An Exploratory Study on Predictive Factors for Utilization of Long Lasting Insecticide Treated Bed Nets (LLITNs) among Tribal Population in India

Mehul Kumar Chourasia[1], Vinod J Abraham[2], Jacob John[3]

[1]Research Fellow, RUHSA, Christian Medical College, Vellore- 632209 (Tamil Nadu), India

[2]Professor of Community Medicine, Department of community health, Christian medical college, Vellore -632004(Tamilnadu), India

[3]Associate Professor, Department of community health, Christian medical college, Vellore -632004 (Tamilnadu), India

Author for Correspondence
Mehul Kumar Chourasia
Research Fellow, RUHSA, Christian Medical College,
Vellore- 632209 (Tamil Nadu)
Mob no- 09993265444

Authors and Their Likely Contributions

Mehul Kumar Chourasia (Study Design, Recruitment of Participant, Intervention and Interpretation of Results)

Vinod J Abraham (Study Design, Interpretation of Results and Manuscript Preparation)

Jacob John (Study Design, Interpretation of Results and Manuscript Preparation)

Abstract: *Currently, long lasting insecticide treated bed nets (LLITNs) is one of the effective methods to prevent malaria in among tribal population residing in endemic areas. But utilization of LLITNs among the community still remains a great challenge. Present community based study includes two tribal villages to identify the predictive factors for utilization of LLITNs in a tribal population in Chhattisgarh, India. It suggests that recent history of malaria, knowledge about symptom, transmission and prevention of malaria could be possible predictive factors for LLITNs utilization. This also implies that Improvement of Knowledge about the disease, mode of transmission, prevention strategies of malaria can help to improve the existing scenario of malaria among the tribal population.*

Keywords: LLITNs utilization, predictive factors, Tribals, Malaria

1. Introduction

Malaria is a pernicious public health illness and one of the major tropical diseases globally. Worldwide, there are more than 100 malaria endemic countries. In majority of developing countries of Asia and Africa, malaria is still a haunting public health problem. Majority of deaths that are attributed to African region (Approx 80-90%) followed by South East Asian region (9-10%). India reports the highest number of cases of malaria (61%) among South East Asian countries [1].

With vast research experience on long lasting insecticide treated bed nets (LLITNs), it has been shown that LLITNs are effective in the preventing malaria [2-5]and also comparatively cost effective [6]. World health organization (2007) adopts long lasting insecticide treated nets as one of the primary intervention for effective malaria control But Compliance with the LLITNs use may be affected by many factors like knowledge about malaria, behavior, belief of certain community, community acceptance, etc [7]. A qualitative study was from Solomon Island suggested that just increase in knowledge about the disease and preventive methods cannot be the all time solution for the compliance with LLITNs use [7]. Other major reasons cited for nonuse

could be low mosquito density, ineffectiveness of ITN and poor condition of the net [8]. IRS sprays, purchase of bed net and geographic area were also another aspect in the LLITNs uses by tribal population

Though knowledge and community acceptance among tribal community can improve LLITNs as the method of malaria control over insecticide spray [9]. Success results of ITN distribution and usage can justify its predicating ability to another region due to diversity of cultural beliefs and tradition varies differently in different tribes. [9]

Vandal et al conducted a study across five countries for assessment of use and nonuse of treated bed nets; there was variation in utilization between countries ranging from 51.1 to 81.1 percent. This study found that 27.5 percent of households in Madagascar did not use bed nets for under five children as someone else was using the bed nets and other 42.2 percent households did not use bed nets due to non-availability of enough bed nets. [10]

Lover et al found that unavailability of bed nets and inadequate space were considerable problems described by the respondent for not using bed nets. This study also revealed that head of the house hold was the decision maker

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and pregnant women should be given preference for bed net. In many places, bed nets are frequently used for fishing and protecting crops. [11]

Worn-out bed nets, dirty bed nets, changes in bed arrangement, lack of enough space in the house, absence of mosquito, and preference of insecticide sprays while sleeping in the farms. discomfort while using bed nets and the use of bed nets as curtain for traditional pit latrine were observations for nonuse of LLITNs This study reported gender, age groups (mainly 15–24 years) and distance from the vector-breeding site as some of the determinants of utilization of bed nets. [12]

Another trial in Ethiopia found foremost reasons were lack of knowledge and skill for proper use of LLITN and resistance in insecticide spay. [13] A qualitative study in Odisha state, India suggests that financial constraints, other uses of bed nets, climate and fear of toxicity also influence the behavior of households and determinants of low utilizations [14].

Little is known about predictive factors in this study population which can progress the LLITNs utilization. Hence, Purpose of this study is to identify the predictive factors for utilization of LLITNs in a tribal population in Chhattisgarh, India

2. Methodology

The present study was carried out from November 2012 to December 2012 in two tribal populated villages of Kabirdham district Chhattisgarh. These villages are surrounded by 'Kanha national park and Tiger reserve' and 'Bhoramdev Tiger reserve' in Chhattisgarh, India. Present study was carried out two months after LLINs were

distributed as a part of intervention study in these villages [15]. All the households of these two villages who gave written informed consent were included in the study. Households which were absent during the study period were excluded from the study. Questions were asked through an Interviewer administered structured questionnaire. The structured questionnaire was designed to collect information on family, demographic characteristics and various factors which may affect the LLITNs utilization

The questionnaire was first prepared in English and then translated and back translated by independent persons. The questionnaire was pretested to check for ambiguity in the language, and all the necessary amendments like arrangement of the questions order, options for the questions were made accordingly. First Univariate analysis was done and then all the important predictive variables were taken in the multivariate model for analysis. Analysis was done using logistic regression method. Double entry of data was done to ensure consistency. Collected data was entered in Epidata 3.1 version and analyzed in Statistical Package for the Social Sciences (SPSS) version 16 for windows software. Present study was approved by the institutional reviewing board (IRB) committee of Christian Medical College Vellore.

3. Results

A Total of 117 households were visited from two villages. In the Univariate analysis, Age, Literacy, education, annual income, type of house, family size and Previous Exposure to Health education was included. Nearly 50% of households were affected with malaria. Table 1 show that 'recent history of malaria' has statistically significant association between with utilization of LLITNs.

Table 1: Association between Various predicting variables and utilization of bed nets
(Univariate analysis)

Name of variable.	Category	Total N=218	Utilization of Bed nets n (%)	Unadjusted OR with 95% CI
Age	Less than 38	112	43(38.4)	1
	38 and above	106	41(38.7)	0.99(0.57-1.7)
Literacy	Illiterate	129	46(35.7)	1
	Read and write	89	38(42.7)	0.74(0.4-1.29)
Education	Less than primary	156	57(36.5)	1
	Primary and above	62	27(43.5)	0.75(0.41-1.4)
Annual income	Less than 12500 INR	152	61(40.1)	1
	12500 INR and above	66	23(34.8)	1.25(0.7-2.29)
Type of house	Hut /kutcha house	160	56(35)	1
	Mixed/Pucca house	58	28(48.3)	0.58(0.3-1.1)
Family size	1-4	111	40(36.04)	1
	5 and above	107	44(41.1)	0.81(0.47-1.4)
History of malaria	No	107	30(28)	1
	Yes	111	54(48.6)	0.41(0.23-0.72)*
Previous Exposure to Health education	No	185	69(37.3)	1
	Yes	33	15(45.5)	0.71(0.34-1.51)

*significant at p < 0.05

Table 2: Binary logistic regression model of predictive variables for utilization of LLITNS

Variable	Category	Adjusted OR with 95% CI	P value
Literacy of head of the Household	Read and write	1.08(0.43-2.7)	0.77
Education head of the Household	Primary and above	1.01(0.38-2.69)	0.98
Type of house	Mixed/Pucca house	1.63(0.85-3.13)	0.122
Family size	5 and above	1.03(0.56-1.89)	0.904
History of malaria	Yes	1.99(1.07-3.7)	0.02*
Previous Exposure to Health education	Yes	1.39(0.6-3.19)	0.55
Post test knowledge score	3-5	8.3(1.04-100)	0.046*
Overall predictive value of model is 73.9%. (p value – <0.001*) *significant at p < 0.05			

Table 2 describes relationship between various predictive variables and utilization of LLITNS. In the final model, after adjusting, previous history of malaria (p value- 0.02) and post test knowledge score(p value- 0.046) were significant predictive variables.

Table 3: Association of present knowledge about malaria and utilization of bed nets

Name of variable.	Category	Total N=218	Utilization of Bed nets n (%)	Unadjusted OR with 95% CI
Symptom of malaria	No	17	02(11.8)	1
	Yes	201	82(40.8)	5.17(1.2-23.2)*
Transmission of malaria	No	34	07(20.6)	1
	Yes	184	77(41.8)	2.7(1.2-6.7)*
Prevention of malaria	No	33	03(9.1)	1
	Yes	185	81(43.8)	7.7(2.3-26.4)*

*significant at p < 0.05

Table 3 also shows the association of utilization of bed nets with main symptom (OR=5.17), transmission (OR=2.7) and prevention of malaria (OR=7.7).Knowledge about main symptom, transmission and preventive method among the community is important for improving the compliance of LLITNs.

4. Discussion

Predictive factors helps to identify the apart from main intervention, other factors which need to looked cautiously such as Age and Living conditions etc. Dealing with human behavior and interaction with society is major confront for public health professionals. Socio economic characteristics of the head of the family have a significant impact on the utilization of bed nets. [11] But Present study did not find any association between utilization of LLITNs and head of the household characteristics such as age, education, occupation, literacy and annual income. This may be due to his decision making ability in the family. In the study group, female members also play active role in decision making in the family for bed net utilization. After adjusting for possible confounders and effect modifiers, recent history of malaria and posttest knowledge score were noted to be potential predictors for utilizing bed nets. The findings of this study that odds of using bed nets among families who had suffered from malaria within the last three month was twice as compared to families which had no similar experience of malaria within the household shows that past exposure to the disease and knowledge gained subsequently on how it could prevent disease impacts motivation. This study also found an association between utilization of bed nets with current knowledge about malaria symptoms (OR 5.17), transmission (OR 2.7) and preventive methods (OR 7.7). In contrast to this, study from odisha shows that the community was more aware about the disease and symptoms than prevention and treatment.[14]This study also demonstrate that proper health education also helps in changing attitude of the community, and positive community response is one of the major determinants for utilization of bed nets.

5. Conclusion

Free LLITNs distribution has removed the financial constraint for the community. After increasing LLITNs coverage, it needs to be assured that Community should use it properly. Certainly, there are factors other than socio economic characteristics which can influence the LLITNs utilization. Correct and appropriate knowledge of malaria transmission, awareness about preventive methods and treatment are some of the determinants of utilization of bed nets. There were always focus on imparting health education effectively. This study has shown the capability of Health education in improving LLITNs by the tribal residents. Apart from Health Education, Ailment due to malaria in the family was another predictive factor for improvement in uses of bed nets by the community.

6. Future Scope

Though, imparting Health education is cost effective tool but further studies need to be done for generating more evidence. It also necessitates further research in different tribe groups residing in other endemic countries. It will help to generalize the study findings in large endemic population.

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8. Declaration of Conflicting Interests

None declared.

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Author Profile

Dr. Mehul Kumar Chourasia is working as **Scientist C** At National Institute of Malaria research (NIMR), India. He was Public health (MPH) scholar from Christian Medical College, Vellore. He has keen interest in Health education for tribal population, communicable & non communicable disease and Health information system (HIS)

Dr. Vinod Joseph Abraham is Professor in department of community health at Christian Medical College, Vellore. He has completed his MBBS and MD (community medicine) from Christian Medical College, Vellore. He further pursued his Public health (MPH) degree from John Hopkins University, Baltimore, USA. Dr. Vinod is Recipient of the "Prof. B.C. Srivastava Foundation Award" for his work on Community Geriatrics from ICMR in 2009.

Dr. Jacob John is currently Associate Professor in department of community health at Christian Medical College, Vellore. He has completed his MBBS from Christian Medical College, Ludhiana and MD (community medicine) from Christian Medical College, Vellore. He is also manages Health Information Systems at community health and department. Epidemiology, Child survival and Health information system are his specific fields of interest.

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