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Insecticide Treated Net Utilization and its barriers among Under-Five Children in Adami Tulu District, Oromia Regional State, Ethiopia: A Qualitative Study

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Received: 14 April 2015 Accepted: 2 May 2015 Published: 15 May 2015

Abstract

Background: Despite the scaling-up of Insecticidal Treated Nets (ITNs) distribution in Ethiopia, its use among net owning households has not been satisfactory. Hence, in addition to scaling up of net distribution, periodic assessment of the use and barriers against the use of bed nets among high risk population is necessary.Objective: The objective of this study was to assess the ITNs use and its barriers among underfive children in Adami Tullu District, Ethiopia.Methodology: A small-scale qualitative approach was used. Purposive sampling was employed to get mothers with under-five children in all kebeles. Semi-structured discussion guide was used for focus group discussions which was conducted in Afaan Oromo (local language of the study area). Open code computer program was used for the analysis of the data. The data was coded; categorized and appropriate themes were developed. The data was summarized and presented along the main themes.

Index terms— ITN use, under-five, barriers, children and malaria.

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Results: The mean age of the participants was 28.3(±4.4).

Majority of the participants knew the cause of malaria. All of the participants agree with vulnerability of children and pregnant women. The participants said that ITN has no side effect as far as it is used appropriately. Rather, it protects against malaria and other insects like housefly and fleas. Lack of understanding, fear of side effect and using the net for other purposes like carrying harvest materials, using the net as a mattress and covering the toilet were among the barriers mostly discussed. Four main themes were identified from the focus group discussion i.e. perception about cause and prevention of malaria, perception about vulnerability of children, benefit and side effects of ITNS and barriers towards ITN utilization.

1 Conclusion and recommendation: Lack of understanding, fear

of side effect and using the net for other purposes were identified as main barriers. IEC (Information, Education and communication) on the effective and continuous utilization of under-five children should focus on durability of LLINs and avoid misconceptions regarding longevity of the nets.

2 I. Introduction

alaria remains a major public health and development challenge (1). It caused 216 million cases and 655,000 deaths worldwide in 2010, of which 81% of the cases and 91% of the deaths were from the Sub-Saharan Africa (1). Children under the age five years are most likely to suffer from the severe effects of malaria because they have not developed sufficient naturally acquired immunity to the parasite (2).

The use of Insecticide Treated Nets (ITNs) is one of the main malaria control strategies in Ethiopia to reach the national targets to achieve malaria elimination within specific geographical areas with historically low malaria transmission and achieve near zero malaria death in the remaining malarious areas of the country (3).

In Ethiopia, the Federal Ministry of Health (FMOH) conducted continuously mass distribution of LLINs between 2005 and 2007, targeting to distribute two LLINs per household in malaria endemic areas and further 15 million were distributed in 2010 and 2011 to replace LLINs distributed previously (4). Despite this rapid scale up of each kebele since 2005, it is unlikely that all LLINs are still in use after six years (5). Identification of awareness gaps, monitoring of behavioral changes on malaria disease recognition and use of preventive and control measures such as the use of ITNs are a priority area for the Government of Ethiopia with a special emphasis on identifying the barriers and increase the use of ITNs as per the national malaria guidelines (5).

Increase in ITN access (i.e. household ownership) does not necessarily translate to equal increase in utilization (6). Because, the success of ITN utilization depends on several factors: such as, willingness of people to use nets, inconvenience to hang the nets, educational background, place of residence, perception of the side effect associated with ITN use and colour of nets (5,6).

Hence, in addition to scaling up ITNs distribution, periodic assessment of the use and M barriers among high risk population is highly recommended (7). Thus, this study aimed at identifying utilization of ITNs use and its barriers among under-five children in a malaria-prone district of Eastern Shewa.

3 II. Methods a) Study setting and participation

A qualitative study was conducted in Adami Tulu District of East Shewa zone in February 2014. Malaria transmission in the District is seasonal and epidemic type, peaking from September to December. Two species of Plasmodium are present in the area; Plasmodium falciparum (about 70%) and P. vivax (about 30%) (5). The source population was all under fivechildren and their mothers/ care takers.

4 b) Sample size and sampling methods

Out of the 47 rural villages, four of them were selected (Anano Shisho, Boccessa, Elka Chelemo and Gallo Heraphe) for malaria intervention trial and all of them were included in our study. Four groups of FGD participants were selected by the investigator purposively in consultation with the Kebele (small administrative units) leaders and health development army. All groups contain at least 6-8 women with at least one child less than five years old. This is helpful to handle the discussion easily and to avoid side conversation. Totally, 30 mothers with at least one under-five children participated. Purposive sampling was employed to get mothers with under-five children in all kebeles.

5 c) Data collection methods and instruments

Semi-structured discussion guide was developed after reviewing similar literatures and held with mothers of under-five children from each of the four kebeles to explore and understand perceptions and barriers towards use and non use of ITNs among underfive children. Based on the objectives of the study the main themes developed were perception about cause and prevention of malaria, perception about vulnerability of children, benefit and side effects of ITNS and barriers towards ITN utilization.

The discussion was facilitated by Principal investigator using a check-list and all the discussions were tape recorded. The note taker was assigned by the investigator. The recorded data was transcribed in Afaan Oromo and then translated into English word-for-word. Then it was supplemented with field note in any case there was a difficult of identifying the audiotape record to clarify the ambiguity. Translation into Afaan Oromo was verified by investigator.

6 d) Data quality control

FGDs were conducted in Afaan Oromo (local language of the study area). Correctness of transcription was checked for 5% of all the audio tapes. Minor corrections, such as incomplete responses to the questions, were checked in comparison with note and corrected on subsequent transcriptions. Principal investigator entered each transcript into Microsoft WORD as each interview ends. Participants gave their ideas freely throughout the discussion until the idea was saturated.

7 e) Data processing and analysis

Open code computer program was used for the analysis of the data by sorting information, looking for similarities, differences or contradictions. English transcripts were read and re-read to develop codes that identify important and common concepts related to the main themes of the study. The data was coded; categorized and appropriate themes were developed. Field notes and original transcripts were looked upon when more information/ clarity are needed during coding, analysis and write up. Finally, the data was summarized and presented along the main themes.

8 f) Ethical consideration

Ethical clearance was obtained from Ethical review committee of School of Public Health, Addis Ababa University. Formal letter have been written for Adami Tulu health office. The letter was written for each of respective kebeles from Woreda Health bureau and informed before going for data collection. Participants were informed that their participation is purely voluntary and assured of the confidentiality of all information.

9 III. Results

10 a) Sociodemographic characteristics of the participants

The mean age of the participants was 28.3 (±4.4) and ranges from 20-38 years. Half of the participants are literate (had formal education) and around three fourth of them were Muslims in religion. On average each mother has 1.5 children and 17(56.7%) of the participants are housewife in occupation (Table **??**ne). The result of FGD is summarized in the following paragraph.

Majority of the participants knew the cause of malaria. All of the participants agree with vulnerability of children and pregnant women. Most of the participants agreed that cleaning environment and hanging the nets helps to prevent malaria. The participants said that ITN has no side effect as far as it is used appropriately. Rather, it protects against malaria and other insects like housefly and fleas. Lack of understanding, fear of side effect and using the net for other purposes like carrying harvest materials, covering the toilet were among the barriers mostly discussed. Majority of participants had misconception concerning ITN utilization throughout the year. Finally, education was explained as the best way to increase utilization among under-five children.

Four main themes were identified from the focus group discussion i.e. perception about cause and prevention of malaria, perception about vulnerability of children, benefit and side effects of ITNS and barriers towards ITN utilization

11 b) Perception about cause and prevention of malaria

Almost all of the FGD participants mentioned mosquito bite as a cause of malaria though they explained it in different ways. The stagnant water around the home, unclean environment and absence of toilet were raised as a reason for mosquito breed there and bite peoples. One of discussant said "If there is stagnant water around the home; the mosquitoes will breed there and bites peoples at home. The same is true if there is no toilet around the home" (30 years, Muslim Mother of one child, Gallo Heraphe kebele)

Majority of the FGD Participants discussed role of ITNs in prevention. In addition, they said that washing the clothes of children, keeping the household materials clean, burning the waste materials and digging toilet at distance from the home as a prevention ways. Draining the stagnant water around the home is considered as most important mechanism in preventing malaria.

12 "By draining water in front of the home, using net hanging correctly, Cleaning one own house, washing clothes of the children and cleaning eating materials." (38 years, Orthodox mother of one child in Boccessa kebele) c) Benefits and side effects of ITNs

FGD participants discussed that ITNs could prevent malaria if used in appropriate manner and most of the side effect occur due to technical problems. In addition, it protects nuisance insects like fleas, housefly and others if hanged correctly and kept in a clean manner.

The discussants agreed that the side effects may occur depending on the way the net is being hanged. One of participants said "specially, it needs great care for the children.

18 AND PREGNANT MOTHERS ARE MOSTLY AFFECTED BECAUSE MOST OF THE TIME CHILDREN'S GO TO THE STAGNANT WATER TO PLAY (20 YEARS, PROTESTANT MOTHER, 1 CHILD GALLO HERAPHE KEBELE) E) BARRIERS TOWARDS ITN UTILIZATION

13 If it burns you during the night time, you will feel it throughout the day. Specially, when the net is new, it should be hanged correctly since it has the chemical at the beginning. We can take care of U5 Children by correctly hanging the net and inserting under the bed or mat in all directions (35 years Muslim mother of 2 children in Gallo Heraphe kebele)

The discussants further recommended inserting the net under the bed in all corners in order to avoid hotness. One of the participant said "if treated with insecticide and hanged the net could prevent Malaria.

14 The chemical may burn your body if hanged without making in the air; you feel discomfort and hotness during the hot season (Bonna). Therefore, you have to insert it

15 " (30 years Muslim mother of 1 child in Elka Chellemo kebele)

Making the net in the air is suggested before use. Unless, it dangerous especially for children.

16 One of the mother said if children hold the net before making in the air, it may cause danger since the child eat by contaminated hand, unless the family wash the children immediately (25 years Muslim mother of 2 children in Elka Chellemo kebele)

Majority of the mothers witnessed inappropriate use of the net in their community. One of the mothers said, after taking the net some peoples uses it as mattress, bed cover and then it causes irritation which looks like scabies. But, the net is not given to wear during night rather to use it by hanging rectangular on the bed and inserting the four edges under the bed (28 years, Orthodox mother of 1 child in Boccessa kebele).

17 d) Perception about vulnerability of children

All of the discussants agreed that malaria is more serious for under-five children and pregnant women. One of the mother said "under-five year's old children

18 and pregnant mothers are mostly affected because most of the time children's go to the stagnant water to play (20 Years, Protestant mother, 1 child Gallo Heraphe kebele) e) Barriers towards ITN utilization

The most common reasons for non use raised by FGD participants were dirty due to smoke, lack of understanding; perception of repeated wash decreases the chemical, living far away from the lake and fear of side effect especially for children.

19 Concerning lack of understanding, "There is a say in Afaan Oromo "Dooqni ofiis hin nyaatu, namas hin laatu"-peoples have nets in the house. But, they neither use for themselves nor give for others." (35years, Muslim mother of 2 children in Anano Shisho kebele.). Another mother said the following about fear of side effect "peoples fear that their children's might be affected due to hotness under the net (25 years, Muslim mother of 1 child in Anano Shisho kebele)

Almost all of the FGD participants had wrong perception about the longevity of ITNs." peoples are saying that the net is not protecting us from Insect bite after one or two wash because they think that chemical decreases during wash and become useless. Therefore, it is better if given with insecticide for the future (26years, Orthodox mother of 1 child in Boccessa kebele)

FGD participants expressed different ideas concerning the relation between seasonality and ITN use based on their living village. Those mothers living near the lakes agreed that they use the net throughout the year. Those living away from the lake were not using the net during the dry season. For example, mothers near Lake Dambal said "since we are living around the Lake, mosquito is always there even though it increases during rainy season. Thus, it is good to use throughout the year by washing." (32 years, Muslim mother of 1 child in Boccessa kebele)

Another mother said" Mostly we use when Malaria starts; during the rainy season when mosquito comes back. You will not find many mosquitoes during winter unless we hang the net to protect other insects (27 years, Protestant mother of 2 children in Gallo Heraphe kebele)

Majority of the participants rose cooking in the house as the problem in using the net, since there is smoke in the house, we wash it many times which makes the chemical non-fuctional.in addition, the rain comes down through the thatch and affect the net. The net had worn out with in short time. **??**

20 years, Muslim mother of 1 child in Elka Chellemo kebele)

All FGD participants raised lack of knowledge and misuse of the net as the main reason for not using among under five children. One of the participants said ""walaala"-due to lack of knowledge, even there are peoples who sell instead of protecting himself and his children from Malaria (30 years, Grade 5, Orthodox mother of 2 children in Boccessa kebele).

Finally, the discussants agreed that health extension workers should educate the community about the procedures of hanging the net and appropriate utilization. One of the discussant said that health extension workers have to educate the people on the hanging procedure and utilization and we have to use it properly in the future (25 years, Muslim mother of 1 child in Anano Shisho kebele)

In addition, they agreed to teach each other ones they learned from health extension workers. The mother from Gallo Heraphe kebele said, for example I had used the nets and seen its benefits for myself and my family. Therefore, I have to advice my neighbor on how to hang the nets and its benefits.

At kebele level, the net should be distributed as it reaches all family members including U5 children's (25years, protestant mother of 1 child in Gallo Heraphe kebele).

21 IV. Discussion

This study, using a qualitative approach, has explored the knowledge of the cause and prevention of malaria, benefits and side effects of ITNs and barriers for ITNs use in Adami Tulu District of East Shewa Zone. In this study majority of the discussants said mosquito bite is a cause of malaria. Similarly, study among underfive Nigerian children in Nigeria found that the perception of the majority of caregivers about the cause of malaria is mosquito bite (8). This is very important because cross sectional study on Bioko Island, of Equatorial Guinea found that knowledge of prevention and transmission of malaria were associated to ITN utilization (9).

The knowledge towards malaria prevention using insecticide treated nets was reported to be low from couple of studies done in Ethiopia (10,11). However, in our study, majority of the discussants agreed that insecticide treated nets can prevent malaria if hanged correctly. The possible reason for this difference could be increase in awareness creation by health extension workers.

In the present study, all of the discussants said that under-five children and pregnant women are at risk of malaria and should be given priority. Similarly, a study about ITNs usage against malaria in Tigray Region found that three fourth of the respondents claimed that children under-five years of age and pregnant women are at high risk of malaria and should be given priority to sleep under ITN in the household (12).

In our study majority of the discussant (those living away from the lake) agreed that they don't use the net throughout the year due to hotness, absence of mosquito during the dry season and other reasons. Similarly, a study carried out in 2011 in the highlands of western Kenya showed that, the vast majority of the population

was not willing to use the net during dry season because of hotness, discomfort, low mosquito density and other reasons (13).

The perception that the ITN was no longer effective after two washes if not re-treated was the most important reason for not using ITN among households with under-five children (14). Similarly, in our study majority of the discussants had similar perceptions and recommended the net to be given with the chemical.

One of the mothers' said, I have taken two nets two years ago, I removed and washed it since it gets dirty due to smoke .Then after, I didn't used it again since there is no chemical to retreat it (30years Muslim mother of 1 child Elka Chellemo). But, the government is distributing long lasting insecticide treated nets which does not need re-treatment and can serve 3 to 4 years on average (4).

Majority of our discussants said that the nets get dirty due to smoke in the house and the peoples will wash it again and again. Then after, they will use it for other purpose other than the intended use. Similarly, the study in the southern nations, nationalities and peoples in Ethiopia identified possible reasons for not using ITNs among households like too old or torn, too dirty and unavailability of nets (15).

Lack of understanding was also found to be one of the main barriers against the net use. Most of the peoples use it for other purpose like carrying harvest materials like maize, covering the toilet and plant in the garden. Other similar studies also reported using nets for other purposes than sleeping under have been reported in a number of studies. These include drying of fish in Western Kenya, fish farming, curtains at home, ant traps in Uganda, and protecting dead bodies from house flies while making burial arrangements in Nigeria (16, **??**8).

22 Limitations and strengths of the study

Due to logistical constraints the FGD was conducted among only 4 groups.

Despite the limitations, this study gives an overview of the knowledge of discussants towards the cause and prevention, benefits of the nets and barriers towards the use of the nets. Fortunately, saturation was achieved with in these 4 groups. The investigators participated in the data collection, analysis and write up. The FGD was conducted among populations of different education level and from different geographical area.

23 V. Conclusions

Majority of the discussants identified mosquito bite as a cause of malaria. Under-five children and pregnant women were discussed as a vulnerable group in the community. The participants said that ITN has no side effect as far as it is used appropriately. Lack of understanding, fear of side effect and using the net for other purposes were identified as main barriers.

Health extension workers should have to teach the procedures of hanging and the benefits of the net ones distributed for the community. Continuous supervision of the health extension workers is important to avoid using the net for unintended purpose.

IEC (Information, Education and communication) on the effective and continuous utilization of under-five children should focus on durability of LLINs and avoid misconceptions regarding longevity of the nets. [1]

[1]Insecticide Treated Net Utilization and its barriers among Under-Five Children in Adami Tulu District, Oromia Regional State, Ethiopia: A Qualitative Study

Figure 1: F

.1 Authors' contributions

Both authors contributed in the design, analysis and interpretation of data. BL prepared the draft of the manuscript and WD reviewed the manuscript. Both authors read and approved the manuscript.

.2 VI. Acknowledgements

Our special thanks for the Addis Ababa University, School of Public Health Librarians for providing us reading materials and internet service. Last but not the least; we would like to thank Adami Tulu Woreda Health Office especially malaria focal person because of his continuous support.

.3 Competing interests

The author(s) declare that they have no competing interests.

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