

Prevalence, clinical pattern and immediate outcomes of HIV-infected children admitted to Al Sabah Children's Hospital, South Sudan

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Introduction: HIV continues to be a major global health issue. There were approximately 2.1 million infected children aged <15 years in 2017 and most were in sub-Saharan Africa. South Sudan with its low prevention of mother to child transmission (PMTCT) coverage has a greater risk of high transmission rates of HIV from mothers to their children.

Objective: To determine the prevalence of HIV infection, the clinical pattern, and the immediate outcomes of children admitted to Al Sabah Children's Hospital.

Method: This was a cross sectional descriptive study, with a longitudinal component for the immediate outcome. A total of 828 children were recruited: 424 aged <18 months and 424 aged ≥ 18 months. HIV rapid tests were done to confirm the HIV infection for children aged ≥18 months, while HIV DNA-PCR was done to confirm the HIV infection for children aged <18 months found to be HIV exposed.

Results: Twenty four children tested HIV positive giving an overall HIV prevalence of 2.8% (95% CI 1.8 – 4.2). The clinical characteristics associated with HIV infection were: a history of cough (p=0.001), weight loss (p <0.001), oral thrush (p <0.001), lymphadenopathy (p=0.001), ear discharge (p <0.001), skin lesion (p <0.001), hepatomegaly (p <0.001), and splenomegaly (p <0.01). Factors associated with prolonged hospital stay were history of weight loss (OR=4.96, 95% CI 2.68-9.18), skin lesions (OR=3.60, 95% CI 1.36-9.56), and weight for height/length z score <-3SD (OR=8.67, 95% CI 4.70-15.99).

Conclusion: The prevalence of HIV among this hospital based population of children aged less than 15 years was 2.8%. Children who presented with cough, weight loss, oral thrush, lymphadenopathy, ear discharge, skin lesion, hepatomegaly, and splenomegaly in this setting were likely to have HIV infection and should therefore raise suspicion for testing and early diagnosis.

Key words: HIV infection, clinical characteristics, children, hospital stay, South Sudan

INTRODUCTION

According to UNAIDS, approximately 36.7 million people were living with HIV globally in 2017, of which 2.1 million were children aged under 15 years. ^[1] Most HIV-infected African children are never tested for HIV, although some symptoms such as non-specific generalized dermatitis, ear discharge, lobar pneumonia, and tuberculosis are associated with HIV. ^[2] The prevalence of HIV for hospitalized children in Africa has ranged between (10%-12.5%). ^[3, 4, 5, 6]

South Sudan has a very low 'Prevention mother to child transmission' (PMTCT) coverage. Only 29% of HIV positive pregnant women in 2016 received antiretroviral (ARVs) treatment, even though the country's circumstances favour increase in transmission rates due to low preventive programmes; displacement, increased commercial sex activities ^[7], stigma and negative attitude to HIV infection and HIV infected mothers.

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OBJECTIVE

This study aimed to determine the prevalence of HIV infection, the clinical pattern of the illnesses, and the immediate outcomes of the admitted children in Al Sabah Children's Hospital in Juba, South Sudan between January and April 2018.

METHOD

This was a cross sectional descriptive study, with a longitudinal component for the immediate outcomes. Consecutive enrolment of two cohorts of eligible children aged 0-14 years (424 aged under 18 months and 424 aged 18 months or over), admitted to Al Sabah Children's Hospital during the study period was done after obtaining informed consent from the mother/guardian.

DNA-PCR was done to confirm HIV infection in children aged <18 months and found to be HIV exposed, while HIV rapid testing was used for children aged ≥18 months. The clinical patterns and the short term outcome within seven days of close follow up were documented.

A questionnaire was used to obtain information on the socio-demographic characteristics and use of PMTCT services by their mothers. The main primary outcome was the prevalence of HIV among in-patient children. Data were entered into Epidata version 3.1, exported and analysed using Stata version 12 (Stata Corporation, Houston, Texas). For the continuous variables, mean and median were used to summarize the data, while proportions / percentages were used to describe categorical data. Ethical and administrative approvals were obtained from Makerere University, Uganda, Ministry of Health, South Sudan, and Al Sabah Children Hospital.

RESULTS

The ages of the enrolled children ranged from 0 to 14 years; 52.2% were male and 47.8% were female. Most had been delivered by spontaneous vaginal delivery (n=779; 91.9%), and most had been exclusively breast fed for 4-6 months (n=706; 83.3%). Only 15 (1.8%) children were reported to have a sibling infected with HIV, whereas 555 (65.4%) did not have a sibling who had been tested for HIV.

The median age for the mother/guardian was 25 (22-30) years; 611(72.1%) were housewives and 753 (88.8 %) were married. Table 1 gives their other characteristics.

Twenty four children tested HIV positive giving a prevalence of 2.8% (95% CI 1.8 – 4.2). The WHO clinical stages for the 24 HIV infected children revealed that four were at stage 1, six at stage 2, eleven at stage 3 and three at stage 4. Six of these children (25%) had already been diagnosed with HIV infection, of whom five were enrolled in treatment prior to this study. Table 2 gives details of these 24 children and their mothers.

Table 1. Characteristics of 848 mothers/guardians

| Characteristics | Categories (n=848) | n (%) |
|-----------------------------------|--------------------|-----------|
| Education Level | Uneducated | 339(39.9) |
| | Primary | 321(37.9) |
| | Secondary | 141(16.6) |
| | Tertiary | 44(5.2) |
| | Missing | 3(0.4) |
| ANC Visits | None | 1(0.1) |
| | 1-2 | 206(24.3) |
| | 3-4 | 641(75.6) |
| HIV Status | Positive | 22(2.6) |
| | Negative | 763(90.0) |
| | Not tested | 63(7.4) |
| Taking ARVs | Yes | 18(81.8) |
| | No | 4(18.2) |
| Duration on ARVs in months | Median | 12(5-20) |

Table 2. Characteristics of HIV infected children

| Characteristics | HIV Positive: (n=24) | % | 95%CI |
|-------------------------------|----------------------|------|----------|
| Overall | 24/848 | 2.8 | 1.8-4.2 |
| Age in months | | | |
| ≥18 | 15/424 | 3.5 | 1.9-5.8 |
| <18 | 9/424 | 2.1 | 0.9-4.0 |
| HIV status of mother | | | |
| Positive | 13/22 | 59.1 | 31.4-100 |
| Negative | 10/763 | 1.3 | 0.6-2.4 |
| Not tested | 1/63 | 1.6 | 0.04-8.8 |
| Mother taking ARVs | | | |
| Yes | 11/13 | 84.6 | 42.2-100 |
| No | 2/13 | 15.4 | 1.9-55.6 |
| Breast feeding history | | | |
| Exclusive 4-6 months | 19/706 | 2.7 | 1.6-4.2 |
| Mixed feeding | 5/140 | 3.6 | 1.2-8.3 |
| Not breast fed at all | 0/2 | 0 | 0 |

Table 3. Clinical pattern of illness in HIV infected and uninfected children and presenting symptoms

| Clinical presentation | HIV Status | | P value |
|---|-----------------|------------------|---------|
| | Positive (n=24) | Negative (n=824) | |
| History of cough | | | |
| Yes | 23(95.8) | 543(65.9) | <0.001 |
| No | 1(4.2) | 281(34.1) | |
| Duration of cough in weeks | | | |
| < 2 | 15(62.5) | 469(56.91) | |
| =/>>2 | 8(33.3) | 74(8.9) | |
| History of fever | | | |
| Yes | 20(83.3) | 744(90.3) | 0.29 |
| No | 4(16.6) | 80(9.7) | |
| Duration of fever in weeks | | | |
| <1 | 6(25) | 352(42.7) | |
| 1 | 9(37.5) | 348(42.2) | |
| 2 | 4(16.6) | 35(4.2) | |
| 2+ | 1(4.2) | 9(1) | |
| Missing | | | |
| History of diarrhoea | | | |
| Yes | 11(45.8) | 488(59.3) | 0.19 |
| No | 13(54.1) | 336(40.7) | |
| Duration of diarrhoea in weeks | | | |
| <2 | 9(37.5) | 463(56.1) | |
| =/>>2 | 2(8.3) | 25(3) | |
| History of weight loss | | | |
| Yes | 17(70.9) | 235(28.6) | <0.001 |
| No | 7(29.1) | 589(71.4) | |
| Loss of consciousness | | | |
| Yes | 0(0) | 53(6.5) | 0.39 |
| No | 24(100) | 771(93.5) | |
| History of convulsions | | | |
| Yes | 4(16.6) | 123(15) | 0.77 |
| No | 20(83.3) | 701(85) | |
| Weight for height/length Z score (WHZ) | | | |
| Normal (>-1) | 8(33.3) | 595(72.2) | <0.001 |
| Mild (<-1, >-2) | 1(4.1) | 48(5.8) | |
| Moderate (<-2, >-3) | 3(12.5) | 40(4.8) | |
| Severe Malnutrition (<-3) | 12(50%) | 141(17.1) | |

Children diagnosed with HIV infection had a variety of clinical presentations: most were underweight ($p < 0.001$) and stunted ($p < 0.001$) (Table 3).

Table 3 shows that the clinical characteristics with significant associations with HIV infection were: a history of cough ($p = 0.001$), weight loss ($p < 0.001$). We also found a significant association with oral thrush ($p < 0.001$), lymphadenopathy ($p = 0.001$), ear discharge ($p < 0.001$), skin lesion ($p < 0.001$), hepatomegaly ($p < 0.001$), splenomegaly ($p < 0.01$).

Out of the 24 HIV infected children, 12 (50%) stayed at the hospital for more than 1 week and 12 (50%) for ≤ 7 days ($p < 0.001$). One child died (4.2%) within the one week of the follow-up period. Factors associated with prolonged hospital stay were history of weight loss (OR=4.96, 95% CI 2.68-9.18), skin lesions (OR=3.60, 95% CI 1.36-9.56), and weight for height/length z-score < -3 SD (OR=8.67, 95% CI 4.70-15.99).

Among children diagnosed with HIV, 11 (45.8%) were admitted with severe acute malnutrition, 10 (41.6%) were diagnosed with diarrheal diseases, 9 (37.5%) with malaria and 8 (33.3%) had pneumonia. The least diagnoses which have been made in this population of HIV infected children were bacteraemia, severe anaemia, sickle cell anaemia, osteomyelitis, and tuberculosis.

In children who were not infected with HIV, 456 (55.3%) were diagnosed with malaria, 218 (26.4%) with septicaemia/bacteraemia, 218 (26.4%) with pneumonia, 216 (26.2%) had diarrheal diseases, 80 (9.7%) with severe acute malnutrition and 40 (4.8%) with severe anaemia. The least diagnoses which were made in the HIV negative population are heart diseases, urinary tract infection, sickle cell anaemia, asthma, epilepsy and others.

DISCUSSION

The prevalence of HIV infection was 2.8 %. This is low compared to other studies in East, West and South Africa in in-patient settings, where the prevalence ranges between 10% and 12.5%.^[3,4,5,6] Despite this, the low prevalence of HIV infection in our study must be viewed with caution as the current risks for HIV transmission are still very high.^[8,9]

The implication of this result should lead to the shifting of resources toward prevention and elimination of HIV transmission.

In our study 11 out of 13 (84.6%) mothers who were on ARVs had children infected with HIV. This indicates inadequate and under-utilized PMTCT services. This picture is supported by other data from South Sudan which showed that only 7.3% of

infants born to HIV-positive women had been HIV tested within two months of birth.^[10] This poor uptake will lead to an increase in mother to child transmission. The early diagnosis and utilization of PMTCT in nearby countries e.g. Kenya and Uganda, is much better compared to South Sudan.^[11, 12] Therefore improved completion rates of PMTCT are necessary to reduce vertical HIV transmission.^[13,14]

The clinical pattern in our study compares well with other studies in Africa.^[3, 4, 5, 6] Most of our children infected with HIV were at WHO clinical stage 3.

Other studies have reported higher rates of deaths in the HIV in-patient population compared to our study.^[15] The reason for our lower rate may be attributed to the shorter period of follow-up.

CONCLUSION

The prevalence of HIV in our hospitalized children was 2.8% being lower than that reported from elsewhere. Expanding access to early detection of infant HIV infection in South Sudan should aid in the HIV care for infants, and contribute to the 'Elimination of mother to child transmission' (EMTCT)/PMTCT) programme.

The clinical characteristics associated with HIV infection compared to HIV negative children were: a history of cough, weight loss, oral thrush, lymphadenopathy, ear discharge, skin lesion, hepatomegaly, and splenomegaly. These should raise suspicion of HIV infection and the need for HIV testing.

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