SHORT REPORT

Impact of HIV-1 infection in South Africa

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Abstract

In a prospective study, 60% of admissions to an academic hospital were infected with HIV. HIV infected children were younger, less likely to have been referred, more likely to have pneumonia and candidiasis, and had more health service attendances. This impact may be alleviated by appropriate primary and secondary level health care.

(*Arch Dis Child* 2001;**85**:50–51)

Keywords: impact; children; health care services; HIV infection; South Africa

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Accepted 28 March 2001

The rapidly increasing prevalence of HIV infection among antenatal clinic attendees in South Africa[1] suggests that, in the absence of antiretroviral therapy for all seropositive pregnant women, a significant impact of paediatric HIV infection on health care services is likely. However, the extent of this impact has not been determined. Despite a change in emphasis towards cost effective primary health care, significant numbers of patients with HIV related conditions use secondary or tertiary level facilities.[2] It is important, therefore, to determine the impact of HIV disease within the health services in order to improve referral patterns and anticipate future needs.

We set out to determine the impact of HIV infection on admissions and outcome of children admitted to the paediatric wards of an academic hospital during a four week period, and describe the profile of disease during this period.

Methods

We conducted a linked, anonymous cross sectional study at King Edward VIII Hospital, Durban, South Africa. This 2000 bedded, academic hospital intended for tertiary care also admits self referred patients and administers all levels of care. Children admitted to the wards in a four week period (5 October to 1 November 1998) were eligible for inclusion. On admission, demographic and clinical details were entered onto a bar coded data sheet. A blood sample, collected at the same time as venepuncture for diagnostic tests, was also bar coded. Data were collated daily by a field worker. On verification of the data, the first page of the data sheet (which contained identifying information) was detached and destroyed.

Blood samples were tested for HIV antibodies using a single enzyme linked immunosorbent assay (ELISA) test. Polymerase chain reaction (PCR) for viral DNA was performed in children under 15 months of age with positive ELISA results. The serological results and clinical data were linked by the bar code.

Children aged 15 months or more were defined as infected with HIV if they had a single positive ELISA. Children under 15 months of age were classified as infected if they had a positive ELISA and PCR. The University of Natal's ethics committee approved the study.

Data were analysed by Epi Info and SPSS statistical software packages using χ^2 tests for categorical analyses and *t* tests for continuous variables. Prevalence ratios and relative risks were calculated for HIV infected and non-infected groups.

Results

There were 226 admissions during the study period. Of these, 66 were excluded from analysis: 13 because of no clinical data and 53 because HIV status could not be determined. Among 160 (70.1%) admissions with a defined HIV status, 100 (62.5%) were infected. Table 1 presents the characteristics of the children admitted. HIV infected children had lower mean age and were less likely to have been referred.

The most common conditions at admission were respiratory (40.6%), gastrointestinal (20.7%), and neurological conditions (8.5%), with the most common primary diagnoses being acute pneumonia (29.7%), acute gastroenteritis (12.2%), and chronic gastroenteritis (7.5%). HIV infected children were more likely

Table 1 Demographic details of children admitted to the paediatric wards of King Edward VIII Hospital

	All	*HIV infected*	*HIV uninfected*	*p value*/difference in means*
Number	213	100	60	
Age (months), geographic mean (SE)	9.77 (0.3)	8.28 (0.3)	14.22 (0.6)	1.71 (1.11 to 2.65)†
Male sex, n (%)	122 (57.5)	50 (50)	37 (62.7)	0.10
African, n (%)	210 (98.6)	99 (99)	58 (96.7)	0.29
Referred to hospital, n (%)	76 (38.6)	32 (34)	28 (51.9)	0.01
Median duration of hospitalisation (days)	7.0	8.0	7.0	0.08
Outcome, n (%)				
Discharged	124 (61.7)	50 (52.1)	39 (67.2)	0.07
Died	26 (12.9)	17 (17.7)	6 (10.3)	0.21
Transferred to another facility	50 (24.9)	28 (29.2)	13 (22.4)	0.36
Absconded	1 (0.5)	1 (1.0)		0.42

*p value from χ^2 test for difference in proportions between HIV infected and HIV uninfected children.
†Difference in means between infected and uninfected children with 95% CI in parentheses.

to have acute pneumonia (relative risk (RR) 3.0, 95% confidence interval (CI) 1.86 to 4.83) and candidiasis (RR 18.0, 95% CI 2.52 to 128.6), than uninfected children, but the frequency of other conditions was similar in both groups.

Most admissions (125/213; 58.9%) were 12 months of age or younger (infants); the major primary diagnoses at admission were either pneumonia (n = 47; 38.2%) or acute diarrhoea (n = 18; 14.6%). Among infants for whom HIV infection status could be determined, most (63/91; 69.2%) were infected. The mean duration of hospitalisation for these infants was 8.85 days with no difference between infected and uninfected infants. The case fatality rate among all infants was 15.8%. HIV infected infants had a case fatality rate almost double that of uninfected infants (20% *v* 11.5%), but this difference did not reach statistical significance.

Infected children were more likely to have had a previous admission at King Edward VIII Hospital (32/96 *v* 8/51; RR 2.69, 95% CI 1.06 to 7.03) and more likely to have had an outpatient consultation (43/96 *v* 10/51; RR 2.28, 95% CI 1.26 to 4.16). Among those with previous outpatient consultations there was no difference in the mean number of consultations per child (4.37 *v* 4.10; difference in means 0.27, 95% CI −2.47 to 3.01). Among 43 HIV infected children with prior contact with services at King Edward VIII Hospital, 27 (62.8%) were diagnosed prior to the current admission. Of these, 15 (55.5%) were receiving cotrimoxazole and 10 (37.0%) vitamin A. None of the infected children was receiving antiretroviral medication.

Discussion

The substantial impact of HIV infection on paediatric admissions in this hospital population is higher than that found in previous studies in Africa (8.2–21.6%).[3 4] This difference is most probably a result of the higher maternal seroprevalence in the South African population.

The striking decline in HIV infection with age may be a result of the pace of evolution of the epidemic, with lower rates of maternal infection earlier in the epidemic resulting in fewer older children with infection. It may also be a result of high mortality and morbidity of HIV infected children during infancy. Vitamin A supplementation[5] and cotrimoxazole[6] may alleviate some of the disease burden in this age group, but these strategies have not been fully utilised. The commonest conditions at admission (acute respiratory infections and gastroenteritis) have protocols of management which are designed for implementation at a primary care level.

The spectrum of illness and response to treatment suggests that programmes of care at primary and secondary level health care facilities may alleviate this impact. The magnitude of the impact suggests that the provision of antiretroviral drugs to reduce transmission is likely to have a large effect and may well be cost effective.

This study was funded through the South African Medical Research Council and, in part, from a contract with the Department of Health, Directorate: Health Systems Research and Epidemiology. We thank Mrs Male Dlamini and Mrs Ivy Mndingi for assistance with data collection, Mrs S Pillay (CERSA) for assistance with data entry and handling, and Dr Angie Wade (Institute of Child Health, London) for assistance with data analysis.

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