

A Comparative Study Of The Ownership And Utilization Of Insecticide Treated Nets In Household Of Children With Uncomplicated Malaria In Nigeria

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Abstract

The objective of the study was to determine insecticide treated net possession and usage; and factors associated with their utilisation in a cohort of house hold of children with uncomplicated malaria. A cross-sectional study was conducted at a secondary level health facility.

Subjects were children with uncomplicated malaria and their caregivers. Inclusion criteria were children presenting with fever and have a positive rapid diagnostic test for malaria. Children with severe malaria were excluded. The subjects were recruited consecutively during the period of highest malaria transmission. Information was obtained on insecticide treated net ownership and utilisation from the caregivers. One hundred and thirteen children were recruited. Seventy one of the children were aged less than five years. Insecticide treated net ownership rate was 52.2% and utilisation rate was 62.7%. Age less than five years was the only factor significantly associated with an increased likelihood of net ownership ($p=0.03$).

In conclusion, insecticide treated net ownership and utilisation among children with uncomplicated malaria in Nigeria is low and children aged less than five years are associated with a higher likelihood of household net ownership.

Keywords: Malaria; Prevention; Insecticide-treated bed-nets; Nigeria

Introduction

Globally, malaria is a very common cause of morbidity and mortality, especially in under-five children and pregnant women. The World Health Organization estimates that about 198 million cases of malaria occurred in 2013 with 584,000 deaths, most of which occurred in Sub-Saharan Africa and South East Asia.

Current efforts at malaria control revolve around three strategies namely: integrated vector management, malaria case management and chemoprophylaxis in vulnerable groups. Vector control strategies involve the use of insecticide treated nets (ITN) and indoor residual spraying. ITNs have been shown to be effective in malaria control with reduction in the frequency of severe malaria by 45%, 50% reduction in frequency of uncomplicated malaria across several population groups, reduction in malaria mortality among under-five children by 55% and an improvement of packed cell volume. Despite current evidence of the efficacy of ITNs there has been limited success with its use in Nigeria. Major reasons for the limited success are availability and usage. Data from the Nigeria Demographic and Health Survey in 2013 showed only 42% of households had at least 1 insecticide treated net. Similarly the Nigeria Malaria Indicator Survey in 2010 revealed only 31% of under-five children slept under an ITN. Campaigns with free distribution of ITNs have not necessarily resulted in improvements in ITN utilisation. Several studies in Africa have linked poor utilisation to practical and technical difficulties related to the fixing of the net above the mat, the design of the house, the feeling of suffocation and discomfort related to the relatively high temperatures even during the night, and the preferred use of local methods against mosquitoes, such as herbal repellents among others. Considering the major objective of the use of ITN is to prevent malaria episodes among children, the study examined a population of children with uncomplicated malaria in a hospital to determine their ITN usage and factors associated with their utilisation.

Materials and methods

The study was a descriptive cross-sectional study in which the subjects were children admitted with features of uncomplicated malaria and their parents. The study was carried at the Children Specialist Hospital, Ilorin which is a public-based secondary health facility located in Ilorin South Local Government Area (LGA) of Kwara State. The study was carried out during the peak of the malaria season between August and October 2013. The ethical principles outlined in the Declaration of Helsinki were followed in conducting this study. The minimum sample size required was calculated using a 95% confidence level and 10% confidence interval with an anticipated 15% non-response rate to give a sample size

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of 110 children/ caregiver pairs. The inclusion criteria were children between the ages of 6 months and 14 years presenting with fever and a positive rapid diagnostic test or blood film for malaria parasites. Children with severe malaria were excluded. Children meeting the inclusion criteria were recruited consecutively until the desired sample size was achieved. Subjects were recruited after child had been commenced on the appropriate treatment according to local malaria treatment protocols. Written informed consent was obtained from the caregiver. A semi-structured questionnaire was administered to the parents of the children to obtain information on socio-demographic status of the child, current clinical presentation, household characteristics, ownership and use of ITN. Social class was determined using the social classification system as proposed by Oyediji with the social class of the child being equal to the mean of the social class scores of both parents. Data analysis was carried out with a micro-computer using SPSS version 20 software package. Frequency distribution tables and cross-tabulation of variables were generated. Mean and standard deviation for quantitative variables were provided and proportion for qualitative variables was also determined. A p-value of <0.05 was considered significant.

Results

One hundred and thirteen children who met the inclusion criteria were recruited. All the subjects completed the questionnaire given a response rate of 100%. The mean (SD) age of the children was 4.2 years

(3.18). There were 70 males (61.9%) and 71 (62.8%) were children aged less than 5 years. The mean (SD) maternal age was 33.1 years (5.9) with a range of 18 – 49 years. The mother was the caregiver and informant for 95 (84.1%) of the subjects and the father, grandmother or aunt among the others. Regarding the social class distribution of the children, 20 (17.7%) belonged to the high social class (Oyediji classes I and II), 28 (24.8%) to the middle social class (Oyediji class III) and a majority of 65 (57.6%) belonged to the lower social class (Oyediji classes IV and V).

Fifty nine of the families owned at least one mosquito net and all of these were insecticide treated nets giving a net ownership rate of 52.2%. Out of this number, only four (6.8%) had purchased their nets. Fifty three (89.8%) of the parents had received nets during the net donation drives from the State or Local Government. Two had acquired their nets as gifts from friends or relatives. There was no statistically significant difference in maternal age, social class of the family, maternal or paternal education and family size between the families that owned and did not own an insecticide treated net. (Table 1)

Over the past 24 hours prior to presentation, 37 of the children had slept under an insecticide treated net giving an ITN utilization rate of 62.7%. Among the children less than five years of age whose households had an ITN, only 25(59.5%) of them had slept under an ITN in the preceding 24 hours. The predominant reason for non-use of the ITN among parents that had one was the hot weather/ perceived discomfort of the child (66.7%). Other reasons include suspected allergy, use

Table 1: Distribution of ITN possession by selected sociodemographic variables

Parameter	Has an ITN (N=59)	Does not have an ITN (N = 54)	P
Age			
< 5 years	42	29	0.030
≥ 5 years	17	25	
Maternal age			
mean ± SD	32.27±5.47	33.83±5.92	0.148
Social class			
High	14	6	0.128
Mid	16	12	
Low	29	36	
Maternal education			
None	13	18	0.110
Primary	13	17	
Secondary	25	17	
Tertiary	8	2	
Paternal education			
None	10	17	0.178
Primary	11	14	
Secondary	21	15	
Tertiary	17	8	
Number of siblings			
0 – 2	24	20	0.700
3 – 5	32	31	
> 5	3	3	

Table 2: Use of ITN in the preceding night by children of parents that own an ITN

Parameter	Used an ITN (N = 37)	Did not use an ITN(N=22)	P
Age			
< 5 years	25	17	0.230
≥ 5 years	12	5	
Maternal age	31.97±4.31	32.71±6.91	0.644
Social class			
High	9	5	0.828
Mid	11	5	
Low	15	14	
Maternal education			
None	7	6	0.968
Primary	8	5	
Secondary	15	10	
Tertiary	5	3	
Paternal education			
None	4	6	0.287
Primary	8	3	
Secondary	12	9	
Tertiary	11	6	
Number of siblings			
0 – 2	13	11	0.416
3 – 5	22	10	
> 5	0	3	

of indoor residual spraying or a feeling that the child was too old to use an ITN. There was no statistically significant difference in maternal age, number of siblings, maternal or paternal education and social class between families of children that did or did not sleep under an ITN in the preceding night. (Table 2)

Discussion

In most developing countries there have been increasing drives to distribute ITN to households in order to reduce the burden of malaria. Net ownership in this study is higher than the current National average (2010) of 42% and much higher than the average for the North-Central zone of 32.1%. This may reflect the net distribution drives as part of the process of scaling up malaria control interventions in Nigeria. The finding that families with children less than five were more likely to have ITN supports this assertion as donated nets are especially targeted at pregnant women and children less than five years of age. The reported net ownership rate is far below the target set by the National Malaria Strategic Plan (2009-2013) of achieving at least 80% net ownership by households of two or more ITN. Furthermore, the strategic Plan seeks to achieve a target of at least 80% of children less than 5 years and pregnant women sleeping under an ITN. Thus the finding of about 63% of children in the current survey sleeping under an ITN exposes the urgent need for strengthening mass educational campaigns for ITN use.

Net possession and utilisation studies have consistently shown a significant discrepancy between both variables as in this study. Baume showed that nets distributed free were less used than nets purchased. However, families gave preference to under five children. Documented myths about ITN use include chemicals could cause harm, nets could lead to heat and false beliefs that some people are immune to malaria. Similar reasons were given in this study. There is a need for a better grasp of the issues militating against ITN utilisation in households that possess them. These findings suggest that while it is important to provide these nets to households it is equally important to ensure families are convinced to use these nets consistently by providing relevant information that will address concerns and myths about its use.

Conclusion

The study has shown that ITN ownership and utilisation in households of children with malaria is low and age less than five years is associated with an increased net ownership rate.

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Conflict of interest

The authors do not declare any conflict of interest.

References

1. WHO. World Malaria Report 2014. Geneva: World Health Organisation; 2014.
2. Lengeler C. Insecticide-treated bed nets and curtains for preventing malaria. *Cochrane Database Syst Rev* 2004;(2).
3. Nevill CG, Some ES, Mung'ala VO, Mutemi W, New L, Marsh K, et al. Insecticide-treated bednets reduce mortality and severe morbidity from malaria among children on the Kenyan coast. *Trop Med Int Health* 1996;1(2):139-46.
4. Eisele TP, Larsen D, Steketee RW. Protective efficacy of interventions for preventing malaria mortality in children in *Plasmodium falciparum* endemic areas. *Int J Epidemiol* 2010;39 Suppl 1.
5. FMOH. Nigeria Strategic Plan 2009-2013. Malaria Situation Analysis. Abuja: National Malaria Control Programme; 2009: 23-9.
6. National Population Commission. Nigeria Demographic and Health Survey 2013. Abuja: National Population Commission; 2014: 201-21.
7. National Population Commission. Nigeria Malaria Indicator Survey: A preliminary report. Abuja: National Population Commission; 2011: 6-10.
8. Toe LP, Skovmand O, Dabire KR, Diabate A, Diallo Y, Guiguemde TR, et al. Decreased motivation in the use of insecticide-treated nets in a malaria endemic area in Burkina Faso. *Malar J* 2009;8.
9. Alaii JA, van den Borne HW, Kachur SP et al. Perceptions of bed nets and malaria prevention before and after a randomized controlled trial of permethrin-treated bed nets in western Kenya. *Am J Trop Med Hyg* 2003;68(4 Suppl):142-8.
10. Aikins MK, Pickering H, Greenwood BM. Attitudes to malaria, traditional practices and bednets (mosquito nets) as vector control measures: a comparative study in five West African countries. *J Trop Med Hyg* 1994;97(2):81-6.
11. World Health Organisation. Management of severe malaria. Severe *Falciparum* Malaria. 3rd ed. Geneva: World Health Organisation; 2012. p. 6-8.
12. Oyedeleji G. Socio-economic and cultural background of the hospitalized children in Ilesha. *Niger J Paediatr*. 1985;12:111-7.
13. Baume CA, Marin MC. Intra-household Mosquito Net Use in Ethiopia, Ghana, Mali, Nigeria, Senegal, and Zambia: Are Nets Being Used? Who in the Household Uses Them? *Am J Trop Med Hyg*. 2007;77(5):963-71.