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Knowledge Of Malaria Prevention And Practices In A Near-year-round Malaria Endemic Community In West Africa: The Impact Of A Decade Of Sustained Malaria Control Programme

Jombo G.T.A.[1*], Araoye M.O.[2], Akpera M.T.[3]

[1]Department of Medical Microbiology and Parasitology, College of Health Sciences, Benue State University Makurdi, PMB 102119 Makurdi, Benue state, Nigeria.

[2]Department of Community Health and Epidemiology, College of Health Sciences, Benue State University Makurdi, PMB 102119 Makurdi, Benue state, Nigeria.

[3]Department of Haematology and Blood Transfusion, College of Health Sciences, Benue State University Makurdi, PMB 102119 Makurdi, Benue state, Nigeria.

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*Corresponding author:

E- mail: jombogodwin@yahoo.com

Tel: +2348039726398

ABSTRACT

Effective control of malaria in Sub-saharan Africa has always been slowed down by lack of adequate knowledge on transmission, modes of prevention and control. Ten years after commencement of a renewed malaria control initiative- 'roll back malaria' (RBM) on the continent, this study was set up to assess the impact of the programme in an endemic city through knowledge and practices of malaria control. The study was carried out between October and December 2009 and was cross-sectional in nature involving 3171 adult women who were selected from households using systematic sampling methods. Quantitative information such as age, educational level, marital status, occupation number of children, and knowledge of malaria prevention and practices were obtained using structured and semi structured questionnaires, while qualitative information was obtained using focussed and in-depth group discussions to complement quantitative data. Over 99% of the respondents were aware of malaria as a disease popularly called *Osuala* but only 63.3% considered it a serious disease of public importance. At least 16.5% of the respondents had no clear knowledge about malaria prevention. Factors affecting knowledge about malaria prevention in the community were illiteracy, poverty and unemployment, and cultural beliefs. Health education should be strengthened on malaria prevention while efforts to intensify on formal and informal adult education strengthened in order to realise the objectives of RBM initiative in the community and hence that of Africa at large.

INTRODUCTION

Malaria fever caused by *Plasmodium species* is still a major public health issue in sub-saharan Africa and other parts of developing world [1-3]. With an estimated yearly death toll of over a million principally among pregnant women and children; the disease arguably still occupies the number one position among diseases of global public importance [4-6]. The present burden of malaria in Africa is traceable to as far back as 1955 in Mexica where the WHO presented her first global malaria eradication plan covering Europe, north Africa, middle east, some Asian countries and Latin America but excluding sub-saharan Africa [7-9]. The probable lack of adequate understanding about the disease hitherto among Africans occasioned by weak or poor institutionalised control and preventive methods as observed in Tanzania, Sierra Leone and Nigeria, is believed to have significantly contributed to the monumental losses in human, material and economic on the continent from the disease over the past six decades [10-12].

The roll back malaria (RBM) programme launched in 2000 in Abuja as a follow of the earlier launched multilateral initiative on malaria (MIM) by the United Nations (UN) 1997 was to redefine as well as renew strategies towards probable elimination of malaria from the African continent [13-15]. Cardinal objectives of the RBM programme among others include raising the level of awareness about malaria through a well co-ordinated health education campaigns and programmes in order to entrench correct and appropriate malaria control methods and practices among the people [16-18].

After more than nine years of probable sustained domestication of the RBM initiative in African communities; assessing the knowledge and level of understanding of the people about the disease becomes imperative. The findings from the present study would help assess the local success of a key component of RBM initiative which is health education and public enlightenment [19-21]. Also, a recent finding of a high prevalence of malaria parasitaemia among the high risk

groups in the community slated for the present study and its environs further prompted the need for the study [22-24].

MATERIALS AND METHODS

Study area

The study was carried out in Otukpo, a semi-urban community in Benue state of north –central Nigeria. It is located in the Savannah zone between latitude 7, 20 N and longitude 8, 12 W, and Latitude 7,30S and longitude 8,20E with annual rainfalls of about 1650mm from April to October.

Procedure

The study was carried out between October and December 2009. Five major parts of the town comprising Ogwonu Igbolafa, Ukpu, GRA, Sabon geri and Oweto were selected taking into consideration the ethnic, socioeconomic, and religious backgrounds of the inhabitants. Interviewers were trained on the basic art of questionnaire administration and subsequently recruited for the study. Households were selected using systematic sampling methods. Women 18 years and above or of any age with a biological child in each household were individually interviewed to assess their depth of knowledge and perceptions about malaria. Where more than one adult female was encountered in a household, the one with an under five child was given priority or selection was based on general consensus. Semi structured questionnaires with both closed and open ended questions were either self or interviewer administered to the respondents to obtain the information [25].

Information such as age, educational level, occupation, methods of transmission and prevention of malaria, ownership/ use of bed nets and types, drugs for treatment of malaria, and sources of information on malaria were obtained. Focused group discussions and in depth discussions on myths and cultural practices surrounding malaria control were also carried out where it was possible to assemble more than 10 adults in any location of the city; this qualitative data was used to strengthen the quantitative data obtained from the questionnaires. The DILO (a day in the life of villagers) was adopted whereby the team designated to collect data in each locality worked only from morning to evening [26]. A minimum work was required from each team member but while they were moving in the town they were free to make use of any event (e.g a febrile child, death, social gathering etc.)

Principal Component Analysis (PCA) was used to develop wealth indices for the households based on ownership of durable assets including radio, television, telephone, refrigerator, bicycle, motorcycle/scooter and car/truck. Ownership was coded as 0 or 1 and missing cases were excluded. The households were then divided into socio-economic quartiles based on their scores. Cronbach's alpha was then calculated to test consistency-reliability [27].

Analysis of Results

Data obtained was analysed using SPSS 16 statistical software; Pearson's Chi squared test or Mantel-Haenszel were used to determine association with a P-value of d" 0.05 accepted as significant. Fisher's exact test was calculated for borderline significance and for cells with counts less than five. Analysis of variance (ANOVA) and Regression were used where applicable to determine the predictors of appreciable knowledge about malaria prevention methods among the study population.

RESULTS

From the 3,385 questionnaires administered, 3,293 (97.3%) were returned of which 3,171 (96.3%) were correctly filled. The age range of the respondents was 18 and 83 years with a mean age of 38.5 years and a bimodal age of 27 and 34 years. Malaria was generally referred to as *Osuala* by inhabitants of the community. Those aware of the existence of malaria were 99.5% (3155); of these 36.7% (1,158) did not consider malaria as a serious disease of public health importance. Almost 100% (3154) of the respondents could associate malaria fever with mosquito bite although other causes were also mentioned; fever was the commonest symptom 99.6% (3142) of the disease mentioned while febrile convulsions were generally not considered symptoms of malaria. About 83.5% (2648) of the respondents knew the mode of transmission with at least one method of prevention and one correct drug for its treatment. The remaining 16.5% (523) had faint, cloudy or absent knowledge about the disease.

Other causes of malaria apart from mosquito bites mentioned by respondents were excessive cold 19.2% (73), excessive heat 15.5% (59), evil spirits 27.1% (103), as a result of curses 11.6% (44), as a result of punishment for sin 16.6% (63), and food or water 10.0% (38).

There was no significant association of age with knowledge about malaria among the respondents (F= 0.411) (Table 1).

Table 1 Age distribution pattern and knowledge about malaria among adult women in Otukpo (N=3171)

Age Interval (Years)	Proper (%)	Improper (%)	Total (%)
<20	270 (98.5)	4 (1.0)	274 (100)
20-29	778 (99.6)	3 (0.4)	781 (100)
30-39	953 (99.6)	4 (0.4)	957 (100)
40-49	453 (100)	0 (0.0)	453 (100)
50-59	258 (100)	0 (0.0)	258 (100)
60-69	182 (98.4)	3 (1.6)	185 (100)
70-79	165 (99.4)	1 (0.6)	97 (100)
≥80	96 (99.0)	1 (1.0)	166 (100)

SS= 343471.938, df= 7, F=0.411

NB: Proper knowledge was adjudged as ability to know the mode of transmission and at least one correct mode of prevention or control.

A review of occupational distribution of the respondents and knowledge about malaria prevention methods showed that all the civil servants, health workers, military/paramilitary personel and businesswomen could mention at least one correct method of malaria prevention. On the other hand 23.1% (87), 14.5% (233), 20.5% (17) and 14.1% (97) of petty traders, farmers, artisans, and applicants could not list correctly at least one malaria preventive method (P< 0.05) (Table 2).

Table 2 Occupational distribution and knowledge about malaria prevention methods among women in Otukpo (N=3171).

Occupation	Correct	Incorrect	Total
Petty Trading*	290 (76.9)	87 (23.1)	377 (100)
Civil servant	222 (100)	0 (0.0)	222 (100)
Farming*	1377 (85.5)	233 (14.5)	1610 (100)
Military/ Paramilitary	61 (100)	0 (0.0)	61 (100)
Artisans*	66 (79.5)	17 (20.5)	83 (100)
Applicant*	592 (85.9)	97 (14.1)	689 (100)
Health worker	36 (100)	0 (0.0)	36 (100)
Business	54 (100)	0 (0.0)	54 (1000
Others	26 (92.9)	2 (7.1)	28 (100)
Unclassified	10 (90.9)	1 (9.1)	11 (100)

*= X^2 (Mantel-Haenszel)= 15.66-21.15, df=1, P< 0.001

Analysis of the knowledge about antimalarial drugs among the respondents showed that 16.5% (523) had no correct knowledge about any antimalarial drug, 51.8% (1642) and 31.7% (1006) listed correctly One and, Two or more drugs respectively. Knowledge about artemisinin combined therapy (ACT) was found to be 15.0% (476/3171), and Intermittent preventive treatment for malaria (IPTM) 4.7% (149/3171); Home based management of malaria (HBMM) programme was non operational (Figure 2).

A breakdown of the malaria preventive methods utilized by the respondents were insecticide treated bed nets (ITNs) 23.3% (739), untreated bed nets (UTN) 35.0% (1,110) while 15.1% (478) utilized no malaria preventive method (Table 3).

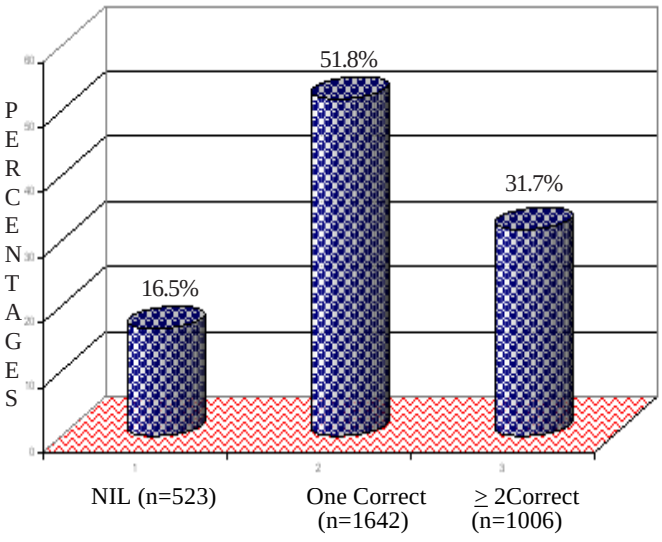


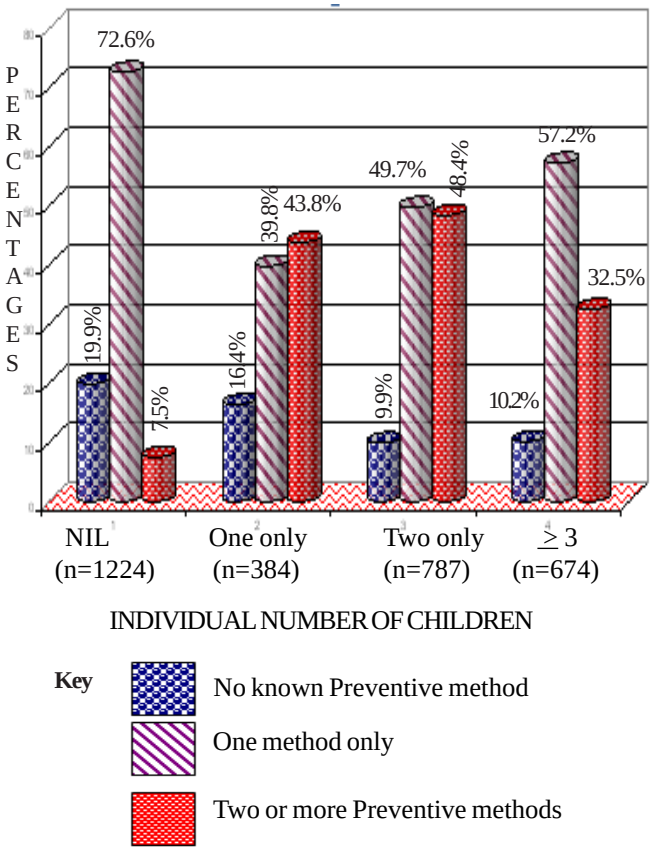
Figure 1: Knowledge about antimalarial drugs among women in Otukpo (N=3171).

Table 3: Methods of malaria prevention among women in Otukpo (N=3171).

Method	Number (%)
Insecticide Treated bed net (ITN)	739 (23.3)
Untreated bed net (UTN)	1,110 (35.0)
Coil	132 (4.2)
Insecticides (Spray)	356 (11.2)
Local Methods	30 (0.9)
Otapiapia*	326 (10.3)
NIL	478 (15.1)

*= Local chemical usually sprinkled

A review of the knowledge of malaria preventive methods in relation to the number of children per respondents showed that 1224 (38.6%), 384 (12.1%), 787 (24.8%) and 674 (21.4%) had not had children, one child, two, and three and above number of children respectively. There was correlation with increasing number of children with knowledge about malaria prevention methods (Cox Shell= 0.924, P< 0.05) (Figure 2).



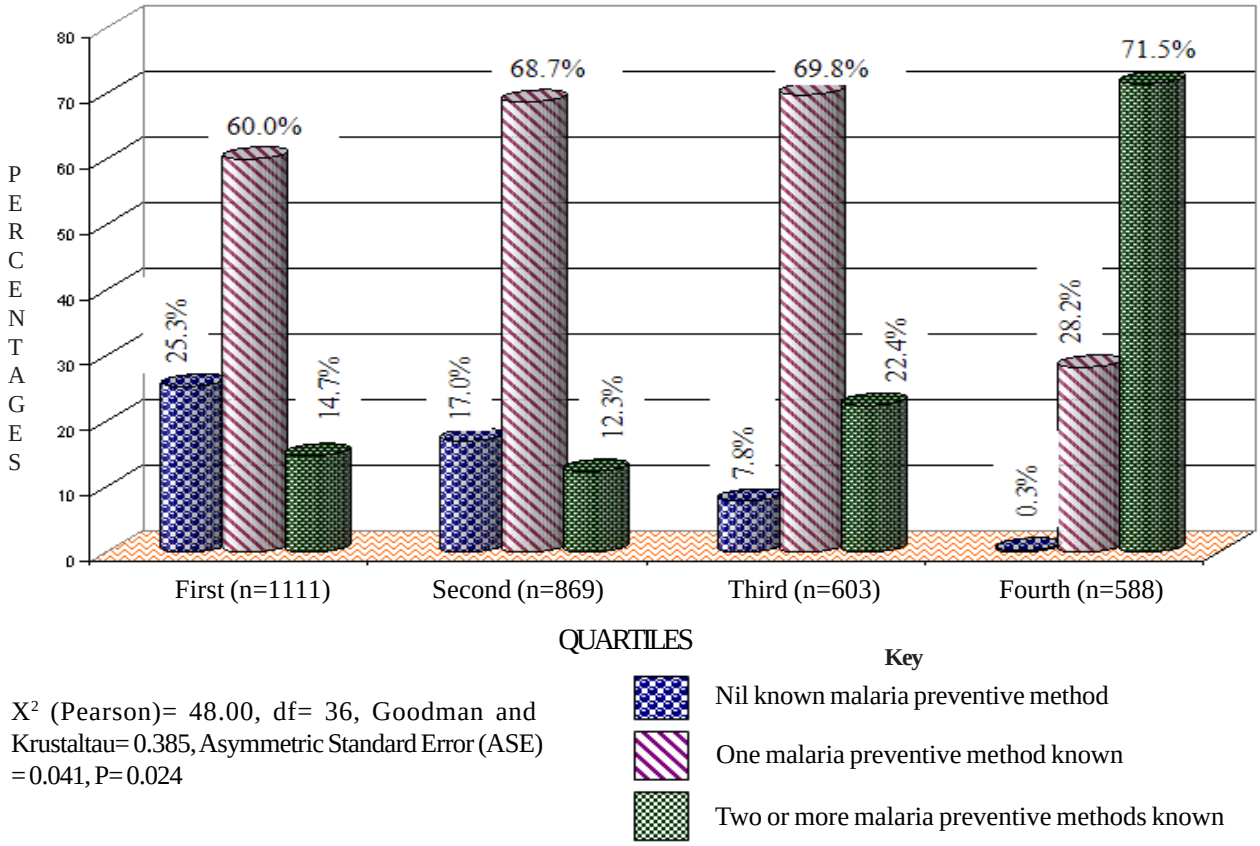
X^2 (Pearson)= 26.367, Likelyhood or Reduced Model 26.367, df= 24, Cox and Shell= 0.924, P= 0.002

Figure 2: Number of children in relation to the number of known malaria preventive methods among women in Otukpo (N= 3069).

Analysis of marital status in relation to knowledge about malaria prevention methods among the respondents showed that 1217 (38.4%), 325 (10.2%) and 1629 (51.4%) of the respondents were singles, separated or divorced and married respectively. Knowledge about malaria prevention methods were significantly higher among the married and separated groups compared to the singles (P< 0.05).

A review of the educational distribution of the respondents showed that 385 (12.1%), 521 (16.4%), 957 (30.2%) and 1308 (41.3%) had nil, primary, secondary and tertiary education respectively; 51.9% (200), 26.3% (137), 14.7% (141) and 0 (0.0%) of those with nil, primary, secondary and tertiary education respectively had no knowledge about any malaria control method. There was proportionate increase in the number of malaria prevention methods with increasing educational levels of the respondents (CI= 1.3, RR= 1.45).

Based on economic status and a review of the wealth index of the respondents showed that 1111 (35.0%), 869 (37.4%), 603 (19.0%) and 588 (18.6%) belonged to first, second, third and fourth quartiles respectively. Those in the third and higher quartiles were better informed about malaria prevention methods compared to those in the fiest and second (Goodman and Krustaltau= 0.385, P< 0.05) (Figure 3).



X^2 (Pearson)= 48.00, df= 36, Goodman and Krustaltau= 0.385, Asymmetric Standard Error (ASE) = 0.041, P= 0.024

Figure 3 Correct knowledge about malaria preventive methods in relation to socio-economic status among women in Otukpo (N=3171).

DISCUSSION

More than 99% of the women in Otukpo were aware of malaria as a disease which they popularly called *Osuala* but 36.7% did not consider it as a serious disease that would need urgent attention. Factors that contributed to comparatively low knowledge about malaria preventive methods were: types of occupations such as artisans, petty trading, farming, singleton status, low family income, low educational levels and cultural beliefs. Knowledge about ACT was 15.0%, IPTM 4.7% while HBMM was non operational. Almost 100% of the respondents could associate malaria fever with mosquito bite while fever was the commonest symptom (99.6%) of the disease mentioned; febrile convulsions were generally not considered symptoms of malaria.

The high number of respondents who did not consider malaria as a serious disease in the community constitutes a large population of ill-informed group about the damaging impact of the disease in the community. This also stresses the fact that a lot of malaria mortalities and morbidities could have been given different interpretations such as febrile convulsions, with probably different attempted remedies other than that meant for malaria. The underrating of the disease by this segment of the population would hamper the control activities of the disease and ensure its persistence and continued spread.

The findings from the present study which appear to have contributed significantly to malaria persistence in the community have at present also been corroborated as significant factors contributing to malaria persistence in several other African communities [28-30]. In Ethiopia, there were wild interpretations about malaria among women concerning its transmission and prevention [31]; also in Ghana in a study, malaria was generally not considered a serious childhood disease hence mothers did not readily seek prompt medical attention for their febrile children [32]; and in another study in Ethiopia, a considerable gap was observed between knowledge

and practices of malaria control [33]. Similarly in Gabon severe cases of malaria were generally attributed to supernatural factors needing largely supernatural interventions [34]. The quality of health education on malaria in this community as well as other parts of sub-Saharan Africa needs to be reviewed and probably re-designed to suit each communities uniqueness and peculiarities for optimum impact [35,36].

Among the malaria control methods listed by the respondents 23.3% and 35.0% used ITN and UTN respectively while 15.1% adopted no control measure. This falls short of the target of the RBM programme of over 60% ITN utilization coverage [37]. Also the inability to link drainage of gutters and clearing of bushes around houses as malaria preventive measures by up to 50% of the respondents was another indication that a comprehensive malaria control and prevention programme is yet to be implemented in the community. These are the aspects that health education ordinarily may tend to overlook or take for granted but should nevertheless be emphasised with all seriousness in health awareness campaigns.

The findings from the present study are however different from that in Kenya [38], Rwanda [39], central Vietnam [40], and Malawi [41] where the studied communities were found to have sound knowledge about the prevention and control of malaria with a corresponding significant drop in the disease burden. This was largely attributed to introduction and implementation of integrated malaria control programme involving well organized public enlightenment campaigns. In the present study, illiteracy was found to affect negatively the rate of understanding of the people about malaria prevention and control. Adult mass education through formal and informal settings should be considered a vital component of the overall success of the health education campaigns against malaria as well as other tropical diseases [42-44].

RECOMMENDATIONS

The local authorities in conjunction with the national malaria control programme should step up health education in the community. This should be designed taking cognizance of cherished cultural values and beliefs of the people in order to achieve internalization of these control practices. Government should employ health educators and also welcome volunteers who would interact with the people at home and at other informal gatherings in the community to educate them about malaria prevention and control.

Avenues for formal and informal adult education should be provided in the community and adequate incentives provided for would be benefactors in order to ensure maximum enrolment so as to boost further understanding of the disease.

Government should boost the economic strength of the people through provision of credit facilities and other incentives to boost commercial activities among the people and also open up avenues for employment opportunities among them. This would boost their economic strengths and hence easy procurement of facilities for malaria control [44,45].

The WHO and other multilateral organizations saddled with malaria eradication in Africa should be involved in both technical and logistic assistance in health education to communities in sub-Saharan Africa. This could be through provision of ICT facilities and also supply of bicycles, speed boats and motorcycles for health educators. Also the health educators as well as volunteers should be properly trained and re-trained in the art of health education so as to blend smoothly with Africa's heterogeneous and cultural diversity. A percentage of the global fund for malaria control could be devoted to this cause while regional governments persuaded to contribute matching grants to ensure its success [46-48].

CONCLUSION

The present study has shown that although the level of awareness about malaria and its mode of transmission among women in Otukpo is very high, knowledge about its prevention is disproportionately low. Factors such as illiteracy, unemployment, poverty and adherence to certain cultural beliefs were found to be significant contributors. Health education should therefore be reviewed and hence intensified in the community while efforts at improving the economic strengths of the people and raising the literacy levels pursued in order to bring it in line with the continental wind of malaria control.

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