

## ABSTRACT

### Background

Understanding the complex heterogeneity of risk factors that can contribute to an increased risk of malaria at the individual and household level will enable more effective use of control measures. The objective of this study was to understand individual and household factors that influence clinical malaria infection among individuals in the highlands of Western Kenya.

### Methods

This was a matched case–control study undertaken in the Western Kenya highlands. Clinical malaria cases were recruited from health facilities and matched to asymptomatic individuals from the community who served as controls. Each participant was screened for malaria using microscopy. Follow-up surveys were conducted with individual households to collect socio-economic data. The houses were also checked using pyrethrum spray catches to collect mosquitoes.

### Results

A total of 302 malaria cases were matched to 604 controls during the surveillance period. Mosquito densities were similar in the houses of both groups. A greater percentage of people in the control group (64.6%) used insecticide-treated bed nets (ITNs) compared to the families of malaria cases (48.3%). Use of ITNs was associated with lower level of clinical malaria episodes (odds ratio 0.51; 95% CI 0.39–0.68;  $P < 0.0001$ ). Low income was the most important factor associated with higher malaria infections (adj. OR 4.70). Use of malaria prophylaxis was the most important factor associated with less malaria infections (adj OR 0.36). Mother's (not fathers) employment status (adj OR 0.48) and education level (adj OR 0.54) was important malaria risk factor. Houses with open eaves was an important malaria risk factor (adj OR 1.72).

### Conclusion

The identification of risk factors for clinical malaria infection provides information on the local malaria epidemiology and has the potential to lead to a more effective and targeted use of malaria control measures. These risk factors could be used to assess why some individuals

acquire clinical malaria whilst others do not and to inform how intervention could be scaled at the local level.