

Cross-sectional assessment of heterogeneity of malaria prevalence among children 0–13 years in three malaria endemic subregions of Uganda

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Introduction

Currently, national malaria indicator surveys in Uganda are conducted at the regional level among children under five. Thus, surveys do not provide information on malaria prevalence among school-going children, or that relating to district and subdistrict levels. In collaboration with the National Malaria Control Division (NMCD), Malaria Consortium conducted a survey in 26 districts in northern Uganda and the Karamoja region to assess the heterogeneity of malaria prevalence.

Methods

- We conducted a cross-sectional descriptive study among 6,350 children from a sample of 7,684 households, which were determined using regional-level malaria prevalence at a precision power of 0.84.
- We sought consent from caregivers/parents for malaria testing using both microscopy and malaria Histidine-rich protein 2 rapid diagnostic tests (mRDTs).
- For quality assured microscopy, the testing team comprised experienced phlebotomists, nurses and clinicians who underwent a two-day refresher training.
- World Health Organization-certified laboratory technicians at Makerere University’s Molecular Biology Laboratory conducted slide reading.
- Microscopy results were used to assess heterogeneity of malaria prevalence. Malaria plasmodia were typed and four categories identified: *Plasmodium falciparum*, *P. vivax*, *P. Ovale* and *P. malariae*.
- Analysis was conducted using STATA 12, with significance levels done using Fisher’s test at five percent (Fisher’s value=0.000<5%).

Results

- Under-five malaria prevalence (percentage of malaria parasites) in the three subregions was 17.1 percent. Karamoja had the highest malaria prevalence, followed by Acholi and Lango (Table 1).
- By district, malaria prevalence was highest in Kotido (55.4 percent), Nabilatuk (50 percent) and Nakapiripirit (42.1 percent) in Karamoja, and lowest in Amolator (2.4 percent) and Alebtong (2.9 percent) in Lango (Figure 1).
- *P. falciparum* was the dominant parasite species (92 percent) in all three regions; 0.8 percent of blood samples showed mixed infections.
- Malaria prevalence significantly (Fisher’s value=0.000<5%) decreased across quintiles (Table 1) as the wealth status of households increased.
- Prevalence did not significantly (p=0.25>5%) differ by gender (Table 1).
- Analysis including children over five showed malaria prevalence (Fisher’s value=0.005<5%) was significantly higher among over-fives: 26 percent among under-fives versus 43 percent in children 5–9 years and 37 percent in children 10–13 years.

Conclusion

The study demonstrated that malaria prevalence across the three subregions is highly heterogeneous in terms of geography, age and wealth.

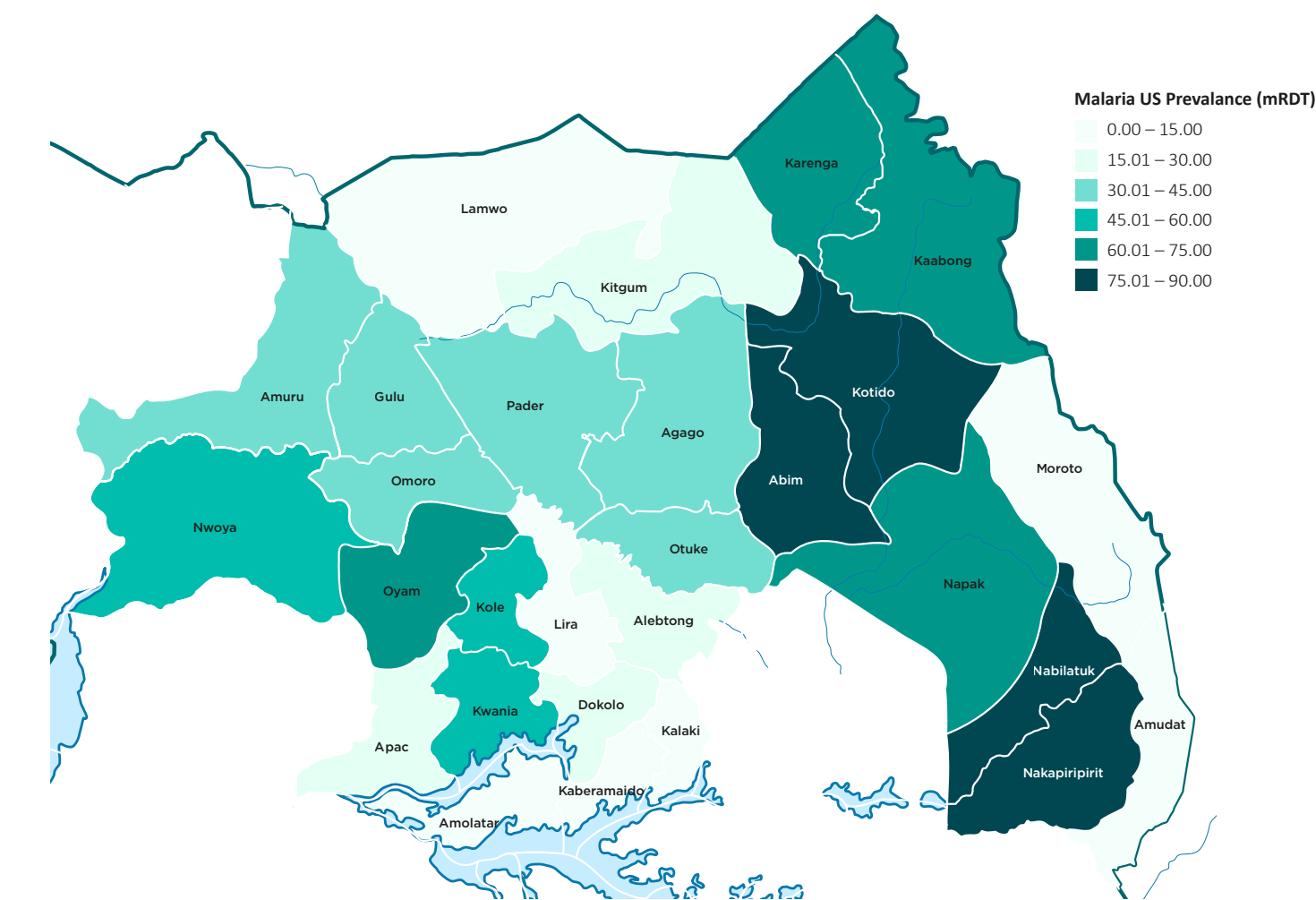
Malaria prevalence among children in Uganda is highly heterogeneous

Supplementary visuals

Table 1: Malaria prevalence based on microscopy, by selected background characteristics

Background characteristics	Percentage positive malaria cases (using mRDT) (95 percent confidence interval)	Percentage malaria parasites (using microscopy) (95 percent confidence interval)	Number
Region			
Acholi (Districts: Amuru, Nwoya, Omoro, Gulu, Pader, Kitgum, Lamwo, Agago)	32.6 (27.9–37.7)	9.8 (7.9–12.1)	2,077
Lango (Districts: Otuke, Alebtong, Kole, Oyam, Dokolo, Amolator, Kwania, Apac, Kaberamaido)	19.6 (12.8–28.9)	7.9 (5.2–11.8)	571
Karamoja (Districts: Kaabong, Karenga, Abim, Kotido, Amudat, Moroto, Napak, Nabilatuk, Nakapiripirit)	70.1 (61.3–77.6)	36.0 (29.5–43)	1,067
Sex			
Male	42.1 (36.5–47.9)	17.7 (14.5–21.6)	1,763
Female	41.2 (35.9–46.7)	16.4 (13.4–20)	1,720
Age (years)			
0	22 (16.8–28.2)	8.4 (5.1–13.5)	441
One	38.2 (31.6–45.4)	16.2 (11.9–21.5)	625
Two	43.2 (36.7–50)	17.3 (13.8–21.5)	775
Three	49.5 (43.1–55.9)	20.7 (16.2–26)	725
Four	50.4 (43.6–57.2)	22.1 (17.7–27.2)	829
Wealth proxy (quintile)			
Lowest	61 (52.3–69)	31.6 (25.1–39)	761
Second	39.7 (33.4–46.4)	15.2 (10.9–20.8)	763
Middle	40.1 (34.3–46.3)	14.8 (11.4–19)	770
Fourth	32.1 (26.6–38.2)	11.3 (8.9–14.4)	685
Highest	30.3 (23.3–38.2)	10.1 (6.7–15)	532
Total	41.5 (36.2–47)	17.1 (13.9–20.9)	3,892

Figure 1: Distribution of malaria prevalence by mRDT across the three subregions



Read more

<https://bit.ly/MC-ASTMH-Surma>

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