Larger families are less likely to achieve universal long-lasting insecticidal nets coverage in Ethiopia

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Background

- In a population with a high risk of malaria infection, using long-lasting insecticidal nets (LLIN) is an essential malaria prevention method *(WHO, 2017; Kebede et al, 2021).*

- Ethiopia has been distributing LLINs for free.

- However, ensuring sufficient access and use of LLINs requires close monitoring and evaluation *(Koenker et al, 2018).*
  - Addressing access is presumptive to LLIN use (*Kebede et al, 2021*).

- Hence, this study assessed ownership of LLINs in the Sidama Region, Southern Ethiopia, to contribute to malaria control efforts.

Objective

- To investigate the ownership of LLINs in the Sidama Region

Methods

- A community-based cross-sectional study was conducted in February and March 2023.
- The data used for this study was from a malaria prevalence survey in two districts (Boricha and Bilate Zuria)
- Multi-stage cluster sampling was used to select representative households.
  - Two districts, nine kebeles, 55 development teams, all households

Methods cont'd…

- Sample size for the malaria prevalence survey was estimated using single population formula:

  - Prevalence of malaria measured by Rapid Diagnostic Tests (RDT) = 1.17% (*Nega et al., 2021*).
  - 95% confidence level, 0.3% precision, and a design effect of 1.5
  - The final sample size was estimated to be 8105 individuals including 10% no response rate.
  - Considering a family size of 5 people per household, **1621** households will be included in the study.

Methods cont'd…

- We estimated LLIN coverage in terms of:
  - WHO's universal LLIN coverage (at least one LLIN for every two people) (*WHO, 2017*)
  - National LLIN targets aim at 100% LLIN coverage of the at-risk population, with one LLIN per sleeping space (*FMOH, 2017*).

- In addition, the LLIN distribution depends on the family size:
  - One LLIN for a family size of 1-2, two LLINs for a family size of 3-5, three for 6-7 and four for eight or more family members (*FMOH, 2017*).

- Ethical considerations: IRB of HU (IRB/087/14)
  - Support letters from the Sidama Regional Public Health Institute (Ref: DFI/7895/1)

Results and discussions

- A total of 1647 households were included in the study.
- Most households were led by males (89%), farmers (63%) and persons who were unable to read and write (55%).

Results and discussions

- The ownership of at least one LLIN per household was 85% (95% CI 83.5 – 86.9%; 1405 of 1647 households).
  - Indicates the reach of LLIN to the community
  - Recent distribution (both districts distributed 100% as per their plan from Nov 2022 to Jan 2023).

- About two-thirds (66%) of households had at least one LLIN for every sleeping space, and about half (49%) had the required LLIN per family size.
  - But only 35.9% had required LLIN as per family size according to 2022 guidelines (seven or more receive four LLINs)

Results and discussions cont'd…

- Only 36% of households had universal access to LLIN.
- Moreover, only 33% of households with children under five years of age or pregnant women had universal access to LLIN.
- Homes with larger families (Adjusted Odds Ratio (AOR): 8.1 [6.3, 10.6]) and female-headed households (AOR: 3.1 [1.5, 6.4]) were more likely to have unmet universal LLIN coverage.

Results and discussions cont'd…

Table 1: LLIN distribution guide as per family size, malaria guideline, 2017

Family Size	**Number of LLINs to be supplied**
One to two	One
Three to four	Two
Five to six	Three
Eight or more	Four

8 vs 12 members

- **Fairness/Equity?**

Results and discussions cont'd…

- Higher coverage is required when mosquitoes resist insecticides (*Ngonghalaa et al, 2020*)

- When only some members of households are covered, mosquitos could bite the persons not using ITNs and thus increasing the risk of infection
  - "Diversion effect" (*Xu et al, 2015*).

Limitation of the study

- We should have assessed the quality of the LLIN.
- The study limited to two woredas
- We used a cross-sectional design

Conclusion

- We conclude that the LLIN coverage was low compared to WHO-recommended universal LLIN coverage and national LLIN targets per sleeping space and family size.
    - May not yield its intended benefits.
- The National LLINs distribution standard should consider additional LLIN for larger families.
- Thus, there is a need to distribute more bed nets

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