Factors Affecting Utilisation of Insecticide Treated Net among Household with Children Less than Five Years in Hodan District, Mogadishu, Somalia

Mohamed Hassan Mohamed¹, Hafsa Mohamed², Anisa Hassan³

¹Public and Environmental Health, Somali International University, Mogadishu, Somalia
²EPI Program, Health Center, Mogadishu, Somalia
³Health Center, Mogadishu, Somalia

Email: tacshiir@gmail.com, Mhafsa235@gmail.com, Anishassan156@gmail.com

Abstract

Malaria is hyper-endemic in Somalia and remains one of the leading causes of morbidity and mortality, especially vulnerable groups such as old people, pregnant women, and children under five years. The prevalence of the disease is the highest along the rivers, settlements in southern Somalia, with artificial water reservoirs, where there is a year-round transmission. About 80% of malaria cases in Somalia occur in the Shebelle and Juba river basins. Outside of the malaria-endemic areas, it is estimated that 87% of Somalia is at risk of being exposed to malaria epidemics. According to a recent KAP (knowledge, attitude, and practices) survey, less than 10% of the households have Insecticide-treated mosquito net. This cross-sectional study was conducted to describe the factors affecting utilization of Insecticide-treated net among households with children under 5 years in Hodan district. The study was all adult households (more than 18 yrs.) with five years. A total of 50 respondents were interviewed during the period of data collection. A structured questionnaire dealing with socio-demographic characteristics, household’s knowledge about the Insecticide-treated net and availability and ownership and uses of Insecticide-treated net were used as data collection instrument. Results were presented in frequency tables and graphics. The majority of respondents indicated that 30 out of 50 (60%) have Insecticide-treated mosquito net while 20 out of 50 (40%) do not have it. The main reason for those who do not have Insecticide-treated mosquito net they did not able to afford it. Knowledge about malaria and Insecticide-treated mosquito net importance, the majority of respondents (92%) believe that there is a great benefit to use Insecticide-treated mosquito net for a reason to protect them mosquito bites.
20 (40%) were primary education and they didn’t know the causes of malaria (38 out of 50, 76%). The households of the Hodan district need special attention to the utilization of Insecticide-treated mosquito net. Free provision of Insecticide-treated net awareness creation on the utilization of Insecticide-treated mosquito nets and participated in an income generates supremely important activities. This study demonstrated a wide gap between knowledge, Insecticide-treated mosquito net ownership, and Utilization among the household with children less than 5 years. Therefore, the suggested recommendations arising from this study are for effective case management and control efforts of malaria. One of the strongest weapons in the fight against malaria is the use of insecticide-treated mosquito net while sleeping.

**Keywords**

Malaria, Insecticide Treated Bed Nets, Household, A Mosquito Net

---

**1. Introduction**

Malaria is an infectious disease that infects millions of people on the global annually. The disease may be a global ill health, which affects mainly young children especially those but five years aged. Everybody [1] [2] especially the non-immune is at risk of getting the disease [3] [4]. Malaria is caused by any of the human parasites including; plasmodium falciparum, plasmodium malaria, plasmodium varix, and plasmodium ovale. The most dangerous and common malaria parasite is the plasmodium falciparum [5] [6].

It is believed that the Anopheles mosquito feeds in the night and mainly between 10.00 pm and 4.00 a.m. and this is peculiar to Africa [7]. It could be the reforest aid that if people are made aware of the eating habit of the Anopheles mosquito and the use of the insecticide-treated net is promoted; the rate of malaria infection will reduce to an appreciable level [8].

Insecticide-treated mosquito net (ITN) used for cover against mosquito bites has proven to be a practical, highly effective, and cost-effective intervention against malaria. Community-based randomized controlled trials (RCT) in these regions have documented average reductions of 20% altogether causes of mortality in children under 5 years old within 2 years of accelerating ITN use from 0 to 50% - 70% [9]. Scaling up ITN coverage and use by young children and pregnant women have been made a consensus target of the Millennium Development Goals (MDGs), the Roll Back Malaria Partnership (RBM), and thus the US President’s Malaria Initiative (PMI). Targeting individual protection to those vulnerable groups could also be a well-founded and explicitly accepted priority of all three initiatives because these groups absolute the best risk of morbidity and mortality from malaria [10].

Insecticide-treated bed net (ITN) is shown to significantly reduce malaria-related morbidity and all-cause child mortality across a variety of transmission settings in Africa, especially children 5 years old and pregnant women [11].
The Roll Back Malaria Partnership has recently set the target of protecting 80% of youngsters and pregnant in danger for malaria with ITNs by 2015. However, preventing malaria morbidity and malaria-related mortality could also be minimized if ITN isn’t properly and consistently employed by vulnerable populations [12]. Although ITN is increasingly accessible in many Sub-Saharan Africa countries, getting people to properly and consistently use ITN has proven difficult. A previous multi-country assessment in SSA using national and sub-national household surveys between 1991 and 2001 found a substantial gap between use and possession among children. Within households possessing a minimum of one ITN, only 55% of youngsters were found to possess slept under an ITN the previous night [13] [14].

Within each country, we present factors related to ITN use among children younger than 5 within ITN-owning households to isolate factors aside from access to an ITN influencing use. Although we recognize that information on the utilization of bed nets, treated or untreated, is beneficial for investigating factors associated with their use, this analysis focused on ITN only because [15]. ITN are according to international targets. ITNs, especially long-lasting ITNs, are increasingly more prevalent in SSA than untreated net; and ITN have a bigger impact on preventing malaria and thus their use is probably going different from older untreated net [16].

Some demographic factors are identified as important predictors of ITN use including gender, wealth, access to health care, education, and ethnicity [17]. This study was aimed toward determining the factors affecting utilization of insecticide treated net among household with children under five years [18].

Malaria may be a major health concern in Somalia. The prevalence of the disease is highest along the rivers, settlements in southern Somalia, with artificial water reservoirs, where there’s year-round transmission. About 80% of malaria cases in Somalia occur within the Shabelle and juba river basins. Outside of the malaria endemic areas, it’s estimated that 87% of Somalia are in danger of being exposed to malaria epidemics. consistent with a recently KAP (knowledge, attitude and practices) survey, but 10% of the households have ITN [19] [20].

Malaria may be a major public ill health in Somalia. the present strategy of the National Malaria Control Programmers absent, there’s no effective case management and therefore the use of insecticide treated bed net among vulnerable groups like children under-five years aged and pregnant women are very low [21].

One recommended intervention from the planet Health Organization (WHO) that has been implemented to make sure successful malaria prevention and control is that the use of Insecticide-Treated Net (ITN) [22] [23] [24] [25]. Evidence from the literature has shown that the utilization of ITN reduces malaria incidence in endemic areas by 50% compared to areas where there’s no net use, and it’s also cost-effective. However, despite known evidence that these interventions significantly reduce malaria incidence and associated morbidity and mortality, there’s still a coffee rate of implementation and usage [26] [27] [28].
2. General Objective of the Study

The main objective of this study is to assess the factors affecting utilization of insecticide-treated nets among household with children five years in Hodan District.

Specific objectives

- To assess the knowledge of malaria among households with children under five years.
- To identify barrier the use of ITN as prevention and control tools against malaria.
- To identify ownership and usage of ITN among the household.

3. Methodology

This study employed a cross-sectional study design. Cross-sectional studies are use questionnaires for data collection with the view of generalizing from a sample to a population. The area of this study is Hodan District, the study populace was representative 50 household with children under five years in Hodan district, Sample size is 50 representatives was conveniently selected randomly from the population live in Hodan district. Data was be reviewed, edited and entered into computer and to be analyzed by software program statistical package for social sciences (SPSS) version 16.0.

4. Ethical Consideration

The written ethical approval and clearance was obtained from research ethics committee in Somali International University (SIU). Participation is voluntary. Orally informed voluntary consent was being taken from each participant after explaining the benefits of the study in improving the quality of health services. Confidentiality of the data obtained was being assured.

5. Result

5.1. Socio-Demographic Data

A total of 50 respondents participated in the study. Each respondent represented a household. The majority of respondents by gender shows that 33 (66%) of respondents were female, while 17 (34%) were male the mean age twenty-four, (48%) respondents were aged 26 - 35 years; and 33 (66%) were married. About 21 (42%) had at least a primary level of education. Regarding the occupational status of the participants, housewife and students were the highest 25 (50%) were housewife’s while 11 (22%) are students (Table 1) the paragraph is to describe the content of the table.

Age of children less than five years The majority of respondents by children less than five years shows that 48 (96%) of respondents between 1 - 5 years, while 2 (4%) of respondents between 6 to 10 and 44 (88%) had several bedrooms between 1 to 6 (Table 2).
Table 1. Socio demographic characteristics of respondents.

| Characteristic     | Frequency | Percent % |
|--------------------|-----------|-----------|
| **Gender**         |           |           |
| Female             | 33        | 66        |
| Male               | 17        | 34        |
| Age                |           |           |
| 18 - 25            | 12        | 24        |
| 26 - 35            | 24        | 48        |
| 36 - 45            | 10        | 20        |
| Above 50           | 4         | 8         |
| **Marital status** |           |           |
| Single             | 16        | 32        |
| Marriage           | 33        | 66        |
| Divorced           | 1         | 2         |
| **Education level**|           |           |
| Primary school     | 21        | 42        |
| Secondary          | 12        | 24        |
| University         | 13        | 26        |
| Others             | 4         | 8         |
| **Employment status** |       |           |
| Housewife          | 25        | 50        |
| Jobless            | 6         | 12        |
| Self-employment    | 7         | 14        |
| Students           | 11        | 22        |
| Others             | 1         | 2         |

Table 2. Age of children less than five years.

| Variables                        | Frequency | Percent % |
|----------------------------------|-----------|-----------|
| children less than five years    |           |           |
| 1 - 5                            | 48        | 96        |
| 6 - 10                           | 2         | 4         |
| number of bedrooms in your household |     |           |
| 1 - 6                            | 44        | 88        |
| 7 - 12                           | 6         | 12        |

5.2. Household's Knowledge of ITN

This table shows that all of a respondent are heard about mosquito net treated with insecticide and 20 (40%) of respondent were hear in health workers while 17 (34%) of the respondent are hear in family members and “The majority of respondents remember that 24 (48%) said they use of ITNS protect against malaria infection 11 (22%) said children under five years must sleep under ITNs everyday Table 2”.

The majority of the respondents believed there is a clear benefit of ITNs uses shows that 46 (92%) said yes, 2 (4%) said no and 2 (4%) said don’t know. the reasons 26 (52%) said do not get bitten by mosquitoes and the respondent are said the main causes of malaria is being in the rain, near collected water and plasmodium. The means of transmission reported including: mosquito bite 47 (94%), presence of lack hygiene 3 (6%) (Table 3). The main preventive measure of malaria was reported by the majority, 23 (46%) said use INT while 12 (24%) of respondents said environmental cleanliness (Table 3).

5.3. Ownership and Use of ITN

The majority of 30 (60%) of respondents have INT while 20 (40%) of respondents
Table 3. Household’s knowledge of ITN.

| Variables                                      | Frequency | Percent |
|------------------------------------------------|-----------|---------|
| Do you Heard about mosquito net treated with insecticide | Yes       | 50      |
|                                                 | No        | 50      |
| Family member                                   | 17        | 34      |
| Community                                       | 4         | 8       |
| Radio                                           | 5         | 10      |
| Television                                      | 3         | 6       |
| Health facility                                 | 20        | 40      |
| Other                                           | 1         | 2       |
| where did you first hear or seen it             |           |         |
| ITNs is safe to use for the whole family        | 10        | 20      |
| must sleep under ITN everyday                   | 11        | 22      |
| use of ITN protect against malaria              | 24        | 48      |
| I do not remember anything                      | 5         | 10      |
| what do you remember best about ITN health message |           |         |
| ITNs is safe to use for the whole family        | 10        | 20      |
| must sleep under ITN everyday                   | 11        | 22      |
| use of ITN protect against malaria              | 24        | 48      |
| I do not remember anything                      | 5         | 10      |
| Do you think ITN have any benefits?             |           |         |
| Yes                                            | 46        | 92      |
| No                                             | 2         | 4       |
| I do not know                                   | 2         | 4       |
| if yes what do you think are the benefits of ITN |           |         |
| do not get bitten by mosquitoes                | 26        | 52      |
| do not get malaria                              | 21        | 42      |
| other insects                                   | 3         | 6       |
| being in the rain                               | 15        | 30      |
| Drinking dirty water                            | 8         | 16      |
| Living near collected water                     | 12        | 24      |
| Plasmodium                                      |           |         |
| transmits malaria                               |           |         |
| mosquito bite                                   | 47        | 94      |
| lack of hygiene                                 | 3         | 6       |
| use ITNs                                        | 23        | 46      |
| environmental clean                             | 12        | 24      |
| destroying breeding sites                       | 5         | 10      |
| uses of antimalarial                            | 1         | 2       |
| use insecticide sprays                          | 8         | 16      |
| using repellents                                | 1         | 2       |

have not INT all households. The reasons for unavailable INT include: is too expensive 10 (20%) of respondents are said. And respondents 10 (20%) get two or more INT by households. The majority of respondents who got ITNs indicated that 18 out 30 (36%) got purchase system 7 out of 30 (14%) 7 (14%) got free from local NGO while 5 out of 30 (10%) got free from government sources and Most respondents used ITN 12 (24%) said during rainy season 12 (24%) said when sees mosquitoes 11 (22%) always (Table 4). Most respondents asked if net treated with insecticide 25 (50) said no 17 (34%) said yes while 8 (16%) said do not know. And this table indicated that the majority of the respondents said no 35 (70%) while said yes 15 (30%).

6. Discussion

The socio-demographic characteristics identified to be influencing ITN use in hodan district include age, educational level, occupation and marital status.
Table 4. Ownership and use of ITN.

| Variable                                                                 | frequency | Percent % |
|--------------------------------------------------------------------------|-----------|-----------|
| do you have ITN                                                         |           |           |
| Yes                                                                      | 30        | 60        |
| No                                                                       | 20        | 40        |
| it is not necessary                                                      | 4         | 8         |
| it is too expensive                                                     | 10        | 20        |
| If no, reasons for unavailability of ITNs                                 |           |           |
| old, then thrown away                                                   | 1         | 2         |
| house structure affects net use                                          | 4         | 8         |
| afraid of its toxicity                                                   | 1         | 2         |
| missing                                                                  | 20        | 40        |
| If yes, how many ITN do you have in your household                       |           |           |
| One                                                                      | 10        | 20        |
| Two                                                                      | 10        | 20        |
| Three                                                                    | 7         | 14        |
| Four and above                                                           | 3         | 6         |
| Missing                                                                  | 20        | 40        |
| How did you get ITN?                                                     |           |           |
| free from the government                                                | 5         | 10        |
| local NGO                                                                | 7         | 14        |
| purchase system                                                          | 18        | 36        |
| missing                                                                  | 20        | 40        |
| When should you use ITN                                                 |           |           |
| Always                                                                   | 11        | 22        |
| during rainy season                                                      | 12        | 24        |
| when sees mosquitoes                                                     | 12        | 24        |
| some times                                                               | 7         | 14        |
| don’t know                                                               | 8         | 16        |
| Yes                                                                      | 17        | 34        |
| No                                                                       | 25        | 50        |
| Do not know                                                              | 8         | 16        |
| Is your ITN treated with insecticides?                                   |           |           |
| Yes                                                                      | 15        | 30        |
| No                                                                       | 35        | 70        |
| Do you know the difference between ITN and non-treated nets?             |           |           |

The majority respondents of age indicated that 24 (48%) were between 26-35, the majority of respondents of education indicated that 21 (42%) were primary, the most respondents of the employment status shows that 25 (50%) were housewives and the most respondents who participate answered for the questions of marital status 33 (66%) were married.

The all respondents have seen or heard the mosquito net treated with insecticide and said yes, shows that 50 (100%). Most respondents had heard or seen ITN include health facility and health workers, the family members, radio, the community meeting and television. The majority of the respondents believed there is a clear benefit of ITN uses shows that 46 (92%) said yes, 2 (4%) said no and 2 (4%) said don’t know. the knowledge of respondent’s main causes of malaria is very different 15 (30%) s%) said malaria cause being in the rain 15 (30%) said near collected water 12 (24%) said plasmodium such as plasmodium falciparum, plasmodium vavix, plasmodium malaria and ovale while 8 (16%) said drinking dirty water. The majority of respondents indicated that 47 (94%) said
malaria transmitted by mosquito bite while 3 (6%) said malaria transmitted by lack of hygiene. Most respondent mention the main preventives measure of malaria these ways and indicated that 23 (46%) said use ITN. The majority of the respondents indicated that 30 (60%) said yes while 20 (40%) said no. The majority of respondents who got ITN indicated that 18 (36%) got purchase system 7 (14%) 7 (14%) got free from local NGO while 5 (10%) got free from government sources. the majority of the respondents did not known difference between insecticide treated net and non-treated net 35 (70%) said no while 15 (30%) said yes.

7. Conclusion

In conclusion, the usage of insecticide treated nets by under-fives was low despite the high level of awareness within the community about them. Besides, even some households with nets weren’t using them consistently. Factors like knowledge of ITN, level of education, legal status and occupation of caregiver affected ITN utilization by under-fives in households. Thus, interventions to extend net ownership and use among fewer than five should take into thought these variables.

Recommendation

At last, although the govt with bolster from other partners has as lately began on huge scale distribution of nets in tall hazardous areas, more interventions from different partners are required to increase accessibility and availability of subsidized forever treated nets, counting mediations to deal with non-compliance to legitimate utilization of nets. Further efforts to extend IT coverage should be matched with efforts to extend their proper utilization. There’s need also therefore, additionally to increasing ITN ownership, to teach caregivers on the importance of using ITN properly and consistently. Proper utilization of ITN, alongside other initiatives like indoor residual spraying might greatly contribute in reducing malaria. This belief illustrated a good hole between knowledge, ITN possession and Utilization among the household with children but 5 an extended time. Hence, the proposed suggestions emerging from this consider are to effective case managements and control efforts of malaria. One among the strongest weapons within the fight against malaria is that the use of insecticide-treated mosquito net (ITN) while sleeping. The utilization of Insecticide-Treated Net (ITN is one recommended intervention to make sure successful malaria prevention and control globally). Use of ITN improved the reduction of mortality and morbidity of malaria to market awareness of the behavioral change communication (BCC) intervention of the community in Hodan districts to use ITN. To strengthen the system and structural responses of the mosquito vector control programs including ITNs uses. ITN dissemination and BCC messages on malaria avoidance programmes should go parallel. Not only use of ITN but also use of other preventive methods like environmental cleanness, use insecticide sprays,
destroying breeding site of the vector, and using repellents. There’s the necessity for a robust collaboration among major stakeholders including the govt, District Authority, and Non-Governmental Organizations to sensitize the communities on Malaria as a disease also as creating the all-encompassing and compelling strategies for anticipation and control.

**Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

**References**

[1] Abe, T., Honda, S., Nakazawa, S., Tuong, T.D., Thieu, N.Q., Hung, L.X., Yamamoto, T., et al. (2009) Risk Factors for Malaria Infection among Ethnic Minorities in Binh Phuoc, Vietnam. *Southeast Asian Journal of Tropical Medicine and Public Health*, **40**, 18-29.

[2] Account, L.M., Guidelines, S. and Access, O. (2013) Ownership and Use of Insecticide-Treated Nets during Pregnancy in Sub-Saharan Africa: A Review. *Malaria Journal*, **12**, Article No. 268. [https://doi.org/10.1186/1475-2875-12-268](https://doi.org/10.1186/1475-2875-12-268)

[3] Alaii, J.A., Hawley, W.A., Kolczak, M.S., Ter Kuile, F.O., Gimnig, J.E., Vulule, J.M., Phillips-Howard, P.A., et al. (2003) Factors Affecting Use of Permethrin-Treated Bed Nets during a Randomized Controlled Trial in Western Kenya. *American Journal of Tropical Medicine and Hygiene*, **68**, 137-141. [https://doi.org/10.4269/ajtmh.2003.68.137](https://doi.org/10.4269/ajtmh.2003.68.137)

[4] Astatkie, A. and Feleke, A. (2010) Utilization of Insecticide Treated Nets in Arba-minch Town and the Malarious Villages of Arbaaminch Zuria District, Southern Ethiopia. *Ethiopian Journal of Health Development*, **24**, 15-24. [https://doi.org/10.4314/ejhd.v23i3.53241](https://doi.org/10.4314/ejhd.v23i3.53241)

[5] Admasie, A., Zemba, A. and Paulos, W. (2018) Insecticide-Treated Nets Utilization and Associated Factors among under-5 Years Old Children in Mirab-Abaya District, Gamo-Gofa Zone, Ethiopia. *Frontiers in Public Health*, **6**, 1-7. [https://doi.org/10.3389/fpubh.2018.00007](https://doi.org/10.3389/fpubh.2018.00007)

[6] Batisso, E., Habte, T., Tesfaye, G., Getachew, D., Tekalegne, A., Kilian, A., Lynch, C., et al. (2012) A Stitch in Time: A Cross-Sectional Survey Looking at Long Lasting Insecticide-Treated Bed Net Ownership, Utilization and Attrition in SNNPR, Ethiopia. *Malaria Journal*, **11**, Article No. 183. [https://doi.org/10.1186/1756-3305-11-183](https://doi.org/10.1186/1756-3305-11-183)

[7] Baume, C.A., Reithinger, R. and Woldehanna, S. (2009) Factors Associated with Use and Non-Use of Mosquito Nets owned in Oromia and Amhara Regional States, Ethiopia. *Malaria Journal*, **8**, Article No. 264. [https://doi.org/10.1186/1475-2875-8-264](https://doi.org/10.1186/1475-2875-8-264)

[8] Atieli, H.E., et al. (2011) Insecticide-Treated Net (ITNs) Ownership, Usage, and Malaria Transmission in the Highlands of Western Kenya. *Parasites & Vectors*, **4**, Article No. 113. [https://doi.org/10.1186/1756-3305-4-113](https://doi.org/10.1186/1756-3305-4-113)
[10] Belay, M. and Deressa, W. (2008) Use of Insecticide Treated Nets by Pregnant Women and Associated Factors in a Pre-Dominantly Rural Population in Northern Ethiopia. *Tropical Medicine and International Health, 13*, 1303-1313. https://doi.org/10.1111/j.1365-3156.2008.02159.x

[11] Berie, Y. (2013) Factors Affecting Utilization of Insecticide Treated Nets among People Living with HIV/AIDS in Bahir Dar City, Northwest Ethiopia. *Science Journal of Clinical Medicine, 2*, 147. https://doi.org/10.11648/j.sjcm.20130206.11

[12] Chuma, J., Okungu, V., Ntwiga, J. and Molyneux, C. (2010) Towards Achieving Abuja Targets: Identifying and Addressing Barriers to Access and Use of Insecticides Treated Nets among the Poorest Populations in Kenya. *BMC Public Health, 10*, Article No. 137. https://doi.org/10.1186/1471-2458-10-137

[13] Dagne, G. and Deressa, W. (2008) Knowledge and Utilization of Insecticide Treated Mosquito Nets among Freely Supplied Households in Wonago Woreda, Southern Ethiopia. *Ethiopian Journal of Health Development, 22*, 34-41. https://doi.org/10.4314/ejhd.v22i1.10060

[14] Deressa, W., Fentie, G., Girma, S. and Reithinger, R. (2011) Ownership and Use of Insecticide-Treated Nets in Oromia and Amhara Regional States of Ethiopia Two Years after a Nationwide Campaign. *Tropical Medicine and International Health, 16*, 1552-1561. https://doi.org/10.1111/j.1365-3156.2011.02875.x

[15] Diabaté, S., Druetz, T., Bonnet, E., Kouanda, S., Ridde, V. and Haddad, S. (2014) Insecticide-Treated Nets Ownership and Utilization among Under-Five Children Following the 2010 Mass Distribution in Burkina Faso. *Malaria Journal, 13*, Article No. 353. https://doi.org/10.1186/1475-2875-13-353

[16] Eisele, T.P., Keating, J., Littrell, M., Larsen, D. and Macintyre, K. (2009) Assessment of Insecticide-Treated Bednet Use among Children and Pregnant Women across 15 Countries Using Standardized National Surveys. *American Journal of Tropical Medicine and Hygiene, 80*, 209-214. https://doi.org/10.4269/ajtmh.2009.80.209

[17] Haileselassie, B. and Ali, A. (2016) Assessment of Insecticide Treated Nets Coverage for Malaria Control in Kafta-Humera District, Tigray: Possession versus Use by High-Risk Groups. *The Ethiopian Journal of Health Development, 22*, 259-267.

[18] Hill, J., Hoyt, J., van Eijk, A.M., D’Mello-Guyett, L., ter Kuile, F.O., Steketee, R., Webster, J., et al. (2013) Factors Affecting the Delivery, Access, and Use of Interventions to Prevent Malaria in Pregnancy in Sub-Saharan Africa: A Systematic Review and Meta-Analysis. *PLoS Medicine, 10*, e1001488. https://doi.org/10.1371/journal.pmed.1001488

[19] Kimbi, H.K., Nkesa, S.B., Ndamukong-Nyanga, J.L., Sumbele, I.U.N., Atashili, J. and Atanga, M.B.S. (2014) Socio-Demographic Factors Influencing the Ownership and Utilization of Insecticide-Treated Bed Nets among Malaria Vulnerable Groups in the Buea Health District, Cameroon. *BMC Research Notes, 7*, Article No. 624. https://doi.org/10.1186/1756-0500-7-624

[20] Kyalo, G.M. (2013) Factors Affecting Use of Insecticide Treated Nets by Children under Five Years of Age in Kenya. Research Project Submitted to the School of Economics, University of Nairobi, in Partial Fulfillment of the Requirements for the Award of the Degree of Master.

[21] Malusha, J.M., Mwanzo, I., Yitambe, A. and Mbugi, J.P. (2009) Use of Insecticide Treated Nets among Caregivers of Children under Five Years in Makueni District, Kenya. *East African Medical Journal, 86*, 308-313. https://doi.org/10.4314/emj.v86i7.54144

[22] Minakawa, N., Dida, G.O., Sonye, G.O., Futami, K. and Kaneko, S. (2008) Unfore-
seen Misuses of Bed Nets in Fishing Villages along Lake Victoria. *Malaria Journal, 7*, Article No. 165. [https://doi.org/10.1186/1475-2875-7-165](https://doi.org/10.1186/1475-2875-7-165)

[23] Rhee, M., Sissoko, M., Perry, S., McFarland, W., Parsonnet, J. and Doumbo, O. (2005) Use of Insecticide-Treated Nets (ITNs) Following a Malaria Education Intervention in Piron, Mali: A Control Trial with Systematic Allocation of Households. *Malaria Journal, 4*, Article No. 35. [https://doi.org/10.1186/1475-2875-4-35](https://doi.org/10.1186/1475-2875-4-35)

[24] Thwing, J., Hochberg, N., Eng Vanden, J., Issifi, S., James Eliades, M., Minkoulou, E., Lama, M., *et al.* (2008) Insecticide-Treated Net Ownership and Usage in Niger after a Nationwide Integrated Campaign. *Tropical Medicine and International Health, 13*, 827-834. [https://doi.org/10.1111/j.1365-3156.2008.02070.x](https://doi.org/10.1111/j.1365-3156.2008.02070.x)

[25] Toé, L.P., Skovmand, O., Dabiré, K.R., Diabaté, A., Diallo, Y., Guiguemdé, T.R., Grénais, M.E., *et al.* (2009) Decreased Motivation in the Use of Insecticide-Treated Nets in a Malaria Endemic Area in Burkina Faso. *Malaria Journal, 8*, Article No. 175. [https://doi.org/10.1186/1475-2875-8-175](https://doi.org/10.1186/1475-2875-8-175)

[26] Tokponnon, F.T., Ogouyémi, A.H., Sissinto, Y., Sovi, A., Gnanguenon, V., Cornélie, S., Massougbodji, A., *et al.* (2014) Impact of Long-Lasting, Insecticidal Nets on Anaemia and Prevalence of *Plasmodium falciparum* among Children under Five Years in Areas with Highly Resistant Malaria Vectors. *Malaria Journal, 13*, Article No. 76. [https://doi.org/10.1186/1475-2875-13-76](https://doi.org/10.1186/1475-2875-13-76)

[27] Wagbatsoma, V.A. and Aigbe, E.E. (2010) ITN Utilization among Pregnant Women Attending ANC in Etsako West LGA, Edo State, Nigeria. *Nigerian Journal of Clinical Practice, 13*, 144-148.

[28] Winch, P.J., Makemba, A.M., Makame, V.R., Mfaume, M.S., Lynch, M.C., Premji, Z., Shiff, C.J., *et al.* (1997) Social and Cultural Factors Affecting Rates of Regular Retreatment of Mosquito Nets with Insecticide in Bagamoyo District, Tanzania. *Tropical Medicine and International Health, 2*, 760-770. [https://doi.org/10.1046/j.1365-3156.1997.d01-376.x](https://doi.org/10.1046/j.1365-3156.1997.d01-376.x)