

Evaluation of Long-Lasting Insecticidal Nets Mass Distribution Campaign and Malaria Among Under-Five Children in Mayo Belwa L.G.A., Adamawa State, Nigeria

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Background: Nigeria carries the greatest malaria burden among countries in the world. As part of the National Malaria Control Strategic Plan, free long-lasting insecticidal nets (LLINs) were distributed in all the 21 Local Governments Areas of Adamawa states of Nigeria through mass campaign in September 2017. This was due to the backdrop of recurrent cases of about 3.3% increase in malaria cases before LLINs the campaign. The objective of this study was to evaluate the association between LLINs distribution campaign and under-five child malaria in Mayo Belwa LGA.

Methods: Percentage of children malaria infection was ascertained from August 2016 to August 2017 and a cross-sectional study, 523 patients aged 0-5 years with fever or history of fever in the previous 72hours were enrolled. Relevant information was obtained and recorded using a questionnaire. Thick and thin films were prepared from a finger or heel prick for each of the patients and subjected to microscopy.

Result: The prevalence of malaria was 37.7% while 49.3% was seen prior to the mass campaign. Nevertheless, sex, parents educational level, socio- economic class, temperature at presentation as well as ownership of insecticide treated nets had no significant effect on the prevalence of malaria ($p>0.05$).

Conclusion: The observed protective effects on child malaria of these campaigns were encouraging and need to be corroborated by future effectiveness studies. Results also show that improving community-level maternal knowledge through appropriate channels might be helpful in preventing child malaria in Nigeria.

Key words: Children malaria, Insecticide-treated nets, Campaign, Evaluation

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Background

The Global Malaria Action Plan calls for the rapid scale up of key malaria prevention interventions including widespread use of long-lasting insecticidal nets (LLINs) by people at risk for malaria since research has demonstrated their effectiveness in reducing malaria mortality and morbidity in young children (Roll Back Malaria Partnership (RBMP), 2016). Monitoring and evaluation of LLIN distribution efforts is important to help determine the impact of LLINs and to inform optimal program implementation strategies within the National Malaria Control Program (NMCP, 2012).

Malaria caused an estimated 435 000 deaths globally in 2017, compared with 451 000 estimated deaths in 2016. Children aged under 5 years are the most vulnerable group affected by malaria, they accounted for 61% (266 000) of all malaria deaths worldwide. The World Health Organization African Region accounted for 93% of all malaria deaths in 2017, it also accounted for 88% of the 172 000 fewer global malaria deaths reported. Nearly 80% of global malaria deaths in 2017 were concentrated in 17 countries in the WHO African Region and India; seven of these countries accounted for 53% of all global malaria deaths, Nigeria carries the greatest malaria burden among countries in the world (19%) (WHO, 2018).

There has been a rapid scale-up of insecticide-treated net (ITN) or long-lasting insecticidal net (LLIN) distribution in African countries in the recent years (RBMP, 2016), fueled by randomized controlled trials (efficacy studies) of ITN on a variety of outcomes. While many studies have examined the efficacy of ITNs (under optimal conditions), relatively few studies have looked at the effectiveness of ITN mass distribution campaigns in preventing malaria (under real-world conditions in the general population) (Lengeler, 2014). Thus necessitate this study which aimed at evaluate the association between LLINs distribution campaign and under-five child malaria in Mayo Belwa LGA, of Adamawa State.

Study Area

Mayo Belwa Local Government area of Adamawa State lies between Latitude 11°26 ' and 11°34 'N and Longitude 14°12 ' and 14°34 'E. The area has a projected population (2009) of 1,612,645. It is mainly

an upland zone, rising above 250 meters above the sea level. It enjoys tropical climate with two distinct seasons; rainy season (April-October) and the dry season (November-March). Temperature ranges between 21°C and 28°C with high humidity.

Methodology

Baseline malaria raw data for this study was obtained from the recorded parasitology register of the Cottage Hospital Mayo Belwa LGA from August 2016 to August 2017, 523 patients age 0-5 visited the Health Facility for malaria diagnosis prior to LLINs distribution campaign which took place in September-October, 2017. After which, a cross-sectional study was undertaken, from May 2018 to May 2019, 523 children aged 0-5 with fever or history of fever in the previous 72hours visiting Cottage hospital Mayo Belwa were enrolled after informed consent was obtained from each parent/guardian and those on malaria treatment were excluded. Relevant information was obtained using a questionnaire. Thick and thin films were prepared from a finger or heel prick for each of the patients and subjected to microscopy.

Results

The result revealed malaria among aged 0-5 before-and-after campaign of LLINs (Figure 1). Before the campaign (August 2016-August 2017) data showed that 258 (49.3%) had malaria out of which 149 (28.5%) were males and 109 (20.8%) females, ownership of LLINs then was 42% (Figure 1). Then the mass distribution took place from September to October 2017. After the campaign (May 2018-May 2019) the result of the 523 aged 0-5 years patients showed that 197 (37.7%) had malaria of which 97 (18.5%) were males and 100 (19.1%) females (Figure 2). Furthermore, the result of this study revealed that out of the 523 aged 0-5 patients diagnosed of suspecting malaria, 504 had fever with 187 (35.8%) having malaria, 19 had no fever but 10 (1.9%) had malaria (Figure 3). Ownership of LLINs was 95% after the campaign (Figure 4). Chi-square test showed LLINs ownership, sex, parents educational level, socio- economic class, temperature at presentation had no significant effect on the prevalence of malaria ($p>0.05$).

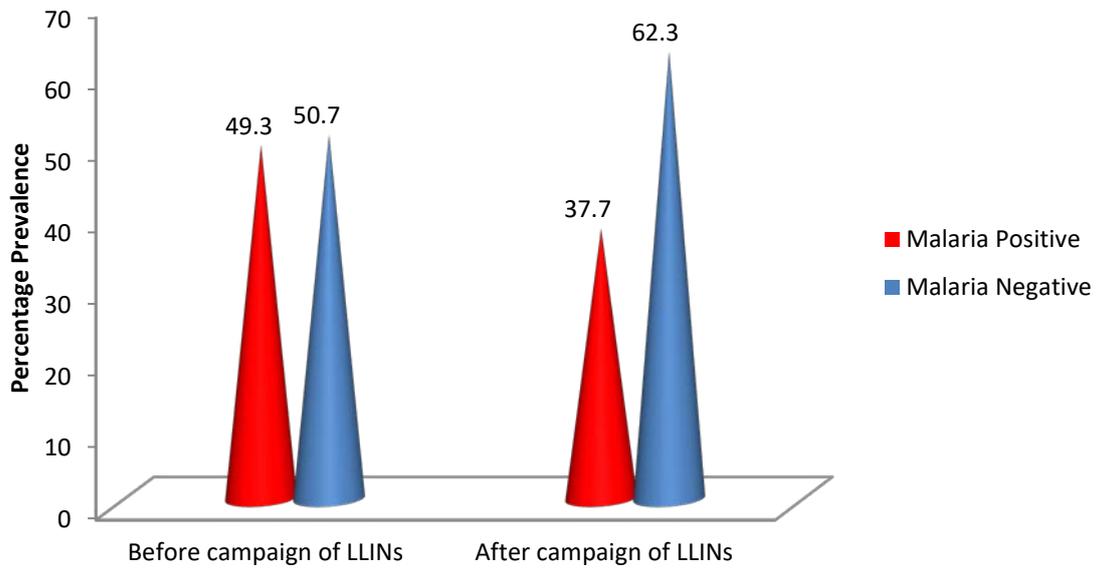
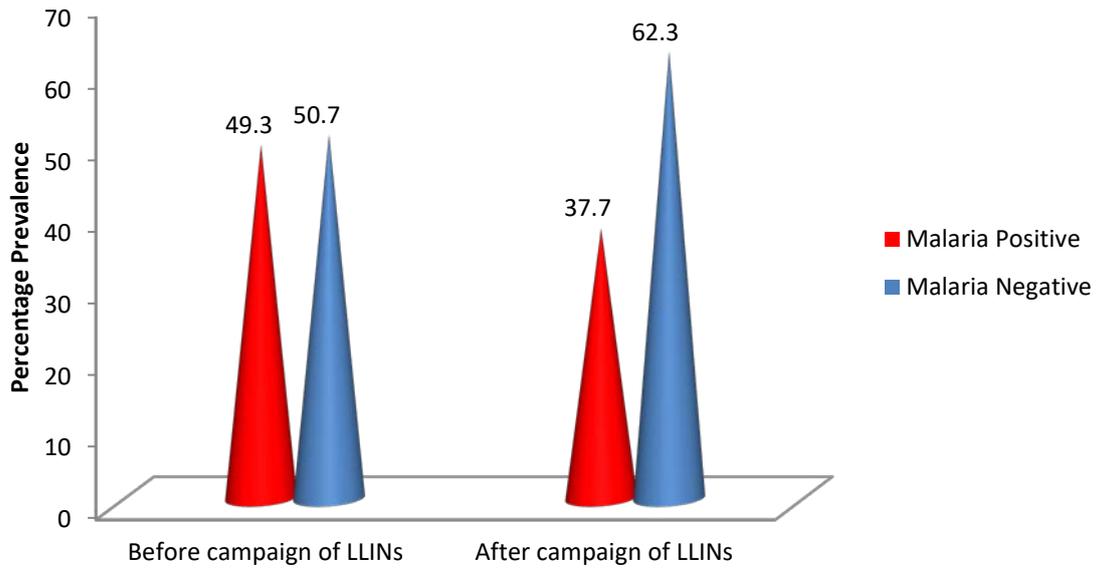


Figure 1. Showing percentage prevalence of malaria infection before and after the LLINs campaign among the participants.

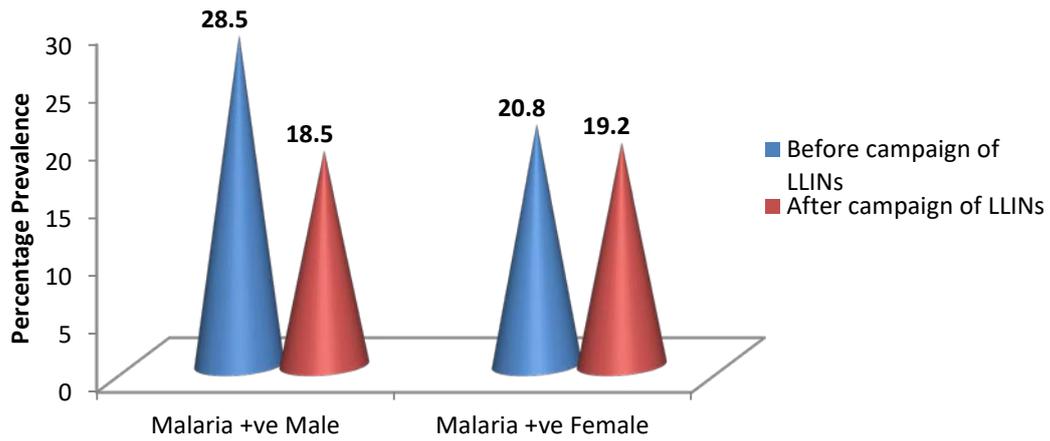


Figure 2. Showing percentage prevalence of malaria infection before and after the LLINs campaign among the participants in relation to gender.

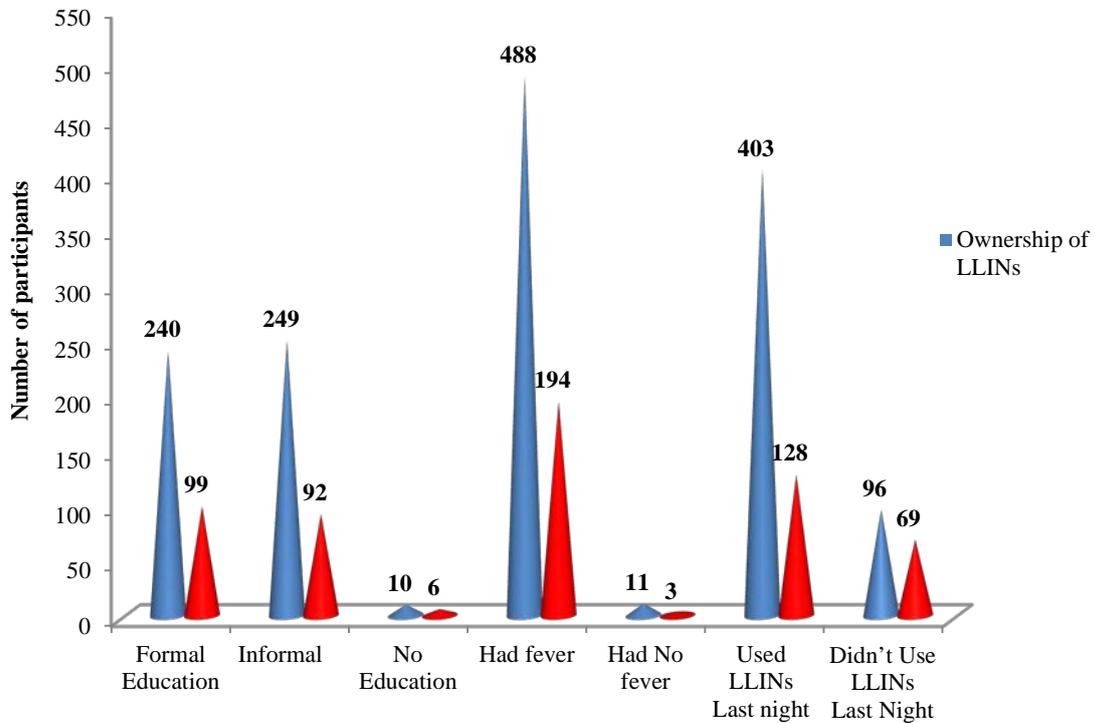


Figure 3. Showing prevalence of malaria infection after the LLINs campaign among the participants in relation to LLINs ownership.

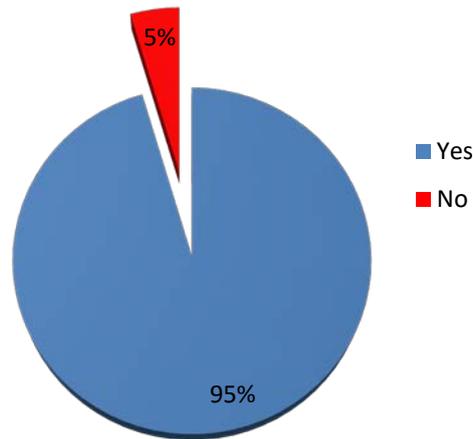


Figure 4. Showing the number of ownership of LLINs of the participants after the campaign.

Discussion

The overall malaria prevalence in this evaluation study showed decline by 11.6% that is 49.3% before the mass distribution campaign to 37.7% after a one year of LLINs distribution. Although, contrary to well established positive impact of access to LLINs on prevalence of malaria ownership of ITN had no significant effect on the prevalence of malaria in this study. Similar finding has been reported by other workers (Atieli *et al.*, 2017). This finding may be attributed to several factors; in the first place, ownership is not synonymous with usage, and even when used, lack of care for the nets may have contributed to this observation (Atieli *et al.*, 2017). In addition, the present study did not evaluate usage of and care for ITNs. Furthermore, those who did not own ITNs were not good controls because many of them practiced other forms of vector control measures such as usage of insect repellent (mosquito coils) and insecticide which are known effective control measures (Amodu *et al.*, 2006)

This variation of the effect of socioeconomic status on malaria prevalence could be due to variable method of socioeconomic status classification; while Yusuf *et al.*(2010) used wealth index to measure socioeconomic status, this study used parental educational status in combination with parental occupation and expected income to determine the socioeconomic status of each child (Ogunlesi *et al.*, 2008). Temperature at presentation neither had significant effect on the prevalence of malaria in this study. This finding may be due to the paroxysmal

nature of malarial fever and thus history of fever may be as important as fever at presentation in the clinical diagnosis of malaria. However, while this finding is similar to the finding in other studies (Elechi *et al.*, 2015) with regards to prevalence of malaria, others have found temperature at presentation to be associated with higher malaria prevalence (Sowunmi, 1995).

Conclusion and Recommendation

In conclusion, the observed protective effects on child malaria of these campaigns were encouraging and need to be corroborated by future effectiveness studies. Results also showed some level of resistant on the LLINs, but improving community-level maternal knowledge through appropriate channels might be helpful in preventing child malaria in Nigeria. Hence, there is need to strengthen and scale up various malaria control programs while ensuring proper implementations of programs and activities through effective monitoring and evaluation.

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