating Mechanism (RCM). A review of PANCAP's first five-years is currently underway and a new Caribbean Regional Strategic Framework to guide the regional HIV response is being prepared.

Most Caribbean countries developed a response to the HIV epidemic several years before the formation of PANCAP. In fact, some countries such as the Bahamas, Barbados, Bermuda, Cuba and Jamaica have had comprehensive HIV control programmes for 15–20 years. However, when the World Bank began providing HIV loans in the Caribbean and the Global Fund was established considerably more funds became available to countries to support a heightened multi-sectoral response. Government leaders have also become more conscious of the significant danger that the HIV epidemic poses with respect to its potential to seriously undermine development. Guyana and Haiti have also received support from the USA President Emergency Plan for AIDS Relief (PEPFAR).

Achievements of National HIV Programmes

Most Caribbean countries have introduced programmes to prevent HIV transmission from mother-to-child through HIV testing of pregnant women and provision of antiretroviral therapy (ART). Countries like the Bahamas and Barbados were among the first to show dramatic declines in HIV infection among infants born to HIV-positive women (4, 15). Global Fund grants have enabled many Caribbean countries to establish public access programmes to antiretroviral therapy (ART). Several countries have shown a dramatic decline in mortality due to AIDS and Haiti has documented the impressive impact of their HIV treatment programme (16–18). HIV testing and counselling is also widely available throughout the Caribbean although many persons remain reluctant to access these services out of fear of testing positive and the continued strong stigma associated with HIV in the Caribbean.

Awareness of HIV/AIDS and how it is prevented is generally high throughout the Caribbean. Of course, it is well recognized that awareness or knowledge of HIV and how it is transmitted does not of itself lead to the practice of safe sex. Despite the high awareness of HIV, many in-school youth do not know the ABCs of HIV prevention. Moreover, a variety of myths concerning HIV and HIV transmission remain strong among significant numbers of Caribbean people and impede the practice of safe sex (19, 20). Some persons still believe that they can identify whether someone is HIV-infected by looking at them or by the odour of their genital secretions during foreplay prior to sexual intercourse. Many persons believe that if the man does not ejaculate within the vagina, HIV infection will not be transmitted. Belief that the mosquito can transmit HIV also remains strong in some sectors of the population.

HIV-education and prevention programmes throughout the Caribbean have contributed to increase condom distribution and sales in all countries where surveys have been conducted. For instance, condom distribution and sales in Jamaica increased from approximately 2.5 million condoms in 1985 to approximately 10 million annually since 1995 (14). The proportion of condoms sold increased from 30% to 70% during the same period. The proportion of men aged 15–49 years reporting condom use at last sex with a non-regular partner in Jamaica has been approximately 75% since 1992, based on periodic national KAP surveys with population based samples (14). Among women aged 15–49 years, reported condom use at last sex with a non-regular partner increased from 37% in 1992 to 73% in 1996 and declined somewhat to 66% in 2004. These data suggest that the behaviour change communication programmes in Jamaica have contributed to sustained safer sex-behaviour among the majority of the adult population. At the same time, a significant proportion of persons (approximately 25% of men and 34% of women in 2004) are at risk of HIV infection due to failure to use condoms with a non-regular sexual partner.

Behaviour surveillance surveys in six Eastern Caribbean countries (Antigua and Barbuda, Dominica, Grenada, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines) conducted in 2005 – 2006 found that the majority of adults reported the use of a condom the last time they had sex with a non-marital non-cohabiting sexual partner (21) though the rates were not as high as those found in Jamaica (14). Among persons aged 25–49 years who had a non-regular non-commercial sex partner in the past 12-months, self-reported condom use at last sex with a non-regular partner ranged from 52% in St Kitts and Nevis to 67% in St Lucia. Among those aged 15–24 years, rates of condom use were higher ranging from 55% in St Lucia to 73% in Dominica. These samples were population based. Among taxi drivers in these six countries, based on a convenience sample, last time condom use with a non-regular partner was 59%. A convenience sample of in-school youth aged 10–14 years in these countries found that condom use at last sex among

those who were sexually active was 39% (21). Thus, significant numbers of youth and adults throughout the Caribbean remain at risk of HIV infection despite HIV education and prevention programmes.

Sexual patterns and Social Vulnerability

Sexual patterns in the Caribbean contribute to the continued spread of HIV among the people. Sex begins at an early age with between 22% to 32% of persons in the six Eastern Caribbean States reporting having sex before 15 years of age. Multiple sexual partners (two or more sex partners in the past year) is relatively common throughout the Caribbean especially among the youth and men (11, 21). Gender roles and stereotypes play an important part in influencing sexual behaviour and a reluctance to use condoms with a steady partner puts many persons especially women at risk of HIV infection (22). Commercial sex is readily available in most Caribbean countries and appears to be taking more diverse forms. However, transactional sex (sex in exchange for social support, school fees, food, a gift, *etc*) is fairly common – 20% of adults in one survey in Jamaica – and places persons at-risk because consistent condom use is less likely in these relationships (23, 24). Age mixing between an older man and a younger female is frequently a feature of these transactional relations and may explain why significantly more teenage girls than teenage boys are HIV-infected in the Caribbean.

While these sexual patterns are seen across all social strata in the Caribbean, many persons are at increased risk of HIV infection due to their social vulnerability arising from poverty, illiteracy or limited education, unemployment, gender inequity and sexual orientation. Many of these persons do not have the knowledge, skills, self-esteem or motivation to negotiate safe sex and consistent condom use with their sexual partner(s). The strong stigma associated with HIV/AIDS, commercial sex and same sex behaviour among men compounds the problem by driving the HIV epidemic underground and making access to prevention and social support services more difficult (25). Many MSM develop sexual relations with women who are unaware of their sexuality in an effort to disguise their same sex behaviour and avoid the strong social stigma associated with male homosexuality. This behaviour acts as a bridge for HIV transmission from the gay community, where HIV rates are high, to the general population.

Challenges

The challenges facing Caribbean countries in mounting an effective response that will control the HIV epidemic are not limited to the sexual patterns, social vulnerability and strong stigma associated with HIV and MSM. Most Caribbean countries have weak national capacities to address their HIV epidemic (26). Even where comprehensive control programmes are in place, these programmes are frequently highly dependent on project funds and need to be properly institutionalized to ensure sustainability including the

establishment of HIV posts in the Government sector. In most countries, there has been little progress in repealing outdated legislation (eg sodomy laws) or updating legislation such as Public Health laws or regulations or elaborating new legislation. Some countries have written HIV policies that affirm the rights of persons living with HIV including their right to work and not be discriminated against. However, these policies are usually not underpinned by legislation.

Stigma associated with HIV remains strong in the Caribbean though there appears to be fewer reports of outright discrimination than in the early years of the epidemic. The survey conducted in six Eastern Caribbean countries found a compassionate response by individuals if a family member were HIV positive (21). Most persons were willing to allow a HIV-positive student, teacher or co-worker to continue normal school activities. However, low willingness for food-related contact may reflect persistent fear of HIV transmission through food. These findings are consistent with other surveys and anecdotal experience elsewhere in the Caribbean.

The technical capacity to manage HIV programmes and deliver high quality prevention programmes to vulnerable populations and young people is a major challenge in many Caribbean countries. There are no regional institutions training persons adequately with the full range of skills needed to lead these programmes. While the health sector has generally been able to integrate antiretroviral treatment and mother-to-child HIV-prevention programmes, other sectors appear to be challenged with how best to mount an effective sectorwide response to the HIV epidemic. This is particularly critical in the education sector which finds it very difficult to institutionalize meaningful sex-education and HIV/STI prevention programmes for school children many of whom are sexually active (27). The tourism sector remains hesitant to make appropriately packaged condoms available in hotel rooms. Many NGOs have good links with vulnerable populations and show strong commitment to HIV prevention and care but lack the resources or capacity to sustain effective programmes. On the other hand, in Haiti, the government health sector is weak and a few NGOs have led the response to their HIV epidemic. Throughout the region, there is a need to strengthen the multi-sectoral response to HIV in order to reduce HIV spread and promote development.

The challenges faced by Caribbean countries in implementing an effective multi-sectoral response to the HIV epidemic is compounded by the uncoordinated and fragmented efforts of the different regional, UN and other international entities seeking to lead various aspects of the response, or provide funding and/or technical assistance. Despite the commendable development of PANCAP and its success in mobilizing resources to support the regional response, there is limited coordination among the critical regional organizations leading or supporting the HIV response. The PANCAP Secretariat has lacked the technical capacity to

lead the regional response while the role of CAREC has been undermined by PAHO's recent decision to remove the HIV/STI unit from CAREC and establish it as a separate entity. The availability of HIV project funding has encouraged the formation of several regional organizations empowering different sectors. However, there is currently no mechanism for effective coordination among these different organizations nor is there any entity or combination of entities that provides a clear leadership direction for the countries and numerous regional players.

The preparation of a new HIV strategic framework by PANCAP offers an opportunity to help address these challenges and to develop a more coordinated and effective regional response to the HIV epidemic. In order to achieve this goal, a number of critical actions are required. Caribbean governments need to be more proactive at regional level to develop policies that countries can adapt and implement to ensure a more supportive environment for an effective HIV response. For instance, a policy mandating sex and HIV education in schools, including condom skills and access to contraceptives would facilitate HIV/STI prevention programmes among Caribbean youth. The Governments need to formally commit to the goal of universal access to HIV prevention, treatment and care and phase in the establishment of posts and staff to sustain programmes over the long term. In many instances, the health and social infrastructure to support HIV and other health programmes needs to be strengthened including an increase in the number of well-trained public health leaders and managers. Caribbean regional health institutions need to be reoriented and strengthened in order to address current health needs including HIV, the chronic non-communicable diseases and mental health.

Towards Universal Access

The new Caribbean Regional Strategic Framework (CRSF) for HIV needs to harmonize regional and PANCAP goals with country programme goals and set specific targets for universal access to prevention, treatment and care of HIV. This requires assessing the current HIV status and programmes of countries; having one regional plan, the CRSF, that guides all countries, regional organizations and partners; and having one set of key indicators with which to monitor progress. Improving communication and coordination among the main regional organizations and the countries is essential. The lead agencies such as CARICOM/PANCAP, UNAIDS, PAHO, CAREC and other organizations such as the UN agencies, CCNAPC, CRN⁺ need to better coordinate, integrate and streamline their activities so that there are fewer, better planned regional meetings and activities that provide more tangible support to countries.

The regional response needs to focus on promoting a favourable policy and legislative environment, mobilizing resources, coordination as well as facilitating technical assistance and support for countries. PANCAP, in particular, can

play a critical role among Caribbean governments through advocacy for sustainable HIV programmes, progressive policy and legislative reform and stigma reduction programmes such as champions for change. However, the CARICOM/PANCAP secretariat and the CARICOM health desk will both need to be strengthened and work more closely together. PANCAP needs to integrate their separate HIV projects into one programme and reduce their role in the implementation of project activities.

An effective response to the HIV epidemic in the Caribbean depends primarily on the commitment, capacity and leadership at the national level. Hence, there needs to be a coherent strategic approach by the countries and the region to build the capacity of the national HIV/STI programmes. This in turn is linked to the need to strengthen public health leadership training including the establishment of a doctorate in public health at the University of the West Indies. More attention must be given to improving the technical quality of programmes through technical assistance that supports the development of local staff. At country level, HIV programmes need to be institutionalized by integrating them within health and other sectors. Thus the need to create additional public health posts at all levels.

Reducing stigma and discrimination associated with HIV throughout the Caribbean is critical for achieving universal access to prevention, treatment and care of HIV (25). Recounting horror stories of HIV discrimination in the past will not achieve this end. HIV programme managers and leaders of government and civil society must act decisively to intervene whenever instances of discrimination arise. We need to model and promote examples of persons living with HIV interacting normally with others as well as our leaders at all levels of society showing that they care. The “getting on with life” anti-stigma campaign in Jamaica featuring Ainsley and Annesha, two persons living with AIDS, is a good example of a campaign that helps to overcome stereotypes and reduce stigma. However, many more persons living with HIV need to disclose to their families, friends, neighbours and co-workers in order to really put a face on the epidemic and drive home the point that people we know, who are just like us, are getting HIV/AIDS.

A much greater challenge than reducing HIV stigma will be to reduce the stigma associated with homosexuality, prostitution and crack/cocaine use (23). Caribbean society appears more comfortable assessing these realities in Old Testament biblical terms rather than from a public health and human rights perspective. Men who have sex with men, sex workers and drug abusers are on the margins of society and are involved in illegal activity given the laws in most Caribbean countries. Decriminalization of MSM or sex-work is viewed by many as promoting immorality. Political leaders shy away from progressive policies that affirm human rights and facilitate public health when MSM or sex-workers are involved. This maintains the stigma associated with these groups, reduces access to services, drives the HIV epidemic

underground and promotes spread of HIV. The irony is that there are a few Caribbean countries that do take a more enlightened approach to these issues but the political leaders lack the courage or conviction to explore and adopt these approaches.

Achieving universal access to ARV treatment is certainly feasible in the Caribbean as is reducing HIV transmission from pregnant mothers to their newborn infants. In most of the countries, resources are available through Global Fund or PEPFAR grants, or the World Bank, to roll out these programmes primarily through integration and strengthening of current health services. A major challenge is identifying the many persons living with HIV who are unaware of their infection. This requires a significant increase in HIV-testing in a variety of settings. Most Caribbean countries offer routine HIV-testing to pregnant women. However, routine opt out HIV-testing should also be offered to persons presenting with a sexually transmitted infection and to all adults on hospital admission and during their annual medical examination. This will facilitate early identification of persons living with HIV and ensure that they have access to ARV treatment as soon as it is indicated.

Current coverage data of persons in the Caribbean with advanced HIV infection on ARV therapy or pregnant women receiving ARV prophylaxis are not readily available. The UN General Assembly Special Session (UNGASS) country reports for 2006–2007 are not yet available and the compilation of the Caribbean country reports for 2004–2005 undertaken by UNAIDS is now outdated (28). Several countries have made good progress in recent years. For instance, coverage of pregnant women in Jamaica has increased from 47% in 2004 to 88% in 2007 while ARV therapy coverage increased from 50% in 2005 to 60% in 2007 despite an increase in the target population (3, 28). Many of the Caribbean countries have relatively good health services and this has facilitated the roll out of these programmes. However, even in countries where the health infrastructure is not well developed, such as Haiti, significant progress is being made though coverage levels still need to be increased further. However, there are anecdotal reports from several countries that many persons living with HIV present for treatment very late due to the strong stigma associated with AIDS. Ensuring adherence to ARV therapy is also a major challenge though the majority of patients do adhere to therapy well.

Persons living with HIV, including those on ARV therapy, must be counselled to practice safe sex. This is known as “positive prevention” as it helps to break the chain of HIV transmission and reduce new HIV infections. In several countries, a number of women with HIV have repeat pregnancies. Hence the importance of counselling persons living with HIV to use dual methods *ie* use of both a condom and an effective family planning method.

Achieving universal access to HIV prevention in the Caribbean will require a significant increase in the scope, quality and coverage of HIV-prevention services and pro-

grammes. One study in Jamaica conducted in 2004 showed the need for a ten-fold increase in prevention programme coverage and resources (29). Preventing new HIV infections is made more difficult by the strong stigma associated with HIV and those who are most vulnerable such as MSM, CSW and drug abusers. The failure of our leaders to elaborate policies that will provide a more supportive environment and facilitate prevention programmes for these vulnerable populations is also a problem.

Despite these challenges, there is an urgent need to expand prevention programmes especially among the youth and the vulnerable populations. In the Caribbean, most young people are in school and this is the best way to reach them with HIV/STI and sex-education (27). The education sector has generally been slow and ineffective in addressing this need and is hampered by the failure of clear policies and decisive leadership as well as limited resources. PANCAP needs to take on this issue at the regional level as a priority. The youth also have to be reached in other settings and there need to be special programmes targeted at out-of-school youth, but we are failing to reach most of the children in school with meaningful prevention programmes.

Targeted outreach programmes with vulnerable populations need to be expanded to ensure full coverage. Many HIV programmes have no estimate of their target populations and are only reaching a small percentage of those most at risk. Expanding HIV-testing with appropriate counselling among vulnerable groups may also contribute to reducing the number of new infections. However, achieving behaviour change and safe-sex among these marginalized groups is not easy and requires consistent, creative engagement over the long term. Empowering influential peers among these groups in order to sustain safe-sex behaviour is important.

Prevention programmes also need to target vulnerable communities and sites where persons go to meet new sex partners. Surveys show that these sites are not restricted to night clubs and bars, but include a wide variety of locations including malls, fast food venues, taxi stands, parks and even churches (30). Prevention programmes also need to address the workplace with special attention to targeting those who are at greater risk. Achieving universal access requires an effective multi-sectoral approach in which all sectors take responsibility for developing and implementing HIV policies and programmes specifically adapted to the needs and circumstances of their sector.

A variety of different HIV prevention approaches have been taken in the Caribbean with only limited documentation (14). Drama, music and dance are frequently used to communicate the educational message (sometimes referred to as "edutainment") as are games and competitions. Community educators and peer educators have been trained and deployed in most Caribbean countries. However, few of these approaches have been adequately assessed and there has been limited sharing and replication of best practices. The capa-

city to evaluate and document these prevention programmes needs to be strengthened. Indeed, there is a need to strengthen the capacity to monitor and evaluate HIV programmes and conduct research throughout the Caribbean.

CONCLUSION

Caribbean countries have worked hard to control the HIV epidemic. However, much more needs to be done to control HIV spread and reduce new HIV infections. The development of a new Caribbean Regional Strategic Framework for HIV by PANCAP is an important opportunity to forge greater unity and leadership at regional level to support Caribbean countries achieving universal access to HIV prevention, treatment and care.

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Paediatric and Perinatal HIV/AIDS in Jamaica An International Leadership Initiative, 2002–2007

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ABSTRACT

Background: Paediatric and Perinatal HIV/AIDS remain significant health challenges in the Caribbean where the HIV seroprevalence is second only to Sub-Saharan Africa.

Method: We describe a collaborative approach to the prevention, treatment and care of HIV in pregnant women, infants and children in Jamaica. A team of academic and government healthcare personnel collaborated to address the paediatric and perinatal HIV epidemic in Greater Kingston as a model for Jamaica (population 2.6 million, HIV seroprevalence 1.5%). A five-point plan was utilized and included leadership and training, preventing mother-to-child transmission (pMTCT), treatment and care of women, infants and children, outcomes-based research and local, regional and international outreach.

Results: A core group of paediatric/perinatal HIV professionals were trained, including paediatricians, obstetricians, public health practitioners, nurses, microbiologists, data managers, information technology personnel and students to serve Greater Kingston (birth cohort 20 000). During September 2002 to August 2007, over 69 793 pregnant women presented for antenatal care. During these five years, significant improvements occurred in uptake of voluntary counselling (40% to 91%) and HIV-testing (53% to 102%). Eight hundred and eighty-three women tested HIV-positive with seroprevalence rates of 1–2% each year. The use of modified short course zidovudine or nevirapine in the first three years significantly reduced mother-to-child transmission (MTCT) of HIV from 29% to 6% (RR 0.27; 95% CI – 0.10, 0.68). During 2005 to 2007 using maternal highly active antiretroviral therapy (HAART) with zidovudine and lamivudine with either nevirapine, nelfinavir or lopinavir/ritonavir and infant zidovudine and nevirapine, MTCT was further reduced to an estimated 1.6% in Greater Kingston and 4.75% islandwide. In five years, we evaluated 1570 children in four-weekly paediatric infectious diseases clinics in Kingston, St Andrew and St Catherine and in six rural outreach sites throughout Jamaica; 24% (377) had HIV/AIDS and 76% (1193) were HIV-exposed. Among the infected children, 79% (299 of 377) initiated HAART, resulting in reduced HIV-attributable childhood morbidity and mortality islandwide. An outcomes-based research programme was successfully implemented.

Conclusion: Working collaboratively, our mission of pMTCT of HIV and improving the quality of life for families living and affected by HIV/AIDS in Jamaica is being achieved.

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VIH/SIDA Pediátrico y Perinatal en Jamaica Iniciativa de Liderazgo Internacional, 2002–2007

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RESUMEN

Antecedentes: El VIH/SIDA pediátrico y el perinatal continúan siendo retos significativos para la salud en el Caribe, donde la seroprevalencia de VIH ocupa el segundo lugar tras el África Subsahariana.

Método: Se describe un enfoque colaborativo para tratamiento, prevención y cuidado de embarazadas, bebés y niños en Jamaica. Un equipo de personal académico y gubernamental vinculados a la salud, colaboraron para abordar la epidemia de VIH pediátrico y perinatal en Greater Kingston, como modelo para Jamaica (población de 2.6 millones, 1.5% seroprevalencia VIH). Se utilizó un plan de cinco puntos que incluyó liderazgo y entrenamiento, prevención de la transmisión madre a hijo (PTMAH), tratamiento y cuidado de mujeres, bebés y niños, investigaciones basadas en resultados, y outreach local, regional e internacional.

Resultados: Un grupo básico de profesionales del VIH pediátrico/perinatal, que incluía peditras, obstetras, trabajadores de la salud, enfermeras, microbiólogos, administradores de datos, así como personal y estudiantes de la tecnología de la información, fue entrenado para servir en Greater Kingston (cohorte de nacimiento 20 000). De septiembre de 2002 hasta Agosto de 2007, más de 69 793 embarazadas se presentaron para recibir atención prenatal. Durante estos cinco años, tuvieron lugar mejoras significativas en cuanto a la recepción de asesoramiento (40% to 91%) y pruebas (53% to 102%) de VIH voluntarios. Ochocientos ochenta y tres mujeres resultaron VIH positivas en las pruebas, con tasas de seroprevalencia de 1–2% cada año. El uso de un ciclo corto modificado de zidovudina o nevirapina en los primeros tres años, redujo la transmisión madre a hijo (TMAH) de VIH significativamente de 29% a 6% (RR 0.27; 95% CI – 0.10, 0.68). Durante el 2005 hasta 2007, usando terapia antiretroviral altamente activa (TARAA) materna, con zidovudina y lamivudina con nevirapina, nelfinavir o lopinavir/ritonavir y nevirapina y zidovudina para niños, la TMAH se redujo a un estimado de 1.6 % en Greater Kingston y a .75% a lo largo de la isla. En cinco años, evaluamos 1570 niños en cuatro clínicas infecciosas pediátricas semanales en Kingston, Saint Andrew y Saint Catherine, así como en seis otros lugares destinados al servicio comunitario (outreach) por toda Jamaica; 24% (377) tenían VIH/SIDA y 76% (1193) estaba expuestos al VIH. Entre los niños infectados, 79% (299 de 377) iniciaron el TARAA, lo que trajo como resultado una reducción de la mortalidad y la morbilidad infantil atribuible al VIH, en todo el país. Se implementó exitosamente un programa de investigación basado en resultados.

Conclusión: Trabajando en colaboración, estamos logrando nuestra misión de prevenir la TMAH del VIH, y mejorar la calidad de vida de las familias que viven afectadas por el VIH/SIDA en Jamaica.

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BACKGROUND

Worldwide, 2.3 million (1.7 to 3.5 million) children aged less than 15 years were living with HIV in 2006 mainly through mother to child acquisition during pregnancy, delivery or from breast feeding (1). Of these, 540 000 (420 000 to 670 000) were newly infected in 2006 (1). The Caribbean remains second to Sub-Saharan Africa in world HIV prevalence (1). However, several successful outcomes have been reported from Latin America and the Caribbean in recent years, particularly through the NISDI Paediatric and

Perinatal HIV Study Group sponsored by the United States' National Institutes of Health (1–8). Significant gains have also been made in several other Caribbean islands because of the impact of mother to child transmission preventive programmes, general protective measures and public access to antiretroviral drugs in these populations (1, 9–17). However, paediatric and perinatal HIV/AIDS remain a significant health challenge in some Caribbean countries (1,18).

Jamaica is a middle developing island with population of 2.6 million (gross national income – US \$3480 in 2006)

where a total of 11 739 AIDS cases were reported between January 1982 and December 2006 and 840 (7%) paediatric cases were documented since the first case report in 1986 (19–23). The predominant mode of HIV transmission in Jamaica is heterosexual and the epidemic is generalized (19–21). Perinatal prevalence islandwide approaches 1.6% with high prevalence pockets existing in Kingston and other metropolitan regions (19–23).

PURPOSE

In 2002, a team of academic and government healthcare personnel collaborated to address the paediatric and perinatal HIV/AIDS epidemic in Kingston, St Andrew and St Catherine (annual birth cohort 20 000) as a model for Jamaica (total birth cohort 50 000). This was accomplished with an International Leadership Award from the Elizabeth Glaser Paediatric AIDS Foundation, collaborating with the University of the West Indies and the Jamaican Ministry of Health. A five-point plan was implemented. The initiative aimed to provide leadership, mentoring and training of a core group of healthcare professionals to serve Kingston, St Andrew and St Catherine as a model for Jamaica; develop and implement a unified programme to prevention of mother-to-child transmission of HIV (pMTCT of HIV) and provide maternal care; establish a unified programme to treat and care for HIV-exposed infants and HIV-infected infants, children and adolescents; build research capacity and implement a strong outcomes-based agenda and finally, to expand the programme throughout Jamaica while collaborating locally, regionally and internationally.

The methods for this five-point leadership initiative and initial outcomes of the first year of the programme have been described (24–36). We report herein the five-year outcomes of this leadership initiative from September 2002 to August 2007 (24–68).

OUTCOMES

Leadership and training, 2002–2007: The first objective comprised leadership and training of a core group of paediatric and perinatal HIV professionals to serve Kingston and St Catherine and to be a model for the rest of Jamaica (24). They included paediatricians, obstetricians, public health practitioners, residents in training, nurses, medical students, microbiologists, data management and information technology personnel. The healthcare team was the Kingston Paediatric and Perinatal HIV/AIDS Programme (KPAIDS), a strong collaboration between The University of the West Indies and the Ministry of Health, Jamaica, which was well-established and functioned since September 2002 (24). Designated healthcare teams continued providing care for pregnant women with HIV/AIDS with a research nurse as case manager in several sites islandwide. Academically and professionally, we have continued to educate through collaborative didactic teaching sessions, and attendance and participation at various local, regional and international

conferences. Collaborative training of diverse healthcare providers and students continued during 2002 to 2007, through didactic lectures, symposia, clinical training and preceptorships. Two faculty members in paediatrics and obstetrics and gynaecology completed NIH-sponsored summer fellowships from the International Society for Infectious Diseases in Washington and California, USA. Over 50 persons were mentored in research and publications. There were five visiting international university students who successfully completed summer research internships (31, 50, 57). Other highlights included two, one-day minisymposia on Paediatric and Perinatal HIV/AIDS in Jamaica in 2003 and 2005. Team members participated in the 15th, 16th, and 17th International AIDS Conferences in Thailand, Canada and Mexico City, the 3rd and 4th International AIDS Society Conferences in Brazil and Australia, Infectious Diseases Society of America annual conference, National Institutes of Health (NIH) Office of AIDS Advisory Council, Office of AIDS Research, International HIV/AIDS Research Planning Workshops (2005–2008), National Institutes of Child Health and Human Development research meetings for observational cohorts of Paediatric and Perinatal HIV/AIDS, Annual “Think Tanks” of the Elizabeth Glaser Paediatric AIDS Foundation (2002–2007), several local and regional conferences and as the Davenport Cook Lecturer in International Child Health at Yale University School of Medicine (68).

Preventing mother-to-child transmission of HIV, 2002–2007

The second objective comprised implementation of a pMTCT of HIV programme (22, 24, 25). In collaboration with the Ministry of Health, Jamaica, we aimed to test over 30 000 women in three years through this programme. KPAIDS continued collaboration with 42 feeder antenatal clinics in Kingston, St Andrew and St Catherine and at high risk obstetric clinics at the Victoria Jubilee Maternity Hospital, Spanish Town Hospital and University Hospital of the West Indies. From September 2002 to 2005, HIV-infected pregnant women and their babies were offered zidovudine or nevirapine prophylaxis. Through the National AIDS programme since late 2006, most HIV-infected pregnant women islandwide received highly active anti-retroviral therapy (HAART) after the first trimester with zidovudine and lamivudine (Combivir™) and nelfinavir, or nevirapine or lopinavir/ritonavir chemoprophylaxis while their infants received nevirapine and zidovudine. The HIV status of these infants, a primarily non-breastfeeding population, was determined by RNA PCR methodology with confirmatory HIV ELISA at 12 to 18 months (69, 70). Research nurse managers from KPAIDS worked closely with the obstetricians and supported these patients through counselling, treatment and care to ensure their compliance with the protocol. Since 2006, lymphocyte subsets and HIV viral loads were used to evaluate the clinical and

immunological stages of HIV/AIDS and to guide clinical, immunological and virological response to HAART.

During September 2002 to August 2005, in the era of zidovudine/nevirapine for pMTCT prophylaxis, 43 931 women presented for antenatal care to 42 antenatal clinics in Greater Kingston, St Andrew and St Catherine (Fig. 1).

Kingston was 6% (5/82) for mother-child pairs enrolled in the programme as compared to 29% (21/72) for those not enrolled in the programme (RR 0.27; 95% CI 0.10, 0.68). This reflected a significant 73% reduction in rates due to the intervention between both groups and a combined MTCT rate of 16% (26/154).

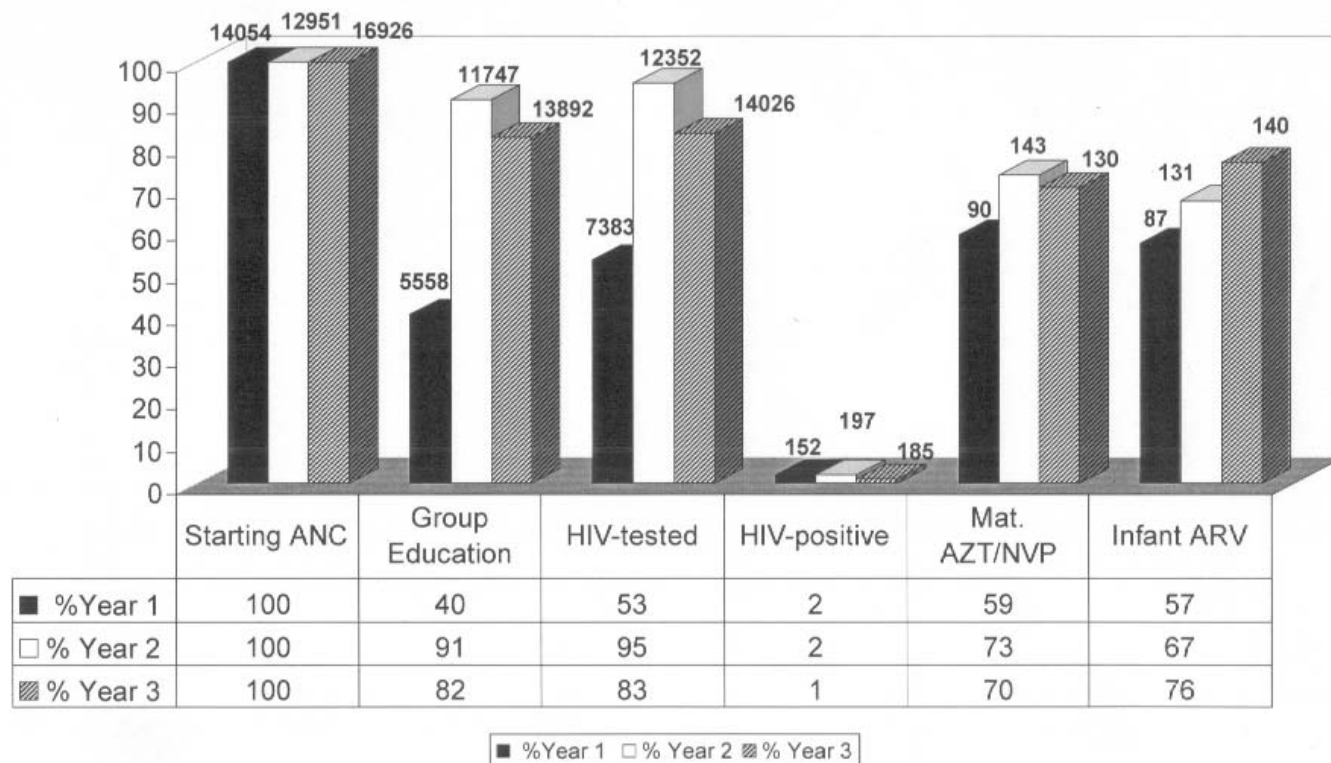


Fig. 1: Efficacy of VCT and ARV prophylaxis in 42 antenatal clinics in Greater Kingston, Jamaica. September 1, 2002 – September 31, 2005; 3 years total.

During the three-year period, improvements occurred in uptake of voluntary counselling (from 40%, to 91%, to 82%) and HIV-testing [from 53%, to 95%, to 83%] (Fig. 1). Five hundred and thirty-four women tested HIV-positive, with seroprevalence rates of 2%, 2% and 1% each year (Fig. 1). These women were managed during pregnancy in three high-risk clinics at the Victoria Jubilee Maternity Hospital, University Hospital of the West Indies and Spanish Town Hospital. The MTCT rate was estimated in infants aged 12–15 months in Greater Kingston, using the public health approach of a modified short course zidovudine regimen or nevirapine. Uptake of zidovudine/nevirapine was 59%, 73% and 70% for the three years, respectively. The estimated MTCT rate in primarily non-breastfed infants aged 12–18 months who had HIV status confirmed by an ELISA test for the Elizabeth Glaser Sponsored programme in Greater

In the era of maternal HAART for pMTCT in Greater Kingston, 25 862 women presented for antenatal care during the two-year period of October 2005 to September 2007 (Fig. 2). Group education was achieved by 83% and 72% in these years. About 102% were HIV-tested in both years, as a few women may have had more than one HIV-positive test in the same pregnancy. HIV seroprevalence was 1% each year. Maternal HAART increased from 71% to 98% while maternal zidovudine/nevirapine declined from 46% to 3% during the period. Infant ARV chemoprophylaxis with nevirapine and/or zidovudine was 101% and 103% both years. Possible explanation for pMTCT rates > 100% in mothers and infants included known HIV-positive repeat pregnancies which may have been unbooked, late presenters and late notification of maternal test results.

Rates of pMTCT were evaluated in the era of HAART for pMTCT in Greater Kingston. Thirty-seven consecutively

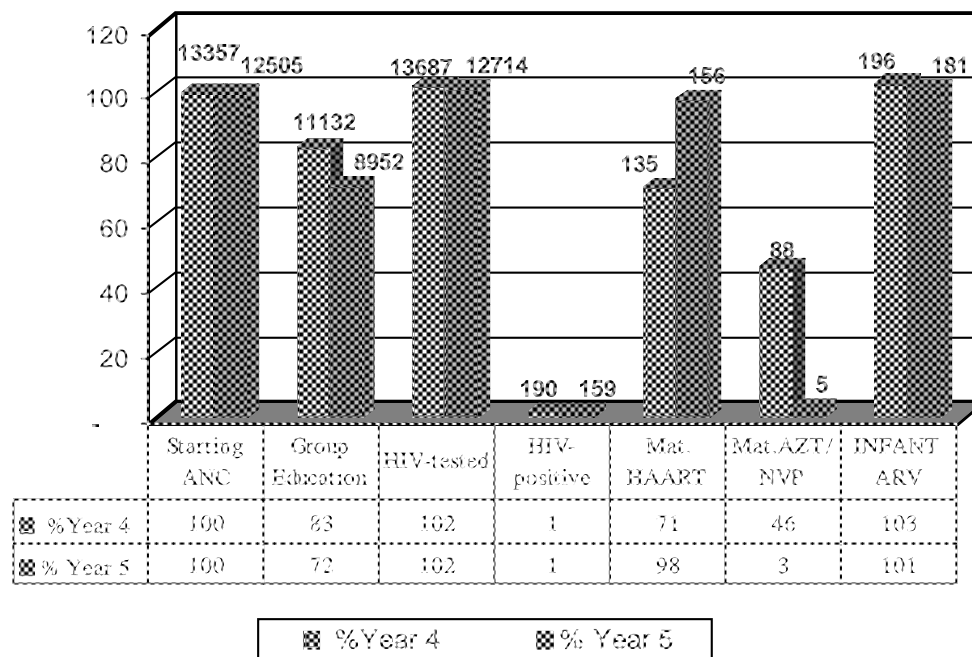


Fig. 2: Efficacy of VCT and HAART in 42 antenatal clinics in Greater Kingston, Jamaica, October 1, 2005 – September 31, 2007.

enrolled women during 2005–2006 received Combivir™ (zidovudine/lamivudine) and nelfinavir for chemoprophylaxis and were followed prospectively at the Victoria Jubilee Maternity Hospital by KPAIDS. These women delivered two stillborn infants. The 35 viable infants received zidovudine and nevirapine and were not breastfed; there was one infant who was HIV-positive by PCR, giving a MTCT rate of 2.8%. During 2007, HAART decreased MTCT to 1.55% (with 3 of 193 PCR tests positive) in infants who were enrolled in KPAIDS. The last case of MTCT with diagnosed paediatric AIDS was made in April 2007 from the KPAIDS programme which operates in Greater Kingston, St Andrew and St Catherine.

Islandwide, in the pre-pMTCT era of 1986 to 2002, HIV seroprevalence in pregnancy was estimated at 0.5% to 1.5% and MTCT rate was 25% (58). During 2002 to 2005, in the pMTCT era, zidovudine and nevirapine reduced islandwide MTCT to 10% (58). Since 2006, HAART (*ie* zidovudine and lamivudine with either nelfinavir or nevirapine) was being used for chemoprophylaxis which targeted about 90% of HIV-infected pregnant women islandwide (19). During 2007, in the era of HAART for chemoprophylaxis, the islandwide pMTCT rate was estimated at 4.75% (with 19/400 qualitative RNA PCR's positive) among infants born to HIV-infected mothers. Since late 2007, through the National AIDS Programme, maternal zidovudine 300 mg/lamivudine 150 mg (combivir™) plus lopinavir 133 mg/ritonavir 33 mg (kaletra™) were commenced islandwide in pregnant HIV-infected women, to prevent MTCT. HIV-exposed infants received nevirapine *stat* and zidovudine for four weeks (69, 70). Breastfeeding of these infants is

strongly discouraged and full replacement feeds are administered. HIV PCR testing is performed twice before six months, with follow-up HIV ELISA at 12–15 months. This programme is expected to further pMTCT throughout Jamaica to the internationally accepted goals of 1–2%.

Paediatric HIV/AIDS treatment and care, 2002–2007

The third objective comprised establishing and leading unified parallel programmes at the four major children's centres in Kingston and St Andrew, and St Catherine for identifying and treating HIV-exposed and HIV-infected infants, children and adolescents, as a model for the rest of the island. Orphaned and vulnerable children (OVCs) with HIV/AIDS who resided in three residential children's homes (orphanages) were also managed by the KPAIDS team. Outcomes of the first year of this programme were reported (24, 26–30). During 2002 to 2007, unified parallel programmes for identifying and treating these children in this region were strengthened. HIV-exposed infants received nevirapine at birth and zidovudine for 4 weeks. Trimethoprim for *Pneumocystis jirovecii* (PCP) prophylaxis, immunizations by national protocols, evaluation of HIV status by RNA PCR and follow-up ELISA testing at 12–18 months as well as full replacement feeds continued. Infants were regularly followed at infectious disease clinics by collaborative multidisciplinary teams, using a predefined protocol at the University Hospital of the West Indies, Spanish Town Hospital, Bustamante Hospital for Children and Comprehensive Health Centre, who implemented protocol-driven case management. Outcome measures included infants' growth, general health, adherence to antiretroviral

and PCP prophylaxis, immunization and nutrition and outcomes documented in a unique collaborative database. Similarly, HIV-infected infants, children and adolescents were followed using protocol-driven guidelines (24, 27–29). During 2002–2007, lymphocyte subsets, HIV viral loads and public access to antiretroviral drugs were made available through a grant from the Global Fund.

During the five-year period of September 2002 to September 2007, 954 paediatric patients (691, 72% HIV-exposed and 263, 28% HIV-infected) were evaluated in four weekly paediatric infectious diseases clinics in Greater Kingston; 52% (136 of 263) of children with HIV/AIDS had CDC category C or severe HIV/AIDS and 84% (222 of 263) of the HIV-infected infants, children and adolescents were commenced on highly active antiretroviral therapy (Table 1). At least 19% (180/954) of the HIV-infected and affected cohort were orphans or had lost one parent. As shown, there was a significant reduction in HIV-attributable morbidity and

mortality throughout this period, with 3.7% (36/954) HIV-attributable mortality overall.

The KPAIDS team members regularly visited and collaborated to establish and maintain several rural outreach sites in Montego Bay (Cornwall Regional Hospital), Mandeville, May Pen, St Ann's Bay, Savanna-la-mar and Black River with local healthcare providers during January 2004 to 2007 (Table 2). Teaching and clinical training of multi-disciplinary members of the healthcare team occurred through "on the ground" preceptorships and patient co-management consultations and discussions. Six hundred and sixteen children were evaluated collaboratively through this programme and 81% (502) were HIV-exposed. Among the 114 children with HIV/AIDS, 68% (77) were commenced on highly active antiretroviral therapy, with only 1.8% (11/616) reported deaths within this cohort, however, these clinics were established after public access to HAART.

Table 1: HIV-infected and HIV-exposed children in Greater Kingston, Jamaica, September 1, 2002 to October. 31, 2007, 5 years total

	UHWI	STH	BHC	CHC	Total
Total	238	309	140	267	954
HIV-exposed	101	275	64	251	691 (72.4%)
HIV+/AIDS	137	34	76	16	263 (27.6%)
N – Asymptomatic	3	0	1	1	5
A – Mildly symptomatic	43	13	10	6	72
B – Moderately symptomatic	18	6	21	5	50
C – Severe symptomatic	73	15	44	4	136
HAART	120	19	74	9	222 (84%)
*Death < 2 yrs./> 2 yrs.	3/9	7/0	9/4	3/1	22/14 (3.7%)
*Orphaned (mother/father/both parents)	98	28	38	16	180 (18.9%)

* Percentage from entire cohort

Death % from total cohort = 3.7 (36/954); Death % from total HIV-infected cohort = 13.7%

Key:

UHWI – University Hospital of the West Indies; STH – Spanish Town Hospital
 BHC – Bustamante Hospital for Children; CHC – Comprehensive Health Centre
 Greater Kingston – Kingston, St Andrew and St Catherine, in Jamaica

Table 2: HIV-infected and HIV-exposed children in outreach clinics, Jamaica

	Cornwall Regional Hospital May 2004 – Oct 2007	Savannah- la-mar Hospital Oct 2005 – Oct. 2007	St Ann's Bay Hospital May 2004 – Oct 07	Mandeville Regional Hospital April 2005 – Oct 2007	May Pen Hospital April 2005 – Oct 2007	Black River Hospital Oct 2007	Total
Total	281	89	139	51	50	6	616
HIV-exposed	220	82	117	38	39	6	502
HIV+ / AIDS	61	7	22	13	11	0	114 (18.5%)
N – Asymptomatic	1	4	2	0	4	0	11
A – Mildly symptomatic	23	1	5	3	2	0	34
B – Moderate	16	1	2	3	0	0	22
C – Severe	21	1	13	7	5	0	47
HAART	43	3	17	10	4	0	77 (68%)
Death < 2 yrs / > 2 yrs.	1/1	0	2/0	3/2	1/1	0/0	11 (1.8%)

Death % from total cohort = 1.8%

Islandwide, 79% (299/377) of children with HIV/AIDS were on treatment with HAART in KPAIDS sites, as of October 31, 2008 (Table 3). Among these, 85% (255) were

impact of the pMTCT programme. The relative increase in 2005 (n = 78) and 2006 (n = 71) was mainly explained by surveillance bias, with increased case finding of mostly older

Table 3: Children with HIV/AIDS, aged 0 – 21 years on HAART enrolled in KPAIDS sites throughout Jamaica and those on 1st, 2nd, 3rd line therapy through October 31, 2007

Treatment sites	Total No. of Children on HAART	Children on 1 st Line therapy	Children on 2 nd Line therapy	Children on 3 rd Line therapy
University Hospital	120	92	26	2
Bustamante Children's	74	68	6	0
Comprehensive Health Centre	9	9	0	0
Spanish Town Hosp	19	19	0	0
Mandeville (MRH)	10	9	1	0
May Pen (MPRH)	4	4	0	0
Black River, St Elizabeth	0	0	0	0
Cornwall Regional	43	35	7	1
Savannah-la-mar	3	3	0	0
St Ann's Bay	17	15	2	0
TOTAL	299	255	41	3
Total HAART/HIV/AIDS	302/377 (79%)			

HAART – Highly active antiretroviral therapy

KPAIDS – Kingston Paediatric and Perinatal HIV/AIDS Programme

on first line therapy, 14% (41) were on second line therapy and 1% (3) were on salvage therapy.

Since the first case of Paediatric AIDS was identified at the University Hospital of the West Indies in 1986 (23), a total of 884 paediatric HIV/AIDS cases have been reported up to December 2007 in national database, with 388 (43%) reported deaths (Fig. 3). The fall in nationally reported cases during 2003 (n = 67) and 2004 (n = 61) reflected the positive

children who were missed perinatally, long-term “healthy” non-progressors with mostly adenopathy and skin lesions, now being identified by astutely trained paediatricians in our programme (58). Recent trends in mortality rates have also fallen significantly (18% – 13/73 in 2006 and 20% – 9/44 in 2007) reflecting the impact of HAART in prolonging and improving quality of life in HIV-infected children (Fig. 3).

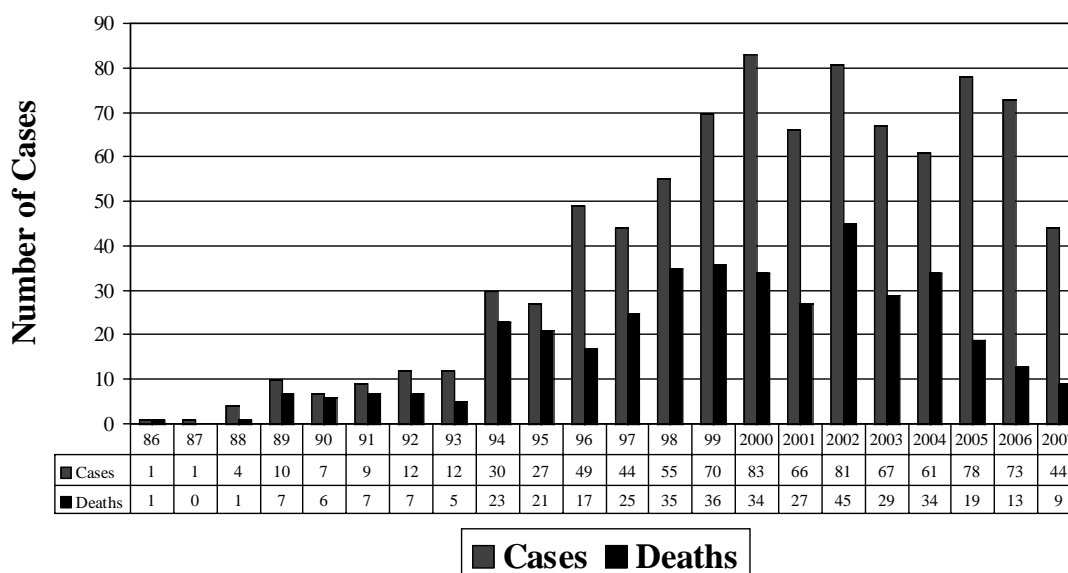


Fig. 3: Reported paediatric AIDS cases and deaths (1986–2007) – Ministry of Health, Jamaica.

Outcomes Research, 2002–2007

The fourth objective comprised peer-reviewed outcomes-based research in preparation for commencing interventional studies. The KPAIDS team built its outcomes-based research capacity and implemented the infrastructure for participation in clinical trials. The first year's work of this team was recently published in a dedicated issue of the *West Indian Medical Journal* (24–36). In this issue of the Journal, the collaborative efforts of the team are again emphasized (37–56). Professor Figueroa, Director of Jamaica's National AIDS Programme, anchors the issue with an update of HIV/AIDS in the Caribbean (37). Christie *et al* reports on the highlights of the effectiveness of the programme in reducing MTCT of HIV/AIDS and improving morbidity and mortality of children with HIV/AIDS while strengthening collaboration, research as well as local, regional and international outreach (38). Johnson *et al* showed that HAART-based pMTCT regimens in pregnant women gave the best outcomes for the mother (39). Pierre *et al* showed that uptake of HAART was significantly associated with reduced mortality, hospitalizations and infectious diseases morbidity in HIV-infected children and adolescents (40). White *et al* reported that adherence to HAART in children was 86% overall and correlated with immune reconstitution while non-adherence was significantly associated with older age of child, missing clinic appointments and nausea (41). Pryce *et al* commented that first line antiretroviral drugs were generally safe and well-tolerated in Jamaican children with few serious adverse events (42). Steel-Duncan *et al* described a 17% incidence of urinary tract infections in HIV-infected children, primarily with *E coli*, *Streptococcus gp D* and *Klebsiella pneumoniae* and emphasized the occurrence of indinavir-associated haematuria and HIV nephropathy (43). Barrett *et al* reported the absence of opportunistic intestinal parasites in institutionalized, HIV-infected, immune-reconstituted children who were receiving cotrimoxazole prophylaxis (44). Harrison *et al* reported on the "healthy" population of adolescent slow-progressors who acquired HIV by MTCT and stressed the importance of implementing healthy lifestyle behaviours (45). Evans-Gilbert *et al* reported that HAART reduced the mortality and prolonged survival for HIV-infected children who were rapid-progressors, had AIDS-defining illnesses and were orphans (46).

Moore *et al* proved that voluntary counselling and testing was an important intervention that enabled an improvement in the awareness, prevention and control of HIV in Jamaican pregnant women, with trained nurses as the counsellors (47). Among psychosocial studies, Weller *et al* reported the negative emotional experiences that HIV-infected women experienced in the perinatal period and recommended appropriate training of religious leaders and health-care providers to better respond to these psychosocial needs (48). Hylton-Kong *et al* compared quantitative outputs of contact investigation, such as time to interview, percentage of

contacts located and tested in urban and rural settings (49). Pilgrim *et al* showed that the majority of HIV-positive adolescents are cared for by family, despite knowledge of the adolescent's status and in the face of potential stigma (50). An invited article from the National AIDS Programme by Harvey *et al* detailed evaluation of adherence to HAART in adults who were unemployed, poor and with limited education, recommending the implementation of educational methods aimed at low literacy HIV-infected populations (51).

Among case series, Singh-Minott *et al* commented on public health, clinical and laboratory challenges in successfully managing a child with HIV/AIDS and isoniazid-resistant *M tuberculosis* with widespread dissemination (52). Dunkley-Thompson *et al* reported a series of infants with immune reconstitution following HAART and BCG vaccination with adenitis (53). Lowe *et al* stated the intensified psychological impact when HIV infection resulted from sexual assault as opposed to other methods of transmission and conveyed the positive role of psychosocial interventions (54).

Billings discussed the potential dangers of unsafe tattooing practices and suggested guidelines for regulating the tattooing industry in Jamaica (55). The specially-invited and final article by Brissett and Griffiths-Irving reported on increasing the awareness of HIV/AIDS in Jamaican children through a novel strategy of implementing an islandwide debating competition in the schools (56).

Awards and Honours

These research articles demonstrate that KPAIDS team garnered experience in outcomes-based research relating to HIV/AIDS in women, infants, children and adolescents. The KPAIDS won the Principal's Research Award for Most Outstanding Research Project in the Faculty of Medical Sciences of the University of the West Indies for 2006. This work also contributed to the award of the University Vice Chancellor's Award for Excellence in Research for the year 2008. These paediatric and perinatal HIV research initiatives along with the experience gained in the recent rotavirus vaccine mega-trial (which enrolled 1805 subjects from Jamaica and which won the Lancet's Paper of the Year Award for 2006 for the best original medical research worldwide) has placed this team in good stead for participation in HIV clinical trials of drugs and vaccines (71–76). A KPAIDS team member was also elected to the Governing Council for the International AIDS Society representing Latin America and the Caribbean.

Outreach and Collaboration, 2002–2007: The fifth and final objective comprised programme expansion throughout Jamaica, as well as, collaboration, regionally and internationally. The first year's collaborative accomplishments were reported. Since then, our strongest collaborator has remained the Jamaican Ministry of Health. KPAIDS established several outreach sites for the treatment of HIV-exposed and

HIV-infected infants, children and adolescents in several regional hospital sites (Tables 2 and 3). We also continued collaboration regionally and internationally. The Bill Clinton Foundation augmented our paediatric HIV/AIDS initiatives through the Ministry of Health and KPAIDS to improve infant diagnostics and mobilize access to paediatric HAART. The KPAIDS Programme negotiated a subcontract with the WESTAT/National Institutes of Child Health and Human Development and joined their Paediatric and Perinatal HIV/AIDS Observational Research Cohorts in Latin America and the Caribbean (N01-HD-3-3345). We collaborated with Harvard University for over five years to evaluate the HIV specific neonatal immune responses as a basis for an appropriate neonatal HIV vaccine (36, 63–65). This collaboration recently received external research funding from awards to Dr Margaret A Feeney from the Elizabeth Glaser Paediatric AIDS Foundation, the Jeweler's for Children of America and the United States' National Institutes of Health (1R01AI068497-01A2). The Global Fund for AIDS, TB and Malaria's continued support to Jamaica's Paediatric and Perinatal HIV/AIDS programme providing antiretroviral drugs and diagnostics, including immunological tests, HIV viral loads and infant PCRs to year 2013.

Advocacy: International advocacy has been performed by KPAIDS programme at several levels. One of our HIV-infected mother-child pairs, participated in several speaker forums on many international forefronts. These included a unique United States Congressional Briefing and press conference, sponsored by Senators Hillary Clinton and Richard Lugar in the Senate Building on Capitol Hill in 2006 (66). Another was a Jeweler's for Children of America Gala and Awards Banquet in Las Vegas, USA, with over 2200 participants in 2007 (65). This nine-year old patient was also the youngest delegate and speaker at the Commonwealth Health Ministers' Conference in Geneva, Switzerland, in 2007. Finally, KPAIDS actively participated at a "Commitment to Children" press briefing on a World AIDS Day luncheon, on Capitol Hill, in 2004 (67).

Challenges, Opportunities and Successes

The challenges and opportunities that the programme has encountered are discussed (24–56). The greatest challenge continues to be the socio-economic factors that fuel the epidemic in Jamaica. We must address the psychosocial issues of orphans and vulnerable children, women and their families. Repeat pregnancies (30–40%), continued stigma and discrimination and the lack of empowerment of vulnerable women and their families deserve special mention (61). The lack of socio-economic and vocational opportunities create an uncertain future for orphaned and vulnerable children who are institutionalized; on attaining the age of 18 years they are required to leave these homes, inadequately prepared to take their place in society. Better programmes must be developed to enable a more successful transition of

these HIV-infected children into adolescence and adulthood. This provides a unique opportunity to fully embrace these issues in daily interactions with the women and address the education of children who are wards of the state. Physical factors, such as demographics and trying to locate known infected patients and HIV-exposed infants who are lost to follow-up and also to identify newly infected mothers and children who live in remote areas of the country continue to be problematic. Follow-up programmes must be ensured for all HIV-exposed infants to enable appropriate HIV diagnosis and treatment. We still need to provide access to all for initiatives to pMTCT of HIV/AIDS, especially the "late presenters". This could be accomplished by ensuring universal access to voluntary counselling, testing and chemoprophylaxis to late presenters on the labour ward. Identification of the "missed population" of perinatally HIV-infected, "healthy" adolescent "slow progressors" continues to be challenging (58). These relatively healthy teens may be ignorant of their status, becoming sexually active and should be identified to facilitate appropriate treatment and care. Unavailability of appropriate paediatric drug formulations is an issue that must also be addressed although this challenge is not unique to Jamaica (76). This is a pressing issue to address considering the increased population of children and adolescents who now require second line antiretrovirals and salvage therapy.

Notwithstanding, the Paediatric and Perinatal HIV/AIDS Leadership Initiative in the Greater Kingston metropolitan region of Jamaica achieved its objectives and implemented a successful five-point plan. This comprised leadership, mentoring and training of a large diverse team of healthcare professionals, including paediatricians, nurses and obstetricians who care for HIV-infected pregnant women, infants, children and families as a model for Jamaica. A programme for pMTCT of HIV and maternal care was implemented. The greatest success has been the marked decline in new cases of infected infants because of a successful pMTCT programme which included PCR testing in infancy in Greater Kingston and also throughout the island. A strong collaborative programme was implemented for paediatric treatment and care with increased public access to HAART with improved safety profile and acceptable adherence rates and subsequent immune-reconstitution. This led to improved growth, significantly reduced hospitalizations, infection-related morbidity and mortality in the children. A successful outcomes-based research programme was implemented (24–64). Collaboration and outreach was achieved, locally, regionally and internationally. Working together, the team's mission of pMTCT of HIV/AIDS and improving the quality of life for those already living and affected by HIV/AIDS is being achieved throughout Jamaica.

The ultimate goals include the elimination of MTCT HIV in Jamaica, with no new cases of paediatric HIV/AIDS, the successful transition of the current cohort of infected children into adult care and treatment and a future for them

that includes leading normal lives by completing college education and/or vocational training, obtaining gainful employment, having their own families, owning their own homes and becoming contributing members of the society.

Finally, we remain sincerely grateful and appreciative to Elizabeth Glaser Paediatric AIDS Foundation (EGPAF) for the unique opportunity to serve Jamaica while joining them in achieving their mission of “*preventing and eliminating the spread of HIV/AIDS through innovative research programmes, collaborative training initiatives, expansive advocacy efforts and rapidly-expanding international programmes.*”

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Evolving Care of HIV-infected Pregnant Women in Jamaica

From Nevirapine to HAART

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ABSTRACT

Background: The Ministry of Health, Jamaica, is scaling-up programmes to improve the health of HIV-positive pregnant women according to the modified WHO recommended preventative mother to child transmission (pMTCT) regimens of therapy based upon the mother's clinical and immunological status. Highly-active antiretroviral drugs (HAART) can result in successful pMTCT to < 1%. We report the clinical and immunological characteristics of HIV/AIDS in an era of evolving treatment and care of HIV-infected pregnant Jamaican women.

Subjects and Method: Clinical records were reviewed of patients registered in antenatal clinics in Greater Kingston and St Catherine, Jamaica (annual birth cohort – 20 000) between September 2002 and August 2006. Disease status was determined using the Centers for Disease Control and Prevention (CDC) classification system for adult HIV/AIDS. Demographic, clinical and laboratory data were documented and analyzed.

Results: During the four-year period, 571 HIV-infected women were enrolled; 62% from Victoria Jubilee Hospital, 25% from Spanish Town Hospital and 13% from the University Hospital of the West Indies. Mean age was 27–29 (range 15–41) years, median parity was 2 (range 0–9) and 68–70% were unemployed. Ninety-five per cent had live births. CDC categories of illnesses were A - mild disease in 82% (n = 473), B - moderate disease in 4.4% (n = 24) and C - severe disease in 1.4% (n = 8) while 12% (n = 66) had insufficient data. During the first three years, CD4⁺ cell counts were evaluated in only 2.5% (10 of 406) of patients with median of 344 cells/uL, compared to CD4 evaluation in 50% (83 of 165 women) in the last year with median of 573 cells/uL. Antiretroviral (ARV) medications primarily for pMTCT were given to 89% (n = 506) of women. Of these, uptake of HAART increased during years 1–3 from 2–3% to 62% in year four. Within two years post-partum, 24 women died, 92% (n = 22) from the direct complications of HIV/AIDS.

Conclusion: A comprehensive system of care of HIV in the peripartum period has been developed in Jamaica. Detailed medical evaluation during pregnancy is performed with modern guidelines and increasing laboratory availability of CD4⁺ cell counts and viral loads. We believe declining HIV infection rates in Jamaican infants and healthier mothers are a direct consequence of increased testing in pregnancy with early diagnosis and initiation of HAART-based pMTCT regimens in pregnant women.

Evolución del Cuidado de las Mujeres Jamaicanas Infeccionadas por el VIH

– Desde la Nevirapina a la TARAA

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RESUMEN

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Antecedentes: En la actualidad el Ministerio de Salud de Jamaica se halla en plena campaña por aumentar los programas de salud para mujeres embarazadas por el VIH positivo, sobre la base de regímenes terapéuticos para prevenir la transmisión de madre a hijo (PTMAH), de acuerdo con recomendaciones modificadas de la OMS, a partir del estatus inmunológico y clínico de la madre. Los medicamentos antiretrovirales altamente activos (TARAA) pueden traer como resultado un exitoso PTMAH a < 1%. Reportamos las características clínicas e inmunológicas del VIH/SIDA en una etapa en la que el tratamiento y cuidado de las mujeres embarazadas infectadas con VIH en Jamaica, se halla en evolución.

Sujetos y Métodos: Se revisaron las historias clínicas de pacientes registrados en las clínicas prenatales en Greater Kingston y Saint Catherine (cohorte de nacimiento anual – 20 000), entre septiembre de 2002 y agosto de 2006. El estatus de la enfermedad fue determinado usando el sistema de clasificación para el VIH/SIDA en adultos, según los Centros para el Control y Prevención de las Enfermedades (CCPE). Se documentario y analizaron datos demográficos, clínicos y de laboratorio.

Resultados: Durante el período de cuatro años, se reclutaron 571 mujeres infectadas con el VIH, 62% del Hospital Victoria Jubilee, 25% del Hospital de Spanish Town, y 13% del Hospital Universitario de West Indies. La edad promedio fue de 27-29 años (rango 15-41), la paridad mediana fue 2 (rango 0-9), y el 68-70% eran desempleadas. El noventa y cinco por ciento tuvo nacimientos vivos. Las categorías de enfermedades de CCPE fueron la enfermedad leve A- en 82% (n = 473), la enfermedad moderada B - en 4.4% (n = 24) y la enfermedad severa C - en 1.4% (n = 8) mientras que para el 12% (n = 66) los datos fueron insuficientes. Durante los primeros tres años, los conteos CD4+ fueron evaluados en sólo 2.5% (10 de 406) de los pacientes con la mediana de 344 células/uL, en comparación con la evaluación CD4 en 50% (83 de 165 mujeres) en el último año con una mediana de 573 células/uL. Los medicamentos antiretrovirales (ARV) fundamentalmente para PTMAH fueron dados al 89% (n = 506) de las mujeres. Entre éstas, el consumo de TARAA aumentó durante los años 1-3 de 2-3% a 62% en el cuarto año. En los dos años posteriores al parto, murieron 24 mujeres, 92% (n = 22) de complicaciones directas del VIH/SIDA,

Conclusión: Un sistema integral de atención al VIH en el período de periparto ha sido desarrollado en Jamaica. Durante el embarazo, se lleva a cabo una evaluación médica detallada con normas modernas y con aumento de la disponibilidad en los laboratorios del conteo CD4+ y cargas virales. Creemos que la disminución de las tasas de infección por VIH en los infantes jamaicanos y el número de madres más saludables, son consecuencia directa del aumento de las pruebas durante el embarazo con diagnóstico precoz y regímenes de PTMAH basados en TARAA en las mujeres embarazadas.

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BACKGROUND

The Caribbean remains second to Sub-Saharan Africa in world HIV prevalence (1). The Caribbean HIV epidemic is heterosexual and seroprevalence among pregnant women appears to be declining in several nations. In Haiti, the HIV rate among pregnant women declined from 6.0% in 1996 and 5.1% in 2000 to 3.4% in 2004 (2). In the Dominican Republic, HIV prevalence among antenatal clinic attendees aged 15-24 years was 0.5% in 1992, peaked at nearly 3% in 1995 and declined to 1.5% in 1998 and 0.5% in 2000 (2). In contrast, Jamaica has maintained a stable HIV seroprevalence rate of 1.5% in pregnant women (3).

In response to a growing urban paediatric HIV epidemic in Greater Kingston and St Catherine, Jamaica, in the early 21st century, the Kingston Paediatric and Perinatal HIV/AIDS Programme (KPAIDS) was configured in September 2002, as a joint collaborative initiative between the University of the West Indies, the Jamaican Ministry of Health and international partners (4). Its perinatal mandates were (and continue to be): early identification of HIV positive pregnant women, reduction of mother-to-child transmission

(MTCT) through provision of antenatal care and anti-retroviral therapy and close follow-up of HIV-exposed neonates. Since initiation of the programme, MTCT rates between September 2002 and December 2004 showed significant reduction from prior rates of 31.5% to < 2%, with the use of HAART-based regimens (5). The KPAIDS serosurvey of the antenatal population in Greater Kingston and St Catherine, performed from September 2002 to September 2003, reported a HIV prevalence of 2.1% (6).

While the course of pregnancy is not altered by HIV infection alone, the complications of chronic immunosuppression can be devastating in pregnant women. Natural history studies of HIV infection show a range from asymptomatic infection to life-threatening conditions characterized by severe immunodeficiency, opportunistic infections and cancers. Physicians and nurse-midwives must remember that with improving access to appropriate therapies, caring for HIV-infected pregnant women involves not only prevention of MTCT (pMTCT) but also provision of optimal care to the mother which should result in a much improved prognosis.(7) This can only be achieved by determination of

HIV status in pregnancy as early as possible. The initial assessment should ideally include clinical evaluation of HIV disease status, evaluation of the degree of existing immunodeficiency determined by CD4⁺ cell count and per cent, assessment of the need for opportunistic infection prophylaxis and risk of disease progression as determined by plasma HIV RNA copy number. This evaluation guides the clinician in choosing when to initiate therapy and in deciding whether to use regimens directed solely at transmission interruption or more comprehensive drug regimens that will simultaneously treat the mother's infection.

In an attempt to adopt this approach to therapy, the Ministry of Health of Jamaica revised its policies with regard to prevention of perinatally acquired HIV. Modified WHO recommended pMTCT regimens are being instituted, targeting antiretroviral drug therapy based upon the clinical and immunological status of women. As we move towards provision of care aimed at improving the health of HIV-positive pregnant women, we sought to determine the health status of our current cohort. The 1986 Centers for Disease Control (CDC) classification system for human immunodeficiency virus (HIV) infection among adolescents and adults (8) was used to assess the spectrum of clinical disease seen in the women registered in the programme during the four-year period September 2002 to August 2006.

METHODS

Study population

Between September 2002 and August 2006, attendees of antenatal clinics in Greater Kingston and St Catherine, Jamaica, were offered group voluntary counselling and HIV testing (VCT) as part of a standard antenatal haematological panel at booking (3–5). All patients seen at the University Hospital of the West Indies (UHWI) were booked in the first trimester. At the other two sites *ie* Victoria Jubilee Hospital (VJH) and Spanish Town Hospital (STH), patients presented for booking at various times in the first, second and third trimesters. A few patients presented to the labour ward unbooked and in active labour. Patients were identified as HIV-positive if they had an initial positive ELISA or Determine Rapid test followed by a confirmatory Western blot. These patients were then post-test counselled and referred simultaneously to the high risk pregnancy clinic at UHWI, VJH or STH. Informed consent was obtained for registration with the KPAIDS Programme due to obtaining data for programme evaluation research purposes.

Study design

This was a retrospective review of the medical records of this cohort. Antenatal care was provided by a team composed of obstetricians, midwives and social workers. Assessment of HIV disease status using CDC criteria was made at the first visit to the antenatal clinic after established HIV seropositive diagnosis. Visits were as per a standard antenatal schedule with extra visits as indicated clinically. Where necessary for

medical or obstetric indications, the patients were admitted to UHWI, VJH or STH. The primary goal of antiretroviral therapy was prevention of perinatal transmission using the Thailand regime (9), zidovudine 300 mg orally twice daily from 28 weeks antepartum, every three hours during labour and as a suspension postpartum for 6 weeks to the infant. Patients presenting late in pregnancy who did not receive antepartum zidovudine received a single dose of nevirapine antepartum during labour and postpartum to the infant as per the HIVNET 015 trial (10). Highly active antiretroviral therapy (HAART) was continued throughout pregnancy in patients who conceived while on medication. CD4⁺ counts were initially determined as laboratory availability and patient's finances allowed. Later as the programme evolved, lymphocyte subsets and HAART were commenced through support from the Global Fund to Fight AIDS, Tuberculosis and Malaria (5). HAART initially comprised of zidovudine and lamivudine with either nevirapine, nelfinavir or lopinavir with ritonavir, beginning within the first trimester or as early as possible. For those presenting late in labour, nevirapine was administered. A dedicated nurse manager employed by the programme within each obstetric hospital sought to ensure that patients were compliant with visits and medications and other interventions (11).

A data extraction form was used by the programme nurse to obtain information from the patient's primary hospital records. This included demographic, clinical and laboratory data documented at enrolment and subsequent clinical data recorded at each antenatal visit. Categorization of HIV disease based upon the CDC clinical criteria was assigned retrospectively to each patient after review of the clinical assessment documented by the obstetrician or nurse-midwife. Where this information was not adequately documented, the patients were assigned a category based upon a more thorough review of their clinical records. Data were cross-checked and confirmed or cleaned as indicated prior to statistical analysis. Main outcome measures included: age at pregnancy, parity, employment status, haemoglobin, CD4⁺ T-lymphocyte count: according to year of pregnancy, CDC stage of disease, antiretroviral therapy, pregnancy outcome (normal delivery, ectopic pregnancy, spontaneous abortion) and maternal death. Bivariate analysis was performed using the statistical package in Microsoft Excel® (Microsoft, WA, USA).

RESULTS

The results for the first three years when zidovudine and/or nevirapine were being used were compared with year 4, when a HAART regimen was used primarily for preventing mother-to-child transmission of HIV (pMTCT) or for maternal treatment. During the four-year period, 571 HIV-infected pregnant women were enrolled: 62% at VJH, 25% at STH and 13% at UHWI. Sociodemographic factors are shown for the four-year period (Table 1). Mean maternal age was 27–29 years and 68–70% of the women were unem-

Table 1: Booking clinical and laboratory characteristics of HIV-positive Jamaican women seen in the antenatal clinics

Sociodemographic Factors	Sept 2002 to Aug 2005	Sept 2005 to Aug 2006
Total women in cohort	369	165
Sociodemographic factors	Sept 2002 to Aug 2005	Sept 2005 to Aug 2006
Maternal mean age in years (range)	27 (15 – 42)	29 (17 – 41)
Parity, mean (range)	2 (0 – 9)	2 (0 – 9)
Employed (%)	112 (30%)	54 (32%)
Partners HIV-tested	Unknown	49 (30%)
Partners HIV-positive	Unknown	16 of 49 (33%)
Partners HIV-negative	Unknown	24 of 49 (49%)
Laboratory Profile		
Haemoglobin in mg/dL	4.6 – 14.20	Range: 6.0 – 14.4 Mean: 11.8
Anaemia, ie haemoglobin < 10 mg/dL (%)	89 (24%)	39 of 134 (29%)
Reactive VDRL (%)	12 (3%)	3 of 139 (2%)
CD4+ cells per μ L, mean (range)	611 (5 – 808)	*573 (14 – 1028)

*83 subjects (50%) had CD4 counts performed in this time period

ployed. About 32% of partners were HIV-tested and 33% of them tested HIV-positive. Haemoglobin at booking showed that 24–29% of the women were anaemic and 2–3% had a reactive VDRL. During the first three years, CD4⁺ cell counts were evaluated in only 2.5% (10 of 406) of patients and ranged from 5 to 808 cells per μ L (median of 344 cells per μ L) compared to 50% (83 of 165 women) in the last year with mean CD4 count of 573 cells per μ L (range 14–1028 cells per μ L). Viral loads were unavailable due to inability of local laboratories to perform analysis at that time.

For the cumulative four-year period, CDC categories of illnesses were Category A – mild disease 83% (n = 473), Category B – moderate disease 4% (n = 24) and Category C – severe disease 1.4% (n = 8) whereas 12% (n = 66) could not

be categorized due to insufficient clinical data (Table 2). Patients who had severe disease had the following conditions (Table 2) *viz*: two women with HIV wasting disease and two with herpes zoster and one each with cryptococcosis outside the lungs, toxoplasmosis of the brain, progressive multifocal leukoencephalopathy, can-didiasis – oesophageal or pulmonary and *Pneumocystis jirovecii* pneumonia. The majority of patients with category A disease had asymptomatic HIV infection while most patients with moderate disease had persistent candidiasis of the vagina. In year one, 28% of patients could not be classified due to insufficient data but this declined to 3% in year four.

Antiretroviral (ARV) medications primarily for prevention of vertical transmission were given to 89% (n = 506)

Table 2: CDC sub-categories of clinical disease seen among HIV-positive antenatal Jamaican women by year registered

Clinical CDC Category	Year 1 (n = 106) n %	Year 2 (n = 142) n %	Year 3 (n = 158) n %	Year 4 (n = 165) n %	Total (n = 571) n %
Mild Disease (A)					
HIV infection (Asymptomatic)	66 (62)	117 (82)	138 (87)	148(90)	469 (82)
Acute (primary) HIV infection	0	1	0	0	1
Persistent generalized lymphadenopathy	0	1	0	2	3 (0.5)
Moderate Disease (B)					
Persistent candidiasis of the vagina	7(6)	3(2)	3	0	13 (2)
Oral candidiasis (thrush)	0	1	0	1	2 (0.4)
Cervical abnormalities	0	0	1	5	6 (1)
Herpes zoster (shingles)	0	1	1	0	2
Idiopathic thrombocytopenia purpura	0	0	0	1	1
Severe Disease (C)					
HIV wasting syndrome	1	1	0	0	2 (0.4)
Cryptococcus outside the lungs	1	0	0	0	1
Toxoplasmosis of the brain	1	0	0	0	1
Progressive multifocal leukoencephalopathy	0	1	0	0	1
Candidiasis – oesophageal or pulmonary	0	1	0	0	1
<i>Pneumocystis jirovecii</i> pneumonia	0	0	1	0	1
Herpes simplex causing prolonged skin problems	0	0	0	1	1
CD4+ counts < 200 and asymptomatic	Unknown	Unknown	2	5	7 (1)
Unknown (O)	30 (28)	15 (11)	14 (9)	7 (4%)	66 (12)

of women during the four-year period ranging from 80% to 93% throughout the period. Among these, use of HAART for pregnant HIV-infected women increased from 2–3% in years one to three to 62% in year four.

Throughout the four-year period, 95% (n = 542) of the cohort ended in live births. For the four-year period, 3% had stillbirths, 1% had neonatal deaths and 1% had spontaneous

component of the initial evaluation includes joint assessment of the status of the patient's HIV disease by the internist and obstetrician or nurse-midwives. This will guide recommendations about beginning or altering antiretroviral treatment and discussion of interventions to reduce the risk of perinatal HIV transmission. Most of the patients in this cohort were clinically assessed only by the attending obstetrician and

Table 3: Indication for administered antiretroviral therapy and pregnancy outcomes

Antiretroviral Therapy	Year 1 n = 106	Year 2 n = 142	Year 3 n = 158	Year 4 n = 165	Total n = 571
pMTCT (mono, dual and/or HAART)	85 (80%)	125 (88%)	143 (91%)	153 (93%)	506 (89%)
Triple Therapy (subset of pMTCT)	2 (2%)	0	3 (3%)	101 (62%)	105 (21%)
Pregnancy outcome					
Live births	97 (91)	134 (94)	148 (93%)	164 (99%)	542 (95%)
Spontaneous abortions	0	3 (2)	1	1	5
Stillbirths/IUD	3 (3)	3 (2)	9 (5.6%)	1	16 (2.8%)
Neonatal deaths	4 (4)	1 (1)	1	0	6 (1%)
Ectopic pregnancies	1	0	0	0	1
Maternal deaths	12	7	4	1	24 (4.2%)

NB: Maternal death: the numbers of women who enrolled in the particular year who have subsequently died within two years of giving birth. One maternal death occurred antepartum.

Table 4: Causes of maternal death

	Sept 2002 – Aug 2005	Sept 2005 – Aug 2006
HIV/AIDS-related	11	0
Pneumonia	2	0
Meningitis	1	0
Severe anaemia, sepsis	1	0
Kaposi sarcoma	1	0
Left hemiparesis, severe anaemia	1	0
CNS toxoplasmosis	1	0
<i>Pneumocystis jirovecii</i> <i>pneumonitis</i>	1	0
Cancer of vulva	1	0
Suicide	0	1
Gunshot wound (homicide)	1	0
Unknown	1	0
Total	23	1

abortions (Table 3). For all four years, 24 maternal deaths (4%) occurred; one occurred antepartum and the others within two years of delivery. Four per cent (one of 24 deaths), occurred in the cohort primarily exposed to HAART while 96% (23 of 24) occurred in the cohort exposed to zidovudine/nevirapine. In 92% (22 deaths), the cause of death was directly related to HIV/AIDS or a known complication thereof.

DISCUSSION

Clinicians can now offer infected women a very high likelihood of birthing children who will be HIV-uninfected as well as much improved disease prognosis. An important

nurse midwives. An integrated system of antenatal and postpartum care involving internists and obstetricians is currently being implemented in order to fully address this issue.

In this study, the majority of the maternal cohort had asymptomatic disease. The initial unavailability of CD4⁺ T-cell testing limited universal use of the 1992 revised classification system which categorizes persons not only on the basis of clinical disease criteria associated with HIV infection but also CD4⁺ T-lymphocyte counts (12). Studies have shown that as the number or percentage of CD4⁺ cells decreased, the risk and severity of opportunistic illnesses increased (13). The use of CD4 counts in the revised classification thus more accurately assessed the severity of HIV-related morbidity and immunosuppression. The results as presented could therefore reflect an underestimation of the severity of disease in this cohort. This theory is supported by the finding that only eight patients were found to have severe disease in the first three years, yet 21 of 22 HIV-related maternal deaths occurred within two years of delivery in the cohort exposed primarily to zidovudine and/or nevirapine. The recent island-wide upgrade of laboratory facilities allowing wide availability of CD4⁺ counts and viral loads as well as the use of HAART has already minimized peripartum deaths in pregnant women with HIV infection. The earlier experience of this group of researchers with postpartum deaths highlights the importance and need for coordinated care beyond pregnancy.

For the four-year period, 82% of patients had category A disease and 89% received antiretroviral therapy primarily directed at preventing perinatal transmission. These figures

on the surface would be concurrent and appropriate; however, the category of patient who is clinically asymptomatic but whose CD4⁺ count is less than 200 cells/*ul* and would require HAART therapy urgently remained unidentified and was therefore inappropriately treated. However, current increasing availability of CD4⁺ counts has addressed this for the present and future. A clear deficiency in therapy was seen in the early years of this study, however, only 1% received the indicated triple antiretroviral therapy despite 8% of patients having been clinically assessed as category C disease. Funding provided by the Elizabeth Glaser Paediatric AIDS Foundation during the first three-year period enabled provision of zidovudine monotherapy and hence increased the proportion of patients that commenced any antiretroviral intervention in pregnancy. Use of mono- or dual-therapy for pMTCT reflected the past problem of triple antiretroviral therapy being largely unaffordable to the population. The Ministry of Health with the aid of the Global Fund has subsidized substantially the cost of medication enabling improved access to triple antiretroviral therapy; therefore access to HAART was increased in year four to 68%, with a substantial decrease in HIV-attributable mortality.

Obi *et al* (14) found that seropositive women were significantly more likely than controls to have recurrent vulvovaginitis and positive syphilis serology. The present cohort also appears to reflect this pattern, as recurrent vulvovaginitis was the most frequent category B disease. Although 3% of the cohort had a positive VDRL which was diagnosed at booking in the antenatal clinic, there was unfortunately no documentation of a confirmatory test for syphilis. A repeat VDRL is also recommended in the third trimester to document seroconversion to a positive VDRL in these vulnerable HIV-infected pregnant women.

Anaemia was documented in over 25% of this cohort. Aggressive diagnosis and treatment of anaemia has to be emphasized as the potential for worsening anaemia in pregnancy with its antecedent antenatal and postpartum complications which coexist with antiretroviral therapy. Despite showing overall improved obstetric outcomes and few maternal toxicities associated with antiretroviral therapy during pregnancy, Tuomola *et al* demonstrated that HAART use in pregnancy was associated with anaemia [OR= 1.6, 95% CI: 1.1, 2.4] (15).

Despite challenges, pregnancy outcomes were relatively good, considering the modest per capita incomes in Jamaica and the low socio-economic status of the patients. The live birth rate was 95% overall. This indicates a low risk of adverse pregnancy outcome in this predominantly CDC class A and B HIV+ cohort, the majority of whom received zidovudine monotherapy. Similar findings of low evidence of adverse pregnancy outcomes were demonstrated by Phanuphak *et al* in a study of HIV-infected pregnant women in Thailand. The women received single dose nevirapine in addition to zidovudine (16).

In 2008, we offer four-drug HAART (*ie* zidovudine, lamivudine, lopinavir with ritonavir) to all HIV-infected women who are diagnosed early in pregnancy, with island-wide uptake consistently approaching 90% regardless of the woman's individual disease stage (15). Lymphocyte subsets and HIV viral loads are also being evaluated consistently. By bringing the patient's viral load to an undetectable level, HAART has minimized the chance of perinatal transmission to < 2% in Kingston and to < 5% islandwide and has also reduced substantially the need for Caesarean delivery for a HIV indication (5). Simultaneously, the mother's prognosis is optimized with minimal maternal toxicity and without significant adverse impact on pregnancy outcome (16).

In summary, a comprehensive system of care of HIV in the peripartum period has been developed in Jamaican nurses and nurse midwives played an important and pivotal role in the execution of the entire KPAIDs programme (11). Detailed medical evaluation during pregnancy in light of the evolution of the guidelines and increasing availability of laboratory facilities to determine CD4⁺ cell counts and HIV-viral loads, along with opportunistic infection prophylaxis and HAART are now being implemented with comprehensive treatment and care continuing postpartum. The use of HAART-based regimes in pregnant women is now associated with the best outcomes for both the infant who is HIV-negative and the mother with better prognosis evidenced by decreased HIV-attributable morbidity and mortality.

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Effectiveness of Antiretroviral Therapy in Treating Paediatric HIV/AIDS in Jamaica

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ABSTRACT

Background and Purpose: Paediatric HIV/AIDS remains a significant challenge in developing countries. We describe the effectiveness of interventions in HIV-infected children attending Paediatric Infectious Diseases Clinics in Jamaica.

Methods: One hundred and ninety-seven HIV-infected children were followed prospectively in multi-centre ambulatory clinics between September 1, 2002 and August 31, 2005, in the Kingston Paediatric and Perinatal HIV/AIDS Programme, Jamaica, and their outcomes described.

Results: Median follow-up was 23 child-months (interquartile range [IQR] 12–31) with 12 children (6.0%) lost to follow-up and deaths ($n = 13$) occurred at 4.64 per 100 child-years of follow-up. Median age was 5.0 years (IQR 2.2–8.1) and 32.1% had Centers for Disease Control and Prevention (CDC) category C disease at enrolment; 62% were ever on antiretroviral therapy (ART) with median duration of 15.4 months (IQR 5.5–25.5); 85% initiated ART with zidovudine/lamivudine/nevirapine. Mean weight-for-height 0.13 ± 1.02 (mean difference -1.71 [95% Confidence interval (CI) $-2.73, -0.69$]; $p = 0.001$) and body mass index-for-age 0.05 ± 1.11 (mean difference -1.11 , [CI $-1.79, -0.43$]; $p = 0.002$); z scores increased after 24 months on ART; however, children remained stunted. Reductions in the incidence of hospitalizations (mean diff 30.95, [CI 3.12, 58.78]; $p = 0.03$) and in episodes of pneumonia, culture-positive sepsis and tuberculosis occurred in those on ART.

Conclusions: A successfully implemented ambulatory model for paediatric HIV care in Jamaica has improved the quality of life and survival of HIV-infected children.

Efectividad de la Terapia Antiretroviral en el Tratamiento del VIH/SIDA Pediátrico en Jamaica

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RESUMEN

Antecedentes y Propósito: El VIH/SIDA pediátrico sigue representando un desafío mayor en los países en vías de desarrollo. Describimos la efectividad de las intervenciones en niños infectados con el VIH, que asisten a las clínicas de enfermedades infecciosas en Jamaica.

Métodos: Ciento noventa y siete niños infectados con el VIH fueron objeto de un seguimiento prospectivo en las clínicas ambulatorias multicentros, entre septiembre 1 de 2002 y agosto 31 de 2005, como parte del Programa VIH/SIDA Prenatal y Pediátrico de Kingston, Jamaica, y se describen los resultados.

Resultados: El seguimiento medio fue de 23 meses-niño (rango intercuartil [IQR] 12–31) con 12 niños (6.0%) perdidos al seguimiento y las muertes ($n = 13$) ocurridas en 4.64 por 100 años-niño de seguimiento. La media de la edad fue 5.0 años (IQR 2.2–8.1) y 32.1% tuvieron enfermedades de

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categoría C en Centros de Control y Prevención de las Enfermedades a la hora de su enrolamiento, 62% estuvieron siempre bajo terapia antiretroviral (TAR) con una duración promedio de 15.4 meses (IQR 5.5–25.5); 85% iniciaron TAR con zidovudina/lamivudina/nevirapina. El peso medio por altura fue 0.13 ± 1.02 (diferencia media -1.71 [95% intervalo de confianza (CI) $-2.73, -0.69$]; $p = 0.001$) y el índice de masa corporal por edad 0.05 ± 1.11 (diferencia media -1.11 , [CI $-1.79, -0.43$]; $p = 0.002$) las puntuaciones z aumentaron luego de 24 meses bajo TAR.; sin embargo, los niños permanecieron raquíticos. Reducciones en la incidencia de hospitalizaciones (diferencia media 30.95, [CI 3.12, 58.78]; $p = 0.03$) y en los episodios de neumonía, sepsis probada por cultivo positivo, y tuberculosis, ocurrieron entre aquellos que se hallaban bajo TAR.

Conclusiones: Un modelo ambulatorio exitosamente implemente para la atención pediátrica del VIH en Jamaica, ha mejorado la calidad de vida y la supervivencia de los niños infectados con el VIH.

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INTRODUCTION

Paediatric HIV remains a significant challenge in the developing world despite tremendous successes of prevention and therapeutic interventions in developed countries. Africa continues to be the global epicentre of the epidemic. Worldwide, infected infants and children remain vulnerable through lack of access to healthcare (1, 2) except in resource-rich settings. Children now account for approximately 14% of AIDS deaths and 90% of children with HIV are in Africa. Access to antiretroviral therapy has been expanding in middle- to low-income countries but treatment and care of children continue to lag behind the developments in the adult population. The percentage of children receiving antiretroviral therapy (ART) is less than that documented for adults, a median of just 8% in Sub-Saharan Africa and in low- and middle-income countries such as in Latin America and the Caribbean (3).

In Jamaica, the HIV epidemic originated among migrant farm workers, men who have sex with men and commercial sex workers (4). Paediatric HIV was first recognized in Jamaica in 1986 (5) and the epidemiologic trend has since mirrored the increasing incidence of HIV infection in the adult population (6).

During the early stages of the epidemic, paediatric HIV care in Jamaica was primarily hospital-based, centred on acute care and palliative management and supervised by healthcare personnel who had limited therapeutic and laboratory capacity to adequately manage these children. Care in the ambulatory setting focussed on prophylaxis with trimethoprim-sulfamethoxazole (TMP/SMX) for *Pneumocystis jirovecii* pneumonia (PCP) and other opportunistic and bacterial infections and primary care management (immunization, nutrition, growth and development). Very few children were initiated on antiretroviral therapy, since the cost was prohibitive and paediatric preparations virtually non-existent. Access to care was also physician-specific and lacked the interdisciplinary approach that could enhance optimal continuity.

In 2002, the Kingston Paediatric and Perinatal HIV/AIDS Programme (KPAIDS) was initiated as a multidisciplinary collaboration between the University of the

West Indies, the Ministry of Health, Jamaica, Elizabeth Glaser Paediatric AIDS Foundation and Pfizer Foundation (7). Using a public health approach (8), the primary programme aims were prevention of mother-to-child transmission of HIV and improving the quality of life and survival of already infected children and adolescents (7, 9–14). With additional support from the Clinton HIV/AIDS Initiative and the Global Fund, increased public access to antiretroviral therapy and laboratory monitoring became possible beginning in 2003.

We proposed to characterize the effectiveness of interventions in the cohort of HIV-infected children and adolescents attending four Paediatric HIV Clinics in KPAIDS and determine outcomes of enrolment, uptake of antiretroviral therapy (ART), hospitalizations, bacterial and opportunistic infections, growth and mortality.

SUBJECTS AND METHODS

Setting

Jamaica is a lower middle income state in the Western Hemisphere with a population of 2.6 million and Gross National Income per capita of US \$3430 (15). The annual birth cohort of 52 000/year accounts for a HIV seroprevalence of 1.5% among pregnant women (6). Cumulatively, 799 paediatric AIDS cases (< 1 to 9 years) have been reported, of whom at least 50% have died (6). The capital, Kingston, has a paediatric AIDS rate of 265.9 per 100 000 population.

Since 2002, the Kingston Paediatric and Perinatal HIV/AIDS Programme began ambulatory management of HIV-infected infants and children attending Paediatric HIV Clinics in the Greater Kingston Region. These clinics were located at the University Hospital of the West Indies, Bustamante Hospital for Children, Comprehensive Health Centre and Spanish Town Hospital. Through outreach and preceptorship training, other clinics were established in major clinical centres throughout the island.

Design

This is a prospective, observational cohort study involving ambulatory management of infants and children attending

four Paediatric HIV Clinics in the Greater Kingston Region of Jamaica.

Participants

Infants and children were consecutively enrolled during the period September 1, 2002 to August 31, 2005. HIV infection was confirmed in children between 18 months to 18 years of age who were HIV antibody-positive by a commercial enzyme-linked immunosorbent assay (ELISA) and confirmatory test (Western blot technique). Children < 18 months of age born to a HIV-infected mother were considered HIV-infected if symptomatic or criteria for acquired immunodeficiency syndrome (AIDS) diagnosis based on the 1987 AIDS surveillance case definition (16) and/or if confirmed by positive HIV polymerase chain reaction test (Roche® DNA Amplicor PCR test). No children < 18 months who were diagnosed presumptively were later found to be HIV uninfected.

Procedure

A multidisciplinary approach to hospital-based and ambulatory treatment and care was developed (7) and key components included the training of a team of healthcare personnel, development of unified treatment and management protocols, facilitated access to care and implementing monitoring and evaluation mechanisms (9–11). Although interventions were primarily ambulatory-based, in-hospital consultations and interdisciplinary consultations were also facilitated. A public health approach to management was adopted, integrating with existing resources; interventions included (i) immunizations according to the recommended schedule of the National Expanded Programme on Immunizations (these include diphtheria, tetanus, pertussis, polio, *Haemophilus influenzae* type B, hepatitis B, measles, mumps and rubella vaccines; bacille Calmette-Guérin vaccine is given to all infants at birth), (ii) TMP-SMX prophylaxis and treatment of opportunistic infections, (iii) monitoring nutrition, growth, development and clinical progression, (iv) initiating and monitoring antiretroviral treatment according to World Health Organization (WHO) guidelines (8), (v) adherence monitoring (ART, prophylaxis for opportunistic infections, immunizations, outpatient visits, risk reduction interventions among adolescents), (vi) counselling and psychosocial support. Using the multidisciplinary team (doctors, nurses, pharmacists, social workers, adherence counsellors) ongoing adherence monitoring by self-report and pharmacy refills was conducted at each ambulatory encounter and through telephone follow-up calls. Team consultations were convened to discuss and propose solutions for challenging situations.

Primarily clinical criteria were used for initiating ART (8, 10, 11) since surrogate immunological parameters (lymphocyte subsets) did not become available until 2003 on a phased basis through the National AIDS Programme. These clinical criteria included: any child 18 months and older

presenting with WHO Stage 4 (or CDC category C) disease with encephalopathy, failure to thrive or recurrent severe bacterial infections; and WHO Stage 3 (or CDC category B) disease with tuberculosis, recurrent hospitalizations due to HIV-related illness and pneumonia; children < 18 months of age with symptomatic HIV disease were initiated on ART regardless of WHO Stage (or CDC category). When immunological parameters became available, CD4⁺ guided criteria were used to commence ART in any child with CDC immune category 2 or 3, regardless of CDC clinical category. The only available paediatric antiretroviral formulations were zidovudine, lamivudine and nevirapine. Adult preparations (zidovudine, nevirapine, lamivudine, abacavir, didanosine) and generic fixed dosed coformulations were utilized in older children. The standard first line highly active antiretroviral regime was zidovudine, lamivudine and nevirapine. Data continually tracked and audited included morbidity, mortality, hospitalizations, laboratory markers (haematology, biochemistry, cultures, immunology, lymphocyte subsets and plasma HIV-RNA).

Data were uploaded to a secure central database (7, 10) which was password protected. Outcomes evaluated were enrolment, the demographic, clinical, immunological and virological profile of the cohort, uptake of antiretroviral therapy (ART), growth, morbidity, mortality and incidence of hospitalizations, bacterial and opportunistic infections. Growth was monitored using the Centers for Disease Control and Prevention (CDC) 2000 growth charts (17).

Definitions

Lost to follow-up was defined as a client who missed two or more consecutive clinic appointments and was no longer contactable or traceable. Deceased children and those who had migrated (internal or external) were excluded from this definition. Infants and children whose care was supervised by their biological parent(s), other family members (*eg* grandmother, aunt) or foster parent received family-based care. Infants and children residing in facilities managed by community-based organizations and whose care was supervised by trained caregivers received institution or residential care.

Statistical Methods

Data were summarized and analyzed using SPSS 12.0 for Windows. Growth parameters (weight-for-age, height-for-age, weight-for-height, body mass index (BMI)-for-age) were standardized to z scores using 2000 CDC growth reference (Epi Info™ Version 3.3.2). Independent group T-tests were used to examine for differences in growth parameters (z scores) following initiation of ART compared to baseline values. Differences in mean CD4 per cent by cohort year were explored using Analysis of Variance (ANOVA). A *p* value of < 0.05 for 2-sided tests was considered to be statistically significant.

RESULTS

Enrolment profile

One hundred and ninety-seven children and adolescents were consecutively enrolled during the period September 2002 to August 2005. The median number of new patients enrolled per quartile was 13.0 (IQR 6.0 – 24.5; range 2.0 – 28.0). Enrolment was greatest in Year 1 (87, 44%) of the programme and subsequently decreased (Year 2 – 65, 33%; Year 3 – 17, 9%). Twenty-eight (14%) infected children were being managed in the ambulatory setting prior to the implementation of KPAIDS and were immediately enrolled at the inception.

The median duration of follow-up was 23 months (IQR 12–31 months). The total patient time of follow-up was 4340 child-months (280 child-years). Deaths (n=13) occurred at 4.64 per 100 child-years of follow-up and 12 children (6.0%) were lost to follow-up. Seven transferred to clinic sites at other locations in Jamaica and two migrated overseas.

Demographic profile

Fifty-five per cent (109; $p = 0.08$) of the cohort was female (Table 1). At enrolment, the median age was 5.0 years (IQR 2.2 – 8.1) and 131 (66.5%) were between 1 – 9 years of age. A hundred and seventy-five children (88.8%) were perinatally infected but 14 (7.1%) had acquired HIV infection *via* the sexual route (consensual or forced), three (1.5%) through transfusion and five (2.5%) by unknown means (Table 1). A hundred and fifty-two (77.0%) were receiving family-based care; the other 45 (23.0%) resided in an institution operated by a community-based organization. The children accessed ambulatory care at the University Hospital of the West Indies (101, 51.5%), the Bustamante Hospital for Children (64,

32.6%), Comprehensive Health Centre (18, 9.2%) and Spanish Town Hospital (13, 6.6%).

Clinicopathological profile

At enrolment, 63 (32.1%) of the cohort had CDC category C disease [AIDS] (Table 1). The median CD4⁺ per cent increased by year of follow-up (Table 2). There was no significant difference in mean CD4⁺ per cent by follow-up year (mean square = 257.56, $F = 1.11$; $p = 0.318$, ANOVA). There was no significant difference ($p = 0.563$) in CDC clinical category between children with perinatal *versus* non-perinatal acquisition of HIV at enrolment, however children with perinatal infection were more likely to progress to severe disease compared to children with non-perinatal acquisition of HIV ($p = 0.033$). There was no significant difference in CD4⁺ count ($p = 0.337$) by mode of transmission.

Public access to viral load (plasma HIV RNA) testing only became available in 2005. Median plasma HIV-RNA was 23 000 copies/ml (IQR 61 – 96 000 copies/ml) among 49 children on ART. Twenty-eight per cent (14/49) had plasma HIV RNA levels less than 400 copies/ml.

ART uptake

The uptake of children on highly active antiretroviral therapy (HAART) cumulatively increased during the follow-up period. Sixty-two per cent (122/196) initiated antiretroviral therapy and 85% (104) commenced nevirapine on a nucleoside reverse transcriptase (NRTI) backbone of zidovudine and lamivudine (the only available paediatric preparations). Few children were commenced on triple NRTI (10/8%) or

Table 1: Characteristics of cohort

Variable	Baseline (enrolment)		24-month follow-up	
	All n = 197	ART-naïve n = 74	On ART N = 54	ART-naïve n = 20
Age, years, mean ± SD	5.9 ± 4.6	5.5 ± 5.0	8.0 ± 3.7	8.5 ± 4.6
median (range)	5.0 (< 1.0 – 19.0)	4.9 (< 1.0 – 18.9)	7.0 (2.0 – 19)	7.5 (2.0 – 19.0)
Age, years, n (%)				
< 1	22 (11.2)	12 (16.4)	0 (0.0)	0 (0)
1 – 4	62 (31.5)	33 (45.2)	9 (16.7)	3 (15.0)
5 – 9	69 (35.0)	17 (23.3)	29 (53.7)	11 (55.0)
10 – 14	31 (15.7)	5 (6.9)	13 (24.1)	2 (10.0)
> 15	13 (6.6)	6 (8.2)	3 (5.5)	4 (20.0)
Gender, female, n (%)	109 (55.0)	43 (58.1)	27 (50.0)	11 (55)
CDC Category, n (%)				
N	31 (15.8)	19 (25.7)	0 (0.0)	3 (15.0)
A	57 (29.1)	26 (35.1)	7 (13.0)	8 (40.0)
B	44 (22.4)	15 (20.3)	10 (18.5)	7 (35.0)
C	63 (32.1)	14 (18.9)	37 (68.5)	2 (10.0)
Unknown	1 (0.5)	–	–	–
CD4 ⁺ , mean ± SD (cells/μL)	595.0 ± 304.4*	908.9 ± 636.1 [†]	758.8 ± 503.8	1123.4 ± 626.5

*n = 80; [†]n = 21

Table 2: Group CD4₊ per cent by cohort year

Year	n	Mean CD4 %	SD (%)	95% Confidence Interval (%)		Median CD4 %	IQR (%)
2001	11	21.6	14.0	12.3	31.0	19.0	6.3 – 31.8
2002	18	24.2	17.2	15.6	32.7	21.9	6.9 – 36.9
2003	18	21.5	15.1	14.0	29.0	17.3	7.0 – 25.6
2004	40	28.4	16.2	23.3	33.6	30.0	17.2 – 42.8
2005	123	30.2	15.4	27.5	33.0	30.8	17.5 – 44.1

protease inhibitor (PI)-based regimes (7/6%) and only one adolescent on an efavirenz-based regime. Adult antiretroviral preparations and generic fixed-dose combinations were used in children over the age of three years. At the most recent clinic visit, 80% (110/137) were still on their initial antiretroviral regime. The median duration on HAART was 15.4 months (IQR 5.5 to 25.5; range < 1 to 47.4 months).

Twenty-six (21.3%) of those on HAART required change to an alternative regime because of toxicity (13, 50.0%), clinical and immunologic failure (8, 30.8%), financial limitations (3, 11.5%) or the need for optimization (2, 7.7%). Toxicity included severe anaemia and/or neutropenia (zidovudine-induced), hypersensitivity and hepatotoxicity (nevirapine-associated). Seven children were subsequently changed to a third regime and just one to a fourth regime because of clinical and immunologic failure.

Growth

Mean baseline anthropometric parameters (z scores ± SD) prior to initiation of HAART were as follows: weight-for-age -0.86 ± 2.94, height-for-age -0.48 ± 2.56, weight-for-height -1.58 ± 2.21 and BMI-for-age -1.06 ± 1.80.

The mean weight-for-height and BMI-for-age z scores (± SD) increased to 0.13 ± 1.02 (mean difference -1.71 [CI

-2.73, -0.69], *p* = 0.001) and to 0.05 ± 1.11 (mean difference -1.11, [CI -1.79, -0.43], *p* = 0.002), respectively after 24 months on HAART. There was overall improvement in weight-for-age z scores (-0.70 ± 1.33, mean difference 0.16 [CI -1.12, 0.81], *p* = 0.789) following initiation of HAART but children remained relatively stunted (height-for-age z score -1.03 ± 1.50, mean difference -0.55 [CI -0.40, 1.50], *p* = 0.256).

Hospitalizations, bacterial and opportunistic infections

There were 7220 admission days and median hospitalization duration was 5.5 days (IQR 1.0 – 13.0 days). There was an overall reduction in incidence of hospitalizations (mean diff. 30.95; CI 3.12, 58.78; *p* = 0.03), bacterial pneumonia, sepsis, urinary tract infections, presumed pneumocystis pneumonia and pulmonary tuberculosis in those children who were initiated on antiretroviral therapy (Table 3). A lower incidence of hospitalizations and infection-related morbidity was also observed in those who never commenced ART compared to the incidence in the pre-ART group. Few children had documented opportunistic infections due to central nervous system (CNS) toxoplasmosis, cryptococcal meningitis, cytomegalovirus retinitis and cryptosporidiosis.

Table 3: Incidence of events per 100 child-months of follow-up

Events	Ever on ART				ART-naïve	
	1030 child-months SD 12.79 n = 121		2090 child-months SD 12.93 n = 121		1194 child-months SD 16.36 n = 73	
	Pre-ART		Post-ART		# Episodes	Incidence
# Episodes	Incidence	# Episodes	Incidence			
Hospitalizations	190	18.45	124	5.93*	66	5.52
Pneumonia	95	9.22	52	2.49†	11	0.92
Pneumocystis pneumonia	10	0.97	1	0.05†	3	0.25
Bacterial sepsis	26	2.52	7	0.33†	4	0.33
Pulmonary tuberculosis	11	1.07	3	0.14†	4	0.33
Urinary tract infections	32	3.11	20	0.96†	7	0.59
Cytomegalovirus retinitis	1	0.10	0	0†	0	0
Cryptosporidiosis	1	0.10	1	0.05†	1	0.08
CNS Toxoplasmosis	2	0.20	1	0.05†	1	0.08
Cryptococcal meningitis	1	0.10	0	0†	0	0

* *p* = 0.03; † *p* = NS

Deaths

Thirteen deaths (6.6%) occurred during the period (6 in 2003, 4 in 2004 and 2 in 2005) at 4.64 per 100 child-years of follow-up. The median age at time of death was 5.4 years (range 0.8 to 17.8). All but one had CDC category C disease. Although seven of these children were initiated on HAART, they demised within two weeks of commencing therapy. Sepsis or acute respiratory illness was implicated in eight cases and complications of HIV-associated nephropathy (three), acute gastroenteritis (one) and Burkitt's lymphoma (one) in the other five children. There was no significant difference in frequency of deaths ($p = 0.369$) by mode of transmission.

Characteristics of the ART-naïve children

In 74 (38.0%) children who did not initiate ART, 66 (89.2%) acquired HIV infection perinatally, seven (9.5%) *via* sexual route and one (1.4%) was unknown. At enrolment, median age was 5.5 years (range < 1.0–18.9 years) and 50 (68.5%) were between 1–9 years of age (Table 1). The frequency of most recent CDC clinical category was 11 (14.9%) category N, 22 (29.7%) category A, 25 (33.8%) category B and 16 (21.6%) category C. Median CD4⁺ count was 788.0 cells/ μ L (range 39.0 – 2240.0 cells/ μ L; IQR 391.5 – 1246.0 cells/ μ L). Twenty-five (33.8%) had required hospitalization and there were seven deaths.

DISCUSSION

The implementation of the KPAIDS in Jamaica has resulted in improved growth and reduced hospitalizations, infection-related morbidity and frequency of deaths in the cohort of infants, children and adolescents followed longitudinally at four paediatric HIV clinics. These were attributed to concomitant increased uptake of antiretroviral therapy and improved immunological function in these patients. The programme has thus enhanced the quality of life and improved survival of these infected children while adopting a public health approach and integrating with existing resources in the healthcare environment.

A public-health approach to ART was adopted at inception to ensure that children would be consistently initiated on standardized, simplified, evidence-based regimes (18). Available paediatric preparations were limited in the setting and so clinicians improvised with use of adult preparations and generic fixed dose combinations. Most continued on therapy for a median of 15 months and there were no toxicity-related deaths. The advantages to this approach included dose administration convenience, preference by caregivers and children, greater acceptability compared to liquid formulations and enhanced adherence. These findings are similar to the experience in the Médecins Sans Frontières HIV programmes and in Thailand (19, 20), and support the safety and usefulness of HAART in the public-health, resource-limited setting. There are concerns regarding bio-availability and potential 'under-dosing' and 'over-dosing'

with use of split tablets and emerging resistance. The cohort has the strategic option of a protease inhibitor-based regime for second line therapy in the anticipated future. With increased access to lymphocyte subsets and plasma HIV-RNA determination, the efficacy of treatment would be better characterized.

The significant improvement of growth parameters (weight-for-height, BMI-for-age and weight-for-age z scores) following initiation of HAART, clearly indicates clinical effectiveness of treatment as substantiated by paediatric cohort studies in resourceful settings (21, 22). In a similar cohort of 159 children in Abidjan, Cote d'Ivoire, in 49% initiating HAART (23), improved growth, reduced incidences of pneumonia and diarrhoea consistent with immune reconstitution and optimal viral suppression were observed. For resource-limited settings, surveillance of growth and development remain key clinical indicators of disease progression and therapeutic efficacy where capacity for laboratory monitoring may be unavailable.

Most of the children remained stunted but this may be the normal reaction to the correction of a growth-retarding disorder, that is, catch-up growth first affects weight followed by height (24). In addition, the degree of growth failure was probably significant at initial presentation, since 50% of the cohort actually presented with moderate to severe disease. Growth faltering may be related to the social environment but severity of HIV disease also affects the potential for 'catch-up' height despite use of HAART (25).

The significant reduction in hospitalizations and overall reduction in infectious events following initiation of ART further substantiates the effectiveness of therapeutic interventions (26–29) in the cohort, and is consistent with outcomes in paediatric cohorts in Thailand and Cote d'Ivoire (20, 23). In addition, all infected children in the cohort received chemoprophylaxis with TMP-SMX regardless of clinical status at enrolment until surrogate immunological markers became available. This intervention has demonstrated efficacy in reducing incidence of opportunistic and bacterial infections especially *Pneumocystis jirovecii* pneumonia (30, 31) and is congruent with recent WHO recommendations (32). The current immunization schedule in Jamaica includes *Haemophilus influenzae* type B and Hepatitis B coverage in addition to the other standard vaccines. However, none of the children was immunized against *Streptococcus pneumoniae* or influenza virus because of cost limitations. This remains a pertinent gap in prevention since pneumococcal sepsis is an important pathogen for HIV-infected children.

We were unable to adequately report on immunological and virological outcomes in the cohort since most children were initiated on HAART based on clinical criteria. This is the operational reality of many 'scale-up' initiatives where cost, capacity and access pose as barriers to these investigations. Most of the children presented between 2 to 8 years of age with approximately 50% having moderate to

severe disease at enrolment. They represented primarily slow progressors and their immunological nadir may have implications for effectiveness of antiretroviral therapy in optimally restoring immunological function (33–35). The overall improvement in CD4⁺ per cent in the cohort suggests efficacy of treatment.

The case fatality of 6.6% in the cohort is in sharp contrast to national figures of approximately 50% in the pre-ART era in Jamaica (6). Most of the deaths occurred in children who presented at an advanced stage of disease, despite initiation with HAART, and perhaps needed palliative care. Similar findings of increased mortality in the first months of therapy are observed in other developing countries (36, 37). This is a sober reminder of the challenges facing HIV care in resource-limited settings (36), including inadequate laboratory capacity for early diagnostic testing and monitoring and access to paediatric antiretroviral formulations. A recent meta-analysis of data from resource-limited settings indicate that growth markers (*eg* weight-for-age) and haemoglobin in addition to CD4⁺ % and CD4⁺ count are strong predictors of mortality (38) and should be included as important variables in trials of treatment effectiveness in these settings.

Public access to antiretroviral therapy and laboratory monitoring in Jamaica has occurred on a phased basis. The process has been largely facilitated through funding by the Clinton Foundation HIV/AIDS Initiative and the Global Fund. Hence many of the children in this cohort were initiated on ART and monitored using clinical criteria (8, 10, 11). With improved laboratory capacity for monitoring the response to therapy, the efficacy of antiretroviral therapy will be more definitively characterized as the cohort matures.

In conclusion, a stable cohort of HIV-infected children and adolescents has been developed in Jamaica using a public health approach to treatment, care and support. Already other treatment sites have been established and training in Paediatric HIV medicine facilitated through preceptorship and outreach services. The conceptual and strategic framework for replication to other sites throughout Jamaica has been set. Through commitment and ongoing collaboration with other stakeholders, the vision of improving the quality of life of affected children and adolescents in Jamaica will become a reality.

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Adherence to Antiretroviral Drug Therapy in Children with HIV/AIDS in Jamaica

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ABSTRACT

Objective: We aimed to describe the adherence patterns to antiretroviral therapy (ART) in a cohort of HIV-infected children.

Methods: Between the periods May to October 2005, 63 HIV-infected children and their caregivers recruited consecutively at four Paediatric Infectious Disease Clinics in Greater Kingston and St Catherine, Jamaica, were interviewed. Adherence was defined as no missed doses in the last four days. Biomedical markers and factors associated with adherence were explored.

Results: Global adherence level was 85.7% (54/63) and was significantly higher for children in residential care (approaching 100%) compared to 76.3% for children in family care ($p = 0.008$). Children had median age 7.9 years (range 0.8 – 19.4 years) and 57% were male. Median duration on ART was 18.3 months (range 0.1 – 123.8 months). Median CD4 count and per cent available for 95.2% (60/63) and 92.1% (58/63) children were 440 cells per μL (IQR 268-897 cells/ μL) and 24.9% (IQR 15.6–42.7%), respectively. Median viral load was 9.60×10^3 copies/ml (IQR $0.05 \times 10^3 - 52.50 \times 10^3$) with 16% (10/63) having viral loads ≥ 50 copies/ml. Children in residential care ($n = 26$), receiving directly observed therapy had higher CD4 counts ($p = 0.006$) and CD4 per cent ($p = 0.001$). Factors associated with non-adherence were primarily caregiver related, especially long work hours ($p = 0.002$) and nausea as a side effect of ART ($p = 0.007$). Non-adherence was positively correlated with missing clinic appointments ($r = 0.342$, $p = 0.009$) and increasing age of child ($r = 0.310$, $p = 0.013$).

Conclusion: In resource-limited settings, psychosocial factors contribute significantly to non-adherence and should complement biomedical markers in predicting adherence to antiretroviral therapy in children.

Adhesión a la Terapia con Medicamento Antiretroviral en Niños con VIH/SIDA en Jamaica

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RESUMEN

Objetivo: Este trabajo tiene por objeto describir los patrones de adhesión a la terapia antiretroviral (TAR) en una cohorte de niños infectados por el VIH.

Métodos: Entre los períodos de mayo a octubre de 2005, se entrevistaron 63 niños infectados con el VIH y las personas a cargo de su cuidado, reclutados consecutivamente en cuatro clínicas pediátricas de enfermedades infecciosas en Greater Kingston y Saint Catherine, Jamaica. La adhesión fue definida en términos de las dosis no perdidas en los últimos cuatro días. Se exploraron los marcadores y factores biomédicos asociados con la adhesión.

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Resultados: El nivel de adhesión global fue de 85.7% (54/63) y fue significativamente más alto para niños en cuidados residenciales (cerca de 100%) en comparación con el 76.3% de los niños en cuidado familiar ($p = 0.008$). La edad promedio de los niños fue de 7.9 años (rango 0.8 – 19.4 años) y el 57% eran varones. La duración promedio del TAR fue de 18.3 meses (rango 0.1 – 123.8 meses). El conteo medio de CD4 y el porcentaje disponible para el 95.2% (60/63) y el 92.1% (58/63) de los niños fueron 440 células por μL (IQR 268-897 células/ μL) y 24.9% (IQR 15.6 – 42.7 %), respectivamente. La carga viral media fue 9.60×10^3 copias/ml (IQR 0.05×10^3 – 52.50×10^3) con 16% (10/63) con cargas virales $\# 50$ copias/ml. Los niños en cuidado residencial ($n = 26$), que recibían terapia directamente observada, tuvieron conteos más altos CD4 ($p = 0.006$) y porcentaje de CD4 ($p \# 0.001$). Los factores asociados con la no adhesión estuvieron fundamentalmente relacionados con el encargado del cuidado, especialmente largas horas de trabajo ($p = 0.002$) y náuseas como un efecto colateral de TAR ($p = 0.007$). La no adhesión fue correlacionada positivamente con los turnos médicos perdidos ($r = 0.342$, $p = 0.009$) y el aumento de la edad del niño ($r = 0.310$, $p = 0.013$).

Conclusión: En escenarios donde los recursos son limitados, los factores psicosociales contribuyen significativamente a la no adhesión y deben complementar los marcadores biológicos a la hora de predecir la adhesión a la terapia antiretroviral en niños.

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INTRODUCTION

Children comprise eight per cent of the estimated 22 000 persons living with the Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) in Jamaica (1, 2). Within the Kingston Metropolitan Area, approximately 27% of these children are cared for within residential facilities and the rest receive family-based care (3). Globally, substantial expansion in antiretroviral access has occurred including in the Caribbean; however at the end of 2005, children represented at least 10 per cent of unmet treatment targets (4). Since 2003, there has been accelerated access to and increased uptake of highly active antiretroviral therapy (HAART) in HIV-infected children in Jamaica. This has been facilitated by funding *via* the Global Fund and the Clinton HIV/AIDS Initiative. Under the direction of the Kingston Paediatric and Perinatal HIV/AIDS Programme (KPAIDS) in collaboration with the National HIV/AIDS Programme, Ministry of Health, Jamaica, unified parallel treatment programmes for paediatric HIV have been established in the Kingston Metropolitan Area and strategic centres islandwide [through outreach and mentorship initiatives] (2). The initiation of antiretroviral therapy has contributed to improved outcomes in the paediatric cohort and there has been a strong emphasis on optimizing adherence (5).

Despite the impact of HAART, adherence remains a major challenge in children (6). The factors contributing to non-adherence are varied and include those associated with the medication regimen, socioeconomic factors, attending clinic appointments and caregiver-related issues (7). These have important implications for the evolution of drug resistance and increased HIV-related morbidity and mortality. It is therefore critical to measure and address non-adherence to minimize these problems. Although there are several modalities for assessing adherence, resource-limited settings, like Jamaica, have peculiar challenges including limited availability of objective biomedical markers.

Adherence rates are generally higher in controlled clinical trials than in other studies and range from 57% to 77% (8, 9). Although patients may take the total number of prescribed doses, up to 50% show significant fluctuation in dosing intervals. Various methods may be employed to measure patient adherence to antiretroviral therapy. These include directly observed therapy (10), blood drug concentration, electronic monitoring, pharmacy reporting, self-reporting, biomedical markers such as CD4⁺ count and viral levels and adherence to clinic appointments. Self-report surveys that ask about missed doses within the last 1–4 days are more valid and reliable than surveys that ask respondents to remember a week or more ago (11). More objective methods like the biomedical markers may be combined with self-reporting in order to improve or assess accuracy of investigation. Questionnaires completed by caregivers are a useful tool for measuring adherence to ART in paediatric HIV-infected patients (9) and may correlate with virologic response to antiretroviral therapy (12, 13).

Adherence rates are similar in caregiver reporting, clinician perspective and pharmacy reporting (14). Researchers and clinicians could benefit from acquiring information on children's adherence from multiple sources, even though there is no significant difference between child and caregiver reporting, except that seen for older children (15). Predictors and correlates of adherence in children are generally similar to those in adult samples (16). But studies tend to concur that there is a need for ongoing and individualized support and information to families (17). Medical providers believe that the current limited availability of treatment options for paediatric HIV-infected patients pose major adherence challenges for families of these patients (18).

Purpose

Against the background of uniform protocol-driven management at established treatment centres, we aimed to des-

cribe the adherence patterns to antiretroviral therapy and explore factors contributing to non-adherence in a cohort of HIV-infected children attending the Paediatric Infectious Disease Clinics of the Kingston Perinatal and Paediatric HIV/AIDS Programme (KPAIDS) in Greater Kingston and St Catherine.

We anticipated that the data would inform on measures to limit non-adherence, thus delaying the development of viral resistance and treatment failure and the need for costly, less accessible second line therapy.

SUBJECTS AND METHODS

Setting

Confirmed HIV-infected children and adolescents are followed three-monthly at the Paediatric Infectious Diseases Clinics of the KPAIDS Programme. Clinical management is guided by standardized evidence based protocols and pertinent investigations (haematological, biochemical, immunological, microbiological and radiological) and treatment (anti-infectives, prophylaxis and antiretroviral agents) are offered to all patients as the need arises. Monitoring methods include interval history, physical examination, nutritional, growth and development assessments and addressing adherence to prophylaxis and antiretroviral agents (2, 5, 19). Prior to the initiation of antiretroviral therapy (ART), caregivers and children are counselled to (i) assess their readiness for ART, (ii) educate about the goal, practical considerations, administration, and adverse effects of ART, and (iii) identify and address potential barriers to treatment success. Using the multidisciplinary team (doctors, nurses, pharmacists, social workers and adherence counsellors), ongoing adherence monitoring and evaluation are conducted at each ambulatory encounter and through telephone follow-up calls. Team consultations are convened to discuss and propose solutions for challenging situations.

Study Design

This was a cross-sectional study to determine the level of adherence to ART and associated factors, document reasons for non-adherence, explore the relationship between self-reporting and other adherence monitoring mechanisms utilized by the programme and to formulate strategies for further intervention among this paediatric cohort.

Procedure

Sixty-three children and their caregivers were recruited consecutively by convenience sampling as they accessed services at four Paediatric Infectious Diseases Clinics in Greater Kingston and St Catherine, Jamaica (University Hospital of the West Indies, Bustamante Hospital for Children, the Comprehensive Health Centre and Spanish Town Hospital). Patients received no prior notification that they may be asked questions about how they take their medications and were informed about the study by the clinic nurse at the time of ambulatory visit. Patients who were

known to be non-compliant with clinic appointments and hence at greatest risk for negative outcome due to non-adherence to ART, were reminded of their clinic appointments by telephone, a strategy which was already being utilized by KPAIDS. They were not told that they may be asked questions about how they take their ART.

Informed consent and assent for children over seven years was obtained by an independent, trained interviewer following which a peer-reviewed 54-item questionnaire was administered. Older children were interviewed separately from caregivers to complete pertinent aspects of the questionnaire. Data, which were collected between the periods May to October 2005, included sociodemographic characteristics, caregiver/child health status, disclosure patterns, knowledge of antiretroviral therapy and reported adverse effects. Clinical, immunological and virological data were extracted from patient's medical records. Adherence data were obtained from caregivers and older children but there was no disaggregation of these data. Adherence was defined as no missed doses in the last four days.

Inclusion criteria were as follows: (1) confirmed diagnosis of HIV infection by a commercial enzyme-linked immunosorbent assay (ELISA) and confirmatory test (Western blot technique) in children between 18 months and 18 years of age, (2) clinical diagnosis of HIV infection in infants less than 18 months of age if symptomatic according to criteria for acquired immunodeficiency syndrome (AIDS) diagnosis based on the 1987 AIDS surveillance case definition (20) and/or confirmed by positive HIV polymerase chain reaction test (Roche® DNA AmplicorPCR test), (3) primary caregiver is biological parent, relative, adopted or foster parent or residential institution caregiver. Ethical approval for this study was received from the University of the West Indies/University Hospital of the West Indies, Faculty of Medical Sciences Ethics Committee.

Completed questionnaires were coded at the clinic to protect patient confidentiality. Data obtained from these questionnaires were compared with data from previously implemented mechanisms for monitoring adherence, most recent biomarkers in the past year where available (viral load, CD4⁺ count and per cent), and documented compliance indicators: socio-economic status, family support, past history of adherence, understanding of doses, drug administration and side effects and the relationship between adherence and viral resistance. Data were analyzed using the Statistical Programme for the Social Sciences (SPSS) version 12.0. A p -value < 0.05 was considered statistically significant, except for multiple comparisons where a more rigorous p -value of < 0.01 was applied using the Bonferroni's method. Descriptive statistics were calculated for reasons of non-adherence. Student independent t-test was used to make comparisons between children in residential *versus* family-based care. Pearson's chi-squared, Fisher's Exact tests and Pearson's correlation were used to assess factors potentially

impacting adherence. These were further explored in logistic regression models using STATA version 9.0.

RESULTS

Adherence was significantly higher among children in residential care, approaching 100%, compared to 76.3% in family care ($p = 0.008$). Global adherence level was 85.7% (54/63). Children had median age of 7.9 years (range 0.8 – 19.4 years; IQR 4.8 – 10.6 years) and there were 36 males (57%). Seventy-nine per cent had severe disease by Centers for Disease Control and Prevention (CDC) classification and 81% were receiving first-line highly active antiretroviral therapy comprising zidovudine/lamivudine/nevirapine. The median duration on ART was 18.3 months (range 0.1–123.8 months; IQR 8.3–32.6 months). Median CD4⁺ count and per cent, available for 95.2% (60/63) and 92.1% (58/63) children, were 440.0 cells per μL (IQR 268.5 – 897.0 cells/ μL) and 24.9% (IQR 15.6–42.7%), respectively. Median viral load available for 51% (32/63) of participants was 9.60 $\times 10^3$ copies/ml (IQR 0.05 $\times 10^3$ – 52.50 $\times 10^3$). Sixteen per cent (10/63) had viral load ≥ 50 copies/ml. The median duration between commencing ART and viral load testing was 25.6 months (range 4.0–129.3 months). Duration on antiretroviral therapy, a potential confounder in this cross-sectional survey, was similar between children receiving family-based and residential care. Likewise, the age ($p = 0.324$), CDC categories ($p = 0.384$) and drug regimen were similar for the two groups (Table 1).

Table 1: Epidemiological and biomedical characteristics of Jamaican children on antiretroviral therapy

Mode of Caregiving	Median Age years (IQR) n = 63	Mean (SD) CD4 count ($\mu\text{L/ml}$) n = 60	Mean (SD) CD4 % n = 58	Mean (SD) Viral Load (cells/ml/ 10^3) n = 32	Mean (SD) duration of ART (days) n = 63	CDC category n = 63	
						CDC	Frequency (%)
Residential Care	7.7 (5.5–9.6)	887 (534)	38.4 (12.23)	50.0 (133.0)	732 (587)	A	2 (7.7)
						B	3 (11.5)
						C	21 (80.8)
Family Care	8.0 (4.8–14.3)	484 (540)	20 (12.6)	81.3 (196.5)	562 (458)	A	3 (8.1)
						B	5 (13.5)
						C	29 (78.4)
t-test	–	$p = 0.006$	$p < 0.001$	$p = 0.596$	$p = 0.262$	–	–

Children in residential care had significantly better CD4⁺ counts ($p = 0.006$) and per cent ($p < 0.001$) although there was no statistically significant difference in viral load when compared to children in family care. The epidemiological and biomedical characteristics of the children on antiretroviral therapy are shown in Table 1.

Reasons for non-adherence to antiretroviral therapy were primarily caregiver-related. Due to frequently alternating staff caregivers in institutions, these factors were only analyzed for children in family care (n = 37). Main reasons

included caregiver forgetting to administer medications (35%), change in caregiver's schedule (35%), running out of medications (30%) and child being away from home (27%) without caregiver putting measures in place to ensure adherence (Table 2). Caregiver hours worked ($p = 0.007$) and nausea as a side effect of ARVs ($p = 0.011$) appeared to be

Table 2: Reasons for non-adherence to antiretroviral medications in Jamaican children (n = 37)

Reason	Frequency (%)
Caregiver forgot	13 (35.1)
Change in caregiver schedule	13 (35.1)
Pills finish (ie family ran-out of drugs)	11 (29.7)
Caregiver busy	10 (27)
Child away from home	10 (27)
Antiretrovirals unavailable at pharmacy	7 (18.9)
Child feels down/ depressed	6 (16.2)
Child having side effects	6 (16.2)
Child can't swallow medications	6 (16.2)
Child sleeping	5 (13.5)
Child too ill	5 (13.5)
Antiretrovirals taste bad	5 (13.5)
Fear of having side effects	4 (10.8)
Antiretrovirals too much (ie too many pills, too much medicine to drink)	3 (8.1)
Antiretrovirals got lost	1 (2.7)
No privacy to take antiretrovirals	1 (2.7)

significantly associated factors (Table 3) and remained so with logistic regression analysis with p-values of 0.002 and 0.011 respectively (Table 4). Furthermore, when all poten-

tially significant variables (except income) were analyzed in the same regression model, caregiver hours worked ($p = 0.017$) remained statistically significant and nausea remained marginally significant ($p = 0.052$). Since the presence of nausea was strongly associated with non-adherence both in children receiving residential and family care, it was always included in logistic regression models. Older age of child ($p = 0.001$) was also found to be correlated with non-adherence (Table 3).

Table 3: Correlates of adherence among children on antiretroviral therapy receiving family care in Jamaica (n = 37)

Factors	p-value
Caregiver hours worked	0.007*
Last school attended by caregiver	0.136
Weekly household income	0.285
Caregiver employment	0.617
Caregiver work shifts	0.684
Caregiver on antiretroviral therapy	0.105
Caregiver's age [†]	0.297
Caregiver status	0.202
Caregiver's belief that antiretrovirals help child	0.352
Older age of child [†]	0.001*
Child's sex	0.177
Child's knowledge of status	0.160
Cannot name/ describe medications	0.024
Missing clinic appointments	0.018
Antiretroviral regimen	0.680
Child taking medications other than antiretrovirals	0.432
Caregiver-child pair knowledge of medication dosage	0.141
Nausea	0.011*
Vomiting	0.269
Dizziness	0.140
Pruritus	0.141
Weakness	0.244
Sleepiness	1.000
Abdominal pain	0.373
Headache	1.000
Other side effects	0.620
Disclosure of HIV status to neighbours	0.181
Disclosure of HIV status to church	0.815
Disclosure of child's HIV status to others	0.364
Disclosure of child's HIV status to school	0.797
Disclosure of child's HIV status to family	0.548

Chi-square test, Fisher's exact test, [†]Pearson's Correlation where appropriate;

*statistically significant (p < 0.01)

Caregiver-child pairs were interviewed to assess their knowledge of adherence and antiretroviral therapy. Ninety per cent (or more) of participants knew that no more than three doses of antiretrovirals (ARVs) should be missed each month, that ARVs should be taken at the same time everyday and that the ARVs should be continued even if the child feels better. However, 43% (16/37) of respondents did not demonstrate an appreciation of the need to stop all other ARVs if one finished before the others and 30% (11/37) failed to understand that non-adherence leads to viral resistance.

Viral load testing was available for just over 50% of children in this study and was obtained at a median of 25.6 months (IQR 4.0–129.3 months) after commencing ART. The primary reason for the unavailability of this marker of adherence was the prohibitive cost. Viral load was not significantly lower ($p = 0.596$) among children in residential care than those in family care (Table 1).

DISCUSSION

The level of adherence to antiretroviral therapy (85%) was good among the infected children in this cross-sectional study. Adherence level was significantly higher ($p = 0.008$) approaching 100%, among those children receiving care in residential facilities compared to 76.3% of those receiving family-based care. These findings are attributed to the support strategies implemented by the KPAIDS programme and include assessing patients' and their caregivers' readiness for ART, pre-ART counselling on dosing, side effects and implications of non-adherence, increased access to staff via mobile phone contacts, reinforcement by pharmacists and adherence counsellors. Adherence is further enhanced in children in residential care by directly observed therapy (DOT).

Table 4: Results of multiple logistic regression analysis for children on antiretroviral therapy receiving family care (n = 37)

Factors	Number Adherent (%)		Odds Ratio (95% CI)	P-value*
	Yes	No		
Working hours/week				
< 40	23 (82)	2 (22)	1.00 (referent)	0.002
≥ 40	5 (18)	7 (78)	0.04 (0.004, 0.45)	
Caregiver education				
Primary and secondary	16 (57)	2 (25)	1.00 (referent)	0.045
Tertiary and vocational	8 (29)	2 (25)	0.44 (0.04, 5.15)	
Other	4 (14)	4 (50)	0.05 (0.003, 0.77)	
Weekly household income				
Low (< JAD \$5000)	14 (56)	2 (25)	1.00 (referent)	0.127
High (≥ JAD \$5000)	8 (32)	2 (25)	0.43 (0.04, 4.73)	
Unknown	3 (12)	4 (50)	0.10 (0.01, 1.08)	
Can name/describe ARVs				
Yes	26 (96)	5 (62.5)	1.00 (referent)	0.028
No	1 (4)	3 (37.5)	0.06 (0.004, 0.92)	
Nausea				
No	23 (82)	3 (33)	1.00 (referent)	0.007
Yes	5 (18)	6 (67)	0.11 (0.02, 0.59)	

*P values were obtained by likelihood ratio test using logistic regression models, and the presence of nausea was always included in the model as a covariate. When all variables in this table, except income, were analyzed in the same logistic regression model, only "working hours" was statistically significant ($p = 0.015$) and the presence of nausea was marginally significant ($p = 0.052$); (p values for school and name/describe ARVs were 0.317 and 0.331, respectively).

Non-adherence was primarily related to caregiver issues and reinforces the fundamental role of caregivers in influencing the overall outcome of children with HIV. Medication-related issues were less important except for the side effect of nausea especially when initiating ART. Biomarkers, such as viral load and CD4⁺ count are useful indicators of adherence but the impact of temporally-related and immunologic factors in this cross-sectional study necessitate further investigation.

The greater level of adherence and immunologic status of children receiving residential care, relative to those in family care, underscores the positive impact of directly observed therapy. However, these benefits must be weighed against the value of the family social support system in enhancing the developmental outcome of children. A possible option for improving adherence in the family-based setting is developing a 'day-clinic' facility that provides multidisciplinary multifaceted holistic care to children on ART, similar to Early Childhood Day Care Centres in Kenya (21). Services could include educational, developmental, spiritual, social, medical care and directly observed antiretroviral therapy during mornings and afternoons; children would return home to their families in the evenings. The Multi-system Therapy (22) and similar approaches involving home visits, directly observed therapy and developmentally appropriate counselling are other options to explore in our setting (23). Improving adherence to antiretroviral therapy in paediatric patients requires innovative and multifaceted strategies on a sustained basis in order to improve the quality of life of these patients.

Self-reporting, the main approach in determining adherence levels in this study, may lead to over-reporting. However, the other parameters used to measure adherence provided support for the adherence levels observed. Children receiving residential-based care had significantly higher mean CD4 count, CD4 per cent and higher adherence levels than their peers who received family-based care. Viral loads were similar in both groups of children, despite higher CD4 markers in residential children. A study of 154 HIV-infected children in Uganda revealed no correlation between viral load and T-cell activation after controlling for CD4 count (25). Sub-threshold HIV antigen exposure, thymic dysfunction and variable T-cell maturity were suggested explanations.

Mellins *et al* noted that caregiver's HIV positive status was a predictor of non-adherence; however, this association was not seen in our study. Missing clinic appointments and side effects from ART, compounded by factors related to caregiver stress and developmental challenges particularly in older children, contribute to non-adherence to ART in Jamaican children. Strategies to enhance understanding of ART and improve social support systems could reduce the impact of non-adherence in our setting.

More definitive laboratory markers, such as plasma viral load, were not available for many participants due to

resource constraints. The relatively low number of patients with available counts also limited statistical inferences. Cross-sectional studies of this nature do not capture trends in adherence over time and are limited in drawing conclusions regarding a cause-effect relationship of potential factors. Additionally, there was a wide age range in the children enrolled in the study; hence differences in developmental stage may influence adherence behaviour. It is possible that reporting bias by caregivers may have resulted in inflated adherence levels.

Adherence in this study was defined as missing zero doses in the last four days, as the accuracy of self-reporting improves with shorter recall intervals. Indeed, adherence levels were lower when participants were asked about taking their medications over longer recall intervals (data not shown). The relatively small sample size limits the generalizability of these findings, but provides valuable lessons for intensifying present adherence interventions.

In conclusion, increased access to paediatric antiretroviral therapy demands a concurrent systematic approach to innovative adherence strategies. In order to achieve the goal of maximal viral suppression and immune reconstitution, as well as overall social and developmental health, caregivers and older children must receive special focus in longitudinal adherence programmes. Factors impacting adherence are multidimensional and complex but it is prudent to consider social, developmental and biomedical issues when assessing adherence. Innovative translational and experimental research on adherence to ART based on sound theoretical knowledge and behaviour-change models will aid in ensuring a better quality of life for children with HIV/AIDS in Jamaica and similar resource-limited settings.

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Safety of Antiretroviral Drug Therapy in Jamaican Children with HIV/AIDS

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ABSTRACT

Background: HIV has been a leading cause of death in Jamaican children aged \leq five years. Antiretroviral drugs (ARVs) are increasingly available in Jamaica through the Global Fund. Adverse effects of ARVs are a major cause for non-adherence to medications. Knowledge of the use and side effects of these drugs are crucial in the management of HIV-infected children as we scale-up the use of antiretroviral therapy, islandwide. We evaluated the adverse events and safety of antiretroviral therapy in children attending four Infectious Disease Clinics in Kingston, Jamaica, a resource limited setting.

Methods: Data for children prospectively enrolled in the Kingston Paediatric and Perinatal HIV/AIDS Programme during September 2002 to April 2005 were analyzed.

Results: Among 121 HIV-infected children, 77 (64%) were on ARVs, 90% had CDC class C disease, 60% were males and perinatal transmission predominated. AZT/3TC based regime was utilized in 93%, trimethoprim/sulphamethoxazole prophylaxis was used in 100% and five were completing anti-tuberculous drugs. Anaemia occurred in all patients, with increased severity in those on ARVs. Macrocytosis occurred in 83% and thrombocytopenia in 8% of those on ARVs. Elevation of bilirubin, aspartate transaminase (AST) and alanine transaminase (ALT) levels and reversed albumin to globulin ratio prior to commencing ARVs, with significantly lower prevalence following use of ARVs emphasized the severity of HIV disease at time of ARV initiation. Clinical adverse reactions were uncommon and included nail discoloration (8%), vomiting (7%), nausea (3%), peripheral lipodystrophy (4%) and abnormal dreams (1%). Ten children required change of ARV medication because of severe adverse effects: three for severe anaemia with repeat blood transfusions, three for severe nevirapine-associated rash and four for indinavir-associated haematuria.

Conclusions: ARVs are being successfully initiated in HIV-infected Jamaican children using the public health model. The excellent safety profile, good tolerance and few reported significant adverse effects augur well as antiretroviral therapy is scaled-up islandwide.

Seguridad de la Terapia con Medicamento Antiretroviral en Niños Jamaicanos con VIH/SIDA

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RESUMEN

Antecedentes: EL VIH ha sido la principal causa de muerte en los niños jamaicanos de \leq cinco años de edad. Las drogas antiretrovirales (ARVs) se hallan cada vez más a disposición en Jamaica a través del Fondo Global. Los efectos adversos de los ARVs constituyen una causa fundamental para la no adherencia a los medicamentos. El conocimiento del uso y los efectos colaterales de estos medicamentos son cruciales para el tratamiento de los niños infectados por VIH en la medida en que escalamos el uso de la terapia antiretroviral a lo largo de toda la isla. Evaluamos los eventos adversos y la seguridad

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de la terapia antiretroviral en niños que asisten a cuatro clínicas de enfermedades infecciosas en Kingston, Jamaica, las cuales constituyen un escenario limitado en recursos.

Métodos: Se analizaron los datos de niños prospectivamente alistados en el Programa VIH/SIDA Prenatal y Pediátrico de Kingston, Jamaica, durante septiembre de 2002 hasta abril de 2005.

Resultados: Entre los 121 niños infectados con VIH, 77 (64%) estaban bajo medicación con ARVs, 90% tenían enfermedades del subgrupo C según la clasificación de CDC, 60% eran varones y predominó la transmisión perinatal. El régimen basado en AZT/3TC fue utilizado en 93%, trimetoprima/sulfametoxazol se usó en el 100%, y cinco estaban completando medicamentos antituberculosos. La anemia estaba presente en todos los pacientes, con mayor severidad en aquellos bajo ARVs. Se observó macrocitosis en el 83% y trombocitopenia en un 8% de los que se hallaban bajo ARVs. La elevación de los niveles de bilirrubina, aspartato transaminasa (AST) y alanina transaminasa (ALT) y la relación albúmina/globulina invertida antes de comenzar con los ARVs, con una prevalencia significativamente menor tras el uso de los ARVs, enfatizaron la severidad de la enfermedad del VIH al momento de la iniciación del ARV. Las reacciones clínicas adversas fueron poco común e incluyeron decoloración de las uñas (8%), vómitos (7%), náuseas (3%), lipodistrofia periférica (4%) y sueños anormales (1%). Diez de los niños necesitaron cambio de medicación ARV debido a los severos efectos adversos: tres a causa de una anemia severa con repetidas transfusiones de sangre, tres debido a una severa erupción asociada con la nevirapina, y cuatro a causa de hematuria asociada con indinavir.

Conclusiones: Los medicamentos ARVs han comenzado a ser administrados exitosamente en niños jamaicanos infectados por el VIH, usando el modelo de salud pública. El excelente perfil de seguridad, la buena tolerancia y el pequeño número de efectos adversos significativos reportados, auguran un buen futuro a la escalada de la terapia antiretroviral en toda la isla.

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BACKGROUND

HIV has been a leading cause of death in Jamaican children aged less than five years (1, 2). Antiretroviral drugs have been accessible to the public in Jamaica through a grant from the Global Fund for AIDS/Tuberculosis and Malaria (2). The appropriate use of these drugs has significantly reduced the morbidity and mortality of patients suffering from HIV/AIDS. Once highly active antiretroviral drugs (HAART) are commenced, there has to be a long-term commitment and vigilance on the part of patients, parents and attending physicians. This is necessary to prevent the emergence of drug resistant virus that will occasion more expensive second and third line HAART therapy. Knowledge of the use and side effects of these drugs is therefore crucial, because this can contribute to adherence, which is necessary to significantly extend the life span of infants and children living with HIV/AIDS.

The Kingston Paediatric and Perinatal HIV/AIDS Programme (KPAIDS) is a joint collaborative initiative between The University of the West Indies (UWI) and the Ministry of Health (MOH), Jamaica, with their participating hospitals and clinics. The mission of the programme was the prevention of mother-to-child transmission (MTCT) of HIV and treatment of women, children and families with HIV/AIDS in four ambulatory clinics in Greater Kingston and others throughout Jamaica (3–14). The initial clinical description of these children using the criteria developed by the Centers for Disease Control and Prevention and use of ARVs in this population have been documented (7, 8). Except for a few initial case reports from Jamaica, there have been no

reports of adverse events to paediatric antiretroviral drugs from the English-speaking Caribbean (14).

Paediatric ARV Therapy and Adherence

The WHO guidelines were modified, the principles of paediatric ARV were summarized and guidelines for antiretroviral therapy recently developed for Jamaica and the Caribbean were implemented (15, 16). Children differ from adults in the progression and sequelae of HIV/AIDS. Almost 50% of adults with HIV will develop AIDS by 10 years. On the contrary, 25% of children will develop AIDS by one year and 50% by three years. Because of this and other factors (eg taste of drugs, liquid formulations, weight-adjusted dosing and adherence factors), children differ from adults in administration of antiretrovirals. In principle, antiretroviral therapy is to be delayed if the patient was stable, if there were unresolved issues of non-compliance or if non-adherence is expected to jeopardize success of treatment. Family and caregivers were assessed and prepared for adherence to therapeutic regimens. Major causes of treatment failure were a combination of non-adherence and intolerance. Comprehensive evaluation usually included nursing, social and enquiries into behavioural and psychological issues. Assessment of prior adherence should be sought noting all phases of medication administration including obtaining, storage and administration.

Adverse events of Paediatric HAART – internationally

Outside of the Caribbean, many recent studies have been reported analyzing the various side effects of antiretrovirals and their effects on treatment outcomes (17–31). These

studies have shown that HAART in HIV-infected children is feasible and accessible in developed and in some developing countries, improving long-term survival in children, with reduction of serious infections and death. Although adverse drug reactions to HAART sometimes occurred, most were minor and infrequent. Clinical effects of HAART therapy included rashes, vomiting, nausea and peripheral lipodystrophy, with laboratory abnormalities affecting the haematologic, renal and hepatic systems. Some instances of immune reconstitution syndrome were recorded. Overall, paediatric ARV therapy was thus deemed to be safe and well-tolerated.

Adverse events of Paediatric HAART in Jamaica

Initially, an observational prospective study was performed on antiretroviral therapy in 37 HIV-infected Jamaican children in the KPAIDS Programme (8). First line drugs usually comprised zidovudine/lamivudine and nevirapine or nelfinavir whereas second line drugs included stavudine, didanoside and nelfinavir or nevirapine (15, 16). Antiretroviral therapy in this study was shown to significantly reduce the number of admissions to hospital and length of stay and to improve weight gain and height. Of the 37 children studied, five required second line therapy; two of three in this group had issues of ARV compliance resulting in clinical signs of ART failure. However, it was not stated whether there were issues regarding side effects of medication used. Further, adverse events, whether minor or major, were not specifically enunciated as an outcome measure in this study.

Hypothesis

We hypothesized that HAART was being successfully initiated in Jamaican children with excellent safety profile, minimal intolerance and other adverse effects.

SUBJECTS AND METHODS

We designed a descriptive observational cohort study which sought to characterize the use of antiretroviral therapy (safety profile and adverse events) in children and adolescents attending the Infectious Disease Clinics in Greater Kingston, Jamaica. Specifically, we examined clinical and laboratory effects of ARVs in paediatric patients, including severity of adverse effects, symptom/signs: nausea, vomiting, nail discoloration, peripheral lipodystrophy; haematological parameters (such as anaemia, leukopenia, thrombocytopenia), biochemical profile (such as abnormal liver function, lipid profile and nephrolithiasis).

Data for children enrolled in the KPAIDS Programme during September 2002 to April 2005 were utilized. These children were all confirmed as infected with HIV and attended ambulatory Paediatric Infectious Disease Clinics at three main centres in Kingston and the Metropolitan Area: University Hospital of the West Indies (UHWI), Bustamante

Hospital for Children (BHC) and Spanish Town Hospital (STH). Five hospital charts at the BHC could not be located.

Standardized management protocols had been established for clinical care, laboratory monitoring and documentation (3, 7, 8). Trained paediatricians and registered nurses specifically trained in HIV/AIDS management were involved in the management of these patients. The infected children were managed by scheduling monthly visits for monitoring initially, then every 2–3 months as determined by the clinical status. Monitoring methods included history, nutrition, growth and developmental assessment, physical examination and adherence to prophylaxis and antiretroviral agents and evaluation of adverse events. Investigations included complete blood count, total lymphocyte count, serological tests for co-infection (*eg* hepatitis, syphilis, toxoplasmosis, cytomegalovirus and herpes viruses) and CD4 counts by non-flow technique, as available. Laboratory investigations were performed at baseline and three-monthly thereafter while on ART. The children in the before ART group usually had laboratory investigations collected immediately preceding ART. Abnormal laboratory values were repeated as frequently needed to guide clinical management. Standardized forms were used to record the relevant demographic, historical, clinical and laboratory data for each child before uploading to a database maintained to track the clinicopathological progress of the cohort. Records kept were confidential and are available only to the staff involved in the day to day care of the patients. Microsoft Access, Excel and SPSS were used where appropriate for analyses. Information was entered on Excel files and analyzed using SPSS. Here percentages of total for the different parameters were obtained with statistical means in the analysis of the data.

Adverse events and side effects

Clinical and laboratory effects evaluated included: drug reactions, nausea, vomiting, nail discoloration, lipodystrophy, central nervous system abnormalities, hypersensitivity reactions, anaemia, macrocytosis, deranged liver function tests, hypercholesterolaemia and hypertriglyceridaemia. Deranged liver function tests were determined for age appropriate groups using international reference values (32).

Guidelines for establishing antiretroviral drug toxicity in infants, children and adolescents, as established by the National Institutes of Health (NIH), National Institutes for Child Health and Human Development (NICHD) were used (33). These guidelines were developed specifically for use in clinical trials of ARVs in infants and children. The guidelines are as follows: Grade 1 – grading severity of paediatric (< 3 months of age) adverse experiences, November, 1993; Grade 2 – grading severity of paediatric (> 3 months of age) adverse experiences, September, 1993; Grade 3 – supplemental toxicity: grading severity of paediatric cutaneous/skin rash/dermatitis adverse reaction.

Variables

We examined and recorded the following parameters: socio-demographic data, address and healthcare institution, CDC clinical and immunological diagnostic criteria, where available, virological monitoring, where available, combinations of ARVs used; commencement and duration of therapy, other co-medications, *eg* trimethoprim/sulfamethoxazole, anti-tuberculosis medications; types of adverse events, monitoring of adverse events, continuation, discontinuation or changing of ARVs, interventions *eg* blood transfusion and suggested appropriate recommendations.

RESULTS

Demography

We report on a total 121 children with HIV/AIDS, 77 (64%) of whom were on ARVs. The demographic data for these children are presented (Table 1). Most patients (69%)

Table 1: Sociodemographic and clinical factors

Characteristic	Total	On ARVs	Not on ARVs
Total with HIV/AIDS	121	77 (64%)	44 (36%)
Site of care			
UHWI	83 (69%)	51 (60%)	32 (40%)
BHC	29 (23%)	20 (69%)	3 (33%)
STH	9 (7%)	6 (67%)	9 (31%)
Age, median(range)	7 (1–20) yrs	7 (1–18) yrs	8 (1–20) yrs
Sex	70 (58%) M	46 (59%) M	24 (54%) M
Residential institution	32 (26%)	24 (75%)	8 (25%)
Mode of transmission			
Perinatal	101 (83%)	66 (65%)	35 (35%)
Sexual	14 (12%)	6 (43%)	8 (57%)
Transfusion	2 (2%)	2 (100%)	–
Unknown	4 (3%)	3 (75%)	1 (25%)
Clinical staging of HIV/AIDS			
CDC – N	6 (5%)	2 (34%)	4 (66%)
CDC – A	27 (22%)	12 (44%)	15 (56%)
CDC – B	29 (24%)	10 (34%)	19 (66%)
CDC – C	59 (49%)	53 (90%)	10 (10%)
CD4 count cells/ μ L			
Median		51	45
Range		39 – 2 150	11 – 2 150

BHC = Bustamante Hospital for Children

STH = Spanish Town Hospital

UHWI = University Hospital of the West Indies

accessed treatment and care at UHWI and between 60 and 69% of patients initiated ARVs at clinic sites. The ages of the patients ranged from 1–20 years with a median age of seven years for patients on ARVs. There was a predominance of males in the subgroup of patients (58%) who were also on ARVs (59%). Twenty-six per cent were in residential institutions and the rest were receiving family-based care. There are three residential institutions caring for children, with HIV/AIDS, who receive comprehensive and standardized treatment and care through the KPAIDS programme. The

mode of transmission of HIV was primarily *via* the perinatal route (83%) but sexual (12%) and transfusion (2%) transmission modes were identified.

Clinical and immunologic criteria

The CDC categories for the patients are shown (Table 1). Most (49%) patients had severe disease (CDC-C), 22% had moderate disease (CDC-B) and 22% had mild (CDC-A) AIDS-defining signs. The median CD₄ count for patients on HAART was 51 (range 39–2150) cells/ml. None of the patients in the study had viral loads done as these became available after the period of study. Children commenced HAART based on the modified WHO guidelines.

Current medications

Current drug regimens by the patients comprised HAART in 64% (77), trimethoprim/sulfamethoxazole prophylaxis in 100% (121) and completion of antituberculous therapy in 6% (5). Eighty-seven per cent (67) were on a regime of zidovudine/lamivudine/nevirapine and 93% were receiving zidovudine/lamivudine based regimes; five were taking abacavir with zidovudine and nevirapine and five were on other HAART regimens. All patients were on trimethoprim/sulfamethoxazole prophylaxis and 6% of patients were completing therapy for TB. Standard antituberculous therapy is usually commenced in accordance with the WHO's guidelines.

Haematologic abnormalities

Severity of anaemia was classified according to the NIH guidelines for disease severity in HIV-infected children. We examined three groups of patients: those not on ARVs, those prior to starting ARVs and those on ARVs (Table 2). The children in the “prior to ART” and the children “on ART” represent a before and after comparison. There is some overlap between the populations of children prior to starting HAART and after starting HAART. The populations represent a cross-section of subjects who were on ART as compared to those who were not on ART.

Anaemia was found in all three groups with no marked difference between the groups with respect to mild and moderate. Only patients on ARVs and those prior to starting ARVs had severe anaemia (Hb < 7 g/dl). Of the patients with severe anaemia, three required change of regime due to symptomatic anaemia, as well as blood transfusions; all patients were on zidovudine-based regime and responded to withdrawal of zidovudine and commencement of new antiretroviral regimens. There were no deaths due to zidovudine-associated anaemia. Other haematological parameters evaluated included macrocytosis and thrombocytopenia (Table 2). Macrocytosis was identified in a significant number of patients on ARVs compared to the other two groups. Mean Corpuscular volume (MCV) >100 fl was found only in patients on ARVs. Importantly, there was no clinical consequence of macrocytosis in these patients.

Table 2: Haematological and biochemical abnormalities

Characteristic	Not on ARVs	Baseline before ARVs	After placed on ARVs	Statistical tests p-value
Total with anaemia	10/30 (33%)	22/50 (44%)	36/77 (47%)	0.29
Hb 9–9.9 gm/dl	5/30 (16%)	11/50 (22%)	14/77 (18%)	0.59
Hb 7–8.9 gm/dl	5/30 (16%)	5/50 (10%)	10/77 (13%)	0.61
Hb < 7 gm/dl	–	6/50 (12%)	12/77 (16%)	0.57
Macrocytosis	6/33 (18%)	2/30 (7%)	61/73 (83%)	< 0.01
Thrombocytopenia < 150,000	1/27 (4%)	5/49 (10%)	7/85 (8%)	0.7
High bilirubin	1/10 (10%)	3/19 (16%)	2/64 (3%)	0.04*
High AST	2/13 (15%)	36/49 (73%)	21/84 (25%)	< 0.01*
High ALT	None	2/10 (20%)	1/16 (6%)	0.29
High GGT	2/9 (22%)	7/26 (26%)	15/55 (27%)	0.97
Reversed albumin/globulin ratio	7/12 (58%)	27/37 (73%)	25/52 (48%)	0.01*
High cholesterol	5/10 (50%)	None	3/27 (11%)	–
High triglycerides	None	3/5 (60%)	15/24 (62%)	0.91

Thrombocytopenia was found in few patients in the different groups. The difference between patient groups was not significant. None of the patients was symptomatic for thrombocytopenia and did not require change of regime.

Biochemical abnormalities

Biochemical abnormalities included hyper-bilirubinaemia which occurred infrequently in all three groups (Table 2). Age appropriate elevated AST by international standards was found in a significantly higher proportion of patients just prior to starting ARVs (73%) compared to those on ARVs and those not on ARVs. A similar trend was observed for ALT levels. There was no marked difference between groups by proportion of children with elevated GGT levels. For patients on ARVs identified with elevated liver function tests, none required change of antiretroviral regime, since the abnormalities were mild (grade 1–2 toxicity– National Institute of Health guidelines, 2005). These patients have been continually monitored to track progress. Other biochemical abnormalities are also shown (Table 2). A reversed albumin to globulin (A/G) ratio was identified in 73% of patients just prior to starting ARVs. This proportion decreased after initiation of ARVs. Lipid profiles were not readily available in all instances. A higher proportion of ARV – naïve patients had elevated cholesterol levels compared to those initiated on ARVs. There was no marked difference in proportion of patients with elevated triglyceride levels according to international standards.

Clinical adverse events

Gastrointestinal (GI) abnormalities, primarily vomiting and nausea, were documented in 7% (5) and 3% (2) of patients, respectively. In all cases, the problems were mild and did not affect patient adherence to medications. Caregivers reported that the effects resolved within 5–7 days and did not require intervention. Nail discolouration was documented in 8% (6) of patients and was a likely complication of zidovudine ther-

apy. These consisted of linear hyperpigmented bands. None of the affected patients or caregivers was particularly perturbed by this problem.

Nevirapine-associated rash (hypersensitivity) was found in four per cent (3) of patients. In all instances, the rash was moderate to severe (*ie* grade 3 or 4, NIH, Division of AIDS grading of severity of paediatric adverse experiences) and required a change in regime. The diagnosis was confirmed following a marked response to nevirapine withdrawal. Minor rashes associated with nevirapine use were not documented. Peripheral lipodystrophy was noted in four per cent (3) of patients. These were all male adolescents who were on ARVs for a prolonged period (> 3 years). No metabolic characteristics (*ie* insulin resistance and glucose intolerance, and dislipidaemia) were identified in these affected children. They never expressed concern about their abnormal body image and in all instances the effect was recognized by the attending physician. One patient on an efavirenz-based regime had florid nightmares which affected quality of sleep for a brief period after starting medication. Other central nervous system abnormalities namely headache, visual problem and hallucination were not documented.

Interval to adverse event after HAART

The median interval to detection of adverse effects following initiation of ARVs are summarized (Table 3). Anaemia and elevated GGT were detected approximately 4–5 months after

Table 3: Interval between ARV initiation and adverse event

Characteristic	Median (weeks)	Interquartile range (weeks)
Anaemia	20	5–51
Macrocytosis	56	31–75
High AST	34	13–117
High ALT	16	na
High GGT	23	5–63

initiation of ARVs. The other abnormalities became apparent after a longer interval (8–14 months). Nevirapine-associated rash developed between 3–4 weeks after commencement of ARVs.

Interventions

Severe anaemia required blood transfusion and withdrawal of the offending agent (zidovudine) in three subjects. Children with nevirapine-associated rash were monitored in hospital and favourable response to withdrawal of nevirapine was observed in three subjects. Four children had gross haematuria while on indinavir-based regimes. This occurred against the background of inadequate daily fluid intake and sometimes inadvertent administration of the adult dose, although caregivers were continually advised on the specific requirements for indinavir use. These children were admitted to hospital and were carefully evaluated for haematuria. The episodes of haematuria did not recur after withdrawal of the drug.

DISCUSSION

Adverse effects of ARVs have been shown to be a major cause for non-adherence to medications. Knowledge of the use and side effects of these drugs are therefore crucial in managing HIV-infected children. This is particularly so in Jamaica and other developing countries as the use of anti-retroviral therapy is scaled-up. This prospective study shows that ARVs are being introduced in Jamaican children with an excellent safety profile and few adverse events. Even with proper monitoring, few children with clinically significant adverse effects are being identified and the appropriate interventions instituted.

Nevirapine-associated rash was the most important clinical abnormality requiring therapeutic intervention. Severe anaemia and gross haematuria were the other laboratory abnormalities that required therapeutic intervention. Most adverse effects were mild and were monitored in the ambulatory setting without the need for intervention.

Anaemia was common in the cohort of children identified in this study. This probably reflected the multifactorial causes involved in the pathogenesis of anaemia in HIV-infected children. For patients not on ARVs, causative factors were not fully explored in this study. These factors likely involved a direct toxic effect of HIV on the bone marrow and erythroid progenitor cells and could account for the higher percentage of patients with anaemia prior to starting ARVs. Most patients in this group had severe CDC (C) disease. Severe anaemia only occurred in patients on ARVs and in those prior to starting ARVs. It is important to note that HIV-associated anaemia, even though low in prevalence, can be severe and life-threatening when it occurs. Close monitoring and vigilance is therefore critical for early detection and intervention in a timely manner. Knowledge of the specific idiosyncratic effects of specific ARVs is critical. This would promote timely intervention in management of

clinically significant adverse effects. Fischl *et al* 1990, demonstrated that ARV-related anaemia due to zidovudine, which was mostly macrocytic, occurred with a prevalence of 30–40% (23). In this study, the prevalence was similar.

Macrocytosis occurred at a significantly higher frequency in patients on primarily zidovudine-based regimes. This is a known adverse event associated with zidovudine therapy. A few patients on zidovudine did not demonstrate this phenomenon but they were mainly patients with poor adherence to ARVs during the intervening period. This documented reaction of red cell progenitors to zidovudine use could probably be utilized as a surrogate means of monitoring for adherence with therapy (similar to use of haemoglobin A1C in monitoring diabetes mellitus) in a resource-limited setting (34). This is an interesting finding that may be worth further study in our setting. Thrombocytopenia occurred in eight per cent of the children on ARVs compared to four per cent in previously reported series (23). In most cases, thrombocytopenia was detected on routine laboratory monitoring and resolved spontaneously.

Biochemical abnormalities can occur in up to 58% of patients on ARVs (23). The finding that some patients have markedly elevated AST prior to starting ARVs in the present study may possibly reflect direct or indirect toxic effects of HIV on the liver in patients presenting with advanced disease, co-morbid opportunistic infections could contribute to abnormal liver function tests in patients with severe disease. Elevation of cholesterol and triglycerides may be seen in patients with HIV as a primary occurrence independent of ARV use. This was documented in the study where hypercholesterolaemia was found in significantly more patients not on ARVs. The cause of such elevation in these patients is still being elucidated but could be related to abnormal hepatic metabolism.

Clinical adverse events mainly GI intolerance can occur in up to 33% of patients (33). There was a lower prevalence of intolerance and this is encouraging since it would enhance adherence in the early phase of initiation of ARVs. It is possible that under-reporting could have resulted in this lower prevalence.

Nevirapine-associated rash occurred less frequently than previously reported (33). At least 90% of our patients are on a nevirapine-based regime, part of the recommended first line therapy in Jamaica. The low prevalence of nevirapine-hypersensitivity substantiates the continued use of this regime for ARV initiation.

Central nervous system abnormalities were rare, however only one patient (a male adolescent) was actually commenced on an efavirenz-based regime. Efavirenz-based regimes are known to be highly efficacious as initial therapy in ARV-naïve individuals but the use can be associated with bizarre central nervous system adverse effects. Although the World Health Organization guidelines recommends the use in resource-limited settings as first line therapy in children over the age of three years, the possibility of adverse central ner-

vous system effects makes it less favourable for use in affected children.

Teenagers and adults tend to be more concerned about issues of body image abnormalities associated with ARV use. Peripheral lipodystrophy has a reported prevalence of 38% (35). This abnormality is a longterm sequel to ARV use and the low prevalence in the present study is reflective of the few patients on ARVs for greater than three years duration. With time and increasing ARV use, more patients may present with this syndrome and other metabolic problems.

Limitations

The introduction and use of ARVs in HIV-infected Jamaican children has been based on a Public Health Approach (not a controlled clinical trial) related primarily and initially on guidelines for clinical management by the Ministry of Health, Jamaica, and utilizing the existing resources for clinical and laboratory monitoring. Hence patients were initiated on ARVs primarily on clinical criteria, as previously outlined. Laboratory monitoring capacity was not optimal throughout the period of study nor was it uniformly implemented at the various clinical sites and hence a number of children did not have appropriate investigations in a timely fashion. This may have affected the interpretation of some of the presented data. Notwithstanding, we were able to institute good uptake and monitoring of ARVs in children with minimal side effects.

CONCLUSION

We found that ARV use was generally safe and well tolerated with few significant adverse effects in HIV-infected Jamaican children. The most serious clinical adverse reaction was related to generalized rash with nevirapine use which occurred in few patients. Few patients developed severe anaemia requiring blood transfusion and withdrawal of zidovudine. The occurrence of macrocytosis following at least 6 months of zidovudine-based regime could well be utilized as a surrogate indicator of adherence. Although some patients had elevation of liver enzymes, none was severe enough to require a change in regime. The occurrence of haematuria in children who commenced on indinavir-based regimes may not make it a favoured option for children in our setting.

Recommendations

We recommend the institution of a detailed questionnaire to elicit pertinent adverse effects of medications, to ensure that all cases are reported, even if not volunteered. Close laboratory monitoring should be instituted prior to and post initiation of therapy in a timely manner and subsequently, if no abnormalities are detected. There should be continued training of staff in ARV use and side effects. Indinavir should be used in children only in situations where no alternative is available.

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Renal Manifestations in HIV-infected Jamaican Children

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ABSTRACT

Background: Documentation regarding the renal complications of paediatric HIV infection from developing countries is scarce. In the era prior to highly active antiretroviral therapy (HAART), HIV-infected children in Jamaica who developed HIV-associated nephropathy (HIVAN) progressed to end stage renal disease (ESRD) and death within a few months of diagnosis. With increased public access to antiretroviral therapy since 2002 and subsequent survival, renal complications are increasingly recognized among the surviving cohort of infected children.

Methods: A cohort of 196 HIV-infected children was followed in four multicentre ambulatory clinics from September 1, 2002 to August 31, 2005 as part of the Kingston Paediatric and Perinatal HIV/AIDS Programme, Jamaica. We describe the clinical presentations and natural history of those patients who developed renal complications.

Results: Urinary tract infections were the most common diagnosis, occurring in 16.8% of patients, with a high recurrence rate and the most common organism was *Escherichia coli*. Four of seven patients who started indinavir developed complications of nephrolithiasis and tubulointerstitial nephropathy. Six patients (3%) fulfilled the criteria for HIVAN, five of whom were male. Median age at diagnosis was five years; all presented with advanced HIV disease, nephrotic syndrome or nephrotic range proteinuria and three with chronic renal failure. Patients received standard medical management and were initiated on angiotensin-converting enzyme (ACE) inhibitors and HAART. While the mortality ratio was 50%, only one death was associated with HIVAN and the median survival time was 3.1 years.

Conclusions: HIV-infected children present with a variety of renal complications. With improved survival since the introduction of HAART, the incidence of HIVAN is expected to increase among this maturing paediatric cohort. Early detection and treatment will optimize the outcomes for these children.

Manifestaciones Renales en Niños Jamaicanos Infeccionados por el VIH

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RESUMEN

Antecedentes. La documentación en relación con las complicaciones renales de la infección pediátrica por VIH en países en vías de desarrollo, es escasa. En la era de la terapia antiretroviral pre-altamente activa (TARAA), los niños infectados por VIH en Jamaica que desarrollaron nefropatía asociada con VIH evolucionaron hacia la enfermedad renal en fase terminal (ERFT) y la muerte dentro de pocos meses de hecho el diagnóstico. Con el aumento del acceso público a la terapia antiretroviral a partir de 2002 y la subsiguiente supervivencia, cada vez más las complicaciones renales se observan entre la cohorte sobreviviente de niños infectados.

Métodos: A una cohorte de 196 niños infectados con VIH, se le practicó un seguimiento en cuatro clínicas ambulatorios multicentros, desde septiembre 1 de 2002 hasta agosto 31 de 2005, como parte

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del Programa VIH/SIDA Prenatal y Pediátrico de Kingston, Jamaica. El trabajo describe las presentaciones clínicas y la historia natural de los pacientes que desarrollaron complicaciones renales.

Resultados: *Las infecciones de las vías urinarias fueron el diagnóstico más común en 16.8% de los pacientes, acompañadas de una alta tasa de recurrencia, y el organismo más común fue el Escherichia coli. Cuatro de siete pacientes que comenzaron tratamiento con indinair, desarrollaron complicaciones de nefrolitiasis y nefropatía tubulointerstial. Seis pacientes (3%), cinco de ellos varones, satisfacían los criterios de NAVIH. La edad promedio al momento del diagnóstico fue de cinco años. Todos representaron con la enfermedad de VIH avanzada, síndrome nefrótico o proteniuria de rango nefrótico, y tres con fallo renal crónico. Los pacientes recibieron tratamiento médico estándar y se iniciaron en el uso de inhibidores de enzimas convertidoras de angiotensina (IECAs) y el TARAA. Si bien la proporción de la mortalidad fue 50%, sólo una muerte estuvo asociada con NAVIH y el tiempo medio de supervivencia fue 3.1 años.*

Conclusiones: *Los niños infectados con VIH se presentaron con una variedad de complicaciones renales. Con el mejoramiento de la supervivencia a partir de la introducción del TARAA, se espera que la incidencia de NAVIH aumente entre la cohorte pediátrica en maduración. La detección precoz y el tratamiento temprano optimizarán los resultados obtenidos con estos niños.*

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INTRODUCTION

In the Caribbean, many of the countries have developed and expanded their response to the AIDS epidemic and increased access to antiretroviral treatment. Despite this progress, the Caribbean remains the second-most affected region in the world (1).

An estimated 2.3 million children less than 15 years of age worldwide are living with HIV and in 2006, an estimated 380 000 children died of AIDS-related causes (1). In Jamaica, the first case of paediatric HIV infection was diagnosed in 1986 (2) and since then the incidence has been increasing accounting for 7.4% (children under 15 years) of the cumulative total HIV/AIDS cases reported between 1986 to December 2006 (3).

Renal manifestations can result from HIV infection itself, illnesses associated with HIV and adverse effects of therapeutics. Renal disease in HIV-infected children may manifest as HIV-associated nephropathy (HIVAN) but also as electrolyte abnormalities, urinary tract infections, renal tubular acidosis, acute renal failure, treatment-related nephrotoxicity, infiltrative diseases of the kidney, haemolytic uremic syndrome and IgA nephropathy (4).

HIVAN is rare in children (5, 6) and reports from the developing world are scarce (7). HIVAN affects primarily those of African descent (5, 6, 8, 9), the predominant ethnicity in Jamaica. Patients progress rapidly to end stage renal disease [ESRD] (8, 9) and survival is poor (6, 10) especially in the pre-HAART era. HIVAN usually develops in patients with severe immunosuppression and advanced HIV disease and the cause of death is often unrelated to renal disease (6, 8, 11, 12).

Prior to access to antiretroviral therapy in Jamaica, HIV-infected children who developed renal complications associated with HIV (renal failure, nephrotic syndrome; n = 3) progressed to ESRD and death within months of diagnosis.

In 2002, the Kingston Paediatric and Perinatal HIV/AIDS Programme (KPAIDS) initiated a coordinated res-

ponse for the provision of care, treatment and support, including access to antiretroviral therapy, for HIV-infected children in Jamaica (13). This report describes the clinical presentations and natural history of those children within the cohort who developed renal complications.

SUBJECTS AND METHODS

A cohort of HIV-infected children was prospectively enrolled and followed in four multicentre ambulatory clinics from September 1, 2002 to August 31, 2005 as part of the KPAIDS. Standardized protocols for clinical care, laboratory monitoring and documentation were developed and implemented and an observational clinical database established for ongoing monitoring and evaluation (13–17). The infected infants and children were monitored by trained paediatricians and nurses at three-monthly intervals or less depending on the clinical need following enrolment.

At enrolment, children completed a detailed clinical assessment and comprehensive laboratory investigations as directed by standardized protocols (15), and these investigations included serum chemistries, urea and creatinine, liver function tests, complete blood count and lymphocyte subsets. Public access to viral load (plasma HIV RNA) testing only became available in 2005. Urinalysis (by dipstick) was usually performed at each ambulatory visit. Further evaluation of urinary protein was conducted if persistent proteinuria was identified on dipstick on consecutive visits. Urine bacteriological analysis was performed depending on patient symptomatology. Glomerular filtration rate (GFR) was estimated using the Schwarz formula (18). Renal impairment was defined as GFR < 80 ml/min/1.73 m². Further evaluation for definitive urinary tract infections (UTI) included renal ultrasound for all children and, in addition, micturating cystourethrogram (MCUG) if age < 5 years or if over five years with abnormal ultrasound or symptoms suggestive of lower urinary tract pathology.

Cohort study staff prospectively identified patients with probable uro-renal complications and referred them to the Nephrology Service for collaborative management. Criteria for diagnosing probable HIVAN included (1) proteinuria in excess of 50 mg/kg/day or a urinary protein to creatinine ratio above 2.0 or presentation with nephrotic syndrome (NS); or (2) a progressive increase in serum creatinine or evidence of chronic renal impairment; or (3) presence of characteristic histopathological findings on renal biopsy; and (4) no other underlying disease likely to cause nephrotic syndrome or chronic renal failure.

All children with suspected HIVAN were screened for secondary nephropathy by measuring serum antistreptolysin O titre, antinuclear factor, Venereal Disease Research Laboratory (VDRL) test, Hepatitis B surface antigen (HBsAg) and complement protein (C3). Standardized therapy was initiated including HAART and ACE inhibitors. A trial of steroids (prednisone) was offered for those patients with nephrotic syndrome in consultation with the Paediatric Nephrology service.

Data Handling and Statistical Methods

Demographic, clinical and laboratory data were extracted from the Kingston Paediatric and Perinatal HIV/AIDS Programme database and utilized to determine frequency, incidence and outcomes of children within the cohort who presented with renal complications. The Kaplan-Meier method was used to estimate survival of children with HIVAN.

RESULTS

One hundred and ninety-six HIV-infected children were followed prospectively in multicentre clinics, in the Kingston Paediatric and Perinatal HIV/AIDS Programme, Jamaica, between September 1, 2002 and August 31, 2005.

Urinary Tract Infections

Fifty-seven cases of urinary tract infections were documented in 33 HIV-infected children (16.8% of the cohort), with an incidence of 29.1% or 2908 per 10 000 HIV-infected children. The most common aetiological organism identified was multi-resistant *Escherichia coli* (36.8%) followed by *Streptococcus Group D* (19.3%) and *Klebsiella pneumoniae* (10.5%) as shown in Table 1. All patients who presented with urinary tract infection at < 5 years of age or with recurrent infections were investigated with abdominal ultrasound and micturating cystourethrogram but no underlying structural abnormalities were detected.

Adverse Effects of Therapeutics

Seven HIV-infected children (3.6% of the cohort) were commenced on indinavir and four of them developed renal complications. Three presented with recurrent flank pain, renal colic and haematuria (two of these had haemophilia A) and plain abdominal radiographs were normal. Both patients with

Table 1: Epidemiologic profile of episodes of urinary tract infections (n = 33)

Organism	Organism		% of UTIs
	Frequency	Incidence (per 100)	
<i>Escherichia coli</i>	21	10.7	36.8
<i>Streptococcus GpD</i>	11	5.6	19.3
<i>Klebsiella sp</i>	6	3.1	10.5
<i>Enterobacter sp</i>	5	2.6	8.8
<i>Proteus sp</i>	2	1.0	3.5
<i>Salmonella sp</i>	2	1.0	3.5
<i>Pseudomonas sp</i>	1	0.5	1.8
<i>Enterococcus sp</i>	1	0.5	1.8
<i>Pantoea agglomerans</i>	1	0.5	1.8
Unknown/unidentified	7	3.6	12.2

haemophilia A also experienced increased spontaneous haemarthrosis of the knees post-indinavir initiation. One patient (with pre-existing HIVAN) developed worsening renal failure after commencing indinavir due to possible tubulointerstitial nephropathy.

HIV-associated Nephropathy

The demographic and clinicopathologic characteristics of the six HIV-infected children with HIVAN (3% of the cohort) are presented in Tables 2 and 3. Five were male, median age at diagnosis was five years; all were of African descent and had moderate to severe HIV disease. All presented with nephrotic syndrome or nephrotic range proteinuria and three with established chronic renal impairment. None of the children was hypertensive at initial presentation and HIVAN was one of the major presenting features in only Case # 4; however, this case presented in an advanced stage of disease. No other secondary cause of nephropathy was identified. Abdominal ultrasound (4/6) revealed kidney sizes that were small or normal. The two with small kidneys had co-existing chronic renal failure. Renal biopsy was accessible for just one patient and this demonstrated focal segmental glomerulosclerosis (FSGS).

All patients received standard medical management in consultation with the Paediatric Nephrology service and were commenced on angiotensin-converting enzyme (ACE) inhibitors and antiretroviral therapy. Three of the four patients with nephrotic syndrome received a trial of steroid therapy but there was no improvement in clinical status.

Outcomes

The mortality rate was fifty (50%) per cent and median survival time at the end of the study period was 3.1 years (Fig. 1).

Progress of survivors

Case 1 was asymptomatic and demonstrated resolution of nephrotic syndrome within eight months of HAART initiation. Case 3 had similar resolution of oedema coincident

Table 2: Demographic and clinical presentation at diagnosis of presumed HIVAN

Case	Sex	Age (years)	CDC Category	HAART	Comorbidity	Presentation	Outcome
1	M	0.7	C	Nil	Recurrent UTI, hepatitis, encephalopathy, FTT	Nephrotic syndrome (NS)	Resolution of NS
2	M	8.0	C	zidovudine (AZT), lamivudine (3TC), indinavir (IDV)	FTT (stunting)	Chronic renal failure (CRF), nephrotic range proteinuria, low albumin but no oedema	Reduction in proteinuria; further deterioration of renal function
3	M	6.0	C *	Nil	FTT	NS, renal impairment	Resolution of NS; stabilisation of renal function
4	M	8.0	C	Nil	Tuberculosis, recurrent sepsis, UTI, focal neurological defects	CRF, hypertensive, acidotic, nephrotic range proteinuria but no oedema	Died (9.0 years)
5	M	4.0	C	Nil	FTT	NS, hypertensive	Died (8.0 years)
6	F	11.0	B	AZT, 3TC, nevirapine (NVP)	Nil	NS, hypertensive	Died (13.0 years)

* CD4 count and percentage at presentation were 297 cells/ μ L and 9% respectively, but not available for other cases
FTT = Failure to thrive

Table 3: Laboratory and investigation outcomes in children with HIVAN

Case	1	2	3	4	5	6
Haemoglobin (g/dl)*	7.5 – 12.5	3.7 – 9.7	8.4 – 13.4	5.2 – 10.2	3.4 – 10.5	7.2 – 9.8
Urea (mmol/l)*	< 1.0 – 8.3	5.1 – 39.6	3.7 – 10.8	8.2 – 36.3	1.0 – 21.7	1.0 – 5.7
Creatinine (μ mol/l)*	14.0 – 67.0	76.0 – 992.0	84.3 – 141.1	166.0 – 492.0	44.0 – 580.0	20.0 – 61.4
GFR (ml/min/1.73m ²)*	n	5.6 – 54.0	36.0 – 60.0	10.2 – 60.5	9.0 – 123.0	N
Albumin (g/dl)*	11.0 – 48.0	16.0 – 38.0	24.0 – 43.0	21.0 – 34.0	15.0 – 42.0	9.0 – 26.0
Urine protein:creatinine ratio*	0.1 – 47.3	5.7 – 12.6	14.0 – 17.0	14.8 – 21.8	14.9 – 21.8	5.5 – 10.0
Triglyceride/Cholesterol	n	increased	increased	–	n	–
Kidney size	n	small	–	small	–	n
Renal biopsy	–	–	–	–	–	FSGS

*Values represent lowest to highest recorded parameters; n = normal

with significant reduction of proteinuria and stabilization of renal function. Case 2 showed an initial dramatic improvement after HAART initiation but this was reversed after 18 months due to antiretroviral treatment failure characterized by clinical deterioration, significant immunosuppression and progressive worsening in renal function. Subsequent change to second line HAART resulted in reduction of proteinuria but renal function continued to deteriorate up until the end of the study period.

Mortality

The incidence of death from onset of HIV nephropathy was 25/100 person years. These deaths represented 23% of the deaths that occurred within the cohort during the study period

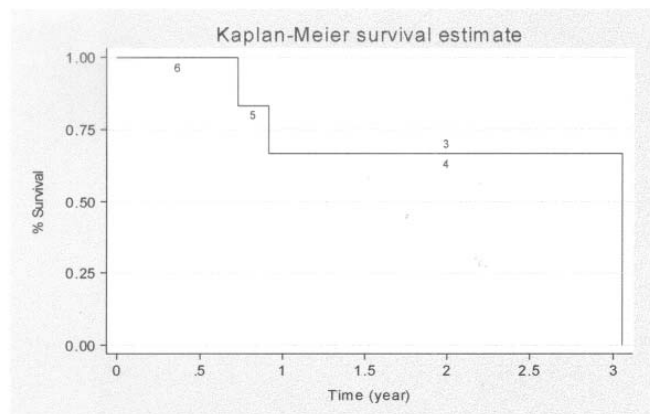


Fig. 1: Survival among children with HIVAN.

(3 of 13 deaths) with 7.7% being directly related to HIVAN. The three children (Cases 4–6) who died all had advanced HIV disease at the time of diagnosis (Fig. 2) and the final

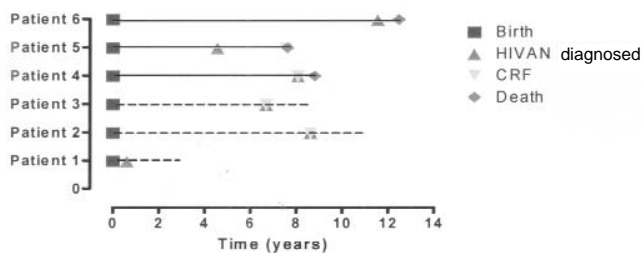


Fig. 2: Timeline of outcomes among children with HIVAN.

causes of death were cardiomyopathy, pulmonary complications of HIV associated with anasarca secondary to nephrotic syndrome/HIVAN and neurological complications of AIDS respectively. The caregiver of Case 6 opted for palliative care and he died at home.

DISCUSSION

There was a relatively high incidence of primarily infectious renal complications of HIV disease in this cohort. Significant urological and nephrotoxic complications associated with indinavir use were also documented. The incidence of HIVAN was 3% with a mortality rate of 50% but with only one death (7.7% of the deaths in the KPAIDS cohort) being attributable to HIVAN. These findings are similar to those reported in other studies internationally (4–6, 8, 19, 20).

Urinary tract infections are a relatively common presentation in HIV-infected children (21–23) and as, with our cohort, *Escherichia coli* is the most common aetiological organism (21–26). Urinary tract infections in HIV-infected children have clinical presentations similar to the uninfected population (25) although there is the tendency to recurrence, infection with multiple organisms and resistant isolates (26), all of which increase the possibility of renal dysfunction.

The spectrum of renal and urinary tract complications including nephrolithiasis, renal colic, pain without stone formation and dysuria have been documented with indinavir use in children, similarly in adults (27–29). Tubulointerstitial nephritis and acute renal impairment have also been observed in association with indinavir (30, 31). In a previous study (31), children treated with indinavir had a high incidence of sterile leukocyturia and frequently had an increase in serum creatinine greater than 50% above normal.

HIV-infected patients with low body mass index and body surface area (32, 33) and those receiving trimethoprim-sulfamethoxazole (32) have increased risk of indinavir-related nephrotoxicity. These were characteristic of most children within our cohort. One could infer from this that children would be more at risk for indinavir toxicity, given the poor bioavailability of the currently available paediatric formulations and the need to use the adult preparations (27).

Brodie *et al* (34) also showed that the overall incidence of indinavir-associated nephrolithiasis was significantly greater in haemophiliacs than in non-haemophiliacs (50% vs 17%) and the median duration of indinavir therapy prior to the development of nephrolithiasis was significantly shorter among haemophiliacs.

All patients who were diagnosed with HIVAN in the present study presented typically with clinical manifestation of proteinuria. This is one of the earliest and most classical clinical presentations of HIVAN and can range from minimal to nephrotic range proteinuria with associated oedema (5, 6, 8, 11, 19). None of the cases was hypertensive on presentation, unlike a recent study of HIV-infected children in Nigeria that reported 50% of the cases presenting with hypertension (35). Three (50%) patients also presented with chronic renal impairment or failure. Rapid progression to ESRD has been observed among patients with HIVAN, especially in the pre-HAART era (8, 10). Just one of the three patients with chronic renal impairment/failure was on HAART at the time of diagnosis and all had advanced HIV disease.

The ultrasonographic finding of small to normal size kidneys in the children with HIVAN is in contrast to findings described in other studies where echogenic kidneys, large for age and height are virtually pathognomonic for HIVAN (5,6,12,19). Both patients with small kidneys presented with chronic renal failure and against the background of recurrent urinary tract infections, it maybe possible that an early insult may have led to scarring with resultant reduced renal size. A review of infected children from Washington DC suggests that the finding of enlarged echogenic kidneys, proteinuria and urine microcysts occur in the early stages of HIVAN in children (6). The one attainable renal biopsy showed FSGS, a commonly demonstrated histological finding in paediatric HIVAN (5, 8, 11, 19). Other reported histological findings include, mesangial hyperplasia, minimal change and focal necrotizing glomerulonephritis (5, 8, 11, 19). Children generally have a less aggressive clinical course than adults, except for those with FSGS (5, 11, 19).

All children with HIVAN received HAART and ACE inhibitors which is the standard therapeutic management (4, 5). Three of the four patients who presented with nephrotic syndrome were given a trial of prednisone but showed no improvement of clinical status. A similar response was seen in prior studies and prednisone is not indicated in the treatment of HIVAN in the paediatric population (4, 5, 8, 19).

The mortality ratio was 50% and the median survival time 3.1 years as compared to 100% and a few months respectively in the pre-HAART era. The three children who were alive at the end of the study period all showed clinical improvement with HAART and ACE inhibitor therapy.

Several studies in adults have shown beneficial effect of HAART and ACE inhibitor on reducing proteinuria and slowing the progression of renal disease in HIV-infected cohorts (36–40). Studies in children are limited but few case

reports have substantiated the resolution of HIVAN in paediatric HIV-infected patients receiving HAART (41, 42). Evidence suggests a direct role of HIV infection in the pathogenesis of HIVAN (43, 44), hence effective control of viral replication should result in slow progression of renal disease.

The poor survival in the affected children is reminiscent of the natural history of HIVAN documented in other studies (6, 8, 10–12). HIVAN is a late presentation of HIV infection and is usually seen in patients with advanced disease who subsequently die from other co-morbid HIV-related conditions (11, 12). With routine screening, earlier detection and the use of HAART, the prognosis will be more favourable for these children.

The study was limited by the small number of patients and the diagnostic challenge of accessing renal biopsies for histological characterization to confirm HIVAN. Despite this, these findings increase awareness of HIVAN in the population of infected children who are now surviving into adulthood.

In conclusion, HIV-infected children present with a variety of renal complications, of which HIVAN is associated with a high mortality rate. Nevertheless, survival is improved with early detection and use of HAART and ACE inhibitors. As the current cohort of children survives to adulthood, the incidence of HIVAN is expected to increase. It is thus prudent that protocols for routine screening for proteinuria and early detection of HIVAN be implemented to ensure optimal outcomes for affected children.

We therefore propose the following recommendations for management:

- C Screening urinalysis (urinary dipstick) every three months.
- C Complete urinalysis, serum electrolyte, blood urea nitrogen and creatinine levels (4), and blood pressure monitoring every six months.
- C Aggressive treatment of intercurrent urinary tract infections.
- C Avoidance of nephrotoxic drugs, where possible.
- C Avoidance, where possible, of the use of the protease inhibitor, indinavir, in the paediatric population and contraindication in those with haemophilia.
- C Paediatric HIVAN should be treated with HAART and ACE-inhibitor in consultation with nephrologists, where possible. Steroid use is not recommended (4).
- C Promote and support adherence to HAART and continuing care.

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Absence of Opportunistic Parasitic Infestations in Children Living with HIV/AIDS in Children's Homes in Jamaica: Pilot Investigations

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ABSTRACT

Background: Many children living with HIV/AIDS in developing countries are infected with intestinal parasites. These infections add unnecessary morbidity to children already suffering the clinical insult of living with HIV/AIDS.

Objective: To determine the prevalence and potential risk factors for intestinal parasitic infections in HIV-infected children living in two institutions in Jamaica.

Methods: A total of 82 faecal specimens were collected from 41 HIV-infected children (age range 2–14 years) who resided in two Children's Homes. A structured 42-item questionnaire was administered to caregivers to obtain clinical and demographic data on each child. Faecal specimens from each patient were examined using standard microbiological techniques and *Cryptosporidium* antigen detection was conducted using a commercially available enzyme immunoassay (EIA).

Results: No opportunistic intestinal parasites were identified in this study. Non-opportunistic parasites diagnosed included *Giardia lamblia* (12.2%) and *Ascaris lumbricoides* (2.4%) while the commensals *Endolimax nana* and *Entamoeba hartmanni* were found in 4.9% and 2.4% of children, respectively.

Conclusion: Children living with HIV/AIDS in institutions in Jamaica that are closely supervised do not appear to be at substantial risk for intestinal parasites. This may be due to the strict clinical monitoring of the children and personal and environmental hygiene practices.

Ausencia de Infecciones Parasitarias Oportunistas en Niños que Viven con VIH/SIDA en los Hogares para Niños en Jamaica: Investigaciones Pilotos

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RESUMEN

Antecedentes: Muchos niños que viven VIH/SIDA en los países en vías de desarrollo, están infectados con parásitos intestinales. Estas infecciones añaden una innecesaria morbilidad a los niños que ya sufren el insulto clínico de vivir con el VIH/SIDA.

Objetivo: Determinar la prevalencia y los factores de riesgo potencial por infecciones parasitarias intestinales en niños infectados por VIH que viven en dos instituciones en Jamaica.

Métodos: Un total de 82 especímenes fecales fueron tomados de 41 niños infectados con VIH (rango de la edad 2–14 años) que residían en dos Hogares para Niños. Un cuestionario estructurado de 42 ítem fue administrado entre los encargados del cuidado de los niños, a fin de obtener datos clínicos y demográficos en cada niño. Los especímenes fecales de cada paciente fueron examinados usando técnicas microbiológicas estándar y se llevo a cabo la detección del antígeno de *Cryptosporidium*, usando inmunoensayos por enzimas (EIA) comercialmente disponibles.

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Resultados: No se identificaron parásitos intestinales oportunistas en este estudio. Los parásitos no oportunistas diagnosticados incluyeron *Giardia lamblia* (12.2%) y *Ascaris lumbricoides* (2.4%) mientras que los comensales *Endolimax nana* y *Entamoeba hartmanni*, fueron hallados en 4.9% y 2.4% de los niños, respectivamente.

Conclusión: Los niños que viven con VIH/SIDA en instituciones de Jamaica estrechamente supervisadas, no parecen correr serio riesgo alguno de parásitos intestinales. Esto puede deberse al monitoreo clínico estricto de los niños y a las prácticas de higiene personal y ambiental.

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INTRODUCTION

The Joint United Nations Programme on HIV/AIDS (UNAIDS) estimated that at the end of December 2007, there were 230 000 people living with HIV/AIDS in the Caribbean and that the region continued to be second to Sub-Saharan Africa in prevalence of infection with HIV (1). Currently, there are approximately 22 000 persons living with HIV/AIDS in Jamaica. During January to June of 2007, a total of 13 new paediatric (children under the age of 10 years) AIDS cases were reported in Jamaica. There were three paediatric AIDS-related deaths between January and June of 2007, compared to four in the same period of the previous year (2).

As the epidemic continues, more children will be placed in the care of the state or private charities as they become orphaned by the disease or abandoned due to stigma and fear. In Jamaica, several of these children have become the wards of Children's Homes which are run either by the state or charities. These institutions, like daycare centres, are likely to be the site of high rates of transmission of infectious diseases including the intestinal parasites *Giardia lamblia* and *Cryptosporidium sp* (3, 4). Furthermore, there is a range of helminth parasites including *Ascaris lumbricoides* and *Trichuris trichuria* which, although not opportunistic, may cause unnecessary morbidity in children already living with HIV but may also affect progression of the disease (5, 6). Heavy infections with these parasites are associated with anaemia, growth retardation, poor cognitive development and school performance in children (7–10). The risk of infection with intestinal parasites was 1.5 times higher among children at a day care centre in Aracaju, Brazil, than among those who were not part of this group setting (11). The most frequently encountered parasites in children in institutions are *G lamblia* and *Cryptosporidium* (12). In a study conducted in Brazil, 53.4% of children in day care centres were infected with intestinal parasites with 27% harbouring *G lamblia* infections (12). Similarly, children in day care centres in the USA and Thailand were found with *G lamblia* infection rates of 11% and 20%, respectively (13, 14).

The Caribbean region has few studies on the epidemiology of opportunistic intestinal parasitic infections in persons living with HIV/AIDS. Furthermore, there have been no reports on institutionalized children living with HIV/AIDS in the region. In Haiti, 30% and 11% of adults living with HIV/AIDS had cryptosporidiosis and cyclo-

poriasis, respectively (15). A hospital-based study in Jamaica reported *Cryptosporidium sp* from about 4% of the general population while another, in malnourished children, reported 4.9% prevalence of the parasite (16, 17). To date, there have been no reports of *Cyclospora* or microsporidia on the island.

In Jamaica, the importance of intestinal parasitic infections in residents living with HIV/AIDS in Children's Homes has not been studied. This study was conducted to determine the prevalence of intestinal parasitic infections in HIV-infected children who are residents of these institutions in Jamaica.

SUBJECTS AND METHODS

Faecal samples were collected from the residents of two Children's Homes operated by a Christian charity dedicated to the care of children infected with HIV. One institution (Home 1) provided care for 30 children and the other (Home 2) for 15 children ranging in ages from one to 13 years. The care offered to the children in these homes focussed on their developmental and psychosocial needs.

Children in need of medical treatment were provided with antiretroviral (ARV) therapy and caregivers ensured that there was full adherence to treatment. CD4/CD8 ratio is done twice per year on each child who receives ARVs.

This cross-sectional study was conducted over a six-week period. Written informed consent was obtained from the caregiver of each child who participated in the study. A 42-item questionnaire was administered to caregivers in order to obtain sociodemographic and clinical data of each child.

Caregivers were requested to submit two fresh faecal specimens in sterile plastic containers from each child. Specimens were collected and transported to the Department of Microbiology at The University of the West Indies, Kingston, Jamaica, for parasitological analyses.

In the laboratory, specimens were examined using formalin-ether concentration and Zeil Nielsen staining. *Cryptosporidium* antigen detection was conducted using enzyme immunoassay (TECHLAB® Blacksburg, VA).

Data were analyzed using SPSS 11.5 for Windows® (SPSS Inc, Chicago, Illinois, USA).

The study was approved by the Ethics Committee of The University of the West Indies/University Hospital of the West Indies.

RESULTS

Eighty-two faecal specimens were collected from 41 HIV-infected children. Twelve (29.3%) children were from Home 1 and the remaining 29 (70.7%) were from Home 2. There were 18 (43.9%) males and 23 (56.1%) females. The median age of children on enrolment was 7.0 years (range 2 to 14; mean 6.8 years, SD 3.5). Figure 1 shows children's age distribution by gender.

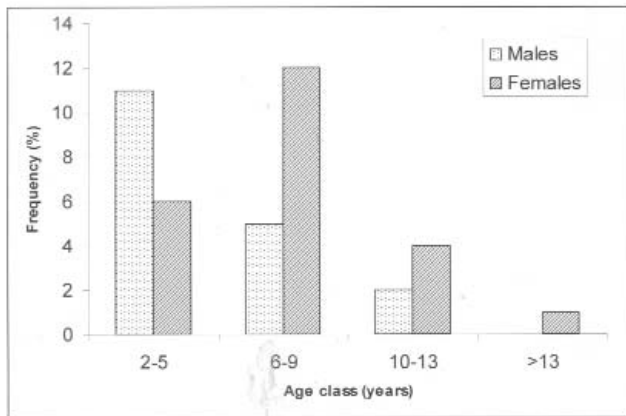


Figure: Age distribution of children gender

No opportunistic parasites were identified in this study. Non-opportunistic parasites (shown in Table 1) were identified in six (14.3%) of the children.

Table: Prevalence of intestinal parasites among study participants

Parasite infection	Prevalence (%)	Institution
<i>Giardia lamblia</i>	12.2	Home 2
<i>Entamoeba hartmanni</i>	2.4	Home 1
<i>Endolimax nana</i>	4.9	Home 1
<i>Ascaris lumbricoides</i>	2.4	Home 1

Among these were *G lamblia*, 12.2% and *A lumbricoides*, 2.4%. The commensals *Endolimax nana* and *Entamoeba hartmanni* were found in 4.9% and 2.4% of children, respectively. There were no cases of multi-parasitic infection. No child in the study presented with diarrhoea or other intestinal symptoms.

Among the study participants, 31 (75.6%) were being treated with ARV of which 28 (68.3%) were on first-line ARV therapy (lamivudine, zidovudine and nevirapine regimen). Patients who were not on ARVs had relatively high CD4 counts (> 500 cells/mm³). Almost all of the patients (97.6%) were receiving cotrimoxazole as prophylaxis against *Pneumocystis jirovecii* including all of the children diagnosed with intestinal parasites. Children diagnosed with intestinal helminths were treated with albendazole and those diagnosed with giardiasis were treated with metronidazole by a clinician who was not a part of the study team.

DISCUSSION

During the study, no opportunistic intestinal parasitic infections were diagnosed while non-opportunistic intestinal parasites were found in 14.3% of institutionalized children. This result was in contrast to several studies (3, 4) which reported *Cryptosporidium* (prevalence of 10.0% and 15.5%) in children attending daycare centres. It is especially important to note that the parasite may be common among children who are living in institutions but who are not immunocompromised. In this study, five cases of giardiasis were diagnosed in one Home with 15 resident children. It is very likely that the parasite was spread clonally within this institution. Whilst *G lamblia* is highly contagious, it was found at low prevalence. In addition, the commensals *Endolimax nana* and *Entamoeba hartmanni* and the non-opportunistic roundworm *A lumbricoides* were all found at low prevalence. This suggests that the risk of transmission of intestinal parasites in these institutions is very low. Therefore, intestinal parasites are not significant contributors to morbidity among these institutionalized children. In contrast, older studies have found that the prevalence of *A lumbricoides* in Jamaican school-age children ranged from 15.4% to 19.4% and 38.3% to 45% for *Trichuris trichuria* (8, 9). Low prevalence of intestinal parasitic infection in institutionalized children may be related to the scrupulous hygienic practices followed by the staff at both institutions. These include routine hand washing and the daily cleansing of tables and chairs.

These findings are also indicative of the benefits of care given to these children by The Kingston Paediatric and Perinatal HIV/AIDS Programme. Facilitators of this programme embarked on a targeted intervention to improve the quality of life of children infected with HIV/AIDS (18). Careful clinical monitoring each week by paediatricians and nurses from the University Hospital of the West Indies through the programme may have also contributed to low infection prevalence in these institutions. Although de-worming is not routinely done, this surveillance has allowed for prompt diagnosis and treatment that would likely assist in preventing the spread of pathogens among these children. This protocol for care should be adopted by other institutions in developing countries for children living with HIV/AIDS.

The findings of this pilot study show that such children's homes can be made safe from opportunistic parasites once they are closely monitored clinically and efforts are made to reduce the probability of transmission by environmental and personal hygiene intervention. Ongoing surveillance and routine de-worming is recommended to ensure that parasitic infection is rapidly detected and treated.

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Clinical Manifestations of Adolescents with HIV/AIDS in Jamaica

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ABSTRACT

Objective: To characterize the clinicopathological manifestations and outcomes of a cohort of HIV-infected Jamaican adolescents.

Methods: This is a retrospective cohort study to determine demographic, clinical, immunological characteristics, antiretroviral uptake and mortality in 94 adolescents aged 10–19 years followed in the Kingston Paediatric and Perinatal HIV/AIDS Programme (KPAIDS) between September 2002 and May 2007. Parametric and non-parametric tests are used to compare variables.

Results: The median age at initial presentation was 10.0 years (interquartile range (IQR) 7.0–12.0 years), 54.3% (51) were female ($p = 0.024$), transmission was primarily mother-to-child (70, 73.4%), with 87% (61) of the latter presenting as slow progressors. Sexual transmission accounted for 19.1% and there was significant female predominance ($n = 15$; $p = 0.024$). At most recent visit, perinatally infected adolescents were more likely ($p < 0.0001$) to reside with a non-parent ($n = 42$) than a biological parent ($n = 19$) and most had Centers for Disease Control and Prevention (CDC) category C (35/50%) disease, whereas the majority of non-perinatally infected children were classified CDC category A. Mean z scores for height-for-age was -1.47 ± 1.21 ($n = 77$), weight-for-age -1.06 ± 1.44 ($n = 80$) and BMI-for-age -0.34 ± 1.21 ($n = 76$) respectively; females ($n = 41$) were taller than males ($n = 36$) at their current height ($p = 0.031$). Lymphadenopathy (82%), dermatitis (72.0%), hepatomegaly (48%) and parotitis (48%) were the most common clinical manifestations, with significant predilection for lymphadenopathy ($p \# 0.0001$), dermatitis ($p = 0.010$), splenomegaly ($p = 0.008$), hepatomegaly ($p = 0.001$) and parotitis ($p = 0.007$) among perinatally infected children. Median baseline $CD4^+$ cell count was $256.0/\mu L$ (IQR 71.0 – 478.0 cells/ μL); median most recent $CD4^+$ cell count was $521/\mu L$ (IQR 271.0 – 911.0 cells/ μL). Seventy-six per cent ($n = 71$) were initiated with highly active antiretroviral therapy (HAART) and 62 (87.3%) were currently receiving first-line therapy. Six behaviourally infected females became pregnant, resulting in five live births. There were seven deaths (7.4%).

Conclusion: This study comprehensively characterizes HIV infection among perinatally infected teens with predominantly slow-progressor disease and an increasing population of sexually-infected adolescents. As the cohort transitions to adulthood, adolescent developmental, mental health and life planning issues must be emergently addressed.

Manifestaciones Clínicas de los Adolescentes Infectados por el VIH en Jamaica

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RESUMEN

Objetivo: Caracterizar las manifestaciones clínico-patológicas y la evolución clínica de una cohorte de adolescentes jamaicanos infectados por el VIH.

Métodos: El presente es un estudio de cohorte retrospectivo con el fin de determinar las características demográficas, clínicas, inmunológicas, así como el consumo de antiretrovirales y la mortalidad en 94 adolescentes de 10 a 19 años de edad, llevado a cabo como parte del Programa VIH/SIDA perinatal y

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pediátrico de Kingston (KPAIDS) entre septiembre de 2002 y mayo de 2007. Se usan pruebas paramétricas y no paramétricas para comparar las variables.

Resultados: La edad mediana en la presentación inicial fue 10.0 años (rango intercuartil (IQR) 7.0–12.0 años), 54.3% (51) eran hembras ($p = 0.024$), la transmisión fue fundamentalmente de madre a hijo (70, 73.4%), presentándose el 87% (61) de los últimos como progresores lentos. La transmisión sexual representó el 19.1% y hubo un predominio significativo de las hembras ($n = 15$; $p = 0.024$). En la visita más reciente, los adolescentes infectados perinatalmente presentaron una mayor probabilidad ($p < 0.0001$) de residir con personas distintas de sus padres ($n = 42$) que con un progenitor biológico ($n = 19$), y la mayor parte tenía la enfermedad categoría C (35/50%) de acuerdo con los Centros para el Control y la Prevención de las Enfermedades (CCPE), mientras que la mayoría de los niños infectados no perinatalmente fueron clasificados con la categoría A del CCE. Las puntuaciones z medias para altura por edad fue -1.47 ± 1.21 ($n = 77$), peso por edad -1.06 ± 1.44 ($n = 80$), y el IMC por edad -0.34 ± 1.21 ($n = 76$) respectivamente; las hembras ($n = 41$) fueron más altas que los varones ($n = 36$) en altura corriente ($p = 0.031$). La linfadenopatía (82%), la dermatitis (72.0%), la hepatomegalia (48%) y la parotitis (48%) fueron las manifestaciones clínicas más comunes, con predilección significativa de la linfadenopatía ($p \# 0.0001$), la dermatitis ($p = 0.010$), la esplenomegalia ($p = 0.008$), la hepatomegalia ($p = 0.001$) y la parotitis ($p = 0.007$) entre los niños perinatalmente infectados. La mediana de la línea de base del conteo celular $CD4^+$ fue $256.0/\mu L$ (IQR 71.0 – 478.0 células/ μL); la mediana del conteo celular $CD4^+$ más reciente fue $521/\mu L$ (IQR 271.0 – 911.0 células/ μL). El setenta y seis por ciento ($n = 71$) fueron iniciadas con terapia antiretroviral altamente activa (TARAA) y 62 (87.3%) estuvieron corrientemente recibiendo terapia de primera línea. Seis hembras infectadas conductualmente fueron embarazadas, produciéndose como resultado cinco nacimientos. Hubo siete muertes (7.4%).

Conclusión: Este estudio presenta una caracterización integral de la infección por VIH entre adolescentes infectados perinatalmente predominantemente con la enfermedad de progresores lentos, y una población creciente de adolescentes infectados sexualmente. En la medida en que la cohorte transita a la adultez, el desarrollo del adolescente, la salud mental y los problemas de la planificación de la vida tienen que ser abordados con urgencia.

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INTRODUCTION

Adolescence is a dynamic period of simultaneous sexual, cognitive and socio-emotional development and is defined by the World Health Organization (WHO) as extending from age 10 to 19 years (1). In Jamaica, the adolescent population represents 20.9% of the total population (2). Globally, young people (age 15 to 24 years) account for 40% of new HIV infections in persons aged 15 years and older (3). During the period 1982 to June 2006, 11.1% of all HIV/AIDS cases occurred in the 10 to 19-year age group and 29.2% in the 15 to 29-year age group in Jamaica (4). The highest rate of newly diagnosed cases of HIV/AIDS in Jamaica has been identified as the 16 to 25-year age group with a mode of 24 years. This implies that the highest rate of HIV infection in Jamaica occurs within the adolescent period, given a range of 1 to 7 years between infection with HIV and clinical presentation and diagnosis.

During adolescence certain developmental tasks must be accomplished in order for them to achieve self-identity and become productive adults (5) and this process often involves risk-taking, pushing of limits and breaking down of barriers. During early and middle adolescence in particular, adolescents tend to be egocentric with a sense of invulnerability and a strong desire for experimentation. These factors coupled with their newly developing capacity for abstract

thought often leads to risky behaviour with little thought given to preventive measures or long-term effects. These factors contribute significantly to how vulnerable adolescents are to the risk of acquiring sexually transmitted diseases including HIV.

There have been few studies, previously, focussing on the sociodemographic factors associated with HIV-infected adolescents in Jamaica and the Caribbean (6, 7, 8). This study aims to characterize the clinicopathological manifestations and outcome of a cohort of HIV-infected Jamaican adolescents aged 10 to 19 years. Pertinent information regarding this high-risk group is needed to assist healthcare workers in offering optimal care to the adolescents in their care.

SUBJECTS AND METHODS

Study Population

During the period September 1, 2002 to May 30, 2007 confirmed HIV-infected children and adolescents were consecutively enrolled in the Kingston Paediatric and Perinatal HIV/AIDS (KPAIDS) Programme (9). These patients attended Infectious Diseases clinics at the University Hospital of The West Indies (UHWI), Bustamante Hospital for Children (BHC), Comprehensive Health Centre (CHC) and Spanish Town Hospital (STH). Most patients were referred

from within the Kingston and Metropolitan area for continued care at the ambulatory service of the respective tertiary institutions. The patients were seen by Paediatric infectious disease specialists and general paediatricians. Registered nurses specially trained in HIV/AIDS management assisted with the care and supervision of these patients (10). Although in the Jamaican public health system children are usually transferred to the adult service at age 13 years, HIV-positive adolescents continue to be followed in the KPAIDS Programme by paediatric specialists given the myriad developmental issues of adolescence that are only compounded and intensified in the presence of a chronic illness.

All confirmed HIV-infected adolescents who were between 10 and 19 years of age at any time during the period September 2002 to May 2007 were included in the study, regardless of mode of infection. HIV infection was established by a commercial enzyme-linked immunosorbent assay (ELISA) and confirmed by the Western blot technique.

Study Design and Procedures

This was a retrospective, cohort study aimed at characterizing the demographics, clinicopathological manifestations and outcome of HIV/AIDS in this adolescent population.

Participants were followed in the ambulatory setting at three-monthly intervals and management was guided by standardized protocols for clinical care, laboratory monitoring and antiretroviral therapy (ART) as previously described for the KPAIDS Programme (9,11). These included interval history, nutritional, growth and developmental assessments, physical examinations, addressing adherence with medications for prophylaxis and antiretroviral agents (11). More frequent interval visits and hospital admissions were facilitated as the situation indicated.

Growth and development were assessed at each ambulatory visit by documentation of height, weight and sexual maturity rating of clients. Blood investigations were performed six-monthly and included complete blood counts, lymphocyte subsets, plasma viral loads, liver function tests, lipid panels, serum electrolytes, creatinine and amylase, if indicated and available.

Antiretroviral medications were administered according to the national guidelines of the Ministry of Health, Jamaica (12). The standard first line regimen used in this programme included two nucleoside reversetranscriptase inhibitors (NRTIs) and one non-nucleoside reversetranscriptase inhibitor (NNRTI), typically zidovudine, lamivudine and nevirapine.

Children were considered to be either rapid or slow progressors when they exhibited clinical signs and symptoms of the disease or signs of immunodeficiency within the first four years of life and after four years of age, respectively.

Outputs and Statistical Analysis

Data were extracted from the secure KPAIDS database (9) and validated by audit of the medical records by trained medical reviewers. Relevant demographic data included age, gender, guardian status and mode of HIV infection. The key clinicopathological outcomes included HIV-related clinical signs and symptoms, growth and development, Centers for Disease Control and Prevention (CDC) clinical and immunological staging, presence of co-infections, CD4⁺ T-lymphocyte subsets (CD4 counts) and plasma HIV RNA (viral load), antiretroviral therapy administration and mortality. CD4 count was measured with BD FACSCalibur™ system and HIV RNA was measured with Roche Cobas AmpliPrep-AMPLICOR system. Both assessments are subject to quality control using proficiency panels sponsored by Virology Quality Assessment Program, Rush – Presbyterian – St Luke's Medical Center, Chicago, Illinois, USA. The revised CDC classification system was used to describe the clinical and immunological categories of the cohort (13, 14).

Growth parameters (weight-for-age, height-for-age, body mass index (BMI)-for-age) were standardized to z scores using Epi Info™ Version 3.3.2. Independent group *t*-tests were used to examine for differences in growth parameters (z scores) by gender. Pearson chi-square, Fisher's exact test, Mann-Whitney U test, Paired *t*-test and analysis of variance (ANOVA) were used where appropriate to examine for differences by mode of transmission, gender and study duration. Data were summarized and analyzed using SPSS® 12.0 for Windows and Microsoft® Excel 2002. A *p*-value of < 0.05 for 2-sided tests was considered to be statistically significant.

RESULTS

Demographics

Ninety-four patients aged 10 to 19 years were included in the study period between September 1, 2002 and May 31, 2007. The majority were seen at the UHWI (69/73.4%) and the remainder at BHC (11/11.7%), CHC (11/11.7%) and STH (3/3.2%).

There were 43 males (45.7%) and 51 females (54.3%) (*p* = 0.024) and median age at enrolment was 10.0 years (range 2.0–18.0 years; interquartile range [IQR] 7.0–12.0 years). Behaviourally infected children were older (*p* < 0.0001) than those in other transmission groups (Table 1) but there was no significant difference in current mean age by gender (*p* = 0.61).

Mode of Transmission

Seventy children 73.4% were infected vertically *via* mother-to-child transmission (MTCT) and 36 (51.4%) were male. Of the children in the perinatally infected group, 66 (94.2%) were slow progressors, presenting after age four years. Eighteen (19.1%) children acquired HIV infection *via* the

Table 1: Baseline characteristics at enrolment by mode of transmission

	MTCT- < 4 yr n = 4	MTCT- ≥ 4yr n = 66	Sexual n = 18	Parenteral n = 2	Unknown n = 4	p value
Age						
(years)						
Mean	2.75	8.86	15.56	11.00	10.75	< 0.0001*
SD	0.50	2.40	2.46	2.83	1.50	
Gender						
n (%)						
Male	1 (2.3)	35 (81.4)	3 (7.0)	2 (4.7)	2 (4.7)	0.008 [†]
Female	3 (5.9)	31 (60.8)	15 (29.4)	0 (0.0)	2 (3.9)	
Caregiver type						
n (%)						
Guardian	0 (0.0)	22 (84.6)	3 (11.5)	0 (0.0)	1 (3.8)	0.19*
Institution	2 (8.0)	18 (72.0)	4 (16.0)	2 (6.7)	1 (3.3)	0.13 [†]
Biological parent	2 (6.7)	17 (56.7)	8 (26.7)	2 (6.7)	1 (3.3)	
Self	0 (0.0)	0 (0.0)	3 (100.0)	0 (0.0)	0 (0.0)	
Unknown	0 (0.0)	9 (90.0)	0 (0.0)	0 (0.0)	1 (10.0)	
CDC Clinical Category						
n (%)						
N	0 (0.0)	3 (75.0)	0 (0.0)	1 (25.0)	0 (0.0)	0.065 [‡]
A	0 (0.0)	28 (65.1)	13 (30.2)	0 (0.0)	2 (4.7)	
B	3 (13.6)	17 (77.3)	1 (4.5)	0 (0.0)	1 (4.5)	
C	1 (4.5)	15 (68.2)	4 (18.2)	1 (4.5)	1 (4.5)	
Unknown	0 (0.0)	3 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Growth						
(Mean z-score)						
Weight-for-age	-0.08	-1.68	-0.27	-0.36	-0.26	0.002 [‡]
SD	1.46	1.43	1.37	0.64	2.57	
Height-for-age	1.74	-1.51	-0.49	-0.14	-2.48	0.001 [‡]
SD	1.86	1.50	1.23	1.44	2.57	

*Kruskal-Wallis Test; [†]Mann-Whitney U Test (MTCT vs sexual group); [‡]ANOVA

sexual route and significantly more were female (15/83.3%; $p = 0.024$). Two haemophiliacs were infected parenterally *via* transfusion of infected blood products and the mode of transmission could not be determined in four patients.

Social Factors

At enrolment, 30 (31.9%) children were living with their biological parent, 26 (27.7%) with a guardian, 25 (26.6%) at a residential institution, 3 (3.2%) independently and caregiver status was unknown in 10 cases ($p = 0.13$). There was no significant change in caregiver status at the most recent clinic visit compared to that at enrolment in the programme ($p = 0.13$; paired samples *t*-test). However, among the perinatally infected children, the caregiver was more likely to be a guardian ($n = 19$) and an institution ($n = 23$) than a biological parent ($n = 19$) at the most recent visit ($p < 0.0001$; chi-square test).

Within the perinatally infected group, slow progressors were not likely to be living with their biological parents; 18 (27.3%) lived in residential institutions and 22 (33.3%) with guardians. The rapid progressors were almost equally distributed between biological parents and residential institutions. Of those children infected *via* the sexual route, 3 (16.6%) were living independently, 8 (44.4%) lived with

biological parents and the remainder were equally distributed between residential institutions and guardians (Table 1).

Growth outcomes

The current mean height was 139.1 ± 1.7 cm ($n = 79$), mean weight was 39.2 ± 2.1 kg ($n = 82$) and the mean BMI was 18.8 ± 0.87 ($n = 76$). The mean z score height-for-age was -1.47 ± 1.21 ($n = 77$), mean z score weight-for-age -1.06 ± 1.44 ($n = 80$) and mean z score BMI-for-age was -0.34 ± 1.21 ($n = 76$). There was no significant difference by gender for the mean growth parameters ($p < 0.05$; independent samples *t*-test), except that females ($n = 41$) were taller than males ($n = 36$) at their current height ($p = 0.031$). Antiretroviral therapy-naïve adolescents had higher z scores for weight-for-age ($p = 0.058$), height-for-age ($p = 0.12$) and BMI-for-age ($p = 0.11$) than ART-initiated adolescents. At enrolment, perinatally infected children (≤ 4 years) were significantly more wasted ($p = 0.002$) and stunted ($p = 0.001$) compared to others by mode of transmission (Table 1).

CDC classification

At the most recent visit, most perinatally infected adolescents were CDC category C (35/50%), whereas the majority of non-perinatally infected adolescents were classified CDC

category A. At enrolment, 50 (53.3%) were CDC category N and A, 22 (23.4%) CDC category B and 22 (23.4%) CDC category C (Mann Whitney U; $p = 0.065$). Among the perinatally infected adolescents, there was 54.8% increase in the proportion categorized as CDC C disease at most recent visit compared to the proportion at enrolment. This change was less evident among the non-perinatally infected adolescents.

Clinical manifestations

The most frequent clinical manifestations were lymphadenopathy (82%), dermatitis (72%), hepatomegaly (48%), parotitis (48%), splenomegaly (30%) and mucocutaneous candidiasis (23.4%). There was significant predilection for generalized lymphadenopathy ($p = 0.0001$), dermatitis ($p = 0.010$), splenomegaly ($p = 0.008$), hepatomegaly ($p = 0.001$) and parotitis ($p = 0.007$) among perinatally infected children compared to sexually-infected adolescents at presentation (Table 2).

median most recent CD4 count was 521 cells/ μ L (range 22.0 – 1747.0 cells/ μ L; IQR 271.0 – 911.0 cells/ μ L). There was no difference in mean baseline CD4 count by transmission mode but most recent mean CD4 count was highest ($p = 0.017$) among the perinatally infected group [≥ 4 years] (Table 3).

Among those who were ‘ever initiated’ on anti-retroviral therapy (71), mean CD4 count was highest among the perinatally infected group (≥ 4 years) and lowest among the parenteral group at both baseline ($p = 0.046$) and most recent ($p = 0.022$) determinations. However, the lowest count (11 cells/ μ L) occurred in the perinatally infected group. There was significant increase in mean CD4 count at the most recent evaluation compared to the lowest value (paired samples t -test, $p = 0.000$), suggesting evidence of antiretroviral treatment efficacy.

Table 2: Frequency of common clinical manifestations by mode of transmission at enrolment

Clinical Manifestations n (%)	MTCT- < 4yr	MTCT- ≥ 4 yr	Sexual	Parenteral	Unknown	p value*
Generalized lymphadenopathy n = 77	4 (5.2)	57 (74.0)	11 (14.3)	2 (2.6)	3 (3.9)	<0.0001
Dermatitis n = 68	4 (5.9)	50 (73.5)	2 (2.9)	11 (16.2)	1 (1.5)	0.01
Hepatomegaly n = 45	2 (4.4)	36 (80.0)	5 (11.1)	1 (2.2)	1 (2.2)	0.001
Parotitis n = 45	2 (4.4)	35 (77.8)	6 (13.3)	1 (2.2)	1 (2.2)	0.007
Splenomegaly n = 28	3 (10.7)	21 (75.0)	2 (7.1)	1 (3.6)	1 (3.6)	0.008
Candidiasis n = 22	4 (18.2)	11 (50.0)	6 (27.3)	0 (0.0)	1 (4.5)	0.293
Encephalopathy n = 13	1 (7.7)	9 (69.2)	2 (15.4)	1 (7.7)	0 (0.0)	0.198
Pulmonary tuberculosis n = 9	0 (0.0)	7 (77.8)	2 (22.2)	0 (0.0)	0 (0.0)	0.622

* Fisher’s exact test (MTCT vs sexual group)

Pulmonary tuberculosis was the most common co-infection in seven (10.6%) of the perinatally infected group and two (11.1%) of the behaviourally infected group. Five children were co-infected with hepatitis B; three of these had perinatal HIV infection, one through sexual transmission and the other parenterally. The latter was also coinfecting with hepatitis C. There were single cases of cryptococcal meningitis, cerebral toxoplasmosis and progressive multifocal leukoencephalopathy. One female was diagnosed with genital herpes simplex virus Type-2 infection and there were no cases of syphilis.

Immunological and virological outcomes

CD4 counts (cells/ μ L) were available for 91% of the cohort ($n = 82$). Median baseline CD4 count was 256.0 cells/ μ L (range 11.0 – 1518.0 cells/ μ L; IQR 71.0 – 478.0 cells/ μ L);

Among those initiated on ART, most recent median viral load was 1340.0 copies/mL (range < 50 to > 100 000 copies/mL; $n = 56$). Twenty-one (37.5%) had viral loads < 50 copies/mL (17 MTCT, 4 sexual); there was no significant difference in viral load by mode of transmission (Fisher’s exact test, $p = 0.44$).

Antiretroviral therapy

Seventy-six per cent ($n = 71$) of children in the cohort were initiated with highly active antiretroviral therapy (HAART). Fifty-three (74.6%) were perinatally infected children (≥ 4 years) but there was no difference in uptake by mode of transmission ($p = 0.35$) (Table 3). Forty-one (57.7%) of them were CDC category C, 19 (26.8%) CDC B and 11 (15.5%) CDC A. Sixty-two (87.3%) were receiving first-line therapy and nine (12.7%) were on second-line regimens. The most

Table 3: Clinicopathologic outcomes by mode of transmission

	MTCT- < 4 yr	MTCT- ≥ 4 yr	Sexual	Parenteral	Unknown	<i>p</i> value
Baseline CD4 count (cells/μL)	n = 2	n = 59	n = 17	n = 2	n = 2	
Mean	805.5	356.5	259.0	93.0	262.5	0.16*
SD	352.9	344.2	217.9	8.5	231.2	
Most recent CD4 count (cells/μL)	n = 2	n = 59	n = 17	n = 2	n = 2	
Mean	1268.0	634.6	432.2	93.0	516.5	0.017*
SD	691.6	412.1	281.6	8.5	128.0	
Most recent viral load (copies/mL x 10 ³)	n = 2	n = 45	n = 14	n = 1	n = 2	
Mean	8.62	19.87	25.80	100.00	23.85	0.19*
SD	12.12	33.62	32.60	–	21.71	
ARV uptake n (%)	2 (2.8)	53 (74.6)	12 (16.9)	2 (2.8)	2 (2.8)	0.35 [†]
Deaths n (%)	0 (0.0)	5 (71.4)	1 (14.3)	1 (14.3)	0 (0.0)	0.21*
Pregnancy n (%)	0 (0.0)	0 (0.0)	6 (100.0)	0 (0.0)	0 (0.0)	< 0.0001*

*ANOVA; [†]Fisher's exact test (MTCT vs sexual group)

commonly used first-line regimen was zidovudine/lamivudine/nevirapine among 48 (67.6%) of those on first-line therapy.

Among the ART-naïve children (n = 23), 15 (65.2%) were infected vertically, 6 (26.1%) sexually and for 2 (8.6%) the mode of transmission was undetermined. Most were classified as CDC category A (14/60.9%), 7 (30.4%) CDC category B and 2 (8.7%) CDC category C. Median CD4 count (n = 13) was 681.0 cells/μL (range 271.0 – 1564.0 cells/μL; IQR 534.0 – 1253.0 cells/μL).

Pregnancy

Of note, 6 female adolescents who were infected *via* the sexual route became pregnant. Five of these pregnancies were successfully completed and all five of the infants have been confirmed HIV-negative.

Mortality

There were seven deaths (Table 3) of which five were perinatally infected adolescents, one *via* sexual transmission and one parenterally (*p* = 0.21). All four perinatally infected adolescents were slow progressors and mean age was 11.0 ± 3.2 years (n = 7) at enrolment. Five of the adolescents were CDC category C at the time of death and the most recent mean CD4 count was 175.2 ± 78.8 cells/μL. Five of the six patients were initiated on HAART (4 on first-line; one on second-line), however adherence was a concern. Mean age at time of death was 12.6 ± 2.9 years and the average duration between enrolment and death was four years. Circumstances surrounding the demise of these adolescents were as follows: *Case 1* (16-year old female) succumbed from respiratory failure secondary to pneumonia; *Case 2* (12-year old female) died from complications of end stage renal failure; *Case 3*

(19-year old male) died as a result of septic shock; *Case 4* (11-year old male) had end stage renal failure secondary to HIV-associated nephropathy; *Case 5* (13-year old male) was known to have CNS toxoplasmosis and died as a result of aspiration during a seizure episode at home; *Case 6* (15-year old male) died from sepsis. *Case 7* (13-year old male) died from disseminated tuberculosis.

DISCUSSION

This study characterizes the clinicopathological manifestations and outcomes, and explores the social circumstances of perinatally and non-perinatally infected adolescents attending ambulatory medical services in Kingston, Jamaica. Since the initiation of universal access to antiretroviral therapy and standardized healthcare for HIV-infected children was facilitated through the Kingston Paediatric and Perinatal HIV/AIDS Programme and the Ministry of Health, Jamaica, in 2002, improved survival of perinatally infected children has led to a maturing cohort now extending into the adolescent period (15). In addition, adolescents in Jamaica continue to be at great risk of acquiring HIV, in light of the median age at sexual initiation being 13 years in males and 15.5 years in females (16). Despite an increased perception of HIV risk among Jamaican adolescents during periods 2004, 2000 and 1996, there has been no significant change in the per cent of youths reporting multiple partners and the per cent initiating sex or age at first sex (17). Although a significant increase in condom usage at last sex was reported in males, of concern was the continued risk behaviour among female adolescents.

In this study, there was a significant female predominance among those patients infected *via* sexual transmission, mirroring the global trend in HIV infection in

females aged 15 years and older (3). However, pertinent contributing factors in Jamaica include poor condom-negotiating skills by female adolescents, early sexual initiation with older men, high prevalence of sexual abuse of adolescent females and increased detection through voluntary counselling and HIV testing for all antenatal attendees (17–19). There was no significant gender difference among the perinatally infected group, a finding similar to other studies in the United States of America (20) and Zimbabwe (21).

The most common clinical manifestations in this Jamaican cohort were generalized lymphadenopathy, dermatitis, hepatomegaly, parotitis and splenomegaly. Perinatally infected adolescents were moderately stunted and wasted at presentation. These findings are similar to a recent report of adolescents in Zimbabwe (21) of similar median age at diagnosis, except that they presented with recurrent upper respiratory tract infections, chronic diarrhoea, past tuberculosis and chronic skin condition. The Zimbabwean adolescents, however, were significantly immunosuppressed and the majority had moderate to severe clinical disease (WHO stages 3 and 4) at presentation in comparison to the adolescents in the present cohort. In addition, seventy-six per cent of the adolescents in this cohort were initiated on antiretroviral therapy, hence their current growth parameters probably reflected treatment effectiveness as demonstrated in other studies (22–26).

Of note is the presentation of asymptomatic or mild disease in the majority of behaviourally infected adolescents, a finding comparable to a previous study in the US population (27). These, in addition to 19% of perinatally infected adolescents with mild disease at presentation, highlight a growing concern of ‘missed opportunities’ for diagnosis in the general population of adolescents in Jamaica (28). Currently, HIV screening among adolescents is limited to antenatal attendees and high risk individuals. Undiagnosed, asymptomatic infected adolescents and youth will continue to drive the epidemic in an environment of continued risk-taking behaviour (16, 17, 28).

Few sexually transmitted infections were identified in the cohort but a comprehensive evaluation would require routine interval screening to be done, which is not currently incorporated in the programme because of resource constraints. This must be addressed expeditiously as the cohort matures and potentially be at greater risk for sexually transmitted infections and pregnancy (29). We note the pregnancies occurring among behaviourally infected adolescents and must be cognizant of the likelihood of pregnancies occurring among those in the perinatally infected group as they mature toward adulthood (30).

Perinatally infected adolescents were more likely to be residing with a non-biological caregiver at the time of presentation. Parental illness and death lead to disrupted home life, inadequate social and mental support and put the child at risk for abandonment and poverty. Although the study was

limited in the exploration of psychological and social issues, the creation of orphans and the psychosocial impact of the illness on the child are well recognized (31, 32).

The deaths among the cohort of adolescents were in patients with advanced disease. These are a sober reminder that palliative care and end-of-life issues must be considered in the management of infected children and adolescents as they mature (33). The initiation of antiretroviral therapy has improved the immunological function of the children in this cohort, as evidenced by the significant increase in CD4 count from nadir values. However, ART is not a panacea and the reality of reduced life expectancy must be at the forefront of the minds of our adolescents, caregivers and healthcare personnel.

This study is limited in consideration of issues beyond the clinicopathological characterization and use and benefit of antiretroviral therapy. Pertinent issues for further evaluation must include adolescent developmental concerns, mental health, disclosure, adherence, sexuality and life planning as the cohort transitions toward adulthood (31, 34–36). Also, there was likely to be referral bias towards sicker patients and the diagnostic facilities were limited especially in delineating antiretroviral treatment efficacy.

In conclusion, this study characterizes HIV infection among adolescents in a setting with moderate prevalence of HIV infection (9). Greater recognition of the implications of undiagnosed HIV infection in older children and adolescents is needed, and services to address adolescent developmental, mental health and life planning issues are emergently needed as this vulnerable cohort continues to mature. Further research is required to guide policy and implement interventions to increase HIV testing, minimize risk behaviours in adolescents and address complications among HIV-infected Jamaican adolescents and youth.

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HIV-related Mortality in Jamaican Children

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ABSTRACT

Objective: Paediatric HIV is a leading cause of morbidity and mortality worldwide. We describe HIV-related mortality in a cohort of HIV-infected Jamaican children and identified factors which influenced survival.

Methods: A retrospective descriptive study was conducted for the period March 2003 – December 2005 at Cornwall Regional Hospital, Montego Bay, Jamaica. We summarized demographic and clinical data of deceased and living perinatally HIV-infected children and identified factors that influenced survival of rapid and slow progressors. Rapid progressors are HIV-infected children identified clinically before age 2 years and slow progressors after age 2 years.

Results: There were 9 (18%) HIV/AIDS-related deaths among 50 HIV-infected children of whom 23 (46%) were males and 21(43%) were AIDS orphans. Five children (10%) received ARV prophylaxis, 31 (62%) were breastfed and 39 (78%) received HAART. Surviving children displayed primarily non-AIDS defining illnesses (pneumonia and sepsis) but there was no difference in AIDS-defining illnesses among living and deceased children. The median age at diagnosis was 26 months (range 3–121; IQR 10,54). The median age at death was 30 months (range 7–122 months; IQR 17,118). Both surviving and deceased children presented with primarily moderate symptoms at diagnosis (21, 42%) and death (7, 78%). In rapid progressors, 19 of 20 (95%) on HAART remained alive and all 4 (100%) who did not receive HAART died. The mortality rate in children on HAART was 30.78 per 100 person years and 48 per 100 person years in children not receiving HAART.

Conclusions: HAART is the only factor identified which prolonged survival for HIV-infected children who are rapid progressors, have AIDS-defining illnesses and are orphans.

Mortalidad Relacionada con el VIH en Niños Jamaicanos

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RESUMEN

Objetivo: El VIH pediátrico es la principal causa de morbilidad y mortalidad a nivel mundial. El presente trabajo describe la mortalidad relacionada con el VIH en una cohorte de niños jamaicanos infectados por el VIH y factores identificados que influyeron en la supervivencia.

Métodos: Se llevó a cabo un estudio retrospectivo para el período de marzo de 2003 a diciembre 2005 en el Hospital Regional Cornwall, de Montego Bay, Jamaica. Resumimos los datos clínicos y demográficos de los niños infectados por el VIH, tanto de los fallecidos como de los vivos, e identificamos los factores que influyeron en la supervivencia de progresores rápidos y lentos. Los progresores rápidos son niños infectados por el VIH identificados clínicamente antes de los dos años de edad y los preopresores lentos son aquellos identificados después de los dos años de edad.

Resultados: Hubo 9 (18%) muertes relacionadas con el VIH/SIDA entre 50 niños infectados por el VIH, de los cuales 23 (46%) eran varones y 21(43%) eran huérfanos del SIDA. Cinco niños (10%) recibieron profilaxis ARV, 31(62%) fueron amamantados y 39 (78%) recibieron TARAA. Los niños sobrevivientes mostraron enfermedades primariamente no definitorias de SIDA (neumonía y sepsis), pero no hubo diferencia en las enfermedades definitorias del SIDA entre los niños vivos y los fallecidos. La edad mediana al momento del diagnóstico fue de 26 meses (rango 3-121; IQR 10, 54). La edad mediana al momento de la muerte fue de 30 meses (rango 7–122 meses; IQR 17 118). Tanto los niños sobrevivientes como los fallecidos presentaron síntomas primariamente moderados en el momento del

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diagnóstico (21 para un 42%) y la muerte (7 para un 78%). En los progresores rápidos, 19 de 20 (95%) bajo TARAA continuaron vivos y el total de los 4 (100%) que no recibieron TARAA murieron. La tasa de mortalidad en los niños bajo TARAA fue de 30.78 por cada 100 años-persona y 48 por 100 años-persona en niños que recibieron TARAA.

Conclusiones: TARAA es el único factor identificado que prolongó la supervivencia de los niños infectados con el VIH que eran rápidos progresores, tenían enfermedades defintorias del SIDA y eran huérfanos.

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INTRODUCTION

In 2003, the World Health Organization and the Joint United Nations programme on HIV/AIDS launched a programme to provide low and middle-income countries with treatment for 3 million people with HIV infection by the year 2005. Children under age fifteen years represented 10% of those in need. Globally, this target was not met (1). Latin America and the Caribbean achieved 68% coverage over this two-year period and deaths were averted due to increased access to highly active antiretroviral therapy (HAART). In developing countries, the use of HAART has resulted in a five-fold reduction in mortality and high survival rates for children of up to 90% into adulthood (2). We describe the mortality experience of perinatally HIV-infected Jamaican children during the scaling-up period of HAART.

SUBJECTS AND METHODS

A retrospective descriptive study was conducted for the period March 2003 – December 2005 at the Cornwall Regional Hospital, a tertiary care referral centre in western Jamaica. In May 2004, the Kingston Paediatric and Perinatal HIV/AIDS Programme (KPAIDS) team established an outreach paediatric HIV clinic at this site and treatment protocols were standardized (3). The cohort included HIV-infected children diagnosed before and subsequent to the establishment of the treatment site. During this period, there was a scaling-up of prevention of mother-to-child transmission, access to immunologic and virologic markers for diagnosis and monitoring and antiretroviral therapy. HIV infection was defined according to the WHO definition (4). This period was chosen as it represented the paradigm shift of no access to universal HIV care in this region. Rapid progressors were defined as an HIV-infected child who presented clinically under age two years and slow progressors were those presenting clinically over age two years. We summarized demographic and clinical data; compared sociodemographic, maternal health status, ever breastfed, clinical and laboratory markers and opportunistic infections using chi-square analysis. Immune and clinical class were classified according to the CDC definition (5). We compared mean age at diagnosis, age at death using student's t-test stratified for living and deceased cases. We analyzed the effect of antiretroviral therapy on outcomes of rapid and slow progressors. Death rates per 100 person-years were calculated by totalling the number of person days observed from time of diagnosis to death or

last follow-up. Deaths among observed patients were counted and observation time was standardized to 100 person-years. All analyses were conducted using STATA (6) version 7.

RESULTS

At the Cornwall Regional Hospital, there were nine (18%) HIV/AIDS related deaths from 50 HIV-infected children with 23 (46%) males and 21 (43%) AIDS orphans. Tables 1 and 2

Table 1: Clinical characteristics among dead and surviving HIV-infected children

	Dead	Alive	Total
ARV prophylaxis	1 (20%)	4 (80%)	5
Breastfed	4 (13%)	27 (87%)	31
Orphan*	0 (0%)	21 (100%)	21
Rapid progressor	5 (21%)	19 (79%)	24
HAART*	3 (8%)	36 (92%)	39

* $p < 0.05$

Table 2: Frequency of clinical complications among 50 HIV-infected children

Complication	Dead	Alive
Tuberculosis	1	3
PCP	1	1
Oesophageal candidiasis	3	0
Encephalopathy	2	3
Wasting syndrome	5	5
Pneumonia	2	19
Sepsis	1	12
Total	15	43

PCP = pneumocystis jirovecii

summarize clinical features stratified from deceased and surviving children. All 21 orphans were alive with 16 (76%) in the care of a family member. Eighteen (86%) were on HAART. Surviving children displayed primarily non-AIDS defining illnesses (pneumonia and sepsis) but there was no difference in AIDS-defining illnesses in living and deceased children. There was no difference between rapid and slow progressors in non-AIDS-defining illnesses. Rapid progressors were more likely to have HIV encephalopathy but this was not statistically significant. There was no correlation of caregiver status, breastfeeding or ARV prophylaxis with death. The median age at diagnosis was 26 months (range

3–121; IQR 10, 54). The median age at death was 30 months (range 7–122 months; IQR 17, 118).

Table 3 compares age of diagnosis and death among clinical class and surviving and deceased children. The

Table 3: Clinical class and median age at diagnosis and death in months among 50 HIV-infected children

Class	n	age at diagnosis	n	age at death
A	11 (22%)	42 (IQR 24, 58)	0 (0%)	0
B	21 (42%)	36 (IQR 11, 56)	7 (78%)	30 (IQR 20, 114)
C	18 (36%)	18 (IQR 5, 41)	2 (22%)	(15 mo, 108 mo)
Total	50 (100%)		9 (100 %)	

median age at diagnosis decreased with increasing severity of disease. Surviving and deceased children presented with primarily moderate symptoms at diagnosis (21, 42%) and death (7, 78%). The immune status among 37 children were 10 (27%) for class 1 (none); 12 (32%) class 2 (moderate) and 15 (41%) class 3 (severe).

Table 4 compares HAART therapy on the outcome of rapid and slow progressors. Two of the three children on

Table 4: Outcomes among 50 HIV-infected children stratified between HAART therapy and rapid and slow progressors

	+HAART		-HAART		Total
	rapid	slow	rapid	slow	
Dead	1 (5%)	2 (11%)	4 (100%)	2 (29%)	9
Alive	19 (95%)	17 (89%)	0 (0%)	5 (71%)	43
Total	20 (100%)	19 (100%)	4 (100%)	7 (100%)	50

$p < 0.0001$

HAART who died had discontinued therapy three months or more before death. The third child died within three weeks of commencing HAART. Among rapid progressors 19 of 20 (95%) on HAART remained alive and all 4 (100%) who did not receive HAART died. The mean age of death for rapid progressors was 23 ± 9 months (95% CI 11, 34) and the mean age at last follow-up for survivors were 48 ± 38 months (95% CI 30, 67). The median age at initiation of HAART was 53 months (range 4–154; IQR 16, 95). The median duration on HAART to last follow-up was 8.4 months (range 0.15–21.8; IQR 3.9, 17.4).

The mortality rate for children on HAART was 30.78 per 100 person-years and 48 per 100 person-years among children not receiving HAART.

DISCUSSION

Paediatric HIV is a leading cause of morbidity and mortality worldwide with approximately 700 000 new cases being diagnosed annually. Fewer than 5% of those who received

HAART in 2005 through the WHO 3 by 5 initiative are children (1). Children in Sub-Saharan Africa who acquire disease in utero, intrapartum or early postpartum have an increased risk of death under age two years compared to acquisition in late postpartum (7). We have examined factors influencing survival for a subset of HIV-seropositive children during the initial scaling-up period of HAART and compared outcomes of rapid and slow progressors.

These data may be biased as the mortality information was hospital-based. Children may have died at home or at other hospitals and more severe forms of the disease would have presented to hospital. A hospital-based cohort may also select families with similar health-seeking behaviours and influence interpretation of the data. Despite these limitations, the results presented here are important because they represent the first attempt to examine survival among rapid and slow progressors in the Caribbean.

Few children were diagnosed in the prenatal period resulting in few receiving antiretroviral prophylaxis, many breastfeeding and the majority of children presenting with moderate to severe symptoms. Ten years ago, children presented similarly in a hospital-based survey but the median age at death increased from 12 months to 30 months (8). This difference may have been influenced by standardized care, a change in health-seeking behaviour due to access to better care and the introduction of HAART. A similar result has been documented in the developed and developing world and is attributed to HAART and prevention of perinatal transmission (9).

In our series, approximately half of deceased and surviving children were cared for by their mothers, as the remainder had died. In Sub-Saharan Africa, children whose mothers died experienced an increased mortality risk of 57.1% compared with 12.8% for children whose mothers survived (7, 10). This was not our experience as all AIDS orphans survived likely due to the introduction of HAART. Earlier prenatal diagnosis of these children would have identified their mothers earlier, allowing maternal access to HAART and improved outcomes in children.

The surviving and deceased children had advanced HIV disease as evidenced by their primary presentation of moderate to severe immunosuppression and clinical class. Rapid progressors were more likely to have HIV encephalopathy but this difference was absent when dead and living subjects were compared due to the presence of HAART. Evidence is emerging that early antiretroviral therapy can protect the central nervous system in infants (9). More recent studies suggest that antiretroviral therapy initiated before 12 weeks of age reduces mortality by 75% in young HIV-infected infants (11). This has implications for the guidelines in commencing therapy and identifying factors to better define the short *versus* long-term survivors.

Previous studies in Jamaican children demonstrated that HAART reduces hospital length of stay, improves growth parameters, improves CD4 counts and reduces viral

load (12, 13). The effect on rapid progressors was that survivors had doubled the mean age at last follow-up compared with those who died.

The children who died were diagnosed late and two of three who had access to HAART were non-compliant for a prolonged period. Access to HAART will improve outcomes only if there is adherence to the regime. Children who are compliant have been shown to have a reduction in symptoms and death. An integrated approach in monitoring adherence is required (14). Severely advanced disease and delayed start may have precluded the benefits of HAART in the child who died within three weeks of initiating HAART.

Overall, HAART reduced the mortality rate and prolonged survival for HIV-infected children who were rapid progressors, had AIDS defining illnesses and were orphans. A greater impact is anticipated with increased access to care, earlier diagnosis and appropriate interventions.

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Challenges and Successes of HIV Voluntary Counselling and Testing Programme in Antenatal Clinics in Greater Kingston, Jamaica

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ABSTRACT

Issues: Voluntary counselling and testing (VCT) is a critical issue impacting HIV disease management from a national and global perspective. In Jamaica (population 2.6 million), 2% of women in antenatal clinics are HIV-positive and mother-to-child-transmission (MTCT) accounted for 7% of all reported cases in 2002. Notwithstanding this, VCT was ad hoc and not standardized. In 2003, a structured VCT programme was developed islandwide with over 300 VCT service providers and 16 qualified trainers.

Description: We describe the challenges and successes of VCT provided by five trained research nurses in the Perinatal HIV/AIDS Programme in Kingston which services 19 000 pregnant women per year in three major maternity centres and their 42 feeder antenatal clinics.

Lessons learned: The VCT model used was group education, opt-out individual testing, individual post-test counselling for seropositives and informing seronegatives of their negative status. Major challenges encountered included lack of quality control of the counselling process and lost opportunities for un-booked women who presented in labour. However, successes enjoyed included client assessment of risk behaviours with appropriate lifestyle changes, increased uptake of HIV testing and adherence to care for themselves and their infants, as well as reduction in stigma.

Recommendations: VCT has proven to be an important intervention that enabled improvement in the awareness, prevention and control of HIV in Jamaican pregnant women. Nurses who are appropriately trained in VCT can play a pivotal role in successful provision of VCT services.

Retos y Éxitos de un Programa de Asesoramiento y Prueba en Clínicas Prenatales en Greater Kingston, Jamaica

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RESUMEN

Cuestiones: El asesoramiento y pruebas voluntarios (APV) constituye una cuestión crítica cuyo impacto sobre el tratamiento de la enfermedad por VIH reviste importancia nacional y global. En Jamaica (con una población de 2.6 millones) 2% de las mujeres en las clínicas de atención prenatal son VIH positivas y la transmisión madre a hijo (TMAH) representa el 7% de todos los casos reportados en 2002. A pesar de ello, el APV fue practicado ad hoc y de manera no estandarizada. En el año 2003, se desarrolló un programa de APV a lo largo de toda la isla, con más de 300 proveedores de servicio y 16 entrenadores calificados.

Descripción: El presente trabajo describe los retos y éxitos del APV ofrecido por cinco enfermeras entrenadas en investigación, en el Programa Perinatal VIH/SIDA en Kingston, el cual ofrece servicios a 19 000 mujeres embarazadas por año en tres centros principales de maternidad y sus 42 clínicas prenatales asociadas.

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Lecciones aprendidas: *El modelo APV usado fue educación grupal, pruebas individuales con opción a negarse (“opt-out”), asesoramiento individual posterior a la prueba para seropositivos e información a los seronegativos de su estatus negativo. Los mayores desafíos encontrados incluyeron falta de control de la calidad de los procesos de asesoramiento y pérdida de oportunidades para las mujeres no registradas que se presentaron estando ya de parto. Sin embargo, los éxitos alcanzados incluyeron el asesoramiento de los clientes con respecto a los comportamientos de riesgo con cambios apropiados de estilos de vida, aumento de la toma de pruebas de VIH y la adhesión a encuitar de sí mismos y sus niños, así como la reducción del estigma.*

Recomendaciones: *El APV ha demostrado ser una importante forma de intervención que hace posible mejorar la conciencia, prevención y control del VIH en las mujeres jamaicanas embarazadas. Las enfermeras que están propiamente entrenadas en APV pueden desempeñar un papel cardinal en el ofrecimiento exitoso de servicios de APV.*

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BACKGROUND AND PURPOSE

Mother-to-child HIV transmission (MTCT) accounts for the majority of HIV infections in children from developing countries. In Jamaica, an estimated 25 000 persons were living with HIV/AIDS (1) with 2% of all pregnant women HIV-infected in 2002 (2). Mother-to-child-transmission accounted for 7% of all reported AIDS cases (3). Voluntary counselling and testing (VCT) is one of the many strategies to prevent, detect and reduce HIV/AIDS and other sexually transmitted infections (STIs). Voluntary counselling and testing is a critical issue impacting HIV disease management from a national, regional and global perspective. This is the process by which an individual undergoes counselling to enable him/her to make an informed choice about being tested for HIV (4).

Voluntary Counselling and Testing has been practised in Jamaica for as long as there has been sexually transmitted infections, however, there was a lack of standardization (5). It was being performed on an *ad hoc* basis by many organizations including the Ministry of Health (MOH) clinics, non-governmental organizations (NGOs) and private healthcare providers. At the request of the MOH and USAID Jamaica, the Johns Hopkins University affiliate, JHPEIGO Corp, collaborated with the MOH and conducted a needs assessment of VCT services in Jamaica. It was found that the service providers lacked current information on HIV/AIDS and did not have a client-based approach to counselling and behaviour change (5). As a result, JHPEIGO's Training in Reproductive Health Project began in 2000 (6). This deficiency resulted in the design of a national programme to build capacity in HIV-VCT based on a client-risk reduction model (5). The aim of the programme was to train a large number of counsellors in low resource settings and provide VCT services to STI and antenatal clinic (ANC) attendees (6).

The first VCT training programme was conducted in 2002 in two 5-day training courses at the Comprehensive Health Centre in Kingston. During the course, the participants observed and practised skills in counselling and did role-plays. The participants included healthcare providers, STI contact investigators, representatives from NGOs, people living with HIV/AIDS (PLWHAs), behaviour change

specialists and mental health counsellors. This supported the efforts of the MOH to make VCT available throughout the island especially at STI and antenatal clinics, to refer HIV-positive clients for care and support and to reduce mother-to-child transmission (MTCT) of HIV/AIDS (6). A JHPEIGO report of August 2003 stated that the counselling programme in Jamaica “exceeded its goal of developing a network of more than 300 VCT service providers and 16 qualified trainers”. Voluntary Counselling and Testing providers are now available islandwide and trainers are available in the Regional Health Authorities [RHAs] (7).

Voluntary Counselling and Testing has been integrated into the Kingston Perinatal/Paediatric HIV/AIDS (KPAIDS) Programme which started in Jamaica in 2002 in an effort to reduce and eventually prevent mother-to-child transmission (pMTCT) of HIV/AIDS in the greater Kingston region and eventually Jamaica and improve the quality of life of women and children infected with HIV/AIDS (8). It is a collaborative effort between the University of the West Indies (UWI), MOH and the University of Maryland. It is funded by the Elizabeth Glaser Paediatric AIDS Foundation, the Pfizer Foundation, UWI and the MOH. Five nurses (4 research nurses and 1 nurse coordinator) were trained in pMTCT and the management of HIV, VCT, HIV/AIDS and paediatric/perinatal HIV/AIDS in the KPAIDS Programme. Their VCT training was done through the MOH/JHPEIGO workshops. There were three obstetric sites: the University Hospital of the West Indies (UHWI), Victoria Jubilee Hospital (VJH) and Spanish Town Hospital (STH) and four paediatric sites: UHWI, STH, Bustamante Hospital for Children (BHC) and the Comprehensive Health Centre (CHC). These sites participate in the management of hundreds of HIV-positive women and their exposed children with HIV/AIDS. Each site is managed by a research nurse and the KPAIDS initiatives are supervised by the nurse coordinator (9).

Voluntary Counselling and Testing was designed for individual as well as group education. It facilitates same day results through Rapid Testing *versus* delayed results. It involves a pre-test counselling session which includes discussion of risk assessment and reduction to ensure that there is a clear understanding of the meaning of the implications of

the HIV test. The HIV test is done followed by post-test counselling, regardless of the HIV test result. There are several models of VCT in operation in various parts of the world (10). The model used in the KPAIDS programme is Group education, opt-out individual testing, individual post-test counselling for seropositives and informing seronegatives of their negative status. Clinic attendees can opt out. There was little or no post-test or preventative counselling for seronegatives while seropositives receive on-going counselling (10).

At the end of a group information session, a woman who presented for care at an antenatal clinic in the Kingston Metropolitan Region is expected to be knowledgeable about the following: two main methods of HIV transmission, one way to decrease their risk of HIV infection, one way to prevent HIV transmission to their babies, information about the HIV-testing process, interventions available for HIV-positive pregnant women and how to make an informed decision on whether or not to get tested (4).

Following a serological test performed by HIV ELISA or Determine Rapid Test, a woman is informed of her result in a confidential setting. A negative result allows her to take steps to avoid infection in the future. It also allows her to breastfeed knowing that this is the best option for her child (11). Those with positive results are advised about existing interventions and are assisted with decision-making about their own lifestyle, nutrition and healthcare (10, 11). Their counselling is on-going. The women are referred to high risk clinics at one of the participating centres for further antenatal care.

The aim of this paper is to evaluate the efficacy of the VCT intervention and client understanding of the components of VCT in the KPAIDS Programme.

SUBJECTS AND METHOD

The study proposal was submitted and reviewed by the Ethics Committee of the UWI/UHWI and permission granted to conduct a small, informal survey. Convenience sampling was used to select participants. A semi-structured questionnaire was used to conduct face-to-face interviews with consenting postpartum women in the immediate postpartum period and up to one year postnatal. The interviews were performed between August 15 to 26, 2005 by the research nurses on the postnatal wards and clinics at the three obstetric sites. Questions were asked concerning patient satisfaction with the counselling process, knowledge about pre-exposure prophylaxis, post-exposure prophylaxis, formula feeding, MTCT, condom usage and breastfeeding. Forty-eight women participated, 28 of whom were HIV-infected and 20 who were HIV-negative. The results were manually collated and analyzed.

RESULTS

Examination of the sociodemographic factors of the women interviewed showed that the age range of the majority of the

participants (19 or 39.6%) was between 20–24 years. They were mostly single and in visiting relationships (26 or 51.2%) and the majority had completed high school (31 or 64.6%) which is similar to the overall population.

An analysis of the responses to the questionnaire showed that approximately 75% or 36 women interviewed were offered VCT and agreed to be tested. Of the 20 women who were HIV-negative, 85% or 17 agreed to be tested while 68% or 19 of the HIV-positive women agreed to be tested (Fig. 1). Approximately 71% (34) of women overall ac-

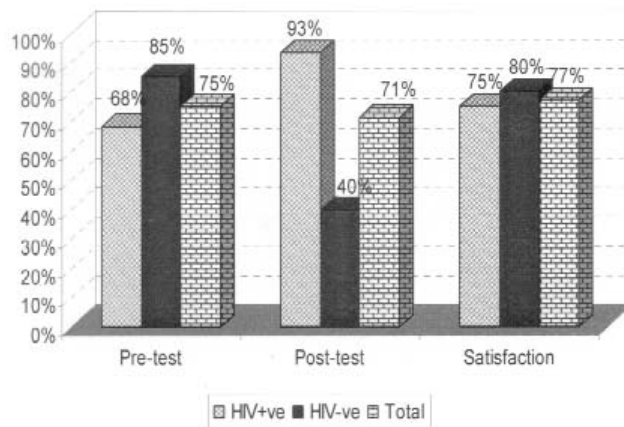


Fig. 1: Counselling.

cepted post-test counselling with a higher percentage in HIV-positive women (93% or 26 women) vs HIV-negative women [40% or 8 women] (Fig. 1). Patient satisfaction with the process approached 77% overall, with no difference in HIV-positive versus HIV-negative women (Fig. 1). Satisfaction was assessed by asking the women if they were satisfied that they had received enough information to help them decide if they should get tested. The majority of women had a good knowledge of HIV and the interventions offered for pMTCT such as pre-exposure prophylaxis (zidovudine antenatally), condom usage and formula feeding (Fig. 2). Almost 90% of women who were HIV-positive and 83% of women who

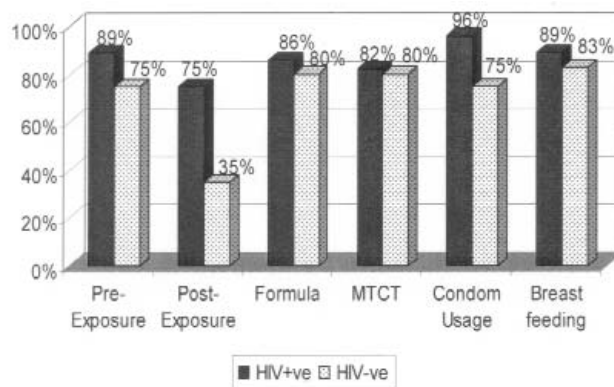


Fig. 2: Knowledge gained of pMTCT.

were HIV-negative were aware that breastfeeding increased the risk of the infant becoming infected (MTCT, Fig. 3). Knowledge about post-exposure prophylaxis (infant zidovudine) was higher in HIV-positive women (75%) as compared to HIV-negative women [35%] (Fig. 2). Over the two-year period (September 2002 to September 2004), improvements were noted in the uptake of VCT and also in HIV testing. There were also improvements in the number of women who had chemoprophylaxis [Table 1] (8).

Table: HIV Seroprevalence and uptake of interventions in the KPAIDS programme Year 1 (Sept 2002 to Sept 2003) and Year 2 (Oct 2003 to Sept 2004)

Characteristics	Year 1	Year 2
Total number of women seen in ANC	14 054	12 951
Total number of women who participated in counselling/group education	5558	11 747
Percentage of women who participated in counselling/ Group education	39.5%	90%
Number of women who accepted testing	7383	12 352
Percentage of women who accepted testing	52.5%	95%
Number of women testing HIV-positive	152	197
Percentage of women testing HIV-positive	1%	1.5%
Number of women receiving MTCT prophylaxis	90	143
Percentage of women receiving MTCT prophylaxis	59.2%	72%

DISCUSSION

This study showed a high level of acceptance and uptake of voluntary counselling using the opt-out strategy. This is demonstrated in Fig. 1 which shows a 75% acceptance of pre-test counselling and is further borne out by the actual results shown in Table 1. This compares favourably with results obtained in the USA (12). Similarly, women in Nigeria were willing to undergo HIV counselling and testing in pregnancy especially if it would assist in preventing MTCT to their babies (13, 14). However, uptake of HIV counselling was < 57% in clinics in Botswana (15). There was a high patient satisfaction level (77%) and retention of knowledge gained to prevent MTCT of HIV in our study (Fig. 2). Women also retained a high knowledge base in methods of pre-exposure and post-exposure prophylaxis to prevent mother to child HIV transmission (Fig. 2).

Although the study showed that there was a high retention of knowledge, it is limited by the fact that information regarding the length of time between counselling and interview is not available. Information on their psychological state at the time of diagnosis is also unavailable. Both these factors would have a bearing on their ability of recall and therefore are limitations to the study.

Successes: Voluntary counselling and testing in the KPAIDS Programme has experienced many successes. Under the guidance of well-trained nurse-counsellors, HIV-positive clients have been helped to assess their risk behaviours and make appropriate lifestyle changes. Expansion of the VCT

programme by the Ministry of Health and the Caribbean HIV/AIDS Regional Training Network has assisted the identification of more HIV-infected pregnant women, provided education and increased the uptake and adherence to care for themselves and their infants. Over the two-year period (September 2002 to September 2004), improvements were noted in the uptake of VCT and also in HIV-testing as well as, significant improvements in the proportion of women who had antiretroviral chemoprophylaxis [Table 1] (8). Discussions with Nurses in the KPAIDS Programme and the Maternal and Child Health Centres participating in the programme revealed that there was the perception that there had been a reduction in the stigma associated with HIV which may be partly due to the normalization of VCT within the maternal and childcare services. This reduction in stigma was greatly enhanced by good nurse-patient relationships which empowered these women to seek to improve their knowledge base.

Challenges: Interviews with the Nurses in the Maternal and Child Health Services of sites participating in the KPAIDS Programme as well as the KPAIDS nurse-counsellors highlighted several major challenges. These include the lack of quality control in the counselling process making it difficult to assess the content of the counselling and the satisfaction of both the counsellors and clients. Counselling and testing were offered as a part of the Maternal and Child Health services and this was labour-intensive and time-consuming. In resource-limited settings, there were time constraints, staff shortages and lack of funds for training which negatively impacted on the quality of counselling. Increased workload can cause emotional and physical strain on the staff and precipitate the "burnout" phenomenon. Hence, there was a need for regular support/debriefing sessions. Missed opportunities for pMTCT intervention occurred when unbooked women present for the first time in labour. Improved access to rapid tests would optimize the use of antiretroviral interventions in seropositive women. However, the quality of counselling could be compromised in these situations. Disclosure issues were fueled by a variety of reasons including fear of discrimination, rejection and violence. In some cases these fears were justified. Also, there was the inability to negotiate condom use and behaviour change in the partners of these women. This contributed to risk behaviours in some women and repeated pregnancies. Privacy and confidentiality were important during counselling sessions especially for the HIV-positive pregnant women. In some instances, lack of physical space, especially in the clinic setting, presented a major challenge. Post-test counselling needed to be better incorporated in the management of HIV-negative pregnant women as this could help them to reduce their risk of becoming infected. The study showed that only 40% of women received post-test counselling (Fig. 1) and only 35% knew what post-exposure prophylaxis was (Fig. 2).

CONCLUSION

In spite of the challenges faced, Voluntary Counselling and Testing has proven to be an important intervention that enables an improvement in the awareness, prevention and control of HIV infection in pregnant Jamaican women. Nurses who are appropriately trained can play a pivotal role in the successful provision of VCT services. Couples counselling and counselling and testing in the labour wards for women who present late in pregnancy need to be explored. There needs to be an increase in the knowledge, acceptability and adoption of VCT. As in Botswana (16), nurses were the backbone of the VCT services provided by the KPAIDS Programme and they need to have ongoing training and support (9).

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Voices of the Women: Feedback from Women of Child-bearing Age who are Living with HIV can help Improve Efficacy of Psychosocial Interventions

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ABSTRACT

Background: We hypothesized that voluntary counselling and testing during pregnancy are necessary but not sufficient to provide the holistic psychosocial support needed by Jamaican women living with HIV and/or AIDS. Based on this hypothesis, we investigated a range of coping methods and support systems used by HIV-infected women and a group of their HIV-negative counterparts before, during and immediately after their pregnancies.

Methods: Women attending obstetric clinics in urban Jamaica completed a quantitative survey aimed at discovering coping behaviours, social and spiritual support systems. Pre-survey focus group studies and key informant interviews contributed to the design of the questionnaire while post-survey focus groups were used to probe the validity of the data gleaned from the questionnaire survey. Survey data were analyzed using non-parametric tests for trend with independent univariate tests.

Results: Fifty-five HIV-infected women and 51 HIV-negative women completed the survey. Compared with HIV-negative women, more HIV-infected women reported both feeling depressed ($p = 0.07$) and having difficulty concentrating ($p = 0.05$) during the month immediately prior to the study. Other statistically significant differences included: HIV-infected women were more likely to pray, to sleep and to change eating habits in response to worry and stress ($p = 0.001$ in each instance). Although several women declared religious faith, significantly fewer HIV-infected women were willing to talk to a religious leader about their problems compared to their HIV-negative counterparts ($p < 0.001$).

Conclusions: Participation of HIV-infected women in post-survey focus groups augmented the survey findings. Many of the women reported negative emotions and some indicated serious challenges in accessing social support. The results point to the need for systematic documentation of psychosocial profiles as part of the approach to caring for these women. In addition, in the Jamaican sociocultural context, we recommend improved training of religious leaders and healthcare providers in psychosocial issues.

Voces de Mujeres: la Retroalimentación de Mujeres en Edad de Parir Viviendo con VIH Puede Ayudar a Mejorar la Eficacia de las Intervenciones Psicosociales

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RESUMEN

Antecedentes: Planteamos la hipótesis de que someterse al asesoramiento y prueba voluntarios durante el embarazo es necesario, pero no suficiente para el apoyo psicosocial holístico que necesitan las mujeres jamaicanas que viven con VIH y/o SIDA. Sobre la base de esta hipótesis, investigamos una serie de métodos de afrontamiento y sistemas de apoyo usados por las mujeres infectadas por el VIH y un grupo de sus contrapartes VIH negativas antes, durante e inmediatamente después de sus embarazos.

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Métodos: *Mujeres que asistían a clínicas obstétricas en áreas urbanas de Jamaica, completaron una encuesta cuantitativa, encaminada a descubrir conductas de afrontamiento, y sistemas de apoyo social y espiritual. Estudios de grupos focales mediante encuestas y entrevistas a informantes claves, contribuyeron al diseño del cuestionario, mientras que grupos focales de post-encuesta fueron usados para investigar la validez de los datos recogidos de la encuesta-cuestionario. Los datos de la encuesta fueron analizados usando tests no paramétricos para tendencia con tests univariados independientes.*

Resultados: *Cincuenta y cinco de las mujeres infectadas con VIH y 51 de las mujeres VIH negativas, completaron la encuesta. En comparación con las mujeres VIH negativas, más mujeres infectadas con VIH reportaron sentirse deprimidas ($p = 0.07$) y tener dificultades con la concentración ($p = 0.05$) durante el mes inmediatamente anterior al estudio. Otras diferencias estadísticamente significativas fueron las siguientes: las mujeres infectadas con el VIH mostraron una mayor tendencia a orar, dormir y cambiar sus hábitos alimentarios en respuesta a la preocupación y el estrés ($p = 0.001$ en cada caso). Aunque varias mujeres declararon tener fe religiosa, significativamente pocas mujeres infectadas con VIH estuvieron dispuestas a hablar a un líder religioso acerca de sus problemas, en comparación con sus contrapartes VIH negativas ($p < 0.001$).*

Conclusiones: *La participación de mujeres infectadas con VIH en grupos focales de post-encuesta aumento marcadamente los hallazgos de la encuesta. Muchas de las mujeres reportaron emociones negativas y algunas indicaron serios desafíos en cuanto a tener acceso a algún apoyo social. Los resultados apuntan a la necesidad de poseer una documentación sistemática de los perfiles psicosociales como parte del abordaje del cuidado a estas mujeres. Además, en el contexto sociocultural de Jamaica, recomendamos mejorar el entrenamiento de los líderes religiosos y los proveedores de salud en cuanto a las problemáticas psicosociales.*

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INTRODUCTION

Data from 2006 indicate that at least 3000 children were born to mothers infected with the human immunodeficiency virus (HIV) each year in the Caribbean (1). It is known that without the benefit of preventive interventions approximately 25–35% of HIV-infected pregnant women will transmit HIV to their newborns (1–4). So, it could be predicted that, without such intervention, approximately 1000 children would be infected every year in the Caribbean if HIV-infected mothers did not receive antiretroviral drugs during pregnancy and at the time of delivery. In fact, it is estimated that the transmission of HIV from an HIV-infected mother-to-child in 2006 was 10% compared to 25% in 2002, prior to the introduction of antiretroviral medication for prevention of mother-to-child transmission (5).

In Jamaica, it has been estimated that as many as 1.5–2% of antenatal clinic attendants are HIV-infected (2, 3). Before programmes for prevention of mother-to-child transmission (pMTCT) of HIV were well established, this form of transmission accounted for 7% of all reported AIDS cases in the country, reflecting the substantial contribution of women to the Jamaican epidemic (3). Among HIV-infected women, MTCT occurred in approximately 25% of such cases, either during pregnancy, through exchange of blood or during labour and delivery or through breastfeeding (3).

Within the past three years, several Caribbean countries, including Jamaica, have accelerated their pMTCT programmes (5, 6). We now know that with appropriate interventions, this form of transmission can be reduced to below 5% in infants born to HIV-infected mothers (2–4).

Given the relatively high incidence of HIV infection among pregnant women in Jamaica and the knowledge that appropriate psychosocial support will ameliorate the effects of HIV/AIDS (7), the authors decided to investigate how some of these women have coped with life before and during their pregnancies, how they are adjusting to living with HIV and/or AIDS and how they anticipate the future.

The main aim of the study was to identify patterns of psychological functioning among pregnant HIV-positive women attending antenatal clinics with a view to helping this group of persons to: a) reduce their risk in relation to further exposure to HIV and other sexually transmitted infections; b) increase their ability to cope with the psychological and social stresses commonly associated with HIV, and c) improve their parenting behaviour.

At the time of the study, a comprehensive voluntary counselling and HIV testing (VCT) programme had been initiated in Jamaica and standardized manuals and training programmes were being used in an effort to improve the quality of VCT provided (8, 9).

In embarking on the study, the desire was that publication of data related to the psychosocial needs and care of HIV-infected women would be beneficial to the women themselves as well as to persons involved in their care, treatment and support (7, 10). We anticipate that the results of the study will improve the ability of members of the healthcare team to provide more pertinent referrals for services, particularly when psychosocial interventions are required.

As far as we are aware, this is the first study of its kind to be undertaken in the English-speaking Caribbean. We trust that

it will prompt similar work in other parts of the region and elsewhere.

SUBJECTS AND METHODS

Objectives

- C To examine a range of psychosocial factors (including emotional well-being, self-esteem, self-efficacy, life stressors and coping strategies, religious beliefs and practices, real and perceived social support, attitude and practice with respect to healthcare, freedom to disclose HIV status and perception of victimization) associated with risk reduction and with adherence to treatment protocols.
- C To compare the issues and psychological profiles of HIV-positive women attending antenatal and postnatal clinics with those of women at the clinic who are not HIV-infected.

Hypothesis

At the beginning of the study, it was hypothesized that voluntary counselling and testing for HIV as currently prescribed and practised is not sufficient to allow pregnant women to adjust to the realities of a diagnosis of HIV infection and to improve their coping with its implications or to guarantee safe behaviour among HIV-negative women. In the context of the present study, we proposed that certain additional psychosocial factors would improve the efficacy of current models of VCT and provider-initiated testing and counselling. We sought to test these ideas by interviewing groups of women who were either attending antenatal clinics or were in the immediate postnatal period.

HIV programme managers have assumed that a standardized approach to pre- and post-test counselling, namely voluntary counselling and testing for HIV, would be sufficient to allow pregnant women to adjust to the realities of a diagnosis of HIV infection and to improve their coping with its implications.

Study Design

This study was a collaborative effort between the Kingston Paediatric and Perinatal HIV/AIDS Programme (KPAIDS), the Ministry of Health, Jamaica, and the University of the West Indies HIV/AIDS Response Programme (UWI HARP). The participants in all phases of the study were attending health services affiliated to the KPAIDS programme in the parishes of Kingston, St Andrew and St Catherine (see below). The majority of the women were therefore from urban or semi-urban residential settings.

Ethical permission for conducting the study was obtained from the Joint Ethics Committee of the UWI Faculty of Medical Sciences and the University Hospital of the West Indies as well as the Ethics Committee of the Ministry of Health, Jamaica. As part of the ethical review that occurred prior to the study, the Ethics committee approved the text of an informed consent form. In carrying out the fieldwork, this

informed consent form was read to each prospective participant and those who agreed to participate signed their agreement with the content of the form; this was done at each stage of the study. A minority of prospective participants declined to take part in the study. Their reasons for declining were not recorded.

Phase 1 – Initial qualitative research

The first phase of the study consisted of (a) focus group interviews with two groups of HIV-infected women and one group of HIV-negative women and (b) ten key informant interviews with the following persons: (i) seven AIDS/pMTCT service providers within Governmental and Non-Governmental agencies, (ii) two HIV-infected patients and one HIV-negative patient. The women who participated in the focus groups and the patients who were interviewed individually were recruited voluntarily from the antenatal clinic at the University Hospital of the West Indies.

Phase 2 – Design and pre-testing of questionnaire

Data from focus groups and key informant interviews were used in the design and modification of a structured questionnaire which was pre-tested before being administered in the second phase of the study.

Phase 3 – Questionnaire survey

Participants were recruited from among women who were attending antenatal and postnatal clinics at the Spanish Town Hospital and at three Kingston locations, namely, the Victoria Jubilee Hospital, the Government Comprehensive Health Centre and the University Hospital of the West Indies (4, 10). Convenience samples were chosen as follows: (a) women who were known to be HIV-infected and who knew their HIV serostatus and who were part of the Kingston Perinatal and Paediatric AIDS (KPAIDS) programme and (b) women who were HIV-negative at the time that they were tested during pregnancy and who reported that they were still HIV-negative at the time of the study. The patients' medical records were reviewed to provide information on demographic variables and to verify the HIV status of prospective participants prior to their recruitment. The relatively small size of the patient population (sampling frame) and the sensitivity of the subject caused the authors to avoid random sampling.

The questionnaire was administered to the respondents by a small team of pre-trained Research Assistants. An explanation of the study was read to each prospective participant and each person then signed consent to take part. The questionnaire, based on a review of the literature, consisted of over 300 questions, designed to assess psychosocial and other variables including: depression, anxiety, life stress, social support, coping skills and religious beliefs/practices (7, 11–15). At the end of the interview, a small gift package and a set of Health Promotion brochures were given to each participant as a token of appreciation. Where important

psychological or social needs were identified during interviews, participants were given advice and/or referrals at the discretion and initiative of the interviewers or the lead researcher.

In the quantitative arm of the study, emotional well-being was measured using a modified well-being question set, a 13-item tool asking participants to rate their levels of various negative emotions on a 4-point scale (not at all, a little, sometimes, a lot). Participants were classified as experiencing important levels of each emotion if they reported the emotion sometimes or a lot. The proportions experiencing each emotion were compared among HIV-negative and HIV-infected women, using the Chi-square test, unadjusted for multiple testing.

Phase 4 – Second qualitative phase

This phase consisted of four focus group interviews to probe information derived from the questionnaire survey. The informants were again recruited voluntarily.

Data Analysis

Data from the initial focus group and key informant interviews were analyzed manually for significant themes and patterns and these were incorporated into the structured questionnaire. Data from the questionnaire survey were analyzed by computer using Stata Statistical Software: Release 8 for performing Chi-square and Student's *t*-tests, where necessary. Data from the final set of four focus groups were analyzed manually for significant themes and patterns in a similar way to the analysis of the earlier focus group data.

RESULTS

In the present paper, the results of analysis of qualitative and some quantitative data are reported. In some instances, information from the three operative phases of the study is reported together. Unique findings are reported separately.

Demographics

The median age of 51 participants without a known HIV diagnosis was 25 years (interquartile range 21 to 32, range 14 to 40) and in 55 HIV-infected participants, it was 27 years (interquartile range 24 to 31, range 15 to 41). This age difference between HIV-infected and HIV-negative participants was not statistically significant ($p = 0.41$).

The majority of the women reported that they were currently either in common-law relationships or had visiting partners (82% HIV-negative and 69% HIV-infected women). There were proportionately more married women in the HIV-negative group. One quarter of HIV-negative women reported having no regular partner.

Most of the women were educated to secondary school level with a larger proportion of HIV-infected women only educated to primary level. There were fewer HIV-infected women who were educated at tertiary level.

Emotional well-being

Statements from some HIV-infected women:

"I thought about death a lotmy mother had to hide the knives and scissors...it is only because of family why I don't kill myself..."

"I am scared to die but I can't see a reason for living..."

"Ask yourself 'what did I do?'"

"...when you die the children ... nobody will take care of them like you"

Statistically significant differences were noted for 'feeling tense' and for 'guilt' with a larger proportion of HIV-infected women reporting these experiences. We also noted an increased rate of self-reported depression among HIV-infected women ($p = 0.02$) compared to their HIV-negative counterparts. In addition, a greater proportion of HIV-infected women reported difficulty concentrating ($p = 0.05$).

In this relatively small sample of respondents, none of the 51 HIV-negative women and four of 55 HIV-infected women reported using alcohol ($p = 0.12$, using Fisher's exact test, two-tailed) (16). None of the HIV-negative women reported using tobacco or "other drugs" compared to five of 55 HIV-infected women ($p = 0.058$, using Fisher's exact test, two-tailed).

With respect to possible coping strategies for 'worry and stress' adopted by the study participants, important differences between HIV-negative and HIV-infected women were noted. Specifically, HIV-infected women were more likely to pray, to sleep and to change their eating habits in response to worry and stress ($p = 0.001$ in all cases).

Knowledge about where to go for help

The voice of one HIV-infected woman:

"If only I could talk to somebody at night!"

Both HIV-infected and HIV-negative women (43% HIV-negative, 36% HIV-infected) reported that they did not know where to go for advice about HIV/AIDS. Although the majority of women had telephone access (90% of HIV-negative and 82% of HIV-infected women), many were not aware of the services offered by the national AIDS/STD Helpline telephone counselling and referral service (35% HIV-negative, 40% HIV-infected). However, the participants in the final focus groups felt that most HIV-positive women should know where to go but probably do not trust the system to maintain confidentiality.

Social support

The voices of HIV-infected women:

"I was longing for this (group session) ... sometimes you feel so alone"

"It brings a lot of guilt... lying to people you love"

The support networks of friends and family are important determinants of quality of life. We asked a series of questions about theoretical and practical support offered by friends and family members.

Across both groups of women, on average, family members were more likely to provide support than friends (family 78%, friends 70%). HIV-infected women were a little more likely to receive support (HIV-infected 77%, HIV-negative 71%). Significantly higher proportions of HIV-infected women reported ease at asking friends or family to take care of children during absence or illness. Families were more likely to provide help without payment to their HIV-infected female relatives compared to HIV-negative women.

When the women were asked theoretical questions about support provided by family and friends, on average, they anticipated more support from family members. HIV-infected women believed that they were less likely to expect support. These differences were not statistically significant except in two instances: (a) significantly fewer HIV-infected women believed that friends understood their problems, and (b) significantly fewer HIV-infected women believed that they could get advice from family compared to their HIV-negative counterparts.

Disclosure

To family

The voice of one HIV-infected woman:

“Family ... too much stress ... they speak too freely...”

Half of all HIV-infected women had told family members about their illness. Among women who had yet to inform a relative, 58% did not feel able to tell any family members about their illness and 76% were not interested in referral to someone who could help them to prepare to tell a relative.

To Friends

One-quarter of all HIV-infected women had told one or more friends about their illness. Among women who had yet to inform a friend, 89% did not feel able to tell any friends about their illness and 90% were not interested in referral to someone who could help them to prepare to tell a relative.

Almost all of the women said that they knew who would take care of their children in a crisis (96% HIV-negative and 85% HIV-infected). More than three-quarters identified a relative (85% HIV-negative and 87% HIV-infected) and one-quarter identified a friend (28% HIV-negative and 29% HIV-infected). Fewer HIV-infected women said that the father would take care of the child [83% HIV-negative and 52% HIV-infected] ($p = 0.002$). However, less than half of the women had contacted the father (50% HIV-negative and 30% HIV-infected), the friend (15% HIV-negative and 18% HIV-infected) or the relative (54% HIV-negative and 41% HIV-infected) about this care.

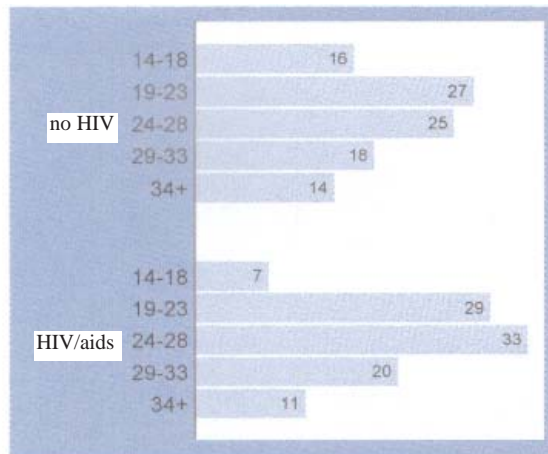
Religious beliefs/practices

The voices of HIV-infected women:

“Paid \$7000 to go to a science healer ... gave me dirty water to drink”

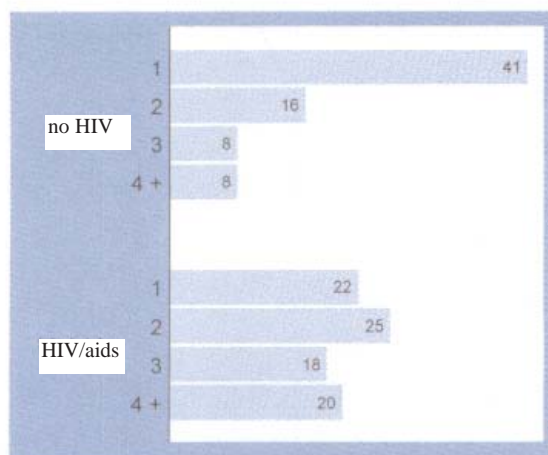
“prayed all daybelieved in miracles...”

Spirituality was noted to play a central part in the responses of many women. Some said that they prayed and believed that their faith helped them to deal with stress. Many believed that their faith, even without medication,



Note: Data expressed as percentages.

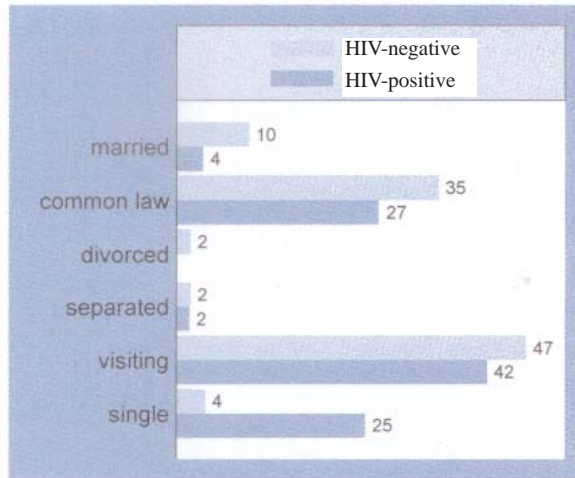
Fig. 1: Age distribution of 106 study participants (55 HIV-infected; 51 HIV-negative).



Note: Data expressed as percentages.

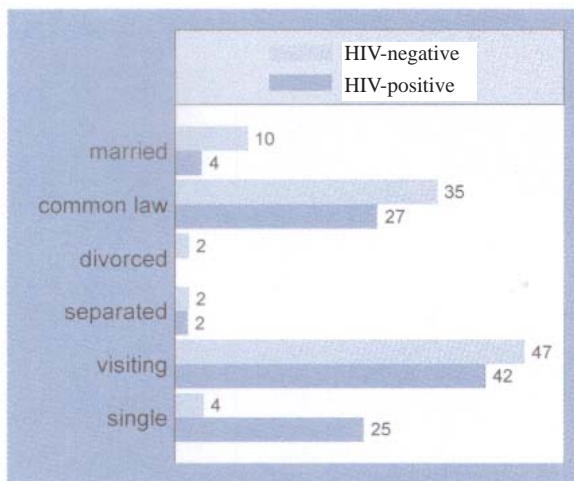
Fig. 2: Numbers of previous births reported by 55 HIV-infected and 51 HIV-negative women.

could lead to healing. Almost a quarter of the HIV-infected women had sought advice from a traditional faith healer. On the other hand, several of the HIV-infected women interviewed were less likely than their HIV-negative counterparts to feel comfortable talking about their problems with a conventional religious leader.



Note: Data expressed as percentages.

Fig. 3: Union status reported by 55 HIV-infected and 51 HIV-negative study participants.



Note: Data expressed as percentages

Fig. 4: Educational status reported by 55 HIV-infected and 51 HIV-negative study participants.

Real or perceived victimization

The voice of an HIV-infected woman:

"Can't deal with so much people ... don't want to go there ... they see you and point you out later."

One-fifth of HIV-infected women (n = 10) reported feeling victimized or taken advantage of because of their HIV status. Of these victimized women, five reported victimization by a healthcare worker, two by a family member, three by a neighbour or community member and two by a friend.

DISCUSSION

This study provided data regarding some of the psychosocial processes influencing the behaviour of women of child-

Table 1: Proportion of HIV-negative and HIV-infected women reporting thirteen negative emotions

Variable	HIV-negative (%) n = 51	HIV-infected (%) n = 55	Prob ¹
Nervousness	8	15	0.28
Sadness	47	55	0.44
Fearfulness	16	27	0.15
Loneliness	25	40	0.11
No interest	29	42	0.18
Hopelessness	20	29	0.26
Feeling tense	31	51	0.04
Panic	10	15	0.46
Restlessness	33	20	0.12
Worthlessness	14	20	0.39
No sleep	47	29	0.06
Eating (too much)	53	55	0.87
Guilt	27	47	0.04

¹Proportions compared using the Chi-square test

Table 2: Proportion of HIV-negative and HIV-infected women who reported that it was easy to get friends or family to provide selected support

Type of Support	HIV-negative (%) n = 51	HIV-infected (%) n = 55	Prob ¹
Friends			
Watch my home	67	71	0.64
Care for my children	49	71	0.02
Do something I couldn't do	73	67	0.55
Social / party	80	71	0.26
Help, without payment	78	75	0.64
Family			
Watch home	74	82	0.36
Care for children	56	89	<0.001
Do something I couldn't do	80	78	0.78
Social/party	73	80	0.37
Help, without payment	76	91	0.04

¹Proportions compared using the Chi-square test

bearing age who are living with HIV. As has been found elsewhere, many of these HIV-positive women were experiencing negative emotional experiences and were attempting to cope with them in the best ways they could (12). A larger percentage of them were depressed, less satisfied with their lives and less optimistic compared with their HIV-negative counterparts (7, 13, 14).

HIV-infected post-natal mothers were worried about their own health and the concomitant financial burdens. Yet they were not seen to be engaging in 'unhealthy coping behaviours' any more than the HIV-negative women. In fact, according to our data, stress was more likely to lead to more 'acceptable' behaviours like sleeping and praying. In addition, with regard to healthcare, the HIV-infected women were also more likely to be watching their diet, taking medication

Table 3: Proportion of HIV-negative and HIV-infected women who reported positively on aspects of support

Type of support	HIV negative n = 51	HIV infected n = 55	Prob ¹
Friends			
Can depend on	82	69	0.11
Can turn to	67	53	0.14
Will come to help	82	84	0.86
Can get advice	71	58	0.18
Understands	78	56	0.02
Want these friends	75	65	0.31
Family			
Can depend on	90	85	0.46
Can turn to	76	67	0.29
Will come to help	98	95	0.35
Can get advice	86	69	0.04
Understands	75	64	0.23
Want this family	71	71	0.97

¹Proportions compared using the Chi-square test

but not exercising – an area of selfcare worthy of more promotion.

The large proportion of respondents who practised religion at a personal level was striking. This reinforced the importance of understanding the spiritual focus of these individuals (7, 14). It was not as simple as saying that if we find that someone was religious we should refer her to a pastor. This may be true and certainly a referral mechanism to spiritual advisors should be part of the armamentarium of any AIDS service provider. However, a full appreciation of the implications of these spiritual beliefs may make all the difference in facilitating uptake of and adherence to medical regimens. It should be noted that there was clearly a need for more work to be done to educate religious leaders to the needs of HIV-infected women and to ensure that the perception of their availability as appropriate counsellors and confidants improved.

As would be expected, social support was an important factor in the lives of the women (7, 11, 13, 15, 17). However, the experience of support, whether from family or friends, appeared to be limited to help with practical problems *eg* in child care and was less likely to include emotional support and empathy with the challenges of living with HIV.

Of the women who had not disclosed their HIV status, the majority did not want to explore ways to share this information either with friends or family. While the issues of disclosure, stigma and discrimination continued to be barriers to accessing the necessary emotional support, there was increasing need to provide additional support systems that were available, when needed (7, 12, 17). In this context, it was also noteworthy that most of the persons interviewed said that they did not know where to go to for advice about HIV/AIDS. This is eminently solvable by the national health authorities.

It was commendable that the majority of the women had allegedly made plans for the care of their children in a crisis should they be unable to play this role and that most of them had identified a relative to play the role of caretaker. However, fewer of the HIV-infected women included the father as an option. These plans were mostly in the minds of the women as less than half of them had contacted the identified caregiver about their roles vis-à-vis the children. There were a number of possible reasons for this lack of communication, ranging from the “superstitious” to the matter of reluctance to disclose HIV status. Whatever the reasons, this was another area worthy of investigation, guidance and support both in the interest of the welfare of the children and for the emotional well-being of the mothers (17).

As we have reviewed some of the more actionable results, it was clear that an appreciation of these potentially complex yet important psychosocial variables could provide insights that were to improve the efficacy of our interventions. Yet the complexity of these behavioural factors may sometimes seem intimidating especially for those who felt that they were not adequately trained to intervene at this level. We need to revisit our paradigm for comprehensive care in order to ensure that the best use is made of all the data available and that all potential providers are appropriately equipped to play necessary roles.

Implications for training of providers included a greater focus on a teamwork approach, psychosocial assessment, creation of an effective referral network, use of material suitable to the literacy level of the client, public education and continuing in-service education (7, 18, 19). The provider must be seen as not only a provider of medication/clinical services but also a sensor who assessed broad needs, a gatekeeper who provided direction to other service providers, a sentinel who identified trends and patterns and a supporter during the entire process.

There must be modifications of curricula in professional schools *eg* schools of medicine, nursing, pharmacy, psychology, counselling and social work (18, 19). Provider competencies must include: communication skills, counselling skills, proficiency in patient education, ability to assess psychosocial needs, current knowledge about drug regimens, knowledge of appropriate referral processes and sources, willingness to refer when necessary and supervision skills (19).

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The authors wish to thank the women who participated in the study and who are courageously facing the challenges that HIV presents in their lives. We thank the staff of KPAIDS, especially the nurses whose supportive relationship with their clients allowed them to be confident enough to meet new persons and to share honestly with them.

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Contact Investigation in the Prevention of Mother-to-Child Transmission of HIV Comparing Urban and Rural Outcomes in Jamaica

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ABSTRACT

Background and Purpose: The contact investigators played a significant role in the decline of infectious syphilis in Jamaica and are likely important players in the prevention of mother-to-child transmission (PMTCT) in the HIV programme. A brief evaluation was done comparing the outcomes of contact investigation in Kingston and St Andrew (KSA) with that of the contact investigation in two rural parishes.

Methods: The interview and field records for the seropositive antenatal clinic attendees for the period October 2004 to September 2005, in urban KSA, were compared with those for rural Clarendon and Portland.

Results: HIV seropositive pregnant women ($n = 88$) were notified and/or referred to the parish contact investigators: 36 in KSA, 9 in Portland and 43 in Clarendon. The time from test date to interview date was almost twice as long for KSA (mean 27 days) than Portland (mean 15.7 days) and thrice that of Clarendon (mean 9 days). Mean disposition (case closure) times were for KSA: 19 days; Portland: 28 days and Clarendon: 15 days. Only 40% of the contacts were located for KSA and 48% of these tested positive for HIV. For Portland, 73% were located and 8% tested positive. For Clarendon, 45% were located and 35% of these tested positive.

Conclusions: On site same day HIV rapid testing is not always available so the contact investigator is an essential member of the PMTCT team in Jamaica. One of the programme outcomes (time to interview) was longer in the urban than the rural parishes while others (time to resolution of the case and percentage of contacts located and tested) had no consistent urban-rural differences.

Investigación de Contactos en la Prevención de la Transmisión del VIH de Madre a Hijo Comparando los Resultados Urbanos y Rurales en Jamaica

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RESUMEN

Antecedentes y Propósito: Los investigadores de contactos desempeñaron un papel significativo en la disminución de la sífilis infecciosa en Jamaica, y son probablemente agentes importantes en la prevención de la transmisión del VIH de madre a hijo dentro del programa de VIH. Se realizó una breve evaluación comparando los resultados de las investigaciones de contactos en Kingston y Saint Andrew (KSA) con los de la investigación de contactos en dos provincias rurales.

Métodos: Los datos de entrevistas y de campo de los asistentes seropositivos a la clínica de atención prenatal para el período comprendido desde octubre de 2004 a septiembre de 2005 en el perímetro urbano KSA, fueron comparados con los de las rurales Clarendon y Pórtland.

Resultados: Las mujeres embarazadas VIH seropositivas ($n = 88$) fueron notificadas y/o referidas a los investigadores de contactos de las provincias: 36 en KSA, 9 en Portland y 43 en Clarendon. El tiempo de la fecha de prueba a la fecha de la entrevista fue casi el doble para KSA (promedio 27 días) en comparación con Pórtland (promedio 15.7 días) y tres veces mayor que el de Clarendon (promedio

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9 días). Los tiempos de disposición promedio (cierre de caso) fueron como sigue: KSA, 19 días; Portland, 28 días; y Clarendon, 15 días. Sólo el 40% de los contactos fueron localizados para KSA y el 48% de estos resultaron VIH positivos a las pruebas. Para Portland, 73% fueron localizados y 8% resultaron positivos. Para Clarendon, 45% fueron localizados y 35% de estos resultaron positivos.

Conclusiones: No siempre hay pruebas de VIH rápidas disponibles para su realización en el mismo lugar el mismo día, de manera que el investigador de contactos es un miembro esencial del team PMTCT en Jamaica. Uno de los resultados del programa (tiempo de entrevista) tuvo mayor duración en las provincias urbanas que en las rurales, en tanto que otros (tiempo de solución del caso y porcentaje de contactos localizados y sometidos a prueba) no mostraron diferencias consistentes urbano-rurales.

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INTRODUCTION

The role of the contact investigators/disease intervention specialists in the declining incidence of infectious syphilis in Jamaica (1) and the United States of America [USA] (2) has been documented. With the increasing burden of HIV in Jamaica (3), there has been a change in caseload and associated complexity from syphilis to HIV. The sense of urgency that the contact investigators had in the prevention of infectious syphilis and mother to child transmission of syphilis continued and also prevailed in the prevention of mother-to-child transmission (pMTCT) of HIV.

The widespread use of the rapid serological test for syphilis was a contributing factor to the success story of syphilis. The rapid test for HIV was also a component of the 'roll-out' of the Jamaican Ministry of Health's pMTCT programme in 2004. As with the rapid test for the syphilis control programme, in the rapid test for HIV, due to lack of human resources at some sites, it was not always possible for clients to obtain results on the same day as in most instances phlebotomy was performed on site but the rapid test was done off site with results returned to the site usually within a week or two. This then translated into more time on field work for the contact investigators locating index cases and possibly contributed to decreased outcomes.

Contact investigation consists of contact interviewing and contact (field) tracing. Contact interviewing was performed the same day for sites with same day rapid testing or later when index cases were found (on return visit or after field tracing). For HIV, the aims of contact interviewing were to a) identify infected contacts who were unaware of their status so that with counselling and treatment they could prevent transmission to others (pMTCT in the case of a pregnant case), b) identify uninfected contacts at high risk who could be counselled to avoid infection (primary PMTCT in the case of both genders), c) identify infected contacts who were counselled and treated to improve the quality of their lives (pMTCT plus). The direct interview approach (4) is usually applied during the contact interview. This approach seeks to elicit all contacts/suspects by asking general questions *re* lifestyle (sexual) history and dispelling general myths/misconceptions to identify more contacts before specific contact locating information is obtained. It is done before

any counselling, specific disease education or data collection was performed. The contact investigator experienced in this approach usually solicits more contacts per case than the clinician attempting partner notification.

In addition to contact investigation, the contact investigators at the outset played and continued to play a significant role in the pre- and post-test counselling of pregnant women and the referral of HIV seropositive pregnant women to other services such as the high risk antenatal clinic, social worker and the nutrition personnel (5). As occurred with the other sexually transmitted infections, the contact investigators were involved in other activities (6) that facilitated case finding, management and augmented prevention efforts for HIV.

Contact investigation for HIV is far from straightforward and there is a paucity of meaningful evaluations on this (7). It is hoped that some lessons learnt in the control of syphilis in Jamaica namely: decentralized rapid (with same day result) testing by trained laboratory technician assistants and prompt contact investigation of new cases, active surveillance of cases from MTCT, training of healthcare staff at all levels will be applied and contribute to the control of HIV/AIDS in Jamaica. A review of the outcomes of contact investigation locally would yield a better appreciation of the benefits and the limitations for the control and prevention of HIV/AIDS.

This study aimed to compare the outcomes of contact investigation from the urban area, Kingston and St Andrew (KSA) part of the collaborative initiative aimed at pMTCT HIV in two maternity hospitals (8), over ten antenatal clinics and three paediatric centres with that of the contact investigation in two rural parishes implementing the pMTCT- HIV programme as per the Ministry of Health pMTCT protocol (9).

SUBJECTS AND METHODS

For each parish involved, a list of HIV seropositive pregnant women during the period October 1, 2004 to September 30, 2005 was obtained from the appropriate registers. The Interview and Field records for each index case were reviewed in a confidential manner and the aggregate data compiled. The information garnered from these forms included

demographics, test and interview dates, number of contacts named and if locatable (had a name and reasonable address or directions), disposition code (work/completed, worked/no progress or not worked) and outcome (test results of contacts or reasons for worked/no progress or not worked). In KSA, the data were compiled by the principal investigator and the contact investigators involved clarified any queries. The contact investigators from Clarendon and Portland reviewed and compiled the data in a similar format for their respective parishes. These were tabulated and compared. It should be noted that other contact investigators and other healthcare workers such as midwives and public health nurses were consulted for any queries or gaps in the data.

RESULTS

For the specified 12-month period, 36 seropositive pregnant women ranging in ages from 15–41 years (mean 26 years) were notified and/or referred to the contact investigators in KSA. For the same period, 9 seropositive pregnant women with an age range 17–35 years (mean 24 years 10 months) and 43 seropositive pregnant women with an age range 15–39 years were notified and/or referred to the contact investigators in Portland and Clarendon respectively. A comparison of the length of time from test date to interview

date and disposition times among parishes are presented in Table 1.

Table 2 shows a detailed comparison of the outcome of contact investigation among the specified parishes. Reasons for not locating contacts included: contacts were out of parish (most common reason): KSA 24%, Portland 12% and Clarendon 27%, or lived in a volatile, violent area, had migrated to the USA/UK, had died and, in KSA, two cases did not disclose location of contacts as there was a real threat of domestic violence if the positive HIV status of the pregnant women was suspected.

DISCUSSION

The outcomes of contact investigation (proportion of contacts located and tested) in the pMTCT of HIV in the metropolitan area were less than that of the two rural parishes in Jamaica. The ratio of named contacts to index case was greater in Portland and Clarendon than in KSA. This outcome may be a reflection of the differences in the AIDS caseload and HIV prevalence in pregnant women in these parishes (10) [Table 3]. The total workload per contact investigator for each parish would help in the explanation of the differing outcomes but this information was not available for this review.

Table 1: Time to interview index case and time to complete contact investigation (disposition)

Parish	Time from test date to interview date: range of time	Mean time to interview, days	Time from interview to disposition: range of time, days	Mean time to disposition, days
KSA	0–105	27.0	0–76	19
Clarendon	5–36	9.0	5–60	15
Portland	0–45	15.7	0–50	28

KSA = Kingston and St Andrew

Table 2: Contacts located and tested in the three parishes

Parish	# cases	# contacts named (c)	# contacts locatable (%)	# contacts out of parish	# located of the locatable (%)	# contacts tested (t) (% t/c)	# of those tested and HIV positive (%)
KSA	36	72 (ratio 2:1)	n/a	17 (24)	29 (n/a)	21 (29)	10 (48)
Clarendon	43	107 (ratio 2.4:1)	68 (64)	13 (19)	48 (71)	40 (37)	14 (35)
Portland	9	22 (ratio 2.4:1)	17 (77)	2 (9)	15 (73)	12 (55)	1 (8)

n/a = not available

Table 3: Comparison of AIDS caseload and antenatal clinic HIV seroprevalence among the specified parishes and Jamaica.

Geographic location	AIDS cases per 100 000 population	HIV seroprevalence rate (%) in pregnant women
KSA	572.4	1.73
Clarendon	138.4	Not determined
Portland	198.8	Not determined
Jamaica	354.2	1.25

This outcome may also be dependent on each contact investigator's skill in interview techniques including use of the direct interview approach as presented to all during their training.

The complexities of urban life often lead to less contacts and index cases (if no same day result testing) being locatable. For example, a home address given by a client often is manifested as a large tenement yard with many homes and sparse locatable information. To compound this, most persons especially in the urban areas were not willing to offer information to outsiders. The contact investigator also has to be prudent in obtaining information because of the risk of informants labelling the client as HIV-positive especially in communities where the contact investigator is known. In addition, contact tracing is sometimes deferred or suspended because of localized violence in some inner city communities. While Clarendon is considered rural, there are increasing settlements that approximate to the urban setting with similar complexities.

Proportionately, more contacts were from out of parish in the urban setting than the rural setting and thus impede the yield of contacts. The inter parish mobility especially during pregnancy was a reality that must be considered. Contact investigators referred the out of parish contacts to their colleagues in the respective parishes but determining the yield of this was beyond the scope of this report as the mechanism for monitoring this was no longer in place. However, if the contact was known to be pregnant, greater inter parish communication and effort among contact investigators was usually extended to locate and test her even if it meant using personal expenses.

Though most pregnant women would have been interviewed before their next antenatal clinic appointment, attention was given to the time from test to interview. This ranged from zero days (for same day result testing) to more than three months and with the pMTCT-HIV, this probably meant no or little time for antiretroviral medications for the mother before delivery as some of these mothers (especially in urban areas) presented to the antenatal clinic in the second or third trimester. The initial system of notifying the contact investigator of test results in KSA was revamped to a more efficient one when this undue delay was reported at the regular pMTCT programme meetings. The rural parishes were less likely to have same day result testing but their system of notifying the contact investigator seemed more efficient than

in the urban setting. Reliable rapid tests with same day results and access to a contact investigator would decrease valuable time on the field locating index cases which could be channeled into locating contacts and thus have a greater impact on controlling the epidemic. Prompt and ongoing communication between the other pMTCT team members and the contact investigators was a key factor in the success of contact investigation. An increase in the number of clients seeking early prenatal care would also facilitate the success of pMTCT services, including contact investigation.

The time to disposition of the case was greatest in Portland and it may have contributed to the higher proportion of contacts located. This could be a reflection of the caseload per contact investigator, less index cases, so more time to spend locating contacts. The terrain and transportation within parishes could affect the time to disposition of cases; the contact investigators in Portland would spend more time travelling to locate cases and/or contacts thus lengthening the disposition time for some cases.

The extent of the HIV epidemic in each parish impacted on the pMTCT programme. If the proportion of contacts that were tested and found to be HIV-positive was greater, then there were likely to be more pregnant women who became infected and were unaware of their HIV status. The magnitude of the problem was far greater in KSA and Clarendon than Portland and more effort and resources should be put into contact investigation and other control efforts there. Also the effort in reaching more HIV-positive contacts to enrol in the HIV treatment and care programme (pMTCT plus) must be intensified and should in fact have a positive impact on the future pMTCT programme – the more persons living with HIV/AIDs that are adherent to medications and positive prevention, the less the extent of MTCT of HIV. The extent of contact investigation in the pMTCT programme will impact on the overall HIV control programme. Parishes like Portland with a relatively low HIV prevalence must seize the opportunity to employ contact investigation as an important strategy to control the spread of HIV.

This study described the important role the contact investigator played in pMTCT programme. It highlighted the importance of monitoring all aspects of the pMTCT programme such as the accessibility and availability of rapid tests, the level of communication among the team, staffing, supervision, transportation and social vulnerabilities of clients. This small sample of three out of thirteen parishes provides a limited comparison and a more detailed evaluation of the contact investigation services could reveal more useful information to enhance the monitoring of the service, the pMTCT and overall HIV control programme.

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Predictors of HIV/AIDS Confirmation and Differences by Guardian Status in HIV⁺ Adolescents in Jamaica

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ABSTRACT

Background: Approximately 25% of the cumulative AIDS cases in Jamaica involve adolescents and young adults. However, the lives of adolescents living with HIV within Jamaica and the Caribbean have been understudied.

Objectives: (1) To describe the sociodemographic characteristics of HIV⁺ Jamaican adolescents who have ever been a part of the Kingston Paediatric/Perinatal HIV Programme (KPAIDS) from September 1, 2002 to August 31, 2006 (2). To identify predictors of HIV/AIDS confirmation as well as factors associated or uniquely present in these adolescents by their guardian status.

Methods: Seventy-two HIV⁺ adolescents, ages 10–19 years, were included. Factors studied included demographics as well as time to and time between HIV and AIDS confirmation. Data were analyzed by bivariate and multivariate statistics.

Results: The mean age of the adolescents was 12.6 ± 2.8 years with slightly more males (52.8%) in the programme. There were equal proportions of adolescents living with HIV as with AIDS (43.1%). There were equal proportions who were lost to follow-up or deceased (8.3%). Twenty-two of them lived with parents, 25 with guardians and 18 in residential institutions. The primary mode of transmission was perinatal infection (68.1%), followed by sexual (20.8%), blood transfusion (2.9%) and unknown (8.3%). The mean time from HIV exposure to HIV confirmation and AIDS confirmation in mother-to-child transmission (MTCT) cases were 8.0 ± 2.9 years and 9.6 ± 3.3 years, respectively. In the multivariate analysis model, age and gender were significant in predicting time from HIV exposure to HIV confirmation.

Conclusion: The majority of HIV-positive adolescents reside with parents and guardians and this might indicate support in spite of stigma and discrimination. However, the mean time to HIV confirmation in MTCT cases is quite long and must be reduced.

Predictores de la Confirmación del VIH/SIDA y Diferencias con Respecto al Estatus de Tutoría de Adolescentes con VIH⁺

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RESUMEN

Antecedentes: Aproximadamente el 25% de los casos cumulativos de SIDA en Jamaica comprenden adolescentes y adultos jóvenes. Sin embargo, las vidas de los adolescentes que viven con VIH en Jamaica y el Caribe no ha recibido suficiente estudio.

Objetivos: (1) Describir las características socio-demográficas de los adolescentes jamaicanos VIH⁺ que hayan sido alguna vez parte del Programa Pediátrico/Prenatal de Kingston contra el SIDA (KPAIDS) desde septiembre 1 de 2002 a agosto 31 de 2006.

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(2). *Identificar los predictores de la confirmación del VIH/SIDA así como los factores asociados o presentes de forma única en estos adolescentes con respecto a su estatus de tutoría.*

Métodos: *Se incluyeron setenta y dos adolescentes VIH⁺, con edades de 10 a 19 años. Los factores estudiados comprendieron los datos demográficos así como el tiempo hasta la confirmación de VIH y el SIDA, así como el tiempo entre la confirmación de ambos. Los datos fueron analizados mediante estadísticas divariadas y multivariadas.*

Resultados: *La edad promedio de los adolescentes fue 12.6 ± 2.8 años siendo el número de varones ligeramente mayor (52.8%) en el programa. Las proporciones de adolescentes viviendo con VIH fueron iguales a las de los adolescentes viviendo con SIDA (43.1%). Hubo iguales proporciones perdidas al seguimiento o fallecidas (8.3%). Veintidós de ellos vivían con sus padres, 25 con tutores, y 18 en instituciones residenciales. El modo primario de transmisión fue la infección perinatal (68.1%), seguida por la sexual (20.8%), la transfusión de sangre (2.9%), y otros desconocidos (8.3%). Los tiempos medios desde la exposición al VIH hasta la confirmación de VIH y la confirmación del SIDA en los casos de transmisión madre a hijo (TMAH) fueron 8.0 ± 2.9 años y 9.6 ± 3.3 años, respectivamente. En el modelo de análisis multivariado, la edad y el género fueron significativos a la hora de predecir el tiempo desde la exposición al VIH hasta la confirmación del VIH.*

Conclusión: *La mayor parte de los adolescentes VIH positivos residen con sus padres y tutores y esto podría ser un índice de apoyo a pesar del estigma y la discriminación. Sin embargo, el tiempo medio hasta la confirmación del VIH en los casos de TMAH es bien largo y tiene que ser reducido.*

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INTRODUCTION

One-third of the approximately 40 million people living with HIV/AIDS are aged 15–24 years and half of those newly infected are within this age group (1–2). An estimated 1700 children become infected with HIV everyday (3). The Caribbean has the second highest regional prevalence rate in the world (1). Approximately 5% of the estimated 440 000 people living with HIV/AIDS in the region are below age 15 years (1). AIDS is the leading cause of death in the 15–44-year age group (4).

The adolescents of Jamaica are at especially high risk for HIV because the incidence among this population has doubled annually since 1995. Furthermore, approximately 25% of the cumulative AIDS cases involve adolescents and young adults (5–7). From 1982 to 2001, the cumulative AIDS case rate was 10.1 and 27.32 per 100 000 for males and females ages 10–19 years, respectively (8). This is of concern since one-third of the country's population is between ages 10 and 24 years (5). Despite these high rates, only one study to date has looked at the lives of adolescents living with HIV/AIDS in the country (8). That study involved 25 adolescents who were seen at a HIV/AIDS outpatient facility and their sociodemographic and clinical characteristics are presented.

Numerous studies have shown that understanding the factors that affect HIV⁺ adolescents can have considerable impact on how care and support programmes are organized as well as reveal ways to improve their lives. Firstly, concerns about privacy and confidentiality minimize adolescents' willingness to seek healthcare for sensitive problems and inhibit their communication with physicians (9). Secondly, HIV⁺ adolescents need support dealing with their sexual development and sexual feelings (10). This is chal-

lenging to achieve in Jamaica since a child may be of the legal age to be sexually active but not of age for HIV/AIDS status to be formally disclosed to him/her (8). Thirdly, HIV⁺ children and adolescents, especially those infected from mother-to-child transmission (MTCT), have to deal with the possible death of their parents. Coupled with the stigma attached to HIV/AIDS, this can place them at risk of discrimination, further isolating them when they need as much care and support as possible (3). One study showed that parents respond to stigma and discrimination in two ways, protective or instructive parenting. The first tries to preserve children's innocence and 'normal' childhood while the latter is used to prepare children through self-sufficiency and independence (11). Finally, one of the major factors affecting HIV⁺ adolescents is the lack of youth-sensitive, age-specific programmes where they can access care and services (9).

Using the Kingston Paediatric/Perinatal HIV Programme's (KPAIDS) database, (12) the only database in Jamaica that has extensive information on adolescents living with HIV/AIDS, the current study seeks to describe the sociodemographic characteristics of HIV-infected adolescents in Jamaica, to identify factors uniquely associated with the adolescents by guardian status and to assess what factors predict time to HIV confirmation and time to AIDS or death.

METHODS

Setting

KPAIDS began in 2002 with the mission of preventing mother-to-child transmission of HIV while improving the quality of life for women, children and families who are infected or affected by HIV/AIDS (12). It is a joint collaboration between the Ministry of Health, Jamaica, and the University of the West Indies and the University Hospital of

the West Indies. The programme identifies and treats HIV-exposed and HIV-infected children at four major children's centres – the University Hospital of the West Indies (UHWI), the Bustamante Hospital for Children, the Comprehensive Medical Centre and Spanish Town Hospital. These centres are found in the three parishes with the highest HIV rates in Jamaica: Kingston, St Andrew (KSA) and St Catherine (STC). The programme has since expanded by performing monthly outreaches in paediatric HIV/AIDS in four other parishes: St Ann, Clarendon, Manchester and St James. A database has been created to keep track of infected children and adolescents, morbidity, mortality and response to therapy. It also includes demographic and clinical variables for these adolescents.

Participants

Participants, ages 10–19 years, who have ever been a part of the KPAIDS programme from September 1, 2002 to August 31, 2006 were included in the study. Of the 76 adolescents in the KPAIDS database, 4 were subsequently found to be HIV negative and were excluded from these analyses, resulting in a final sample of 72. The majority of the adolescents were enrolled in the programme upon visiting the infectious disease clinics at the four main centres while others were already attending general paediatric clinics and were referred to the programme upon its creation.

Variable Assessment

Descriptive factors taken from the database included age, gender, mode of transmission, guardian status, parish and health status of mother. Health status of mothers refers to whether it is known that the mother is dead or alive. Guardian status refers to the legal guardian of the adolescent and has three categories – institutional, parental and guardian. Residential institutions are official homes that care for HIV⁺ children and adolescents who are wards of the state (*eg* whose parents can no longer provide for children or parents who have died).

Mode of transmission is also divided into four categories – MTCT, sexual, blood transfusion and unknown. The sexual category refers to adolescents who became infected through rape as well as through consensual intercourse. Adolescents under the age of 16 years who fall under the sexual category are statutory rape cases according to Jamaican law. Adolescents over the age of 16 years are either rape cases or consensual inter-course cases. All rape cases were reported to the authorities. Age is defined as the mean of the eligible ages that the adolescent was a part of KPAIDS. As such, an adolescent who was 13 years of age in 2002 and 17 in 2006 was re-recorded as age 15 years. Age was then made into a three-level variable for analysis with ages 10–12 years being early adolescence, 13–16 years adolescence and 17–19 years late adolescence.

Relevant dates used in the analysis included date of HIV exposure, date of HIV confirmation test and date of

AIDS diagnoses. As KPAIDS primarily cares for HIV-infected infants, the dates of HIV exposure are only known for adolescents who contracted the virus from their mother. As such, all analysis involving time from HIV exposure includes only those who are MTCT. Mother-to-child transmission or perinatal transmission of HIV/AIDS may occur during pregnancy, at birth or during breast feeding. As such, the date of HIV exposure/infection was presumed to be at the time of birth. HIV confirmation test date refers to the date when a HIV test was conducted to affirm or discover if the adolescent was infected. The analysis of time between HIV confirmation and AIDS diagnosis includes all those who have those dates.

Statistical Methods

SAS (Statistical Analysis System, Version 9.1.3) was used to conduct descriptive statistics. T-test or the variance F-test is used for continuous variables while chi-square or the Fisher's exact tests are used for categorical data. The software is also used for bivariate and multivariate as well as the survival analyses.

RESULTS

The demographic characteristics of the 72 adolescents who have ever been in KPAIDS are shown (Table 1). The mean

Table 1: Description of the sample

Characteristic	n (%)*
Age (years), mean ± SD	12.6 (2.8)
Sex	
Male	38 (52.8)
Guardian status	
Parental	22 (33.9)
Guardian	25 (38.5)
Institutional	18 (27.7)
Parish	
KSA	32 (50.0)
STC	20 (31.3)
Other	12 (18.8)
Current health status	
HIV ⁺	31 (43.1)
AIDS	31 (43.1)
Dead	6 (8.3)
Lost to follow-up	4 (5.6)
Mode of transmission	
MTCT	49 (68.1)
Sexual	15 (20.8)
Blood transfusion	2 (2.9)
Unknown	6 (8.3)
Sexual transmission	
Consensual	5 (33.3)
Rape	10 (66.7)
Health status of mother	
Alive	16 (33.3)
Dead	32 (66.7)
HIV Exp. to HIV confirm. (years), mean ± SD	8.3 ± 2.8
HIV Exp. to AIDS (years), mean ± SD	10.5 ± 1.9
HIV Confirm to AIDS (years), mean ± SD	1.8 ± 1.9

Exp = exposure; KSA = Kingston and St Andrew; STC = St Catherine

*Numbers may not sum to 72 due to missing data and percentages may not sum to 100% due to rounding.

age of the adolescents was 12.6 ± 2.8 years. There were slightly more males (52.8%) in the programme. There were equal proportions of adolescents living with HIV as with AIDS (41.7%) as well as equal proportions who were lost to follow-up and dead (8.3%). Twenty-two (33.9%) of the adolescents lived with parents, 25 (38.5%) were with guardians and 18 (27.7%) lived in residential institutions. The majority of the adolescents' mothers were dead (66.7%).

The primary mode of transmission was MTCT (68.1%), followed by sexual (20.8%), blood transfusion (2.9%) and unknown (8.3%). Of those who were infected sexually, 66.7% were raped and 33.3% were consensual. Eight of the rape cases were statutory.

majority of sexual transmission cases lived with parents. The current health status of the adolescents, gender and time to HIV, AIDS and time between HIV confirmation and AIDS did not significantly differ by guardian status.

Age and gender were significant in predicting time from HIV exposure to HIV confirmation. In comparison to the 10–12-year age group, the 13–16-year age group had a significantly longer time to HIV confirmation with a mean difference in time of 3.99 years. Males have a significantly shorter time to HIV confirmation than females, *p*-value of 0.013 (Table 3). For each unit increase in age, there was a 31% decrease in the hazard of time to AIDS confirmation or death from HIV exposure (Table 4). Death of the mother or

Table 2: Description of the sample, by guardian status*

Characteristic	Parental (n = 22)	Guardian (n = 25)	Institutional (n = 18)	P [†]
Age (years), mean \pm SD	13.2 \pm 3.0	12.1 \pm 2.3	11.3 \pm 1.3	0.046
Female, n (%)	12 (54.6)	8 (32.0)	10 (55.6)	0.194
Parish, n (%)	21 (33.3)	25 (33.3)	17 (27.0)	0.008
KSA	13 (61.9)	13 (52.9)	6 (35.3)	
STC	3 (14.3)	6 (24.0)	11 (64.7)	
Other	5 (23.8)	6 (24.0)	0 (0.0)	
Current health status, n (%)	22 (33.8)	25 (38.5)	18 (27.7)	0.193
HIV ⁺	6 (27.3)	12 (55.6)	6 (33.3)	
AIDS	13 (59.1)	6 (27.3)	11 (61.1)	
Dead	1 (4.6)	3 (12.0)	1 (5.6)	
Lost to follow-up	2 (9.1)	2 (8.0)	0 (0.0)	
Mode of transmission, n (%)	22 (33.9)	25 (38.5)	18 (27.7)	0.009
MTCT	11 (50.0)	20(80.0)	16 (88.9)	
Sexual	9 (40.9)	3 (12.0)	1 (5.6)	
Blood transfusion	2 (9.1)	0 (0.0)	0 (0.0)	
Unknown	0 (0.0)	2 (8.0)	1 (5.6)	
Health status of mother, n (%)	17 (21.3)	20 (42.6)	10 (21.3)	<0.001
Alive	13 (76.5)	2 (10.0)	0 (0.0)	
Dead	4 (23.5)	18 (90.0)	10 (100.0)	
HIV Exp to HIV confirm. (years), mean \pm SD	8.2 \pm 3.4	7.2 \pm 3.9	8.1 \pm 2.5	0.662
HIV Exp to AIDS (years), mean \pm SD	10.5 \pm 2.6	9.4 \pm 3.5	10.3 \pm 1.8	0.634
HIV Confirm to AIDS (years), mean \pm SD	1.4 \pm 1.6	1.8 \pm 2.2	2.2 \pm 2.1	0.550

EXP = exposure; KSA = Kingston and St Andrew; STC = St Catherine

* Numbers may not sum to totals due to missing data and column percentages may not sum to 100% due to rounding.

[†]p-value for analysis of variance F-test (continuous variable) or χ^2 test or Fisher's exact test (categorical variable).

The mean time from HIV exposure to HIV confirmation and AIDS confirmation in MTCT cases were 8.0 ± 2.9 years and 9.6 ± 3.3 years, respectively. The mean time from HIV confirmation to AIDS confirmation was 1.9 ± 2.0 years.

More comprehensive information about the adolescents by guardian status is displayed (Table 2). There were differences (*p* < 0.05) across guardian status by age, parish, mode of transmission and health status of mother. The mean age of adolescents living with parents was significantly older than adolescents residing with guardians and the state. Approximately the same percentage of adolescents living with guardians and in residential institutions were perinatally infected. As expected, those whose mothers were dead were living with guardians, in an institution or with others. The

Table 3: Bivariate and multivariate analyses predicting time to HIV confirmation

Characteristic	F (T) - value	Pr >F	Beta (SE)*	P
Age (years)	3.16	0.009		
10–12			Reference	–
13–16			3.99 (1.04)	< 0.001
17–19			0	–
Gender	1.59	0.177		
Female			Reference	–
Male			-2.03 (0.74)	0.009
Parish	0.50	0.608		
Guardian's status	0.01	0.988		
Health status of mother	1.17	0.251		

* Multivariate model N = 49

Table 4: Bivariate and multivariate analyses predicting time to AIDS/death

Characteristic	Hazard ratio (95% CI)	p	Hazard ratio (95% CI)*	p
Age (years)	0.68 (0.47, 0.98)	0.040	0.69 (0.48, 0.99)	0.049
Gender				
Female	Reference	–	Reference	–
Male	0.61 (0.29, 1.29)	0.198	1.02 (0.44, 2.33)	0.970
Parish				
KSA	Reference	–		
STC	0.68 (0.28, 1.66)	0.395		
Other	1.07 (0.37, 3.11)	0.906		
Guardian status				
Institutional	Reference	–	Reference	–
Parental	0.57 (0.22, 1.28)	0.155	1.13 (0.43, 2.96)	0.798
Guardian	0.88 (0.42, 2.74)	0.876	0.52 (0.20, 1.38)	0.191
Health status of mother				
Alive	Reference	–		
Dead	0.55 (0.19, 1.57)	0.259		

* Multivariate model n = 47; KSA = Kingston and St Andrew; STC = St Catherine

sexual acquisition of infection were associated with a decreased risk of progression from confirmation of HIV infection to a diagnosis of AIDS.

DISCUSSION

The majority of adolescents living with HIV/AIDS in this study reside with parents and guardians. This indicated that the parents and guardians were willing to bring their children in for medical care and may suggest support for the adolescents in spite of past reports of stigma and discrimination (4). Studies have shown that living in a supportive family environment helps to develop positive self-identity and self-esteem, provides individual attention and love and prepares adolescents for life and healthy social interaction (3).

The creation of residential facilities for children and adolescents living with HIV/AIDS has provided a safe haven where their disease can be managed properly. These facilities include caregivers, practical nurses, housekeepers and cooks (13). Without such facilities, the adolescents would have remained in hospitals or even on the streets since children and adolescents are placed in these homes because they had been abandoned or their parents were dead. For the medical care of these vulnerable institutionalized children and adolescents, the staff of KPAIDS arranged for them to attend UHWI's weekly infectious diseases clinics.

The majority of those in the institutions and KPAIDS were perinatally infected. As KPAIDS focusses on HIV-infected infants and prevention of MTCT, this result was not surprising. The mean age in the programme is rather young because the older adolescents may be receiving care at the programme and treatment sites in Jamaica that cater for the older age groups. As such, the small number of 15 for sexual transmission may not be representative of that transmission category. Five of the fifteen sexual transmission cases contracted the virus *via* consensual sexual intercourse. However, the fact that ten of the fifteen adolescents in the study were

raped and of those ten, eight were statutory is cause for concern. All the cases were officially reported to the authorities and some resulted in court trials. While it cannot be determined that infection with HIV was a result of the specific reported sexual assault, eight adolescents contracted the virus before the legal age of consent. In 2004, carnal abuse represented the highest incidence, 413, of child abuse cases reported to the police statistics, which was a 9.5% increase over 2003. Incest was the second highest, with 15 more cases (a total of 42) over the previous year. The Child Development Agency passed the Child Care and Protection Act in March 2004 to help improve standards of care and services in order to achieve the holistic development of children (14). Enforcement of the law must become top priority given the fact that the child/adolescent will not only endure emotional trauma as a result of sexual attack but is at risk of living with an incurable disease.

There is a long time to HIV confirmation in these adolescents. An average of eight years indicated that many adolescents were not receiving the appropriate medications if they were exhibiting HIV-related symptoms. Moreover, this may be the cause for the short time, 1.9 years, between HIV confirmation and AIDS confirmation. The long time may be a result of several reasons. Firstly, some of the children/adolescents that entered KPAIDS were known to have HIV and received appropriate medications but the date of their previous HIV testing was not in their medical charts. As such, to have a HIV test on record, KPAIDS tested the child. Therefore, the long time might actually be shorter. Secondly, a programme such as KPAIDS did not exist until 2002. Therefore, persons had no programme to assist them especially those living outside of the major city areas. This is coupled with the fact that ARV treatment was expensive. In 2004, the Jamaican National HIV/AIDS Programme won a grant from the Global Fund to scale-up public access to antiretroviral drug therapy (12). Studies are needed to assess

how effective is the scale-up in incorporating the well-being of adolescents living with HIV. Thirdly, some parents were in denial, not believing that they had HIV and hence, their child could not have it. Moreover, parents died without family members knowing their status and thus their children were not tested. It was only when the child became sick with a HIV-indicator disease that he or she might have had a HIV test done. Fourth, stigma creates fear among parents and relatives who may prefer not to have the children tested to prevent discrimination and ostracism in case they were positive. As such, the number of actual infected children and adolescents not receiving the necessary care may be a lot more.

Hopefully with the creation of programmes such as KPAIDS, the long time to HIV confirmation among children and adolescents will be reduced as measures have been taken to diagnose and treat infants, children and adolescents who are infected with HIV. This includes chemoprophylaxis with highly active antiretroviral drugs (Combivir® and Kaletra®) for the mother and zidovudine and nevirapine for the HIV-exposed infant with follow-up HIV DNA PCR testing of the HIV-exposed infants at age six weeks and three months, exclusive formula feeds, limited immunologic monitoring and commencing ARVs. The HIV-exposed and HIV-infected children and adolescents are regularly followed in outpatient settings and their hospitalizations are closely monitored by a core group of several dedicated paediatricians and nurse managers (12). Though KPAIDS is treating the children and adolescents medically, more studies are needed to analyze the everyday living situation of this group. Moreover, studies on how the Jamaican health system is identifying and managing the care of adolescents living with HIV, especially given a new funding source, are also needed.

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Evaluation of Adherence to Highly Active Antiretroviral Therapy in Adults in Jamaica

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ABSTRACT

Background and Purpose: Highly active antiretroviral therapy (HAART) has improved morbidity and mortality and quality of life, revitalized communities and transformed the perception of HIV/AIDS from being a “death sentence” to a chronic illness. Strict and sustained adherence to medication is essential long-term viral suppression. In April 2005, an Adherence Support Programme was introduced to Jamaica’s HIV Programme, whereby Persons Living with HIV/AIDS (PLWHA) who had achieved high levels of adherence were trained to provide support to other PLWHA in order to increase their adherence to HAART regimens.

Methods: A cross-sectional survey of 116 individuals with advanced HIV and on HAART was performed in June and July 2006.

Results: Many participants were unemployed, poor persons with limited education. Based on self-report of seven-day adherence, 54.8% of persons were 95–100% adherent, 37.5% were 80–94% adherent and 7.7% were < 80% adherent. Having interacted with an adherence counsellor was not associated with adherence levels. Factors associated with nonadherence were: being away from home (38%), sleeping through dose-time (37%), forgetfulness (37%) and running out of pills (31%). Having no food (26.9%), not wanting to be seen taking medication (20%) and intolerable side effects (18.8%) were also reasons given. Only 44% of persons used aids to remind them of dose times.

Conclusion: Adherence in this study group is low and may have worsened since 2005. More emphasis must be placed on preparing adults to start HAART. The use of pillboxes and other reminders such as alarm clocks and cell phones must be reinforced.

Evaluación de la Adhesión a la Terapia Antiretroviral Altamente Activa en Adultos en Jamaica

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RESUMEN

Antecedentes y Propósito: La terapia antiretroviral altamente activa (TARAA) ha producido un marcado mejoramiento en relación con la morbilidad y la mortalidad así como la calidad de la vida. Asimismo, ha revitalizado las comunidades y transformado la percepción del VIH/SIDA, de una “sentencia de muerte” a una enfermedad crónica. La adhesión estricta y sostenida a la medicación es esencial para una supresión viral a largo plazo. En abril de 2005, se introdujo un Programa de Apoyo a la Adhesión como parte del Programa de VIH de Jamaica, mediante el cual personas que viven con VIH/SIDA (PVCVS) y que han alcanzado altos niveles de adhesión, fueron entrenadas con el fin de ayudar a otras PVCVS a aumentar su adhesión a los regímenes de TARAA.

Métodos: En junio y julio de 2006 se llevó a cabo un estudio transversal de 116 individuos con VIH avanzado y bajo TARAA.

Resultados: Muchos participantes eran personas desempleadas y pobres, con un nivel de educación limitado. Según un auto-reporte de adhesión por 7 días, 54.8% de las personas mostraron una

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adhesión de 95–100%, 37.5% presentaban una adhesión de 80–94% y 7.7% tenían una adhesión de < 80%. El haber interactuado con un consejero de adhesión no guardaba relación con los niveles de adhesión. Los factores asociados con la adhesión fueron el estar fuera de casa (38%), pasar durmiendo la hora de la dosis (37%), olvido (37%), y el quedarse sin tabletas (31%). No tener alimentos (26.9%), no querer ser visto tomando medicamentos (20%) y efectos colaterales intolerables (18.8%) fueron también razones dadas. Sólo el 44% de las personas usaban ayudas para recordarles las horas de las dosis.

Conclusión: La adhesión en este grupo de estudio es baja y puede haber empeorado desde el 2005. Hay que hacer más énfasis en preparar a los adultos para que comiencen con TARA. El uso de cajas de tabletas y otros medios recordatorios tales como despertadores y celulares tiene que ser reforzado.

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BACKGROUND

Jamaica is the third largest Caribbean Island and had an estimated population of 2.6 million in 2006. It is estimated that 1.5% of the adult population is infected with the human immunodeficiency virus (HIV), with no significant change over the last decade. The epidemic is concentrated in vulnerable groups such as sex workers (9% prevalence) and men who have sex with men (20 to 30% prevalence) (1). Since the first case of HIV infection was reported in 1982, a cumulative total of 11 004 cases of the acquired immunodeficiency syndrome (AIDS) have been reported in Jamaica with > 600 AIDS deaths occurring each year. The majority (65%) of reported AIDS cases in Jamaica is in the 20 to 44-year old age group and the AIDS case rates among men exceed that among women (2).

Jamaica has developed treatment Guidelines for the use of HAART (Table 1). This was implemented at 18 treatment

Table 1: National antiretroviral treatment guidelines for adults

First line regime ¹		Second line regime ²	
Column A NRTI	Column B NNRTI	Column C NRTI	Column D Protease inhibitors
Zidovudine + Lamivudine	Nevirapine	Emtricitabine + Tenofovir	Lopinavir + Ritonavir
Emtricitabine + Lamivudine + Stavudine	Efavirenz Lamivudine	Zidovudine + Ritonavir	Indinavir +Tenofovir

1 First line regimen is a combination of drugs from column A and B

2 Second line regimen is a combination of drugs from column C and D

sites islandwide. All drug regimens are in keeping with major international standards. Since public access to HAART began in September 2004, over 3000 persons with advanced HIV have been placed on HAART resulting in a 36% decrease in mortality between 2005 and 2006 [305 AIDS deaths from January–June 2005 compared to 196 AIDS deaths from January–June 2006] (2).

Adherence to HAART

The goal of HAART is to achieve sustained suppression of viral load, maintenance and restoration of immunologic

function and an overall improvement in the patient's quality of life (1, 2). Since the advent of HAART, overall morbidity and mortality in persons infected with HIV has markedly decreased (1–4). Clinical experience has shown that strict and sustained adherence to prescribed medications is essential to long-term viral suppression (1). Intermittent exposure of the virus to antiretroviral agents results in the development of viral resistance and an increase in viral replication with a higher risk of death (1, 2). Therefore, once treatment is started, high levels of adherence, in excess of 95% (1), are required to ensure efficacy and prevent the emergence of resistance.

However, high levels of adherence are difficult to achieve and many studies report an average of 70% of the required doses being taken as prescribed (13).

A number of factors have been shown to predict patients' adherence to HAART. However, patient readiness and the availability of family support positively influence adherence. Negative perceptions such as fear of side effects and concerns about the strict adherence rules have been related to poor adherence (14). Demographic characteristics such as ethnic group and age are usually non-predictive of medication compliance.

Several methods exist by which adherence may be measured. These include patient self-report, pill counts, prescription refill monitoring, use of electronic devices, therapeutic drug monitoring and viral load/CD4 count (15–17). No one method is perfect. Self-report through doctor's office visits, questionnaires, structured interviews or diaries provide a simple and practical way of determining the self-perceived level of adherence (16). Due to the subjective nature of this method results have been inconsistent (18, 19) and tend to give higher values than other methods but may still be the best available tool (20).

This study sought to evaluate the Adherence Programme in Jamaica and assess the current rates of adherence. The objectives of the evaluation were:

- C To describe the demographic characteristics of adults taking HAART in Jamaica
- C To measure current patient-reported adherence and compare with rates measured in 2005
- C To determine the relationship between adherence levels and interaction with adherence counsellors

- C To identify the current factors associated with non-adherence
- C To determine the factors and mechanisms utilized by persons taking HAART to improve adherence levels
- C To compare adherence levels and factors associated with non-adherence in rural and urban sites and
- C To make recommendations with regards to strategies that may improve the delivery of the adherence programme in Jamaica.

SUBJECTS AND METHODS

A cross-sectional survey was conducted among patients attending five government-designated Adult Treatment Sites: CHARES, the Comprehensive Health Centre and the Kingston Public Hospital in urban Kingston and the rural St Ann's Bay and Mandeville Health centres.

Data Collection

After approval by the Ministry of Health, Jamaica, a structured questionnaire was administered to participants. The questionnaire consisted of standardized questions and was previously used in the same setting in 2005. It was pretested among PLWHA and necessary adjustments made. Questionnaires were administered by trained interviewers in face-to-face interviews. Their practice was observed prior to and intermittently during the process.

Site Selection

The five treatment sites were conveniently selected to ensure that sufficient numbers of patients would be available to be interviewed in the limited time frame. A sample size of 126 participants was chosen based on the patient attendance rates of the previous year. The numbers were proportioned among the treatment sites accordingly; 116 persons participated (92% response rate).

Participants

At each of the five sites, on any given day, patients over the age of 15 years who were registered to attend the clinic were approached and invited to participate. No data were collected from persons who refused (8% refusal rate). Data were collected in June–July, 2006.

Inclusion Criteria

All participants were HIV-infected adults and adolescents 16 years or older who had been diagnosed with advanced disease ($CD4^+$ T-cells $< 350/\mu\text{L}$) previously and started on HAART. Participation was voluntary and all patients who agreed to take part in the study were requested to sign a consent form indicating that they were giving informed consent. All patient information was kept confidential. Refusal to participate did not affect provision of service at the treatment site nor were any incentives offered for participation.

Adherence Definition

Adherence was measured using patient recall information about the number of doses missed in the previous 24 hours and over the previous seven days. For the 24-hour report, persons who did not miss any doses were defined as having good adherence while those missing one or more were reported as having poor adherence.

Based on the Jamaica's HAART regimens, all patients on first-line regimens would be taking medications twice daily; therefore, analyses were based on 14 doses per week for all patients as follows:

- No missed doses: 95–100% adherent
- 1–2 missed doses: 80–94% adherent
- 3 or more missed doses: $< 80\%$ adherent.

Statistical Methods

Data were coded and entered into an Epi-Info database and then analyzed using SPSS 10[®] software (Chicago, Illinois, USA). The Pearson Chi-squared (X^2) test was used to assess statistical significance. No multivariable model was constructed.

RESULTS

Sociodemographics

The sample consisted of 116 patients (92% of those approached) with an average of 23 per site, range 11–34. Thirty-nine per cent of the sample attended clinic in rural districts and 61% attended clinic in Kingston. The participants ranged in age from 19 to 62 years, with a median age of 36 years (Table 2).

Table 2: Sociodemographic data for participants

Age n = 116		Marital status n = 116		Educational level n = 116	
Age Group/ years	Frequency	Relationship	Frequency	Level attained	Frequency
15–24	13%	Single	39%	Primary	25%
25–34	33%	Casual	35%	Secondary	61%
>35	53%	Common law/ married	25%	Tertiary	1.9%

Fifty-two per cent of the sample was unemployed, with significantly higher rates in men than women, 64% *versus* 38% respectively ($p = 0.006$). Unemployment rates were also the same for men in rural or urban clinics. Those persons who were employed engaged in a wide variety of non-technical jobs such as hairdressing, telemarketing and catering.

Adherence

Of the 93 patients who could recall if they missed a dose in the last 24 hours, 59% reported not missing any doses with 20% each reporting one missed dose or having missed all doses. One hundred and four persons recalled the number of doses taken over the last seven days, 54.8% reported not missing a dose, 37.5% missed one or two doses and 7.7% reported missing three or more doses. There were no significant differences based on gender and educational levels.

Risk Factors for Non-adherence

Using the 24-hour recall measure, there were no significant differences in adherence levels when compared by gender, educational status or location of clinic. For the seven-day recall, there were also no differences based on gender or education.

Urban dwellers were more likely to take all their medications in the previous seven days than rural dwellers (62.0% to 44.2%, $p = 0.03$). However, 53.5% of those in the rural areas missed only 1–2 doses (80–94% adherent) with only 2.3% being < 80% adherent. Of those in the urban areas 26.2% missed 1–2 (80–94% adherent) doses and 11.5% were < 80% adherent (Fig. 1).

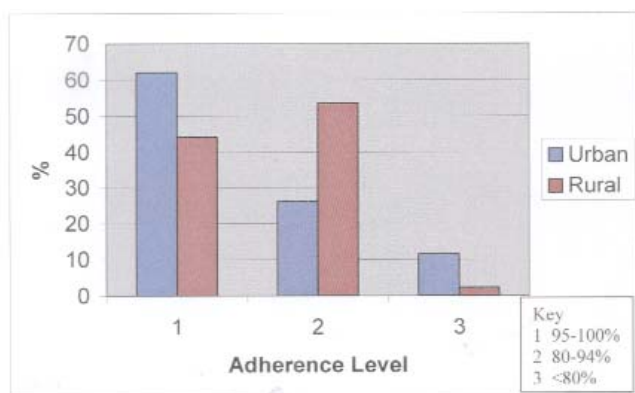


Figure: Comparative adherence by rural vs urban clinic attendees.

Adherence and Interaction with a Counsellor

Eighty-seven per cent of patients reported having some interaction with an adherence counsellor. However, despite the high rate of interaction, there was no difference in adherence levels between those who interacted with a counsellor and those who did not (58% *versus* 57.5% for adherence levels of 95–100%). Additionally, only 20% of

those individuals who interacted with an adherence counsellor reported receiving support in adherence.

Self-reported Reasons for Non-adherence

The major factors influencing adherence were being away from home, falling asleep, forgetfulness and running out of pills (Table 3). The majority of participants (56%) did not

Table 3: Reasons associated with missing ARVs

Reason	Number reporting	Percentage
n = 116		
Away from home	44	38
Fell asleep or slept through dose time	43	37
Simply forgot	43	37
Ran out of pills	36	31
Have no food to take with medication	31	27
Did not want others to notice	23	20
Intolerable side effects	22	19
Felt sick	13	11
Felt good	10	9
Felt depressed/overwhelmed	9	8

use specific aids to remind them of dose times. When mnemonic devices were used, they included assistance from the adherence counsellors, pillboxes and family members (Table 4).

Table 4: Methods utilized to support adherence

Methods utilized	Number reporting	Percentage
n = 116		
Self motivation	65	56
Adherence counsellors	23	20
Pill boxes	19	16
Family member or close friend	15	13
Other clinic staff	12	10
Reminders (eg beepers, phones)	9	8

DISCUSSION

The reported adherence levels both by 24-hour recall and seven-day recall were low, 59% and 55% respectively. The average age of participants was similar to that of the reported AIDS cases in Jamaica with the highest prevalence being in the 24–35-year age group (2). The respondents were generally of a low educational level, not in a stable relationship and unemployed. The unemployment rate in the group was particularly high and not reflective of the general population rate of 9% (21).

Levels of self-reported adherence were even lower than those reported in the previous year, 68% and 60% (22). Nevertheless, the fraction of 37.5% of the population that was between 80–94% adherent would still see significant short-term benefits from the medications though they are at risk for developing antiretroviral drug resistance. The 7.7% who reported adherence levels of < 80% were at risk of developing drug resistance within a very short time frame (23). By geographic site, persons attending clinics in the urban area were more likely to be 95–100% adherent compared to

persons in rural clinics, 62% and 44% respectively. This may be attributed to higher levels of resources being available in the urban clinics. Persons in the rural areas were more likely to be 80–94% adherent with very few persons adhering below an 80% level.

Although most patients reported some interaction with the adherence counsellors, it is of concern that no significant difference was demonstrated in their adherence levels when compared to persons who had no interaction. The fact that only 20% of the sample reported that adherence counsellors provided support in adherence has significant implications for the cost effectiveness of the Adherence Programme warranting a review of the role and function of the counsellors. The methodology utilized by adherence counsellors will also need to be reviewed.

A high percentage of persons slept through their dose times or simply forgot to take their medications. Adherence counsellors, pillboxes and close family and friends all help to promote higher levels of adherence; however the majority of persons were in fact using no specific mechanism to remind them of dose times. A culture of using reminders such as beepers, alarm clocks and cellular phone reminders could enhance adherence levels.

The perception of stigma and discrimination also lead to individuals not wanting others to see them take ARVs. However, the recommendation of the Ministry of Health, Jamaica, for HAART has the vast majority of patients on a twice-daily regimen that facilitates taking the medication in the morning and twelve hours later at night outside of routine activities. Persons therefore need not take medication at work or in public if concerned about stigma and discrimination, a point that needs emphasis in the clinical setting.

This study has limitations. The reliance on self-report may be considered a maximum estimate of adherence; true adherence may be worse. We did not perform multivariable analyses to assess what predictors of non-adherence were most important and independent of other relationships. A comparison of reported adherence levels with viral loads, CD4⁺ T-cell counts and clinical progression would be beneficial in providing a more comprehensive view of adherence to HAART.

In summary, the Jamaican Ministry of Health Adherence Programme needs revision. The use of pillboxes and other reminders must be reinforced to ensure wider use among the population. More emphasis must be placed on preparing individuals to start HAART.

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Isoniazid-resistant Disseminated *Mycobacterium Tuberculosis* in a Jamaican Infant with HIV/AIDS

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ABSTRACT

A case report of isoniazid-resistant disseminated tuberculosis in a young child perinatally co-infected with human immunodeficiency virus (HIV-1) and the challenges managing this child in a resource-constrained setting.

Mycobacterium Tuberculosis Diseminada Resistente a Isoniacida en Infantes Jamaicanos con VIH/SIDA

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RESUMEN

Un reporte de caso de tuberculosis diseminada resistente a isoniacida en un niño co-infectado perinatalmente con el virus humana de la inmunodeficiencia (VIH-1) y los desafíos para tratar a este niño en un contexto con recursos restringidos.

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INTRODUCTION

Mycobacterium tuberculosis (TB) is one of the leading annual causes of mortality in children co-infected with the human immunodeficiency virus (HIV-1) worldwide (1). Individuals with HIV-1 infection are more susceptible to *M tuberculosis* since CD4⁺ T-cells play an important role in inhibiting intracellular growth of mycobacteria. Hence HIV-infected individuals co-infected with TB tend to progress more rapidly to TB disease compared to non-HIV-infected individuals (2).

Worldwide, an estimated 8.8 million new cases of TB occur annually (1) and children less than 15-years old account for 10.7% of infections (3). In Jamaica, there were 196 new cases of TB in 2005 with an incidence of 7.0/100 000 population (1). In 2004, Geoghagen *et al* reported on TB disease in Jamaican children admitted to the University Hospital of the West Indies, 46% (n = 24) of whom were co-infected with HIV-1 (4).

Diagnosis of TB in children is challenging due to the lack of standardized reliable case definitions (4, 5). Up to 50% of children may have both a negative smear for acid fast bacilli (AFB) and a negative culture despite the presence of active disease (6, 7).

Currently in Jamaica, the challenge is even greater due to limited laboratory capacity for *M tuberculosis* culture and sensitivity. Patients are treated empirically presuming that isolates are sensitive to standard first line anti-TB drugs.

Globally, TB control has been threatened by emergence of multi-drug-resistant tuberculosis (MDR-TB) defined as strains of *M tuberculosis* resistant to at least isoniazid and rifampicin. The occurrence of MDR-TB is estimated to be > 4% in the developing world (8). Isoniazid-resistant TB incidence is unknown in Jamaica.

This report documents the first case of disseminated isoniazid-resistant TB in a young child co-infected with HIV against the local background of limited laboratory capacity for isolate identification and drug susceptibility testing.

CASE REPORT

The index case is a 16-month old male child born to an 18-year old primigravida who was diagnosed with HIV infection in the second trimester. She did not receive antiretroviral

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therapy or chemoprophylaxis in the antenatal period or during labour. The mother did not disclose her HIV seropositive status to the staff in the labour ward. The infant was born at term *via* spontaneous vaginal delivery, birthweight 3.17 kgs and received single dose nevirapine at birth. Replacement feeds were provided and the infant subsequently commenced co-trimoxazole for *Pneumocystis jirovecii* (PCP) prophylaxis. The Bacille Calmette Guérin (BCG) vaccine was administered at birth.

At six months of age, he was evaluated in the outpatient department and noted to have oral candidiasis, bronchiolitis and generalized hypertonia. He was admitted to a type B hospital (*ie* there are no subspecialties available, only medicine, general surgery, obstetrics and gynaecology, and paediatrics) at eight-months old with persistent oropharyngeal candidiasis, bronchopneumonia and gastroenteritis. Re-admission occurred at nine months of age for persistent vomiting and malnutrition. At this time, he was diagnosed with severe HIV/AIDS with CDC category C disease associated with HIV encephalopathy, spastic quadriplegia and global developmental delay. Highly active antiretroviral therapy (HAART) was commenced with zidovudine, lamivudine and nevirapine. HIV-PCR screening test was not yet introduced to Jamaica.

In the two months following initiation of HAART, the infant had four admissions because of recurrent fever, respiratory distress and failure to thrive. He was treated presumptively for PCP pneumonia and acute bacterial infections. Five months after commencing HAART (13 months old), he was re-admitted with recurrent fever and persistent respiratory distress. On examination, he had failure to thrive, generalized lymphadenopathy, hepatosplenomegaly and right axillary adenitis involving the ipsilateral site of the BCG vaccination.

He was subsequently referred to the University Hospital of the West Indies for further management. The chest radiograph showed a widened mediastinum and the mantoux skin test was negative. Pulmonary TB was confirmed when acid fast bacilli were identified in gastric washings.

First-line quadruple anti-tuberculous (anti-TB) therapy was commenced with rifampicin (RIF), isoniazid (INH), ethambutol (ETH) and pyrazinamide (PZA). Recurrent painful erythematous subcutaneous nodules first presented on the lower limbs but progressed to involve upper limbs and scalp and subsequently drained serosanguinous fluid (Fig. 1). Excision biopsy of the nodules and right axillary lymph node revealed caseating granulomas on histology (Figs. 2, 3). Despite appropriate first line anti-TB therapy with direct observational therapy in hospital and antibiotic coverage for possible bacterial superinfections, he continued to have intermittent pyrexia. The plasma HIV RNA (viral load) assessed five months after HAART initiation was 13 300 copies/ml and the CD4⁺ was 44%.

Three months after initiating anti-TB therapy, the regional laboratory at the Caribbean Epidemiology Centre

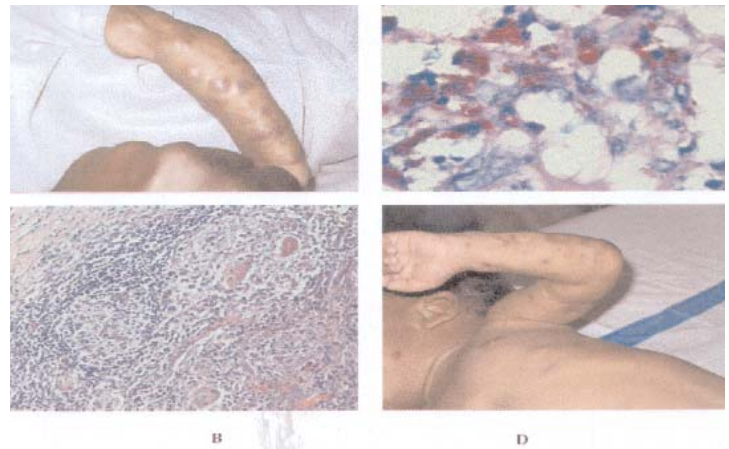


Figure: Subcutaneous nodules (tuberculosis cutis) prior to treatment seen in A; B shows tuberculous granulomas, chronic inflammatory cells (histiocytes and lymphocytes); C shows sheets of acid fast bacilli within the tuberculous granulomas; D shows the complete resolution of the subcutaneous nodules with resultant scarring after eight months on second line anti-tuberculous therapy.

(CAREC) reported isolating *M tuberculosis* from the gastric washings, subcutaneous nodules (*tuberculosis cutis*) and the axillary lymph node. The isolate was reported as resistant to isoniazid but susceptible to rifampicin, ethambutol and streptomycin. Sensitivity testing was not reported for pyrazinamide.

In consultation with the Infectious Diseases team, isoniazid was discontinued and the anti-TB regimen revised to include RIF, ETH, PZA with the addition of streptomycin (given intramuscularly) and a fluoroquinolone (ciprofloxacin). Evaluation for other target sites of dissemination (liver, lung, bone, brain, eyes and kidney) was non-contributory.

Public health officials were emergently advised to initiate surveillance for the source of drug-resistant TB infection and to identify any potential contacts.

Contact tracing including mantoux testing was conducted on family members but were reported negative. The probable adult source for this child's infection has not yet been identified. In addition, all possible in-hospital contacts were screened by mantoux testing and chest radiographs, as indicated. Six months following initiation of the revised anti-TB regime, the young child demonstrated significant weight gain, resolution of cutaneous lesions [*tuberculosis cutis*] (Fig. 4) and his repeat gastric washings were negative for acid fast bacilli and the culture showed no growth.

DISCUSSION

Tuberculosis is a leading cause of death amongst HIV-infected individuals worldwide and accounted for 250 000 deaths in 2004 in TB-HIV co-infected populations (9). The emergence of drug-resistant TB has increasingly become a global problem and a threat to TB control (10). This case highlights the challenges faced in diagnosing and managing TB in resource-constrained settings.

Limited laboratory capacity in Jamaica for diagnosis and susceptibility testing for *M tuberculosis* was a significant barrier to initiating timely specific interventions. The local TB laboratory only offers microscopy reports from direct smears only in the identification of acid fast bacilli. The TB laboratory is not equipped to identify the organism or offer drug susceptibility testing. Furthermore, regarding the clinical progression following HAART initiation, BCG vaccine-induced disease (11), *Mycobacterium bovis* co-infection, drug resistant TB, immune reconstitution syndrome (12, 13) and antiretroviral treatment failure were also considered in the differential diagnoses.

Commercial kits utilizing polymerase chain reaction for detection of *M tuberculosis* can detect the organism within two hours of testing but these are unavailable in Jamaica. And the recently available interferon-alpha release assays for diagnosis of TB in adults have not yet been validated for use in infants, children and adolescents or immunocompromised individuals (2).

The treatment of drug resistant TB in children is challenging. The second-line drugs are expensive, have an increased toxicity profile and some (*eg* streptomycin) require parenteral administration. Long-term use of aminoglycosides is associated with nephrotoxicity and ototoxicity (14). Fluoroquinolones are relatively contraindicated in the paediatric age group because of the risk for cartilage abnormalities observed in human testing (15). Although Burkhardt *et al* reviewed 7000 children between ages 5–24 years who received fluoroquinolones and observed no association between quinolone usage and arthropathy (16). Second-line anti-TB therapy also requires prolonged hospitalization, separation from parents, loss of school time and resultant psychosocial impact of institutionalization.

Data are limited regarding the optimal duration of therapy for drug resistant TB in HIV co-infected children (17–20). A retrospective review of 39 Peruvian children < 15 years of age with multidrug resistant TB demonstrated a 93% cure rate (21). Children were treated with a combination of first and second-line therapy for 18–24 months (for a minimum of twelve consecutive months of negative cultures). Just two of the 39 children were HIV-infected.

In-hospital infection control presented a challenge in this case. Drug resistant TB especially in HIV co-infected individuals requires stringent methods to control cross infection such as confinement to a negative pressure room and other special precautions for nursing. Without appropriate isolation facilities great concern was expressed regarding exposure to healthcare personnel, other patients and visitors to the ward. This child co-infected with HIV and resistant TB had pulmonary TB with disseminated actively draining skin lesions with the potential risk of transmission to contacts in the healthcare setting. Children with HIV and TB co-infection are more likely to transmit TB in the healthcare setting (22). Greater consideration needs to be given for including rooms with air at negative pressure for nursing these

patients in future hospital design. In addition, adult community contacts of the patient should be barred from visiting the hospital until they had been screened with a Mantoux skin test and chest radiograph and active tuberculosis had been conclusively excluded. Nosocomial TB needs to be considered and actively investigated at both hospitals where this child was cared for and treated. Of greater concern is the impact of exposure in the community from which this index case was referred and the fact that the probable adult source had not been identified. This case has highlighted the tardiness of contact tracing and that paediatric TB is dependent on prompt diagnosis and treatment of the adult contact as well as appropriate chemoprophylaxis of exposed infants and children.

Directly Observed Treatment Short-course (DOTS) therapy is the current programme used in the therapeutic management of TB in Jamaica. While adherence is assured in the hospital setting, access to and monitoring of continued anti-TB therapy following discharge from hospital are hampered by affordability and availability of the drugs and limited human resource. DOTS therapy constitutes the heart of the Stop TB Strategy (23) and the key components encompass political commitment and sustained financing case detection through quality-assured bacteriology standardized supervised treatment, an effective drug supply and monitoring, evaluation and impact assessment. These criteria challenge the framework of the current programme in Jamaica and raise significant implications for the promotion of multi-drug resistant TB in the setting.

There are critical ‘gaps’ in the pathway of activities leading to effective TB control in our setting. Inadequate numbers of trained personnel for surveillance, contact tracing, laboratory evaluation and monitoring of community-based treatment continue to hinder optimal management of probable cases of TB. Although policies are in place, effective dissemination of information and retraining of new healthcare personnel should be instituted. The deficiencies of laboratory capacity require urgent attention. Alternatively, expedient collaboration with CAREC could be explored in the interim. The Ministry of Health could consider accessing the National Health Fund to enable free access to anti-TB drugs and thus promote adherence while limiting the development of resistance.

Internationally, the World Health Organization (WHO) provides guidance on scaling-up TB control activities through the Global Plan to Stop TB 2006–2015 (23). With the aim to sustain high levels of case detection (at least 70%) and cure (85% treatment success), developing countries have the framework on which to effectively reduce the impact of TB among HIV co-infected populations. However, to achieve this will require political commitment, financial support, effective intervention, patients’ involvement, community participation and ongoing research (24) and development of improved drugs, diagnostics and vaccines.

In conclusion, the goal of managing drug-resistant TB should be focussed on primary prevention and effective treatment. In Jamaica, development of drug resistant TB can be reduced by ensuring appropriately prescribed anti-TB drug dosages, implementing an effective DOTS programme, providing free and amenable access to the drugs, implementing policies and programmes to prevent nosocomial infection and establishing effective monitoring systems. The newer rapid methods for detection of the organism and resistance patterns must be made accessible to developing countries where the burden of TB and HIV are greatest. Controlled trials on effective treatment protocols for HIV-infected children co-infected with tuberculosis are also needed.

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Bacille Calmette-Guérin Lymphadenitis and Immune Reconstitution Syndrome in HIV-infected Children on Antiretroviral Therapy in Jamaica

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ABSTRACT

The immune reconstitution inflammatory syndrome (IRIS) is a recognized complication associated with opportunistic infections occurring in HIV-infected individuals after the initiation of highly active antiretroviral therapy (HAART). We report on three HIV-infected infants with rapid progressor HIV disease who present with IRIS due to the BCG vaccine and occurring 3–6 weeks after initiation of HAART.

Linfadenitis por Calmette-Guérin y Síndrome de Reconstitución Inmune en Niños Infectados con el VIH Bajo Terapia Antiretroviral en Jamaica

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RESUMEN

El síndrome inflamatorio de la reconstitución inmune (SIRI) es una complicación reconocida asociada con infecciones oportunistas que ocurren en individuos infectados por el VIH, luego de su iniciación en la terapia antiretroviral altamente activa (TARAA). Se reporta el caso de tres infantes infectados por VIH con enfermedad VIH de progresión rápida, que se presentan con SIRI debido a la vacuna BCG, 3-6 semanas después de la iniciación de TARAA.

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INTRODUCTION

The Bacille Calmette-Guérin (BCG) vaccine is a live vaccine derived from a strain of *Mycobacterium bovis* that was attenuated by Calmette and Guérin at the Pasteur Institute in Lille, France (1) and was first administered to humans in 1921. Several strains of the BCG vaccine are available worldwide and differ in their characteristics when grown in culture and in their ability to induce an immune response to tuberculin. Although there was a mass BCG vaccination campaign in Jamaica in the 1950s (2), this vaccine was only

included in the Expanded Programme on Immunizations in Jamaica in 1978.

Protective efficacy rates of the vaccine in young children vary from 52% to 100% for prevention of tuberculous meningitis and miliary tuberculosis (TB) and from 2% to 80% for prevention of pulmonary TB (3–7). Meta-analyses of BCG protective efficacy (8, 9) have confirmed that the vaccine efficacy for preventing serious forms of TB in children (meningitis and disseminated TB) is high (> 80%) but is significantly reduced in older children and adults.

Adverse effects are usually local reactions (ulceration or abscess formation) but infrequent and rarely serious or long-term complications may occur (10). These include ipsilateral axillary lymphadenitis, osteitis and disseminated BCG disease. Factors implicated in the pathogenesis of these reactions include the BCG dose, vaccine strain, method of vaccine administration and underlying immune deficiency. Outbreaks of BCG lymphadenitis and abscess formation have been previously described in immunocompetent children in Jamaica and St Lucia (11, 12).

There have been reports of BCG adenitis occurring in HIV-infected children since the beginning of the epidemic (13, 14). With increased access to antiretroviral therapy in less developed countries that administer BCG vaccine to neo-

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nates at birth, the phenomenon of immune reconstitution inflammatory syndrome manifesting as BCG adenitis has been described (15, 16). The immune reconstruction inflammatory syndrome is an adverse manifestation of vigorous immune recovery that develops following initiation of highly active antiretroviral therapy (HAART). This inflammatory response is directed against a variety of opportunistic pathogens causing latent or subclinical infection, including mycobacterial organisms (17–21).

We report this case series of immune reconstitution inflammatory syndrome developing within a few weeks of the initiation of HAART in three BCG-vaccinated infants with rapid-progressor HIV/AIDS disease.

CASE SERIES

Case 1: A male infant born to HIV-positive parents received BCG vaccine at six weeks of age. He presented at age five months with respiratory tract infection, oral candidiasis, generalized wasting and regression of milestones. First-line HAART was commenced at age seven months with zidovudine, lamivudine and nevirapine. Three weeks later, he developed ulceration at the site of his BCG inoculation and an enlarged right axillary lymph node (5 x 4 cm) which increased to 10 x 6 cm and became fluctuant and hyperaemic (Figs. A and B). Concomitantly, the infant showed marked improvement in his nutritional, neurological and immuno-

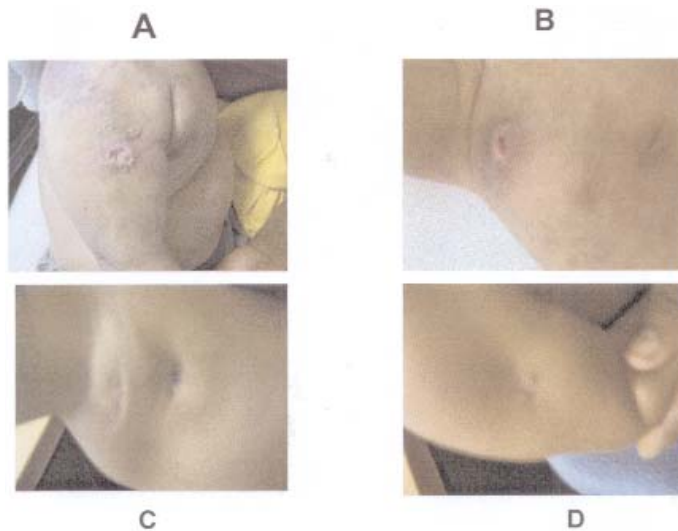
logical status (Table). Nodal aspiration revealed purulent material which stained positive for acid-fast bacilli (AFB) on Zeihl-Neelsen stain. Ongoing management comprised incision and drainage, daily dressings, oral and topical antibiotics for presumed secondary bacterial infection. The abscess and ulceration slowly resolved over a six-month period (Figs. C and D).

Case 2: A male infant whose mother was diagnosed HIV-positive during pregnancy presented at age five months with a history of not thriving, fever, oral thrush and respiratory tract infection. He had received BCG vaccine at birth. First-line HAART was commenced at seven months (zidovudine, lamivudine and nevirapine). Six weeks later, the BCG scar became ulcerated oozing purulent material and the ipsilateral axillary node was enlarged. Zeihl-Neelsen stain on the lymph node aspirate was positive for acid-fast bacilli. He was commenced on anti-tuberculous (anti-TB) therapy consisting of isoniazid, rifampicin, pyrazinamide and ethambutol. Clinical (weight), neurological and immunological improvement were observed (Table). At age 13 months, another right axillary swelling developed which revealed coagulase negative *Staphylococcus* and few acid-fast bacilli in the aspirate. He was treated with oral antibiotics and the lymphadenitis resolved after a seven-month period.

Table: Summaries of patients with BCG adenitis due to immune reconstitution inflammatory syndrome after initiation of HAART

Cases	Sex, Age at BCG vaccination	Clinical presentation	CDC category	Age at HAART initiation (months)	Weight (kg)		CD4 ⁺ (%/count) (cells/ μ L)		Interval to adenitis post-HAART (weeks)	Microbiology	Management	Outcome
					Baseline	6 months post HAART	Baseline	6 months post HAART				
1	M, 6 weeks	Wasting, respiratory tract infection, oral candidiasis, regression of milestones	C	7	6.46	10.20	40.0 / 228	40.7 / 1278	3	Acid-fast bacilli on ZN stain	Incision and drainage, oral and topical antibiotics, daily dressings	Slow resolution over 6 months
	M, At birth	Fever, oral candidiasis, respiratory tract infection, failure to thrive	C	7	4.00	6.94	16.0 / 177	43.7 / 1163	6	Acid-fast bacilli on ZN stain	Aspiration and quadruple anti-tuberculosis medication	Recurrence lymphadenitis at age 13 months resolution after 7 months
3	F, 2 days	Respiratory tract infection, wasting, generalized lymphadenopathy, oral and groin candidiasis	C	9	5.15	9.10	43.0 / 580	56.6 / 1698	4 (after regime switch)	Not done	Conservative management	Complete resolution after 4 months

NOTE. CDC – Centers for Disease Control and Prevention



Pictures of BCG scar ulceration and axillary adenitis following initiation of HAART in Case 1

- A. Ulceration at site of BCG scar (age 8 months); B. Abscess in ipsilateral axilla draining purulent material after incision; C. Healed BCG scar (age 13 months); D. Resolved lymphadenitis (age 13 months).

Case 3: A female infant born to a HIV-positive mother presented at age two months with respiratory tract infection, generalized lymphadenopathy, oral and groin candidiasis, generalized crusted scalp dermatitis and wasting. She received BCG vaccine on day 2 of life. First-line HAART was commenced at nine months (zidovudine, lamivudine and nevirapine). Two weeks later, she developed a Grade 3 adverse cutaneous reaction secondary to nevirapine which was switched to nelfinavir. At age 11 months, she developed zidovudine-induced anaemia resulting in a switch to stavudine. Four weeks later, a painful 3 x 4cm swelling developed in the right axilla. She was managed conservatively with oral antibiotics for presumed secondary infection but the adenitis resolved spontaneously after a four-month duration. She showed concomitant improvement in her clinical and immunological status (Table).

DISCUSSION

There have been few reports of immune reconstitution inflammatory syndrome (IRIS) associated with the BCG vaccine in HIV-infected children. The clinicopathological manifestations have included fever, ulceration and abscess formation at the BCG site, ipsilateral axillary lymphadenitis but no evidence of dissemination developing two to ten weeks after initiating highly active antiretroviral therapy (13–16, 22).

These cases in this report received BCG vaccine within six weeks of birth. On presentation to hospital had severe HIV disease. The development of ulceration and abscess formation at the BCG scar and axillary lymphadenitis occurred three to six weeks after initiation of HAART but was not

accompanied by fever. Although plasma HIV-RNA assays were unavailable, there was evidence of antiretroviral treatment efficacy based on the increased weight and immunological reconstitution for each infant. BCG disease was confined to the contiguous axillary lymph node and there was no evidence of dissemination. We were unable to obtain microbiological identification and susceptibility testing of the isolates due to limited laboratory capacity. But the response to management was consistent with the outcome in other reports (13–16, 22, 23).

Of note in Case 3, the BCG ulceration and axillary lymphadenopathy occurred after a second switch in antiretroviral therapy because of adverse effects. Without evidence from virologic assays, one presumes that treatment efficacy was optimally achieved with the third regime (stavudine, lamivudine and nelfinavir) resulting in immune reconstitution and onset of IRIS. We conclude that these cases represent IRIS due to the BCG vaccine in HIV-infected infants against evidence of concomitant immune reconstitution.

The definitive management of these children varied and there are no guidelines for the treatment of BCG adenitis due to IRIS. Management options in un-infected children range from conservative treatment (none), surgical drainage, administration of anti-TB drugs or a combination of drugs and surgery (10). A randomized placebo-controlled trial in immunocompetent Jamaican infants evaluated oral erythromycin and local isoniazid instillation therapy and demonstrated oral erythromycin to be more efficacious than placebo but less effective than intranodal isoniazid in the resolution of non-suppurative BCG lymphadenitis (24). Results from other controlled trials have revealed that drugs neither decreased the risk of suppuration nor shortened the duration of healing (25). For suppurative nodes, needle aspiration resulted in significantly higher and more rapid rates of healing than in the controls (26). The management of this complication remains controversial and the treatment option is likely to be dependent on the clinical state of the child and the assessment of the attending physician. The World Health Organization (WHO) suggests drainage and direct instillation of an anti-TB drug into the lesion for adherent or fistulated lymph nodes. Non-adherent lesions tend to heal spontaneously without treatment (9, 10, 23). Surgical excision, though probably curative carries risks associated with general anaesthesia and should be confined to cases of failed needle aspiration *eg* matted or multiloculated nodes or suppurative nodes with sinus formation (25, 26).

Suggestions have been made to change the policy regarding BCG vaccination because of increased risk for disseminated BCG disease among HIV-infected children (14, 22, 27) and the occurrence of IRIS. In addition, the proven efficacy of BCG vaccine in HIV-infected populations has not been evaluated.

In a recent policy review by the WHO Global Advisory Committee on Vaccine Safety on the use of BCG vaccination

for children infected with HIV (28), data from retrospective studies indicated a higher risk of disseminated BCG disease developing in children infected with HIV who were vaccinated at birth and who later developed AIDS. The reported risk associated with vaccinating HIV-infected children may outweigh the benefits of preventing severe tuberculosis, especially since the protective effect of BCG against tuberculosis in HIV-infected children has not been validated. The committee concluded that the BCG vaccine should not be used in children with symptomatic HIV infection.

WHO still currently recommends administration of a single dose of BCG vaccine to all infants living in areas where tuberculosis is highly endemic and to infants and children at particular risk of exposure to tuberculosis in low endemic countries. The BCG vaccine is contraindicated in children with symptomatic HIV infection and other immune impaired circumstances. The challenge for many resource-limited settings is limited diagnostic capacity for early identification (< 6 weeks of age) of infants infected with HIV at birth. Hence, in such settings, the BCG vaccination administration should be continued at birth to all infants regardless of HIV exposure but with very close follow-up of HIV-exposed infants until their HIV infection status has been definitively clarified.

In Jamaica, against the background of mycobacteriosis and the recent resurgence of childhood tuberculosis infection associated with the HIV epidemic (29, 30), the benefit of BCG vaccination may outweigh the possible risks. The Ministry of Health, Jamaica, endorses the current policy of the WHO to vaccinate all newborns with BCG within six weeks of life, regardless of perinatal exposure to HIV (31). Close follow-up of HIV-exposed infants is recommended and virologic testing (RNA PCR) should be done at six weeks and three months of age to clarify the infant's serological status.

In conclusion, the BCG vaccine is safe and has a high protective effect for serious tuberculous disease in young infants, although this has not been validated in HIV-infected populations. The phenomenon of IRIS can occur due to the *M bovis* strain vaccine in HIV-infected infants who initiate HAART but this must be distinguished from uncommon serious BCG disease (disseminated). The optimal management of IRIS BCG disease is unclear but the outcome is usually favourable. Healthcare practitioners should continue to administer the BCG vaccine to infants within six weeks of life regardless of perinatal exposure to HIV.

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HIV Infection, Sexual Abuse and Social Support in Jamaican Adolescents Referred to a Psychiatric Service

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ABSTRACT

Background: Children and adolescents with HIV/AIDS often have psychological/psychiatric issues that require specialist intervention. We explored whether HIV infection acquired through sexual abuse led to particularly negative psychiatric outcomes and whether good social support is a protective factor in the development of undesirable psychiatric sequelae.

Methods: This study consists of a case series of five persons referred from the Paediatric Infectious Diseases Clinic to the Child Psychiatry Clinic, both at the University Hospital of the West Indies (UHWI) in Jamaica, during July 1 to November 30, 2005. The patients were clinically assessed and diagnosed by a psychiatrist using the Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition (DSM IV) criteria. Cases were compared according to gender, age, likely route of HIV infection, level of family/social support and nature of psychiatric outcome.

Results: Adolescents who acquired HIV infection through sexual abuse reported more intense feelings of sadness and suicidal ideations. Those with good social support reported less intense feelings of sadness with no suicidal ideations and were more optimistic about their future regardless of the route of acquisition. Two of three adolescents who acquired HIV infection through sexual abuse and one of two who was perinatally infected required ongoing supportive psychotherapy to augment their social support, the characteristic most associated with favourable outcome.

Conclusion: Both sexual abuse and HIV/AIDS are likely to have negative psychological consequences in children and adolescents. This psychological impact may be intensified when HIV infection results from sexual assault as opposed to other methods of transmission. The findings support the practice of providing HIV prophylaxis to all sexual assault victims of known or suspected HIV-positive perpetrators and of encouraging utilization of existing social support networks.

La Infección por VIH, el Abuso Sexual y el Apoyo Social en Adolescentes Jamaicanos Referidos a los Servicios Psiquiátricos

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RESUMEN

Antecedentes: Tanto niños como adolescentes que sufren de VIH/SIDA, tienen a menudo problemas psicológicos/psiquiátricos que requieren intervención especializada. El presente trabajo explora si la infección por VIH adquirida por abuso sexual condujo a resultados psiquiátricos particularmente negativos y si el buen apoyo social constituye un factor de protección en el desarrollo de secuelas psiquiátricas indeseables.

Métodos: Este estudio consiste en una serie de casos de cinco personas referidos a la Clínica Infantil de Psiquiatría desde la Clínica Pediátrica de Enfermedades Infecciosas, ambas en el Hospital Universitario de West Indies (HUWI) en Jamaica, desde julio 1 hasta noviembre 30 de 2005. Los pacientes fueron evaluados clínicamente y diagnosticados por un psiquiatra usando criterios del Manual Diagnóstico y Estadístico de los Trastornos Mentales, cuarta edición (DSM IV). Los casos

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fueron comparados de acuerdo con la edad, el género, la ruta probable de la infección por VIH, el nivel de apoyo familiar/social, y la naturaleza del resultado psiquiátrico.

Resultados: *Adolescentes que adquirieron la infección del VIH por abuso sexual, reportaron sentimientos más intensos de tristeza e ideas suicidas. Aquellos con buen apoyo social reportaron sentimientos menos intensos de tristeza sin ideas suicidas y no tenían optimismo acerca de su futuro con independencia de cual fuera la ruta de su adquisición. Dos de los tres adolescentes que adquirieron la infección del VIH por abuso sexual y uno de dos que estaba infectado perinatalmente necesitaron psicoterapia de apoyo continua a fin de aumentar su apoyo social, la característica más asociada con resultados favorables.*

Conclusión: *Tanto el abuso sexual como el VIH/SIDA tienden a tener consecuencias psicológicas negativas en niños y adolescentes. Este impacto psicológico negativo puede ser intensificado cuando la infección por VIH se produce como consecuencia de un asalto sexual, en comparación con otros métodos de transmisión sexual. Los hallazgos respaldan la práctica de ofrecer profilaxis de VIH a todas las víctimas de asaltos sexuales por parte de perpetradores de los que se sabe o sospecha que son VIH positivos, así como estimular la utilización de las redes de apoyo social existentes.*

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INTRODUCTION

HIV/AIDS is a global disease which poses a significant health threat to children and adolescents. The Caribbean has the second highest HIV prevalence rates in the world and HIV/AIDS is the leading cause of death in Caribbean people between the ages of 15–49 years (1, 2). Between 1986 and 2003, 751 paediatric and adolescent cases and 326 paediatric deaths were reported in Jamaica (3). In 2003, the country's cumulative total number of AIDS cases was 8097 with 1070 of these being newly reported. Sixty-seven of those new cases were children under 10 years old (3). In recent years, the epidemiological profile of HIV infection in infants and children has been transformed from a rapidly terminal condition into a chronic life-threatening illness (4). Child and adolescent sufferers of the condition have to deal with both the issue of having a serious chronic illness and the stigma associated with the disease which, although somewhat diminished, still persists today. The psychological landscape of young people living with HIV/AIDS becomes even more complex when frequently associated social factors are taken into account. Many of these youth have also to deal with poverty, family crises and inadequate social support (5, 6).

A few studies have explored the issue of psychiatric disorders among HIV positive children and adolescents. Eighty-five per cent of an adolescent HIV clinic sample were shown to have co-morbid psychiatric diagnoses (7) and depression and behavioural problems are the most common psychiatric problems found in HIV positive adolescents admitted to psychiatric facilities in the United States of America [USA] (6). Higher rates of anxiety have also been described in HIV positive children compared with children with other chronic illnesses (8).

In this paper, we consider two factors which may have an impact on psychological distress, and more specifically depression, in young persons infected with HIV: level of social support and history of sexual abuse. The former has

received some research attention (9, 10) along with other factors such as presence and type of disclosure (11, 12), death of parents (13), immune status (14) and the presence of reminders/ cues in everyday life (15). The psychological impact of the acquisition of HIV through sexual abuse has been less researched.

CASE SERIES

The cases presented below represent all adolescent patients referred to the Child Psychiatry Clinic at the University Hospital of the West Indies (UHWI) by the UHWI Paediatric Infectious Diseases Clinic between July and November 2005. Patients were referred on the basis of the paediatricians' evaluation or suspicion of some psychiatric or psychological disturbance and do not represent all patients seen at the Infectious Diseases clinic.

Case 1: A 19-year old male was confirmed to be HIV seropositive by haematological studies at age 15 years and it was deduced that he most likely acquired the HIV virus at age 9 years when he was sexually abused (anal; penetrative) by an unknown assailant. A lumbar puncture with microscopic examination of the cerebrospinal fluid extracted from this patient at age 15 years old confirmed a diagnosis of cryptococcal meningitis and he was subsequently placed on triple antiretroviral therapy.

His first psychiatric evaluation was at age 19 years when he reported a three-week history of very sad mood for most days, loss of energy, anhedonia and strong suicidal ideations with no organized plan to kill himself. He felt that his life was unfortunate and worthless. The patient had very little family support at the time of his psychiatric evaluation because his stepfather had evicted him from the family house two years previously and he was temporarily living with his maternal grandmother who also had reservations about him living with her. The patient reported that prior to his eviction

he had no feelings of depression despite knowing his status. He was diagnosed with an adjustment disorder with depressed mood.

He was placed on fluoxetine 20 mg once daily. After one month, he showed dramatic improvement in his depressive symptoms with almost complete remission. He continues to benefit from psychiatric and counselling support.

Case 2: An 18-year old female patient was sexually abused (vaginal; penetrative) at age 15 years old by an unknown assailant and was confirmed HIV seropositive a few months after the incident. It was felt that the abuse was the most likely route of transmission for this patient. The patient's mother was informed of her daughter's status after haematological confirmation but the client was told of her status one year later at age 16 years. Since being informed of her status, the patient has had no medical complications of her illness. At the time of her psychiatric assessment, the patient was living with her mother and sister whom she described as very supportive and helpful. She had no features of depression or any other psychiatric illness. She was a well adjusted young woman who was doing well academically and socially. She had no psychiatric disorder at the time of her evaluation; however, she continues to attend the counselling service to obtain psychosocial support for her illness. She remains symptom free.

Case 3: A 17-year old female had a confirmatory HIV seropositive result by haematological studies at age 14 years. The patient said that she was living in a residential children's home since age 15 years as she was removed from the family home after repeated sexual abuse (vaginal; penetrative) by her stepfather as well as other men in the community. As a result of the repeated acts of abuse, she became pregnant and at the time of the psychiatric interview, was the mother of a one-year old infant. The patient was separated from her child shortly after she gave birth. She lamented the loss of contact with her child and her family, especially her mother.

It was inferred that the most likely route of exposure to the HIV virus for this patient occurred as a result of her prolonged exposure to repeated acts of sexual abuse. She had a past medical history of genital warts for which she received treatment but she was not placed on antiretroviral therapy for HIV/AIDS. Her other haematological reports were normal.

She presented at age 17 years to the psychiatric service for an evaluation and reported a six-week history of very sad mood for most days, strong suicidal ideations with two acts of attempted suicide by hanging in the past. She expressed dissatisfaction with her life and reported that she felt punished. She had decreased appetite with weight loss and difficulty sleeping at nights. She reported feeling irritable for most of the day and for most days during the previous four weeks. She was diagnosed with major depression.

She was placed on fluoxetine 20 mg once daily and received cognitive behaviour therapy. After one month, she

showed some improvement in her depressive symptoms. Attempts were made to reunite her with her family and child. However, due to limited family support, this was not feasible. At follow-up visits, she still had feelings of sadness especially in relation to not seeing her child often. She continues to be seen by the psychiatric service for management of her psychiatric illness.

Case 4: A 13-year old male patient was confirmed HIV seropositive at age 11 years. It was felt that he most likely had a mother to child route of transmission. As an infant, he was breast fed for the first three years of life and had a history of bronchial pneumonia during that period. His mother and younger sibling were also confirmed seropositive previously and his sibling had succumbed to the illness. The patient was informed of his status at age 12 years, approximately five months prior to his psychiatric assessment. He was referred to the Child Psychiatry Clinic by the paediatrician at the request of his mother who wanted to ensure that her son was not suffering from a psychiatric illness such as depression which she understood could be caused by the HIV infection. At the time of his assessment, the patient had been noted to have generalized lymphadenopathy. He was living with his mother and older sibling both of whom he described as very loving and supportive. He had no features of a psychiatric illness and he was performing well academically and was very optimistic about his future. He is presently visiting the psychiatric service once every three months to facilitate counselling and symptom review. He remains symptom free.

Case 5: A 15-year old male patient was confirmed HIV seropositive at age 4 years and was informed of his status by family members some time afterwards. His mother was confirmed to be HIV seropositive while in the gestational period with this patient and it was assumed that the patient most likely had a mother to child route of transmission. The patient's mother succumbed to her illness when he was 7 years old. He continued to be cared for by his paternal grandmother and did well in school experiencing no psychological problems until age 12 years when he had a cerebrovascular accident which resulted in right hemiparesis and issues of short term memory recall. This affected his school performance and it was recommended that alternative placement be sought to support his learning challenges. He described his grandmother as very supportive and loving to him.

He presented to the psychiatric service for evaluation at the age of 15 years and reported mild feelings of sadness related to his impaired mobility. He also expressed feelings of loneliness due to loss of school placement. He denied any other features of a psychiatric illness. He was diagnosed with a dysthymic disorder. He received a course of cognitive behaviour therapy and at his last visit he was reported to be free of depressive symptoms.

DISCUSSION

Although it would be difficult to make generalizations from the small number of cases presented, there is some indication that adolescents who acquire HIV infection through sexual abuse may be at greater risk for negative psychiatric outcomes and that good social support may offset this type of risk regardless of the route of acquisition (Table).

Table: Characteristics of adolescents referred to the Child Psychiatry Clinic

Case Number	Age	Gender	Likely route of HIV acquisition	Level of social support	Psychiatric outcome
1	19	Male	Sexual abuse	Poor	Adjustment disorder with depressed mood
2	18	Female	Sexual abuse	Good	No psychiatric diagnosis
3	17	Female	Sexual abuse	Poor	Major depressive disorder
4	13	Male	Mother-child	Good	No psychiatric disorder
5	15	Male	Mother-child	Good	Dysthymic disorder

In a previous study, social support was found to be negatively correlated with behaviour problems in children infected with HIV (10). However, Murphy *et al* (9) have shown that although good social support is associated with lower levels of psychological distress in HIV-infected adolescents, it does not act as a buffer against the distress which results from stressful life events such as family problems or having to take medication. Similar findings have been demonstrated in a non-clinical adolescent population (16). It would therefore appear that social support is more beneficial for long-standing crises than for acute stressful events. However, this oversimplification belies the complex interactions among risk and protective factors for psychological distress in individual patients. In the cases presented, both chronic (*eg* coping with HIV infection) and acute (*eg* eviction) stressors were described. In all cases of good social support, psychological problems were absent (cases 2 and 4) or minimal (case 5).

In some populations, as many as 53% of paediatric HIV clinic patients have reported a history of sexual abuse (7). However, this does not necessarily mean that this is a principal route of disease transmission in young persons. In a large study in Washington DC, only 26 of 9136 children with HIV or AIDS had been sexually assaulted by persons suspected or confirmed to be HIV positive (17). In Jamaica, 8% of HIV-infected adolescent clinic attendees were found to have acquired the condition through forced sexual contact (18). A slightly higher rate of 10.4% was found in a North Carolina study (19). Three out of the five cases presented had sexual assault as the most likely mode of acquisition of

HIV infection. Two out of the three were diagnosed with depressive illnesses. The third patient, who had no psychiatric problems, had good social support.

Although sexual assault is not the principal route of transmission of HIV in children and adolescents, persons who contract the infection by this route have to deal with the intense psychological impact of both the trauma of sexual assault and having a life-threatening and highly stigmatized disease. The complications of child and adolescent sexual abuse are many and varied. Victims are reportedly more likely to be depressed (20, 21), suicidal (20, 22) and to engage in substance misuse (22). Sexually abused children also often exhibit sexualized behaviour (23, 24) and show a greater prevalence of HIV risk behaviour (25).

Separately, sexual abuse and HIV infection are associated with an increased risk of psychological disturbances. Having to deal with both is therefore particularly challenging. We theorized that the psychological impact is made even more severe when the HIV infection resulted from sexual assault as opposed to other methods of transmission. HIV infection as an additional outcome of sexual assault has the potential to significantly reinforce the maladaptive cognitive perspectives associated with depression as well as significantly worsen the sense of loss associated with that condition.

Cognitive theorists posit that cognition, the process of acquiring knowledge and forming beliefs, is a primary determinant of mood and behaviour. They view negative attitudes and expectations, beliefs that one's life is largely determined by external factors (external locus of control), learned helplessness and feelings of hopelessness as central to the development of depression (26, 27). In addition to feelings of stigmatization, Finkelhor and Browne (28) identified the cognitive position of powerlessness, which is very similar to learned helplessness, as being an important mediator of many of the negative sequelae of child sexual abuse, including depression, anxiety and self-destructive behaviour. Both powerlessness and stigmatization are likely to be magnified if HIV infection is acquired *via* sexual abuse. This is because the feeling of powerlessness would arise not only from the immediate and grossly tangible invasion of the victim's body but also from the mark of a lifelong burden of HIV infection which, far beyond the control of the child or adolescent, are left behind by the abuser. Additionally, the stigmatization of HIV infection would now be added to the stigmatization of having been abused. Clearly the risk for depression is multiplied in these circumstances.

Sadness is the emotional response of the ego to distress brought on by an experience or fantasy of loss or deprivation (29). However, perceived experiences of loss do not always evoke sadness. They may also trigger rage responses. When responses of rage are turned inward on the self, they become transformed into depression (29). Applying these concepts to the sexually abused HIV seropositive youth, the act of abuse may be viewed by the youths as a loss of autonomy and a

personal violation of their body and of themselves to which the response may be internalized anger which is experienced as depression. If that young person identifies the sexual abusive act as the cause of his/her HIV status, then the loss of health becomes an added and compounding loss, thus heightening the internalized rage and worsening the symptoms of depression.

Major limitations of the present study are the use of referred subjects only, not a random sample of the HIV-positive adolescent clinic population and also the small number of subjects. Therefore, the results obtained in this project may be completely by chance, depending on whom was referred during the study period.

CONCLUSION

Sexual abuse is an important mode of transmission of HIV infection in the paediatric population. The psychological effects of HIV infection are likely to be particularly high in this group of youth. Making use of existing social support networks is valuable for minimizing mental health problems in patients with HIV acquired through sexual abuse or otherwise and should be encouraged. HIV prophylaxis as advocated by Steel-Duncan *et al* (30) should be made available to all sexual assault victims of known or suspected HIV positive perpetrators in order to avert significant physical harm and mental anguish. Supportive counselling following sexual abuse, with or without HIV infection, should also be routinely offered to ameliorate the risk of adverse psychological effects.

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Tattooing and Perinatal HIV/AIDS in Jamaica

C Billings^{1,2} and the Kingston Paediatric and Perinatal HIV/AIDS Study Group¹

BACKGROUND

“Tattooing”, now a growing trend in Jamaica, poses an unforeseen threat for transmission of blood-borne pathogens due to unethical and unsterile practices of persons in the art.

Risk of HIV infection

Tattoo is a design or marking made into or under the skin or mucosa with needles or any other instrument used to puncture the skin whereby the ink or pigments are placed into the marked area of the skin (1, 2). This may pose a health risk as the tattoo process exposes blood and body fluids which may carry blood borne pathogens. The Centers for Disease Control in the United States of America (USA) data collection has no documented cases of HIV transmission through tattooing or body piercing although Hepatitis B and C have been transmitted through some of the practices (3). However, tattooing in the USA has been a closely regulated art. The main concern about tattooing and HIV is bleeding which occurs during the tattoo process and if blood or body fluids of an infected person enters the system of a susceptible recipient they may become infected by the virus if correct sterile procedures are not adhered to. Tattooing may also increase the risk of disease transmission if the correct sterilizing method is not implemented (3–5). Tattoo instruments that were used on more than one person without being sterilized, may be a contributing factor towards the spread of blood-borne pathogens such as Hepatitis B, C and HIV (3–5).

Tattooing Practices in Jamaica

Working as a HIV Research Nurse with pregnant HIV-infected women in Jamaica, a client disclosed that the neighbourhood tattooist was murdered for spreading HIV in the community. It was further recognized that there were two

HIV-positive women who had tattoos from the same tattooist and they both lived on the same street. This disclosure of a tattooist possibly spreading HIV in a Jamaican community gave rise to serious concern especially with the increasing incidence of HIV/AIDS within the society.

This led to an informal investigation in my antenatal clinic. A HIV-positive antenatal client stated that four friends and herself received tattoos and the tattooist used the same needle on each person after wiping it with alcohol. Another stated that a hairdressing salon in her local community is being used as a tattoo parlour amid hairdressing clients. There are also known tattooists who carry out their trade through home visits. It appears that most clients' choice of a tattoo parlour was based on financial affordability rather than professionalism of the tattooist. We are also aware of two other HIV-infected married women in long term monogamous relationships with their husbands who both remained HIV-negative six months later when retested. The only risk factor for HIV infection in these women was they both reported receiving tattoos on the same day from the same tattooist in Jamaica.

One cannot ascribe the source of HIV infection to tattooing practices with absolute certainty in HIV-infected pregnant Jamaican women who are obviously sexually active. Although, the unprofessional practices and poor infection control methodologies of tattooists in the community would significantly increase the risk of this procedure transmitting blood-borne pathogens including HIV. Although there is a lack of evidence on the transmission of HIV during the tattoo process in the USA where the practice is closely regulated, there is still a high risk factor based on the potential for exposure to the blood and body fluids that occurs through the tattooing process. In Jamaica, where these practitioners are not closely regulated, it would still be challenging to ascribe HIV infection to the tattooing process in sexually active pregnant women. Notwithstanding, clients must gain an understanding of correct tattooing procedures in order to protect themselves and minimize the transmission of blood-borne pathogens. Although the greater risk of transmission is the Hepatitis B and C viruses which are more infectious than HIV and can survive longer outside the body than HIV, transmission from this route still cannot be excluded conclusively. Poor infection control practices among tattooist and body piercers (6, 7) was also a significant concern in other countries, leading to the regulation of the trade (8, 9).

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The most common motive for tattooing in modern times is body decoration. However, it is seen as a custom and is sometimes used in rituals and as a symbol in certain cultures (1, 10). Almost 50% of tattoos are done in women in some settings, many of whom are counsellors, nurses, doctors, lawyers and business managers (11). Tattooing is also linked to alcohol and drug use behaviours in youth (12). In Jamaica, tattoos have become a fashionable trend especially amongst teenagers who display minimal knowledge about the correct sterile procedures to be used in tattooing.

Regulating tattooing practices in Jamaica

Jamaican clients need to identify safe tattooists who are affordable, yet have the knowledge and understanding of the risk of exposure to blood and this knowledge is fully operationalized in their workplace (13, 14). Clients must also ensure that sterile needles are opened in their presence and new ink is always used. Sterile latex gloves should always be used and stringent hand-washing should be performed. Clients must ensure that tattooist maintain regular hygienic practices throughout the tattooing process. It is important that the client asks questions about sterile procedures and also exercises caution in the choice of tattooists.

Personal service workers in Jamaica who provide tattooing or body-piercing services should also be educated on how HIV is transmitted (3–5) and take precautions to prevent transmission of HIV and other blood-borne infections in these settings (9, 13). A risk of HIV transmission does exist if instruments contaminated with blood are not sterilized, disinfected or are used inappropriately between clients. Centers for Disease Control recommends that single-use instruments intended to penetrate the skin be used once only (3, 5). Re-usable instruments or devices that penetrate the skin and/or make contact with a client's blood should be thoroughly cleaned and sterilized between use.

The Policy

A policy that encourages training and certification should be implemented and monitored by public health specialists. Adaptation of the guidelines from the Minnesota Department of Health could be considered in regulating practitioners in the art of tattooing and body-piercing in Jamaica and may include: use of aseptic techniques, maintaining permanent individual records, use of sterile tools and equipment and a suitable physical environment (9).

A tattooist should use aseptic techniques by taking precautions to prevent the spread of infection such as use of germicidal soap to clean the hands of the tattooist and the skin area of the client to be tattooed, dry hands with single use paper towels or some sort of mechanical (air) dryer, prohibiting artists with certain communicable diseases from tattooing. Food, drink and smoking should not be allowed in the work area. Clean apparel and rubber gloves should be worn and sterile tools and equipment should be used. All clean and ready-to-use instruments and dyes should be kept

in a closed container or storage cabinet while not in use, only disposable needles should be used in the tattooing process and a new needle or set of needles should be used on each patron, autoclaving should be used for sterilization of the needle bar tube and needle bar of the tattoo machine before use on each patron. The needle bar tube of the tattooing machine should be cleaned after each use and before being sterilized for use with the next patron. All sharps, including the needles after removal from the needle bar should be stored and disposed of in containers that are rigid, puncture-resistant and leak-proof when in an upright position. Blood and body fluid precautions should be practiced by the tattoo artist when the potential for contact with body and bloody fluids exists in any procedure; the tattoo studio should be kept in a sanitary condition.

A tattooist should maintain permanent individual records of each person tattooed for a minimum of two years (name, address, phone number, date of birth and their signature, signed consent forms with parental consent forms for minors less than age 16 years old and verbal instructions for wound care).

A tattooist should use sterile tools and equipment. A tattooist should sterilize tools and equipment used on one client before using them on another client. The use of defective, dull or rusty equipment should be banned. Tools and equipment should be sterilized by: dry heating in an oven at 160 degrees Celsius for at least one hour or steam pressure treatment in an autoclave; all needles and instruments should be kept in clean, dust-tight containers when not in use.

A tattooist should have a suitable physical environment. Each tattoo establishment should have at least one tattooing room. This room should be separate and apart from all other areas in the establishment and access should be restricted. Patrons should be tattooed only in the tattooing room and each patron should have a separate work station. Furniture and furnishings within the tattooing room should be easily cleanable and maintained in good repair. At least one lavatory with mixing faucets supplied with hot and cold running water under pressure should be provided for every five artists for hand washing and utensil washing. Lavatories should be accessible to the tattooing room such that tattoo artists can wash their hands and return to the tattoo room without having to touch anything with their hands. Access to these lavatories should be restricted to the tattoo artists. Each lavatory should be cleanable, in good repair and kept free of storage. Poisons, including germicidal solutions, used in the tattoo establishment should be stored in covered containers with labels identifying the contents.

These guidelines may also be applied to other newer and more popular high-risk practices and establishments in Jamaica where transmission of blood-borne infections may also occur (9) such as, "body-piercing", "skin braiding" and "body branding", as the medical complications of these practices are far greater than for tattoos (3). Manicurists, pedicurists, hairdressers, barbers and acupuncturists (14) must be

vigilant due to the sharp instruments used in their establishments.

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Speak Up! Speak Out! Building HIV and AIDS Awareness among Jamaican School Children

D Brissett and J Griffiths-Irving

ABSTRACT

Background and Purpose: The Government of Jamaica, through the Ministry of Health and other ministries, assisted by international funding agencies and members of non-governmental organizations, has diligently led the charge to reduce the incidence of HIV and AIDS in Jamaica. Yet, the continued escalation in the infection rate attested to the need for education towards the reduction of stigma and discrimination, factors that fuel the spread of the virus. Significant efforts were made to woo corporations in Jamaica to redouble their efforts and provide resources to address the continued escalation of the AIDS epidemic in Jamaica. Scotiabank Jamaica responded with a unique educational initiative.

Methods: The Scotiabank National Primary Schools HIV and AIDS Debating Competition in 2006–2007 was conducted over a seven-month period. It was opened to primary-level, government and private institutions islandwide.

Results: A total of 91 institutions competed with each other, debating 16 moots (ie topics) in 417 debates from the first preliminary rounds through to the final. Moots reflected curricular and extracurricular concerns, emphasized the values of compassion, healthy lifestyles, critical thinking and child rights; they also sent messages of anti-discrimination, and parental and community responsibilities. Whereas communication between the organizers and the schools was sometimes challenging, schools subscribed to the activity (debates) for the awareness it brought and for the potential for developing students. Attempts were also made to raise awareness among teachers, parents and the general community.

Conclusion: Feedback at the end acclaimed the debates as a valuable strategy for building awareness as well as development of student potential and unity around a common cause.

¡Habla! ¡Di lo que Piensas!: Desarrollando la Conciencia en Torno al VIH y el SIDA Entre los Escolares de Jamaica

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RESUMEN

Antecedentes y Propósito: El Gobierno de Jamaica, a través del Ministerio de Salud y otros ministerios. Con la asistencia de agencias de fondos internacionales y miembros de organizaciones no gubernamentales, ha centrado diligentemente todos sus esfuerzos en reducir la incidencia del VIH y el SIDA en Jamaica. No obstante, la continua escalada de la tasa de infección acusa la necesidad de una educación con respecto al estigma y la discriminación – factores que atizan la diseminación del virus. Se realizaron esfuerzos significativos por recabar el apoyo de las corporaciones en Jamaica a fin de que redoblen sus esfuerzos y provean recursos para abordar la continua escalada de la epidemia del SIDA en Jamaica. El Scotiabank de Jamaica respondió con una iniciativa educacional única.

Métodos: La Competencia nacional de debates sobre el VIH y el SIDA patrocinada por Scotiabank en las escuelas primarias 2006–2007, se llevó a cabo por un período de siete meses. Estuvo abierta a instituciones de nivel primario, gubernamentales y privadas en toda la isla.

Resultados: Un total de 91 instituciones compitieron entre sí, debatiendo 16 puntos (es decir, asuntos) en 417 debates desde las primeras rondas preliminares hasta las finales. Los puntos a debatir reflejaban preocupaciones curriculares y extra-curriculares, enfatizaban los valores de la compasión, los

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estilos de vida saludables, el pensamiento crítico y los derechos de los niños. También enviaban mensajes de anti-discriminación, y de responsabilidad de la comunidad y los padres. Si bien la comunicación entre los organizadores y las escuelas, resultó por momentos un verdadero reto, las escuelas se suscribieron a la actividad (los debates) por la concientización que traía consigo y por el potencial para desarrollar a los estudiantes. Se trató también de elevar el nivel de conciencia entre los maestros, los padres y la comunidad en general.

Conclusión: *La retroalimentación al final elogiaba los debates como una estrategia valiosa para la concientización así como para el desarrollo del potencial del estudiante y la unidad en torno a una causa común.*

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BACKGROUND

Scotiabank recognized the magnitude of the impending HIV and AIDS crisis and chose to become actively engaged in the fight to contain the epidemic. In 2005, Scotiabank in Toronto called on its companies in the Caribbean to introduce activities to increase staff awareness of HIV and AIDS as a worldwide epidemic (1). Mr William Clarke, President and Chief Executive Officer, Scotiabank Jamaica, agreed to become the spokesman on HIV and AIDS in the Caribbean. Scotiabank Jamaica then initiated the first phase of a programme which saw staff raising funds to contribute to the educational programme of Jamaica AIDS Support for Life and a residential institution for children with HIV and AIDS. Phase two began in November 2006 with the inception of the Speak Up! Speak Out! National Primary Schools HIV and AIDS Debating Competition, an education programme. It complemented both the Bank's corporate objective of supporting health and education and the debate organized by the Ministry of Education and Youth for secondary level students in 2006.

In 2006, Scotiabank also became one of 19 founding members of the Jamaica Business Council on HIV and AIDS, further demonstrating its commitment to prevention, treatment and elimination of discrimination associated with AIDS in the workplace. In 2007, Scotiabank became a member of the Global Business Coalition on HIV and AIDS, Tuberculosis and Malaria.

"We must all accept the fact that the HIV and AIDS epidemic can cripple our society. We must 'Speak Up and Speak Out' about the behaviours that encourage the spread of this disease and become aware of the 'dos and don'ts' in coping with HIV and AIDS. Those who are educated about this disease must share their knowledge with those who are unaware, as our survival depends on our level of awareness and action (2007)." This was how Mr Clarke later summarized Scotiabank's ongoing commitment to promoting HIV and AIDS awareness (2).

Purpose

Whereas Scotiabank's involvement was multi-pronged, the most visible action was the 2006–2007 educational initiative. This used the National Primary Schools HIV and AIDS Debating Competition as the hub for evolving the *Speak Up! Speak Out!* Campaign for HIV and AIDS awareness among

young students, their teachers, other significant adults, members of the school and wider community.

The debate was conceptualized as a process – a journey more than an event. At the end, students would be rewarded with new poise, competences in critical analysis and oratory, and confidence in themselves and their abilities to *Speak Up!* and *Speak Out!* in their schools and communities. The vision driving the competition was an aware and empowered student community, willing to *Speak Up!* and *Speak out!* in the national effort to change negative attitudes and behaviours associated with HIV and AIDS.

The specific aims included the raising of HIV and AIDS awareness, primarily among young children; changing attitudes of students, teachers and other significant adults towards Persons Living With with AIDS (PLWAs) and promoting healthy lifestyles among at-risk groups vulnerable to HIV/AIDS.

METHODS

The initial framework articulated in a Concept Paper served as the springboard for evolving the plan (3). The guiding principles were: Competition Scope – whereas the competition was opened to all primary level institutions, irrespective of school type in the public and private sectors, it targeted 300 institutions. Collaboration – the competition was to be executed collaboratively with public and private sector agencies. Community engagement – deliberate attempts were to be made to engage the community with a view to reducing stigma and discrimination.

The execution of the competition then moved through a series of action steps. Project activities were anchored by a small secretariat led by the coordinator who reported to the Director – Public, Corporate and Government Affairs (PCGA). Three part-time regional coordinators, reporting to the debate coordinator, were also engaged to mobilize and monitor activities in the field. A monitoring committee comprising representatives of the PCGA, the Ministries of Health and Education and Youth and two primary schools was established.

Arriving at a "catch phrase", early public media announcements, and registration of schools were among the earliest activities. The development of the schools' database, critical to the procurement of resource materials and decisions on the dramatized stories, followed. The December

2006 launch of the competition marked the second implementation phase as well as significant acceleration in the pace of activities. Coaches and coordinators were expected to sensitize school communities to the awareness building project and mobilize their participation in line with the schedule supplied. The 294 schools that registered were expected to indicate progress in their preparations utilizing the Monitoring Checklist provided.

Initially, twenty moots (*ie* topics with opposing viewpoints) were approved by the Monitoring Committee. Moots were referenced to The National Policy for HIV/AIDS Management in Schools (4), The Ministry of Education and Youth Curriculum for Health and Family Life Education (HFLE) (5) and the Content Outline provided to schools. The eight key principles of the National Policy for the Management of HIV/AIDS in Schools were to be emphasized, *viz*: non-discrimination and equality, no justification for HIV screening to deny admission or disallow continued attendance, with the right of HIV positive students to attend educational institutions as long as they were able, consistent with statutory requirements, and no one is compelled to disclose his/her HIV status to the institution or employer although voluntary disclosure is encouraged, and an enabling environment should be cultivated to facilitate this disclosure.

Whereas the moots reflected the content, range and depth of the Grade 1–6 HFLE Curriculum, the project experienced the first objections from a small vocal group of schools that resisted inclusion of moots which spoke to aspects of relationships and sexuality. A consequent review eliminated the moot, *‘By the time they are twelve years old, boys should be allowed to have ‘real’ girlfriends if they choose, but girls should not be permitted to have boyfriends until after their 17th birthday’*, because teachers felt this topic was too mature for primary level students.

RESULTS

A total of 417 debates were scheduled at the in-school, cluster and preliminary rounds with 91 schools participating at the outset. Twelve schools competed in the Parish Finals. The series of debates was conducted over seven months requiring a two-month extension to the projected duration.

The debates were complemented by several significant activities targeting critical groups. Seminars were held in each educational region for parents. Similarly, workshops were convened for debate coordinators and coaches of schools which registered to participate. The positive impact of these seminars was corroborated by subsequent actions taken by parents and teachers who initiated community activities, and developed and submitted action plans. Participating schools were encouraged to promote HIV and AIDS awareness using existing school committees and groups.

As the project progressed, new ideas were incorporated to widen scope and deepen impact. Community outreach activities were undertaken to reiterate messages of prevention, nondiscrimination and de-stigmatization. Two activities

staged in rural communities attracted several hundred persons who were provided with current and relevant information. Firstly, the rural town of Black River, St Elizabeth, was galvanized by popular music in the town square, to participate in live condom demonstrations, view displays, be informed through entertainment and ascertain their HIV status. Over 300 persons were tested free of cost (5). Secondly, Scotiabank capitalized on the Annual Kite Festival in the north coast town of Seville, St. Ann, to disseminate information from booths, through storytelling and mounted displays, and to introduce debaters of the competition from the surrounding areas to an audience of thousands.

Deliberate attempts at collaboration resulted in several valuable partnerships, among them being the Macmillan Caribbean Partnership. This secured approval to dramatize two of the children’s short stories produced by Macmillan publishers and the invitation to dramatize other stories to be produced for the Caribbean. Local individuals also partnered to transcribe the two African stories into local dialect. These were dramatized by a Jamaican, the nominated International Storyteller of the Year in 2007. Musical scores for both stories, later reproduced on video, CD and DVD, were composed by an internationally known Jamaican reggae artiste. Other partnerships were activated with the Ministry of Education and Youth which provided endorsement and staff time; the Jamaica Teachers’ Association (JTA), which gave endorsement and publicity, and with NGOs such as Rise Life Management Services and Children First, which use “edutainment” to reach children and youths.

Specific achievements of the project included participation of schools from urban and rural areas, independent and government sectors and from primary, all age, preparatory, primary and junior high. Eventually, the finalists in the competition represented the preparatory and the primary and junior high school levels. The increasing poise and confidence of students became evident beginning at the parish finals. Independent opinions testify to seeing and hearing students in non-debate situations voluntarily speaking out on HIV and AIDS issues. Schools were particularly enthusiastic about the student readers, staff references and other materials provided.

Members of the NGO community expressed gratitude to Scotiabank for its lead role. Whereas incentives were announced from the outset, these were never emphasized. The careful selection and value of these was highly applauded by the audience and press when they were unveiled at the grand final, particularly the student scholarships which were not a part of the original incentive package [Figure], (7, 8).

The final debate between Hydel Preparatory and Retreat Primary and Junior High schools was a magnificent display of oratory among contenders, but represented even more. Students on both sides of the moot, *“The School is not a Suitable Setting for Students Affected by AIDS”*, demonstrated convincing maturity in their grasp of the issues. Their confidence aided by prior research and other preparations

elicited the rapt attention and vocal participation of the audience. Proposers of the moot drew attention to the systemic inadequacies – legislative, physical, human and emotional – that impede the compassionate treatment of AIDS affected students within existing schools. The opposers on the other hand galvanized their arguments around the use of existing legal frameworks, including the Child Care and Protection Act, the Convention on the Rights of the Child and the National Policy for HIV/AIDS Management in Schools, and the moral obligation of the State to protect the human rights of and give hope to affected persons while ensuring education for all. Hence, both sides appreciated the humanitarian challenges and debated the best mechanisms for their resolution.

Hydel Preparatory School from the parish of St Catherine was the winning school, second place went to Retreat Primary and Junior High School from St Mary and third place went to Santa Cruz Primary from St Elizabeth. There was also a champion chosen from each of the 14 parishes in the island. Prizes organized for the competition were plaques for each Parish Champion, trophies, certificates and book vouchers for the three schools in the finals and computers for the first and second place winners. Each of the participants from the 91 schools and their coaches received a Scotiabank-branded T-Shirt with the logo of the competition, a symbolic red ribbon representing HIV/AIDS with the words **Speak Up! Speak Out!** Furthermore, on the day of the final debate, the President and CEO of Scotiabank in Jamaica was so impressed with the performance of the students that he announced that the debate would become an annual event and also added new awards: scholarships for the top three finalists valued at J\$6 838 500 or US\$95 710. The debaters from the winning school received scholarships covering seven years at high school, estimated at J\$188 500 per student, the second place winners received scholarships valuing J\$172 000 per student per annum for five years and the third place winners received a one time scholarship of J\$100 000. The total cost to the bank for coordinating the debate and securing the prizes and scholarships was approximately US\$214 000.

There were also individual and special awards. Inverness Primary and Infant with its Protection Action Plan Programme was selected *Most Supportive Group/ Individual*, Wilmington Primary produced the *Most Outstanding Parent*; the winner of the *Debate Coordinator's Prize* came from Georges Plain Primary and Pike All Age; Retreat Primary and Junior High and Wilmington Primary schools received prizes for *Outstanding Action Plans* aimed at developing activities to continue building awareness within the school and its surrounding community after the finals.

Media publicity, particularly at the beginning and leading up to the finals attracted much attention. Unsolicited reports also suggest pockets of interest were stirred in communities as the events rolled out, independent of the publicity

at the time. Subsequent to the grand final, the debate which was recorded and shown on national television was shown on the street near the bank for the benefit of Scotiabank customers and passersby.

The project has received both national and international recognition. Internationally, it has been recognized by the International Film and Video Festival which awarded the Certificate for Creative Excellence to the project. The certificate was presented at the awards ceremony in Hollywood, California, USA. The Global Business Coalition on HIV/AIDS, Tuberculosis and Malaria, having read of the launch of the debate, offered membership to Scotiabank, recognizing the creative methods employed to build HIV and AIDS awareness.

A report of the competition was also done and presented to both the Ministry of Education and Youth and the Ministry of Health and both entities gave their support for the programme for the second year. After the grand final, the National Primary Schools HIV and AIDS Debating Competition that evolved into the *Speak Up! Speak Out!* campaign has established a platform to accelerate HIV and AIDS awareness and focus on attitude change in a more significant way.

Year two was launched on December 1, 2007, World AIDS Day, under the expanded name **Speak Up! Speak Out! National Primary Schools HIV and AIDS Education Programme**. At this function, five schools that had participated in the first debate and had submitted Action Plans to continue building awareness of HIV and AIDS in their communities were awarded grants of J\$20 000 each to carry out these activities. These were Marverly Primary and Junior High, Wilmington Primary, Retreat Primary and Junior High, Boundbrook Primary and Pike All Age. There were also testimonials from a parent and a student who had benefitted from the first debate.

A new component of the programme is the use of the performing arts to convey the message of awareness and healthy lifestyle. A partnership was forged with the Jamaica Cultural Development Commission to include in its Annual Festival of the Arts, items in the music, speech and drama categories which highlighted HIV and AIDS. Scotiabank will award prizes to the winners in each category.

DISCUSSION

Scotiabank's decision to use the debate strategy was informed by long established practices of curriculum delivery in Jamaican schools. Strategies for teaching of English Language, Social Studies and Guidance, for example, include debating to make teaching /learning more interactive. This position is also essential in presentation of HIV/AIDS education as Smith *et al* bemoans the fact that: "*In general, the prevailing teaching method at the primary level is didactic and this remains true in relation to sex education....*" (9)

Strategy

Iverson and Hoerer (10) and Zaleski (11) acclaim the efficacy of debating in the teaching of English Language to students. The former, having experimented with the strategy with migrant Hispanic students at the elementary grades in the USA, reported remarkable academic and social growth. Zaleski also reported successfully using debating in teaching English as a second language. Students in this project reportedly improved significantly in their academic performance and social competence. The debate strategy was also a key tool in the HIV/AIDS education programme piloted by the Kenyan Ministry of Education, Science and Technology in 1999 (12). Duflo *et al* also reported that teachers in selected schools were taught to organize debates around the issue of condom use by upper primary school students. Participating students were then required to demonstrate through an essay writing competition how much they had learnt about protecting themselves against HIV/AIDS infection then and in the future. The report indicates that there was high participation in the debates, essay writing and other school based activities, thus demonstrating the strategy's ability to attract and hold students' attention.

Fall-out

The fallout in the number of registrants was cause for concern. Of the 294 schools registering in November 2006, only 91 (31%) entered the debate in February 2007. Explanations may be manifold. Despite attempts to inform schools in a timely manner using telephone, facsimile, email, hand delivery, text messages and the media, schools complained repeatedly of not receiving information in a timely manner. Consequently, several became frustrated and withdrew.

Lessons learned

The culminating activities were celebratory even as the project sought to maintain its key objective of informing and building awareness. Occasions suggested a commonness of purpose among participants. Some lessons learned included: the debating strategy has great potential for catching the imagination and galvanizing the interest of teachers and students around the issues of HIV and AIDS; participation of Persons Living With HIV and AIDS (PLWHAs) is a powerful element in raising the consciousness of persons to the extent and the effect of stigma and discrimination of those affected; the residual hesitancy among some teachers to deal with



President and Chief Executive Officer of Scotiabank Jamaica and Caribbean spokesperson for Scotiabank International on AIDS awareness, William "Bill" Clarke (left) poses with winners of Scotiabank's National Primary School HIV and AIDS Debate Competition, which was held at the Chinese Benevolent Association, St Andrew, in Jamaica. Beside Mr Clarke (from right) are Natasha Patterson and Jahtonali Barrett. Grade five student Kyodi Green is in front. The students are from Hydel Primary Preparatory School. These three students along with Torian Wilson, Donique Bowie and Juellee Baker of Retreat Primary and Junior High all received scholarships for having come out on top of the competition. The St Mary School placed second.

sexual matters within the classroom is worrying but more teachers are aware of and willing to become more informed and to develop the competence to confront the sexual issues impacting students lives; the need for clear, unambiguous communication is essential in the organization and execution of the national debate; timing of extra-curricular activities such as this debate must be set, mindful of the school calendar.

Recommendations

Based upon reflections on the processes internally and of key participants, the recommendations are: the debating competition should be regarded as one component of the larger HIV and AIDS Education Programme to be executed by Scotiabank; the competition should be repeated for another four years at least; the duration of the competition should be extended over one school year to allow more time to execute the several steps; every effort should be made to devise a more reliable system of communicating with schools; presentations by PLWHAs should continue to be a feature of competition activities and the reluctance detected among teachers to deal more openly with issues of sexuality should be discussed with the Ministry of Education and Youth in an effort to overcome this reluctance.

CONCLUSION

The National Primary Schools HIV and AIDS Debating Competition in Jamaica was an exciting, fast-paced activity which contributed significantly to the development of teachers, students and parents. It led to the acquisition of knowledge on HIV and AIDS. More importantly, it developed skills which will be important to the students for life. The willingness of teachers who undertook this extra-curricular activity, of parents who gave their consent for stu-

dents to participate and who themselves participated, and of students who became involved, was commendable. Many lessons have been learnt during this first year of execution. Some momentum was lost in year two but debate organizers can only benefit from this experience and be better able to create greater impact in subsequent programme years.

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