



Exposure to invasive *Anopheles stephensi* in the peri-domestic environment is associated with increased individual malaria infection risk in Metehara, central Ethiopia: a case control study

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Anopheles stephensi, an urban-adapted malaria vector native to Asia, is rapidly spreading across Africa and may increase urban malaria transmission alongside native vectors. However, empirical evidence linking peri-domestic exposure to *An. stephensi* with malaria risk remains limited. We assessed the association between household exposure to *An. stephensi* and malaria case status in Metehara. We conducted an age-matched case-control study from October 2023 to November 2025. Cases were febrile individuals with microscopy-confirmed *Plasmodium falciparum* or *P. vivax* infection, while controls were afebrile and microscopy-negative outpatients recruited within 72 hours of case enrolment. Household and entomological surveys were conducted within 48 hours by field teams blinded to participant status. The primary exposure was the presence of *An. stephensi* in or around households. Of 1,806 enrolled participants, 486 cases and 915 controls were included in the final analysis. Adult anophelines were detected in 58.0% of case households compared with 40.3% of controls. *Anopheles stephensi* adults (6.6% vs 4.2%) and immature stages (12.7% vs 6.3%) were more frequent in case households. In adjusted analyses, the presence of adult *An. stephensi* (AOR=2.80, 95% CI 1.64–4.79, $p < 0.001$) and immature stages (AOR=2.46, 95% CI 1.61–3.74, $p < 0.001$) was independently associated with malaria, with effect sizes comparable to native vectors (AOR=2.71, 95% CI 2.02–3.62, $p < 0.001$). Peri-domestic exposure to *An. stephensi* was independently associated with malaria risk in this urban setting, highlighting the need for integrated urban vector surveillance and control strategies targeting both invasive and native malaria vectors.

