Intensity of malaria transmission, antimalarial-drug use and resistance in Uganda: what is the relationship between these three factors?

A.O. Talisuna, P. Langi, N. Bakyaita, T. Egwang, T.K. Mutabingwa, W. Watkins, E. Van Marck, U. D'Alessandro

Transactions of The Royal Society of Tropical Medicine and Hygiene, Volume 96, Issue 3, May-June 2002, Pages 310–317, https://doi.org/10.1016/S0035-9203(02)90108-2

Received: 06 August 2001
Revision received:19 December 2001
Accepted: 15 January 2002
Published: 01 June 2002

Abstract

We studied (in 1998 and 1999) some factors that may be linked to the spread of chloroquine (CQ) and sulfadoxine-pyrimethamine (SP) resistance in 7 discrete communities in Uganda. Exposure to malaria infection was measured by parasitological surveys in children aged 1–9 years, drug use by community surveys and drug resistance by in-vivo tests on children aged 6–59 months with clinical malaria. CQ use was inversely related to parasite prevalence ($r = -0{\cdot}85$, $P = 0{\cdot}01$). CQ and SP treatment failure rates varied significantly according to parasite prevalence ($P = 0{\cdot}001$ and $0{\cdot}04$ respectively). The highest CQ (42·4%, 43·8%) and SP (12·5%, 14·8%) treatment failure rates were observed in sites characterized by high parasite prevalence. Using areas with medium parasite prevalence as reference, the relative risk (RR) for CQ treatment failure was 3·2 (95% CI 1·6–6·4) in high parasite prevalence sites and 3·1 (95% CI 1·2–7·7) in low parasite prevalence sites. The RR for SP treatment failure was also higher in sites with high parasite prevalence but low in those with low parasite prevalence. According to our findings, drug resistance seems to spread faster in higher transmission areas, regardless of drug pressure. In low transmission areas, drug pressure seems to be the critical factor. A decrease in transmission coupled with rational use of drugs may delay the spread of resistance.

Keywords: malaria, *Plasmodium falciparum*, transmission intensity, drug resistance, drug use, chloroquine, sulfa-doxine-pyrimethamine, Uganda