



DESCRIPTIONS OF A PAEDIATRIC VISCERAL LEISHMANIASIS COHORT AND THEIR OUTCOMES IN UPPER NILE STATE, SOUTH SUDAN

M. Litster¹, M. Sangma², M. Kihara², C. Nanclares¹, F. De Bartolomé¹, M.J. Sagrado³

¹Médecins Sans Frontières Spain, MSF OCBA, Barcelona, Spain, ²Médecins Sans Frontières Spain, MSF OCBA, Nairobi, Kenya, ³Médecins Sans Frontières Spain, MSF OCBA, Madrid, Spain

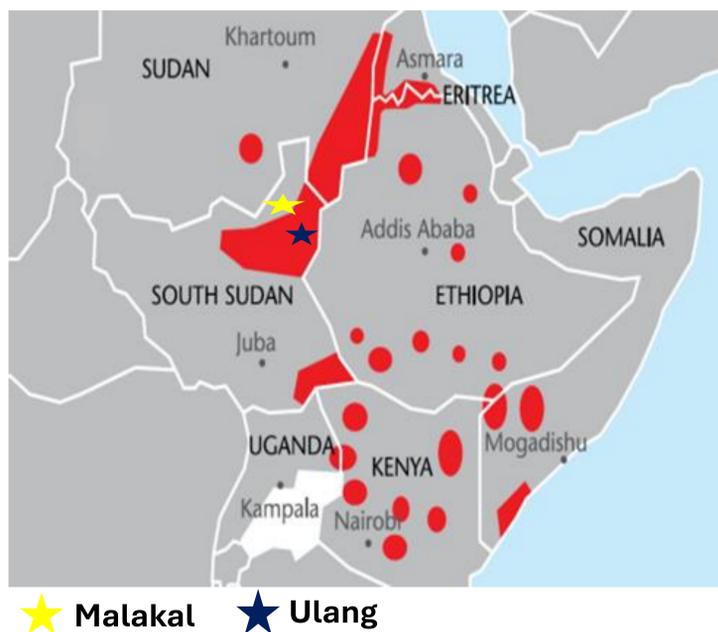
BACKGROUND AND OBJECTIVES

Visceral Leishmaniasis (VL) is a neglected and often fatal parasitic infection endemic to South Sudan (Figure 1), where an estimated 2.4 million people live at risk.

In endemic settings, VL infection disproportionately affects children and adolescents. This is believed to be due to various biological and sociocultural factors, such as “immaturity of the immune system, malnutrition and peri-domestic breeding of sand flies” (Zijlstra, 2016, p. 561).

In this review, we aim to describe the paediatric cohort of VL cases observed in two MSF OCBA projects, in Upper Nile State (South Sudan), over a six-year study period.

Figure 1. Visceral Leishmaniasis Endemicity in East Africa



STUDY DESIGN

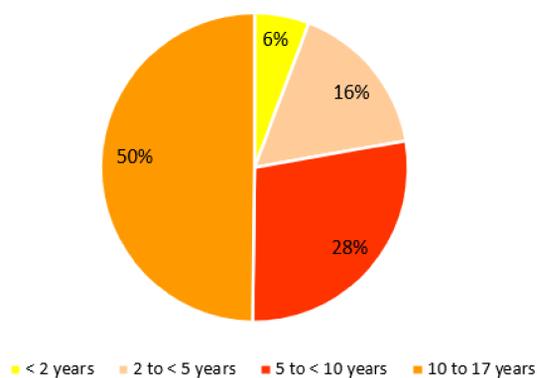
A retrospective, descriptive analysis was performed using routine, programmatic data from two MSF OCBA projects – Malakal and Ulang – in Upper Nile State, South Sudan between October 2016 to December 2021.

All VL patients <18 years of age, registered in MSF’s Ulang and Malakal VL programmes, during the defined time-periods were considered for inclusion in the initial study dataset. In total, 264 children diagnosed with VL were registered in the two programmes during the defined study period, while 243 cases were retained for review in accordance with the study’s inclusion/exclusion criteria.

RESULTS

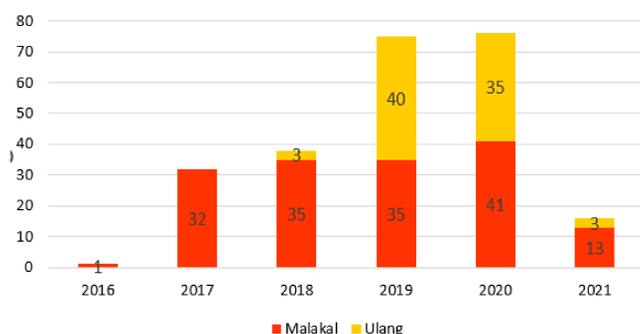
The majority (n = 189; 78%) of all children were 5 years of age or older (Figure 2), and there was a male predominance of 59.7% (n=145). Primary VL infection represented 81.8% (n=199) of all infections, and 18.1% (n=43) of cases were relapses.

Figure 2. Age Distribution Among Paediatric Cohort



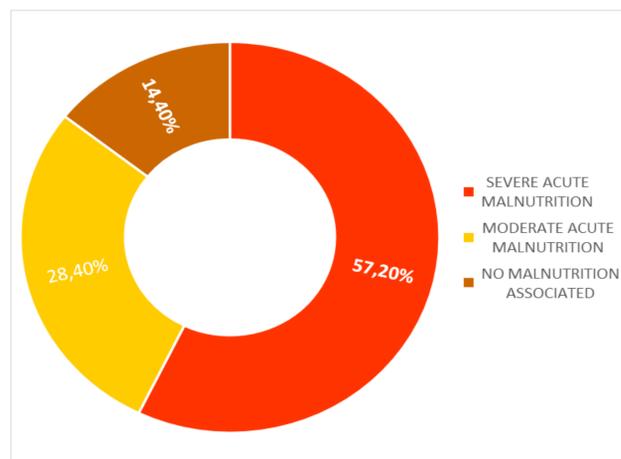
Malakal project accounted for 67% (n=162) of all paediatric VL cases treated, compared to Ulang which managed 33% (n=81). On average, patients were sick for 6.1 weeks (1 week – 75 weeks) prior to diagnosis and treatment initiation.

Figure 3. Yearly Paediatric Incidence by Project



Yearly incidence for Malakal and Ulang projects was stable until 2021, when a sharp decrease in cases was observed across both projects (Figure 3). 2016 data was only representative of a partial year (Oct-Dec) for Malakal. Data collection for Ulang began in Nov 2018 following the start of the programme.

Figure 4. Malnutrition Status of Visceral Leishmaniasis Paediatric Cohort



The majority of all paediatric VL patients suffered from some form of acute malnutrition (85,6%), with more than half classified as severely acutely malnourished (n= 123; 57,2%) at the time of admission (Figure 4). Children <5 were classified as malnourished by MUAC and/or W/H screening. Children 5 to 17 years had their BMI for age calculated. By discharge from the programme, the average weight gain / child was 1.6kg.

DISCUSSION

Male sex and adolescence were associated with higher infection rates, in line with previously identified risk factors for VL in endemic areas. This association is believed to be an interplay of both social (occupational exposure to sandflies, health-seeking behaviours) and biological factors (higher seroprevalence rates in men (Cloots et al., 2020)).

VL is a climate sensitive disease, with flooding previously linked to reduced VL incidence due to the disruption in the vector’s lifecycle. Upper Nile State experienced unprecedented, seasonal flooding during the study years, and this phenomenon should be examined for a possible link to the significant reduction in VL caseload observed in 2021 (Figure 3).

Malnutrition has been long associated with VL, but it is unknown as to what extent malnutrition might predispose one to VL infection, and/or how much malnutrition is the consequence of VL infection. Our study shows extremely high levels of acute malnutrition associated with VL infection (Figure 4), higher than other paediatric VL studies in East Africa.

The CFR observed in this cohort remained in line with the East-African average of 2%. Children, especially those < 5 years, often face higher mortality rates than their adult counterparts. However, in this study, CFR in the paediatric cohort (2.5%) was significantly less than the adult cohort in the same programme (10.2%), possibly due to higher HIV/TB co-infection rates in adults (19.1% and 11.1% co-infection rates for HIV and TB respectively versus 0.4% HIV and 4.4% TB co-infection rates in the paediatric cohort).

Table 1. Proportion of Clinical Characteristics at Admission

Clinical Characteristics	(%) of Cases
Splenomegaly	72.3%
Hepatomegaly	56.3%
Lymphadenopathy	53.3%
Hb <8g/dl	49.6%
Oedema	12.1%
Bleeding	8.0%
Jaundice	6.1%
State of collapse	2.1%

Over 50% of all VL cases had the following three clinical characteristics: splenomegaly, hepatomegaly, and lymphadenopathy (Table 1). Severe anaemia (<6g/dl) was present in 19% of cases, and moderate anemia (6 – 7.9g/dl) was present in 30.6% of cases. By the end of the treatment, the average haemoglobin increase per child was 2g/dl.

- Case fatality rate (CFR) was 2.5% ; 6 deaths and 137 recovered cases.
- Among the deaths, two were relapse cases and 1 had TB co-infection.
- The TB co-infection rate was 4.4% and the HIV co-infection rate was 0.4%.

CONCLUSION:

Older children living in endemic VL areas are the most vulnerable cohort to VL infection. Differential diagnosis of VL should be considered in children (especially > 5 years) living in endemic areas, with comorbid malnutrition, co-presenting with anaemia, adenopathy, and/or hepatosplenomegaly, who are not improving in nutritional programmes.

ETHICS STATEMENT

Fulfils the exemption criteria set by the MSF ERB and was approved for submission by the OCBA Medical Director.



REFERENCES

Cloots, K., Burza, S., Malaviya, S., Hasker, E., Kansal, S., Mollett, G., Chakravarty, J., Roy, N., Lal, B., Rijal, S., Sundar, S., and Boelaert, M. (2020). ‘Male predominance in reported Visceral Leishmaniasis Cases: Nature or nurture? A comparison of population-based with health facility-reported data’, PLoS Neglected Tropical Diseases, 14(1), pp. 1-14. Available at: <https://doi.org/10.1371/journal.pntd.0007995>.

Zijlstra, E. (2016). ‘Visceral Leishmaniasis: A forgotten epidemic’, Archives of Disease in Childhood, 101(6), pp. 561-67. Available at: <https://doi.org/10.1136/archdischild-2015-309302>.