Reviewer's report

Title: Factors associated with non-adherence to Artemisinin-based Combination Therapy (ACT) to malaria in a rural population from holoendemic region of western Kenya

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Reviewer: Francisco Gude

Reviewer's report:

This study aimed to evaluate ACT adherence level, factors associated with non-adherence and accessibility in households (n=297) in rural location of Southeast Alego location in Siaya County in western Kenya. The research question is well defined, the study has been carried out well and the paper is well written.

Major Compulsory Revisions

1. Since a complete list of all members of the population did not exist, sampling was carried out using multi-stage and probability proportion to size sampling methods. These methodologies may be appropriate, but they are not well described. This part should be re-written. More detail describing the study design would be helpful, notably the sample selection in the different stages. A figure may help to do it.

2. Due to the effects of clustering and unequal selection probabilities, it generally is not plausible to view the survey observations as independent and identically distributed. For that reason, it generally is not appropriate to analyze complex survey data with methods based on independent and identically distributed assumptions. The authors should consider performing design-based analysis of survey data.

3. The paper does not contain a clear discussion of the limitations of the study. Point estimators could be biased under a complex design. I would consider that it might be worthy of some comments.

4. Regression analyses were used to identify variables associated with adherence to ACT. Indeed, the authors show the results of these analyses by means of the regression coefficients (#) and p-values. Since the dependent covariate (adherence to ACT) seems to be binary (non/yes), logistic regression analyses would appear to be more appropriate. In addition, these results could be expressed in terms of odds ratios.

5. Regarding the simple size calculation, the reader needs to know on which parameters the calculation was performed.
Minor Essential Revisions
References should follow the instructions of the journal.
Figures 1 to 3 are not necessary.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**
I declare that I have no competing interests