ORIGINAL ARTICLE

Perception of Bed Nets and Malaria Prevention amongst Users of Insecticide-Treated Bed Net in a Semi-Urban Community In South-South Nigeria

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ABSTRACT

Background: *Assessment of the use and success of insecticide treated nets (ITN) in malaria control requires a good insight into the people's perceptions of malaria and ITN. This study reports on the perception of mothers of malaria, malaria prevention, and ITN, before and one year after the ITNs was bought from a social marketing programme.*

Methods: *The study was an intervention study carried out using an interviewer-administered questionnaire. The respondents were mothers who bought ITN sold by a social marketing project in Egbema a semi-urban community in Rivers State. The pre-intervention study was carried out at the time of purchase of the nets, while the post-intervention study was done one year later.*

Results: *There was a significant increase in the proportion of respondents who mentioned mosquito as the sole cause of malaria. (P < 0.001). There was also a significant reduction in the malaria burden of the household (P < 0.001). Most of the respondents (84.8%) stated that they liked the ITN because it ensures a good night sleep, free from the nuisance of mosquitoes. However, 48.31% complained of heat, and 26.40% complained of the task of having to mount the net every night for their children.*

Conclusion: *Sustained health education and use of ITN can promote the use of the nets for malaria control.*

KEYWORDS: Perception; Malaria prevention; ITN, Semi-urban community.

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INTRODUCTION

One of the targets of Roll Back Malaria was to achieve at least 60% coverage of ITN of malaria vulnerable group by 2005. But according to the 2005 World Malaria Report [1] this coverage target was achieved only in Eritrea, with the majority of the countries including Nigeria achieving less than 10% coverage. Even amongst users of the net, the nets were mainly used as a tool for mosquito nuisance control, and often jettisoned when the night-time temperature is hot and the nuisance of mosquito low [2]. Thus, it is not enough to distribute the insecticide-treated bed nets to meet coverage targets, people in malaria endemic countries need to be encouraged to use the nets at all time irrespective of the environmental condition. This is the only way to fully harness the effectiveness of the ITN as a tool for malaria control [3]. A social marketing programme in Tanzania [4] achieved a 60% reduction in the frequency of parasitaemia and anaemia in children under-two years of age, not just because it improved coverage from 10% to 60%, but also because the nets were regularly used.

To encourage the regular use of the nets requires a sustained well-crafted health education campaign, especially in communities without a culture of net use[5]. This will require a good insight into the people's perceptions of malaria and its cause, possible methods of its prevention; and the effectiveness of ITN as a tool for malaria control[5]. This paper reports the perceptions of mothers of malaria, malaria prevention, and ITN, before and one year after the nets were bought from a social marketing programme. It also assessed whether or not the use of the net has changed the perceptions of the users to malaria.

MATERIALS AND METHODS

Study site and Study population

The social marketing project for ITN was established in Egbema - a community of about 47,000 inhabitants [6]. Though, Egbema is one of the leading oil-bearing communities in Nigeria, most of its populace are subsistence farmers and fishermen. The most common type of house in the area is built with cement blocks and corrugated iron sheets. Most of the houses have sealed eaves, and have windows with insect screens, though the screens are often poorly maintained. Most people in the community live in family houses; and an average household with under-five children resides in one room. Sleeping accommodation differs by age. Children less than three years sleep with their parents often on a bed, while older children usually sleep on the floor with mat. Teenagers depending on the economic status of parents either have their own rooms or sleep with friends or relations in the neighboring houses.

The community unlike most others in Nigeria is provided with regular supply of electricity and pipe-

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borne water, though most of the households still get their water supply from the nearest public standpipe. This encourages the storage of water in traditional containers inside the living quarters. Mosquito larvas are common findings in these water storage containers.
Like most communities in south-south Nigeria, malaria is holoendemic in the study area. Transmission occurs through out the year with seasonal peaks corresponding to the rainy season in the area[7]. This in recent years, starts from April and ends in October. Annual rainfall averages 2200mm and daily temperature ranges from 19 ^{oc} and 33 ^{oc}. Most transmissions are due to *Anopheles gambiae, Anopheles funestus,* and *Anopheles melas. Anopheles melas* are the predominant vectors in the swampy areas of the farming settlements of the community[7].
The formative research of the social marketing project revealed that the use of bed net in the community was common up to the 1980s; now bed nets are seen as old fashion, rarely used except in the farm settlements and over baby cots, where they serve for mosquito nuisance control. However, none of these nets were treated with insecticide.

The educational activities of the social marketing project

The social marketing project was established to provide affordable insecticide-treated bed nets for malaria control to members of the community. The specific objectives of the social marketing project were to increase awareness and use of insecticide-treated bed net for malaria control, encourage the re-treatment of the nets; and promote the year-round use of the net especially amongst under-five children and pregnant women. Therefore, all the IEC materials designed for the project bear messages that emphasize the insecticide-treated bed net as a tool for malaria control. The strategy used for the social marketing emphasized face-to-face interactions. Mothers attending the family health clinics in the public health facilities that serve the community were spoken to, and the product demonstrated to them. Mass communication campaigns were also organized using door-to-door marketers, posters, informational leaflets, displays of mounted bed nets, recorded messages from influential members of the community, and the town crier.

Study design

A pre-intervention study carried out at the time the ITNs were purchased in April 2003, and a post-intervention study conducted in 2004, one year after the commencement of the social marketing programme, are the sources of data for the study.

The pre-intervention study was carried out using a structured questionnaire at the time of the intensive educational campaign used to drive the demand for the nets. The questionnaire was face-to-face, interviewer-administered, on all the female buyers of the ITN, and wives of all the male buyers, as extracted from the sales records of the social marketing project. Respondents were not prompted on answers during the interview.
The questionnaire was used to assess the knowledge of respondents on the causes of malaria, methods used by the household to prevent malaria and mosquito bites; and the amount of money spent on each of the preventive measures in the previous three months.
The questionnaire used for the post-intervention survey was an adaptation of that used for the pre-intervention study. It however also contained questions that assessed the experience with the use of ITN.

Data analysis

The data were entered into a data base using EPI-INFO version 2002 [8]. Analysis were carried out with EPI-INFO version 2002 and manually. Summary measures were calculated for each outcome of interest, while proportions were compared using Chi-square tests and independent-sample t-test. For all statistical tests, p-value of 0.05 or less was considered statistically significant.

Ethical clearance

The approval for the study was obtained from the Ethical Review Committee of the University of Port Harcourt Teaching Hospital, Port Harcourt. Informed consent was obtained from the respondents after the study was explained to them in the local language.

RESULTS

One hundred and ninety questionnaires were administered during the pre-intervention study, while 178 questionnaires were administered during the post-intervention study. As at the time of the pre-intervention study, the mean age of the respondents was 25 years, and majority of them (82.6%) had at least primary school (six years) education.

Findings of the pre-intervention study

Most of the respondents (91.6%) considered malaria as the most common cause of ill health in their households. Although, most of the respondents (95.8%) knew that mosquito causes malaria, only 3.7% mentioned mosquito as the sole cause of malaria. Other perceived causes of malaria include working under

intense sunshine (93.7%), overwork (34.2%), dirty environment (88.4%), and consumption of too much palm oil (55.8%). Appropriate preventive actions were commonly taken for each of the mentioned causes of malaria. The intake of medicines (including analgesia) (35.2%), and several anti-mosquito measures (88.4%) were specifically mentioned.

Mosquitoes were believed to breed more in dirty environment (43.7%) than in stagnant water (25.3%) and stored water (11.1%). Common measures used against mosquito bites include use of electric fan (80%), mosquito coil (33.2%), and a combination of measures especially insecticide sprays (43.7%). Most of the respondents (89.0%) bought the ITN, because it was considered a cost-effective tool for the prevention of mosquito bites. The information that led to the purchase of the ITN was given by health workers to 45.8% of the respondents; 15.3% of the respondents got the information from friends/neighbors, while 37.9% got the information from other sources including door to door marketers. None of the respondents specifically mentioned the mass media.

Findings of the post-intervention study

The number of respondents who mentioned mosquito as one of the causes of malaria increased from 95.8% to 100% ($P > 0.05$). There was however a significant increase in the number of respondents who mentioned mosquito as the sole cause of malaria. ($P < 0.001$). The number increased from 3.7% during the pre-intervention study to 30.2% in the post-intervention study. Only 43.3% of the respondents still considered malaria as the main cause of the ill health in their households, a significant reduction of 48.3% when compared to the value during the pre-intervention study ($P < 0.001$). Most (84.8%) of the respondents stated that they liked the ITN because it ensured a good night sleep, free from the nuisance of mosquitoes. However, 48.3% complained of heat, and 26.4% complained of the task of having to mount the net every night for their children.

DISCUSSION

The study suggests that the educational messages used to drive the demand for the ITN did not significantly change the perception of the mothers of malaria and its control, at the time of purchase of the nets. This is because the perceptions of the mothers were the same with those noted during the formative research of the social marketing project.

However, time and the use of the ITN significantly changed the perceptions of the mothers. This is consistent with the findings in other studies carried out in similar setting. It took a social marketing project in Malawi one year to achieve a 70% increase in marketing messages recognition from the baseline level of less than 5% [9]. Also a large scale trial of ITN in Kenya found that the awareness and rationale for ITN use were higher in the intervention villages compared to the control villages [10].

The educational activities of the social marketing project continued all through the year such that the respondents were constantly exposed to the messages. Time is an important factor in every health education effort. Adopting the desired behaviour is a process, not an event; time is needed for the individual to receive the message, absorb it, check if it is acceptable to one's peers and the society at large, before the decision is implemented [10]. This process is not even linear, but circular. People do not go through the stages and "graduate"; they can enter and exit at any point, and often recycle [10] . This contrasts with the situation in a typical social marketing project. Social marketing projects like their parents in commercial marketing, thrives in cajoling the buyers into making a purchase before a proper thought is given to the messages and the product.

The use of the ITN however, affords the buyers the opportunity to test the authenticity of the messages of the social marketing project, as is currently said in Nigeria "a trial will convince you". Apart from ensuring a good night sleep at lesser cost, the respondents also reported a decrease in the malaria burden of their households. These seem to suggest that experience might improve the perceived value of the ITN. This has been reported in other ITN projects, where the bed nets became prized commodities with use, even in communities where the use of bed nets had been uncommon [12].

The increase in the percentage of respondents that identified mosquito as the sole cause of malaria, and the recognition of the effectiveness of the ITN on mosquito, might translate to better adherence to the use of the nets. Poor adherence in the use of the nets for malaria control has been linked to the belief in most traditional communities that malaria is caused by multiple factors, many of which are difficult to prevent [13].

The findings of this study are very instructive in the current efforts at realizing coverage targets and promoting the use of the bed nets. Several countries including Nigeria [1] have engaged in the free distribution of ITN to quickly meet coverage targets. There is little doubt that the nets would at first be used to control the

nuisance of mosquito [2]. But with time and sustained health education, the beneficiaries of these nets would come to appreciate the effectiveness of the nets as a tool for malaria control.

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REFERENCES

1. Roll Back Malaria, World Health Organization, and UNICEF. World Malaria Report 2005. WHO/ HTM/ MAL / 2005.1102.
2. Binka FN, Adongo P. Acceptability and use of insecticide treated bed nets in northern Ghana. Trop Med Int Health 1997 (5) 499-507.
3. Winch PJ, Makembo AM, Kamazima SR, *et al*. Seasonal variations in the perceived risk of malaria: implications for the promotion of insecticide impregnated bed nets. Soc Sci Med. 1994; 39: 63-75.
4. Salim A, Armstrong-Schellenberg J, Lengeler C, *et al*. Impact on malaria morbidity of a programme supplying insecticide treated nets in children aged less than 2 years in Tanzania: community cross sectional study. BMJ 2001; 322; (7281) 270-273.
5. Alaii JA, Hawley WA, Kolczak M, *et al*. Factors affecting use of permethrin-treated bed nets during a randomized controlled trial in western Kenyan. Am J Trop Hyg 2003. 68 (Suppl 4):137-141.
6. National Population Commission. Final result of 1991 population census of Nigeria. Lagos. National Population Commission. 1991.
7. Adjuik M, Bagayoko M, Binka F, Coetzee M, Cox J, Craig M. Towards an atlas of malaria risk in Africa: First Technical report of the MARA/ARMA collaboration. Main MARA/ARMA investigating center. Durban. 1998;17:24. (website www.mara.org.za).
8. Center for Disease Control. Epi-Info 2002 statistical software version 2002. Atlanta. GA, Center for Disease Control, 2002.
9. Holtz TH, Marum LH, Mkandala C, *et al*. Insecticide treated bed net use, anaemia and malaria parasitaemia in Blantyre District, Malawi. Trop Med Int Health 2003;7 (3) 220-230.
10. Alaii JA, Van Den Borne HW, Patrick-Kachur S, *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(suppl 4):142 -148.
11. Prochoska JO, Velicer WF. The transtheoretical model of health behaviour change. American Journal of Health Promotion 1997. 12 (1) 38 -48.
12. Kachur SP, Philip-Howad PA, Odhacha AM, Ruebush TK, Oloo A J, Nahlen BL. Maintenance and sustained use of insecticide-treated bed nets and curtains three years after a controlled trial in western Kenya. Trop Med Int Health 1999;4 (11): 728 -735.
13. Ahorlu CK, Dunyo SK, Afari EA, Koram KA, Nkrumah FK. Malaria-related beliefs and behaviour in southern Ghana: Implications for treatment, prevention and control. Trop Med Int Health 1997; 2(5)488 -499.