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RESEARCH ARTICLE

Psychiatric morbidity among HIV-infected children and adolescents in a resource-poor Kenyan urban community

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The course of HIV/AIDS in children has been transformed from an acute to a chronic one with the advent of Anti-Retroviral Therapy. The aim of this study was to determine the prevalence and pattern of psychiatric morbidity in HIV-infected children and adolescents between 6 and 18 years of age and the relationship between their socio-demographic factors, immune suppression and psychiatric morbidity. The study was conducted at a paediatric HIV clinic in Nairobi, between February and April 2010. One hundred and sixty-two HIV-infected children and adolescents aged between 6 and 18 years and their guardians were interviewed. Seventy-nine (48.8%) of the study participants were found to have psychiatric morbidity. The most prevalent Diagnostic Statistical Manual, 4th Edition TR psychiatric disorders were: Major depression (17.8%), Social phobia (12.8%), Oppositional Defiant Disorder (12.1%) and Attention Deficit Hyperactivity Disorder (12.1%). Twenty-five per cent of the study participants had more than one psychiatric disorder. The prevalence of psychiatric morbidity in HIV-infected children is higher than that found in children in the general population. There is therefore a need to integrate psychiatric services into the routine care of HIV-infected children.

Keywords: HIV; AIDS; children; adolescents; DSM-IV; neuropsychiatry; Kenya

Introduction

An estimated 2.1 million children worldwide were living with Human Immunodeficiency Virus (HIV) at the end of the year 2007, and 2 million of them were in sub-Saharan Africa. Most of them acquired the infection from their HIV-infected mothers during pregnancy, birth and breast feeding (WHO, 2008). The Joint United Nations Programme on HIV/AIDS (UNAIDS) epidemiological fact sheet on HIV and AIDS 2008 estimated the number of people infected with HIV in Kenya to be 1.6–1.9 million. Children living with HIV were estimated to be between 130,000 and 180,000 (UNAIDS, 2008).

Epidemiological studies from developed countries indicate that 14–20% of children have one or more psychiatric disorders in the moderate to severe range. Although there is limited data from developing countries, it still suggests a similar picture (Szabo, 2006).

With the introduction of Highly Active Anti-Retroviral Therapy (HAART), the course of HIV infection has been converted from an acute to a chronic one, with more children surviving to ages once thought impossible. With increased life expectancy, children infected with HIV may be prone to

getting psychiatric symptoms or syndromes common to children suffering from a chronic disorder (Gortmarker, Walker, Wertzman, & Sobol, 1990).

The association of negative stressful life events such as bereavement, hospitalisation of a family member, loss of or change in housing with HIV/AIDS cannot be ignored and it can be expected that these children who are facing multiple losses and stressors will experience significant developmental disruptions and ultimately psychological distress and psychiatric disorder. Negative life events have also been shown to increase the incidence of immune suppression (Howland et al., 2000).

Mental health is of great importance in the well-being of the patient as a whole, and a sound mind influences the patient's attitude towards the treatment offered. Psychiatric co-morbidity has been shown to contribute to increased length of hospital stay in patients suffering from general medical conditions and impair adherence in patients infected with HIV leading to resistance (Saravay, Pollack, Steinberg, Weinschel, & Habert, 1996; Williams et al., 2006).

Very few studies have been done to investigate the prevalence and patterns of psychiatric disorders in children infected with HIV, especially in the African

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continent despite the increasing number of survivors. This was the main objective of the study. In addition, the study relates psychiatric morbidity to the various socio-demographic characteristics and to immune suppression.

Method

This was a cross-sectional descriptive study investigating the prevalence and pattern of psychiatric morbidity in children and adolescents infected with HIV in Kenya and the associated socio-demographic and immunity factors.

Study setting

The participants were recruited from one of the Lea Toto Comprehensive Care Clinics for paediatric HIV management in Kariobangi, Nairobi. The Lea Toto Program operates six clinics and currently provides care to over 3000 children from low socio-economic backgrounds. The program is funded mainly by the United States Agency for International Development (USAID), in partnership with the World Food Program and Concern World Wide. It also relies on well wishers, volunteers and community organisations.

Study design

A sample size of 162 was reached after calculation using the Cochran formula for descriptive studies, with the desired level of precision set at 5% and the hypothesised prevalence level from other studies set at 52%. Adjustments were then made to the Kariobangi clinic population (Israel, 2009).

The study targeted HIV-infected children aged between 6 and 18 years on follow up at the Lea Toto Program in Kariobangi. Those excluded were children and guardians who did not understand English, children whose guardians did not give consent and youths older than 11 years who did not assent to the study. All the children and adolescents included in the study were perinatally infected with HIV and were included in the study whether or not they had formally been told of their HIV status.

Data collection procedure

A researcher designed questionnaire that was directed only towards the guardian was used to collect data such as age, gender, educational background, knowledge of HIV status, age at disclosure and current immunity status (recent CD4 Count). The Mini

international Neuropsychiatric Interview for children and adolescents (MINI Kid) was used to collect data on psychiatric disorders. It is a short structured psychiatry diagnostic instrument that captures up to 27 child and adolescent psychiatry diagnosis mapped to Diagnostic Statistical Manual, 4th Edition (DSM-IV) as well as the risk of suicide, and has been previously used in the Kenyan population (Mulupi, 2006; Syengo-Mutisya, Kathuku, & Ndeti, 2008). It comes in two versions; the parent version for children aged 6–10 years and the youth self-report for those aged between 11 and 18 years (Sheehan et al., 1998; Sheehan & Janavs, 2008). Both versions were used in the study, depending on the age of the child. One hundred and twenty-three children were below 11 years while 39 youths were above 11 years. The presence of the guardian was required during the administration of the Youth self-report version of the MINI Kid to children between 11 and 13 years of age. The MINI Kid and researcher designed questionnaires were administered in English and took 15–30 minutes to administer per participant. One of the authors (Judy Wanjiru Kamau) was directly involved in administering the questionnaires. The data were collected between February and April of 2010 using the purposive sampling technique until the desired sample size was achieved. On average, four participants and their guardians were interviewed per day.

All data were obtained through interview and by examination of clinical records for the most recent CD4 levels, usually done every six months.

The data were analysed using Statistical Package for Social Scientists (SPSS) by a qualified statistician. Results were considered to be statistically significant when $p < 0.05$.

Ethical considerations

Clearance was sought from the Kenyatta National Hospital-University of Nairobi Ethics and Research Committee. The Board of Directors of the Nyumbani children's home, the body that runs the Lea Toto clinics, then granted permission to conduct the study in one of their clinics.

Informed written consent was sought from the guardians of the study participants. The study participants and their guardians were assured of anonymity and confidentiality.

All study participants found to have psychiatric morbidity were referred to the child psychiatry clinic at the Mathari Hospital, Kenya's psychiatry teaching and referral hospital.

Results

Social demographic characteristics

A total of 162 HIV-positive children whose ages ranged between 6 and 18 years were enrolled into the study. The mean age was 9.7 (SD: 2.8) years. Eighty-four (51.9%) were male, giving a female to male ratio of 1:1.1.

Fifty-five (34%) participants had been orphaned due to HIV/AIDS and only 45(27.8%) participants had both parents alive. Some children were being looked after by a guardian despite having a living parent. This is because some of the parents abandoned their children while others could not look after their children due to health reasons.

Eighty-one (50.3%) participants were in a class/grade appropriate for their age, while 80 (49.7%) were two or more classes lower than the age appropriate grade. Poor health (41%) was the main reason given for not being in an age appropriate grade, followed by poor performance (34%). Twelve (11%) of the children were in an age inappropriate class due to a variety of other reasons such as post-election violence, neglect by initial care giver, hearing-related

problems, truancy and others just started late for undisclosed reasons.

Only 49 (30.2%) study participants knew their HIV status. The median age of disclosure was 10 years.

Participants with a CD4 count below 350 cells/mm³ were considered very immune suppressed in the study. This was in keeping with the then WHO guidelines that highly recommended initiation of HAART at a CD4 count of 350 cells/mm³ and below in children over the age of 5 years and adults (WHO, 2009). Our study site was already following these guidelines. Twenty-two (13.6%) of the children enrolled into the study were immune suppressed according to their CD4 count. Ninety (55%) study participants had been started on antiretroviral drugs. Table 1 illustrates the demographic characteristics of the study participants.

Psychiatric morbidity

Seventy-nine (48.8%) of the children and adolescents in the study had at least one type of psychiatric disorder

Table 1. Socio demographic characteristics of the 162 patients in the study.

| Demographic characteristic | n (%) | Psychiatric morbidity (%) | p-value |
|----------------------------|------------|---------------------------|---------|
| Mean age (SD) | 9.7 (2.8) | | |
| Ages | | | |
| < 11 years | 123 (75.9) | 45.5 | 0.143 |
| > 11 years | 39 (24.1) | 59 | |
| Sex | | | |
| Male | 84 (51.9) | 48.8 | 0.991 |
| Female | 78 (48.1) | 48.7 | |
| Attending school | | | |
| Yes | 159 (98.1) | 47.8 | 0.114 |
| No | 3 (1.9) | 100 | |
| Age appropriate age/class | | | |
| Yes | 81 (50.3) | 45.7 | 0.479 |
| No | 80 (49.7) | 51.3 | |
| Primary guardian | | | |
| Biological parent | 98 (60.5) | 49 | >0.999 |
| Adult relative | 54 (33.3) | 48.1 | |
| Non-relative adult | 10 (6.2) | 50 | |
| Parental status | | | |
| Both parents alive | 45 (27.8) | 40 | 0.407 |
| Single mother | 53 (32.7) | 56.6 | |
| Single father | 9 (5.5) | 55.6 | |
| Orphan | 55 (34) | 47.3 | |
| HAART | | | |
| Yes | 90 (55.6) | 44.4 | 0.219 |
| No | 72 (44.4) | 54.2 | |
| Immune suppressed | | | |
| Yes | 22 (13.6) | 50 | 0.901 |
| No | 140 (86.4) | 48.6 | |

Immune suppressed: CD4 < 350 cells/mm³. Fishers exact test applied.

or suicidality and 42(25.9%) of them met the diagnostic criteria of more than one psychiatric disorder.

Anxiety disorders (panic disorder, agoraphobia, specific phobia, social phobia, obsessive compulsive disorder, post-traumatic stress disorder, acute stress disorder and generalised anxiety disorder) were the most common diagnosis 50(32.2%), followed by major depression 28(17.8%). Sixteen (18%) had suicidal risk, but none of the children and adolescents in the study admitted to any suicidal attempts or plans. Oppositional Defiant Disorder and Attention Deficit Hyperactivity Disorder (ADHD) were at an equal prevalence rate of 12.2% each, with the Inattentive type of ADHD being the most common type of the ADHD 16(84%). The prevalence and distribution of psychiatric disorders is summarised in Table 2.

Psychiatric morbidity and social demographic characteristics

Pearson Chi Square test was applied to determine association between the demographic characteristics and psychiatric morbidity as demonstrated in Table 1. There was no statistically significant association found between having a psychiatric disorder and any of the social demographic characteristics. There was however a statistically significant association between male gender and major depressive disorder ($p=0.035$), and between female gender and specific phobia ($p=0.028$) as demonstrated in Table 3.

Major depression was significantly associated with immune suppression (CD4 count < 350 cells/mm³), while knowledge of HIV status was shown to be significantly associated with social phobia in the

Table 2. Prevalence and distribution of psychiatric morbidity.

| Psychiatric morbidity | Number | Percentage |
|--|--------|------------|
| Major depression | 27 | 17.3 |
| Social phobia | 20 | 12.8 |
| Attention deficit hyperactivity disorder | 19 | 12.2 |
| Opposition defiance disorder | 19 | 12.2 |
| Suicidality | 16 | 10.3 |
| Specific phobia | 11 | 7.1 |
| Bipolar disorders | 10 | 6.4 |
| Panic disorders | 9 | 5.8 |
| Conduct disorder | 7 | 4.5 |
| Agoraphobia | 4 | 2.6 |
| Dysthymia | 4 | 2.6 |
| Separation anxiety disorder | 4 | 2.6 |
| Psychotic disorders | 3 | 1.9 |
| Post-traumatic stress disorder | 2 | 1.3 |
| Pervasive development disorder | 1 | 0.6 |

study ($p=0.04$), as demonstrated in Tables 4 and 5, respectively.

Only suicidality was found to be related with age, being significantly found in the older children aged more than 11 years ($p=0.006$).

There was no association found between psychiatric morbidity and the type of primary guardian, parental status (whether single mother, orphaned, both parents alive) or antiretroviral therapy.

Discussion

Socio-demographic profile

Fifty-five (34%) of the children in this study were orphaned due to HIV/AIDS, 25% of whom were living with their grandparents, who at this point in their lives would not be expected to be raising young children, who need special care. Although they may provide considerable support to the children, many elderly caregivers may have unmet needs including healthcare especially in this resource-poor community (Musil, 1998; Potterton, Stewart, & Cooper, 2007).

Eighty (49%) of the study participants were at least two grades lower than expected for their age. The main reason given for this was poor health (41%) due to the various opportunistic infections resulting in either starting class late or missing several valuable school days due to illness. Failure to start antiretroviral therapy early enough may be contributory to this finding, because some guardians only present their children for HAART initiation when they become physically ill. Poor performance (34%) followed in the reasons for not being in an age appropriate class. Various studies have focused on cognitive and learning difficulties in HIV-positive children. Nozyce et al. found that overall IQ scores were lower in HIV-infected children compared to the general population (Nozyce et al., 2006). Other studies done on HIV-infected children also show higher cognitive deficits in this group than in the normal population (Boivin et al., 1995; Droter et al., 1999). Since no cognitive or intelligence tests were carried out in this study, one can only speculate as to whether the poor performance in this study is due to cognitive deficits related to HIV infection.

Psychiatric morbidity

The prevalence of psychiatric morbidity in children infected with HIV in the current study was 48%. This is higher than that found in the general population according to local studies at 20% (Kangethe, 1988). This was not a surprising finding as other studies on children with chronic illnesses such as rheumatoid

Table 3. Association between gender and psychiatric morbidity.

| | Male percentage (<i>n</i> = 84) | Female percentage (<i>n</i> = 78) | <i>p</i> -value |
|--------------------------------|----------------------------------|------------------------------------|-----------------|
| Major depression | 22.6 | 10.25 | 0.035* |
| Suicidality | 11.9 | 7.6 | 0.356 |
| Bipolar disorders | 7.1 | 5.12 | 0.748 |
| Social phobia | 15.4 | 9 | 0.209 |
| Specific phobia | 2.4 | 11.5 | 0.028* |
| ADHD | 11.9 | 11.5 | 0.949 |
| Oppositional defiance disorder | 10.1 | 8.97 | 0.294 |

Note: Fishers exact test applied **p* < 0.05.

arthritis, asthma and skin problems also demonstrate a higher prevalence of psychiatric and behavioural disorders (Blackman, Gurka, Gurka, & Oliver, 2011; Fuhr & DeSilva, 2008; Gortmarker et al., 1990).

Similar studies elsewhere have also found a higher prevalence of behavioural and psychiatric disorders in children infected with HIV. Nozyce et al. found a 52% prevalence rate of behavioural problems, and so did Mellins et al. Musisi and Kinyanda similarly found that 51% of their study participants had significant psychological distress (Mellins et al., 2003; Musisi & Kinyanda, 2009; Nozyce et al., 2006).

The most common psychiatric disorders in the current study were anxiety disorders 50(32.2%) and major depression 27(17.3%). Anxiety disorders were also most prevalent in other similar studies on HIV-infected children and adolescents (Mellins, Brackis, Dolezal, & Abrams, 2006; Musisi & Kinyanda, 2009). Some studies however found a predominance of hyperactivity disorder (Havens, Whitaker, Feldman, & Ehrhardt, 1994; Nozyce et al., 2006). It was surprising to find that major depression was significantly related to male gender in this study. This is in contrast to many other studies that found depression more prevalent in females (Hankin et al., 1998; Rutter & Graham, 1976). Perhaps the males in the current study were exposed to more negative life events, more conflicts in the home setting or felt the brunt of

stigma more than their female counterparts. These factors were not investigated in the current study and can therefore only be speculated upon. It was however not surprising to find that specific phobia was significantly related to female gender in the current study because similar findings have been found in several other studies (Bourdon et al., 1988; Boyd, Rae, & Thomsom, 1990).

Low CD4 count (<350 cells/mm³) was significantly associated with major depression (*p* = 0.04) in the current study. Nozyce et al. related a CD4 count less than 650 cells/mm³ to conduct disorder, while Misdrahi et al. found that more than 80% of his study population with psychiatric complications had low CD4 counts (Misdrahi et al., 2004; Nozyce et al., 2006). Howland et al. in a follow-up study found that negative stressful life events increase the risk of children with HIV infection having impaired immune function (Howland et al., 2000). Data derived from adult studies show mental health problems as being significant barriers to adherence to antiretroviral therapy (Uldall, Palmer, Whellen, & Mellins, 2004). This could mean that negative life events together with other causal factors result in predisposition to depression, and as a result poor adherence leading to immune suppression. However, there is evidence that stress may be related to decrease in functional immune status through neuro-endocrine mechanisms and therefore

Table 4. Association between immune suppression and psychiatric morbidity.

| | Immune suppressed percentage (<i>n</i> = 22) | Not Immune suppressed percentage (<i>n</i> = 140) | <i>p</i> -value |
|--------------------------------|--|---|-----------------|
| Major depression | 31.8 | 14.2 | 0.04* |
| Suicidality | 13.6 | 9.28 | 0.462 |
| Bipolar disorders | 4.5 | 6.42 | > 0.999 |
| Social phobia | 22.7 | 10.7 | 0.111 |
| Specific phobia | 0 | 7.9 | 0.363 |
| ADHD | 4.5 | 12.9 | 0.475 |
| Oppositional defiance disorder | 18.1 | 10.7 | 0.296 |

Note: Immune suppression = CD4 < 350 cells/mm². Fishers exact test applied **p* < 0.05.

Table 5. Association between psychiatric morbidity and knowledge of HIV status.

| | Knowledge $n = 49$ (%) | No knowledge $n = 113$ (%) | p -value |
|--------------------------------|------------------------|----------------------------|--------------|
| Major depression | 11 (22.4) | 16 (14.1) | 0.193 |
| Suicidality | 8 (16.3) | 8 (7.0) | 0.073 |
| Bipolar disorders | 2 (4.1) | 8 (7.0) | 0.725 |
| Social phobia | 10 (20.4) | 10 (8.8) | 0.04* |
| Specific phobia | 5 (10.2) | 6 (5.3) | 0.255 |
| ADHD | 6 (12.2) | 13 (11.5) | 0.893 |
| Oppositional defiance disorder | 8 (16.3) | 11 (9.7) | 0.231 |

Note: Fishers exact test applied * $p < 0.05$.

depression may have a direct causal relationship with immune suppression (Bennet & Cohen, 1993).

Suicidality was noted to increase with age, given that the prevalence was lowest (4.6%) in the youngest age group and highest (25%) in the oldest age group. The mean age of disclosure in this study was 10 years, and from this age onwards, the individual is now able to understand the implications of the diagnosis of HIV/AIDS such as stigma, ill health and dying and matters pertaining to their own sexuality (Dorrell, Earle, Katz, & Reveley, 2008).

A statistically significant relationship ($p = 0.04$) was found between knowledge of HIV status and Social Phobia. This could reflect the fact that the individuals view themselves differently, due to their HIV status. The role of stigma is brought into play. Musisi and Kinyanda also had similar views in their study on HIV-infected adolescents (Musisi & Kinyanda, 2009).

Interestingly, some western comparative studies did not find a statistically significant difference in the prevalence of psychiatric disorders in HIV-infected children and controls living in similar situations, and therefore could not link the presence of psychiatric disorders in HIV-infected children to the infection itself (Gadow et al., 2010; Mellins et al., 2003). Comparative studies in the developing countries where the HIV infection is most prevalent are most certainly needed.

Limitations

This study was carried out in a resource-poor setting, and other issues such as nutrition and poverty may have contributed to the presence of psychiatric morbidity.

Conclusion

There is a higher psychiatric morbidity in HIV-infected children than in other children in the general population, with depression and anxiety disorders

being the most common. It is therefore critical to integrate psychiatric services into the routine care of HIV-infected children. Centres providing care to HIV-infected children should especially routinely screen for depression and suicide.

Caregiver needs, especially of the elderly guardian should also be addressed to facilitate even better care of the HIV-infected children.

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