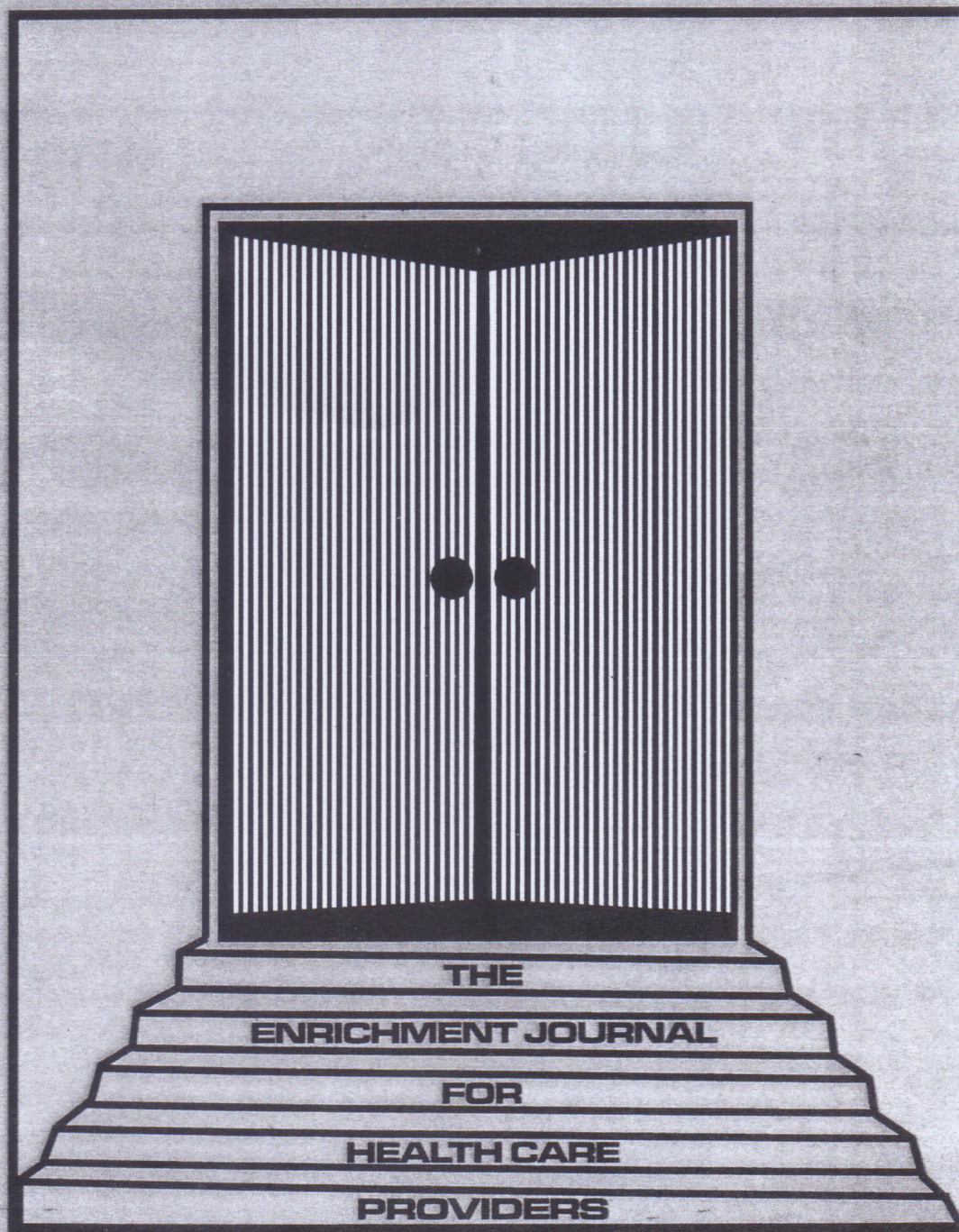


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	Table of Contents	Pages
<i>Editorial</i>		
1.	Utilization of Long Lasting Insecticide Treated Nets and Intermittent Preventive Treatment for under 5-children in Ibadan, Nigeria <i>Aluko, J.O., Kabir, S. Ani, O.B</i>	1 - 10
2.	Birth Preparedness and Complication Readiness: Implications for Sustainable Development Goal (SDG)3 <i>Nwachukwu, U.P.</i>	11 - 20
3.	Factors Associated with Client's Satisfaction with Outpatient Department Nursing Care Services in Primary Health Care Facility in Ghana <i>Ebu, N.I., Richman, I., Okanlawon, F.A.</i>	21 - 32
4.	Exclusion of Males in Human Papilloma Virus Vaccination in Nigeria: Implication for Community/Public Health Nursing <i>Ebunu, P.U</i>	33 - 42
5.	Addressing Psychosocial Concerns of People Living with HIV/AIDS: Implication for Nursing <i>Okpor, C.C., Ohaeri, B.M., Pertomode E.</i>	43 - 49

Utilization of Long Lasting Insecticide Treated Nets and Intermittent Preventive Treatment for under-5 children in Ibadan, Nigeria

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Abstract

Background: The serious burden of malaria infection and its devastating outcomes in under-five have made the prevention of the life-threatening disease an issue of priority. The World Health Organization's recommended Long Lasting Treated bed Nets (LLINs) and Intermittent Preventive Treatment (IPT) are public health interventions aimed at preventing and treating malaria episodes. The interventions build on two tested malaria control strategies, namely prevention of malaria and treatment to clear existing infection.

Aim: This study was designed to evaluate the utilization of malarial LLINs and IPT for under-five children by parents in Ibadan, Oyo State, Nigeria.

Method: This cross-sectional descriptive research design employed the use of a simple random technique to select 215 participants for the study. Thus, a self-administered questionnaire designed by the researchers was used to elicit responses from the participants. The administered questionnaires were retrieved from the participants on the spot after completion. Ethical clearance for the study was obtained from the UI/UCH Ethics Review Committee. All relevant ethical issues around the study were considered for strict adherence. The collected data were analyzed with the aid of computer software – Statistical Package of the Social Sciences (SPSS) version 23. Both descriptive and inferential statistics were used, while the findings were presented in texts, tables and charts.

Results: Findings from the study indicates that 82.3% of the respondents were aware of malaria infection, while 17.7% are unaware of malaria infection. It was also discovered that 55.8% of the participants stated that the cause of malaria was sunlight. Majority, 67.4% of the participants, claimed that they were used to make their under 5 children sleep under LLIN, while the rest, 32.6% had never made theirs to sleep under LLIN prior to the time of data collection.

Conclusion: Malaria is a public health problem, which must be tackled at all levels, to ensure that more children do not come down with it. Therefore, stakeholders should promote appropriate and correct use of LLINs/IPT for under-5 children health information campaigns and supply of LLINs to the vulnerable population.

Keywords: Utilization, Intermittent preventive treatment, Parents, Under 5 children

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Introduction

Globally, millions of deaths are attributed to malaria and are still being recorded, the disease has continued to constitute not only huge epidemiological burden in Africa but has also continued to cripple the economic development in the region¹. Malaria is an infectious febrile disease, common in tropical areas in Asia, Africa, Central and South America². It is a global disease and exists in over 100 countries with higher incidence in the tropical areas of Africa, Asia and Latin America³. Its distribution is limited by conditions that are inimical to the development of the mosquito vector such as temperature and altitude. In Africa, malaria kills one million people each year and causes up to 500 million clinical episodes⁴. About 90% of the malaria related deaths occur in Africa south of the Sahara. Most of these deaths are among children under five years of age. In Africa, at least 20% of the deaths in children under the age of five are caused by malaria⁴. This makes malaria the most common infectious disease to cause death in young children in Africa⁴.

It is estimated that approximately 30% of Nigerians live in areas of very high malaria transmission intensity, while 67% live in the moderate transmission zone¹. In Nigeria, the disease is responsible for 60% of out-patient visit to health facilities, 30% childhood deaths, 25% of deaths in children under one year and 11% maternal deaths^{1,5}. Malaria is a life threatening disease caused by parasites that are transmitted to people through the bites of infected mosquitoes¹. In Nigeria, malaria is holoendemic. It is estimated that approximately 97% of the more than 150 million Nigerian people are at risk of malaria⁵.

Following the World Health Organization's recommendation, Insecticide Treated bed Nets (LLINs) have been proposed for all people vulnerable to malaria infection with a special

focus on children younger than five years of age by the Nigerian government. Thus, an increased public awareness and health benefits of the LLINs have been reported and documented across African indigenous communities^{5,6,7}.

In young children malaria infection causes death in several ways. First, a severe infection, which often presents as seizures or coma (cerebral malaria), may kill a child directly and quickly. Second, repeated malaria infections can lead to the development of severe anemia, which increases the risk of death substantially⁴. Third, low birth weight, which often is a consequence of malaria infection in pregnant women is a major risk factor for death in the first month of a child's life⁸. In addition, repeated childhood episodes of malaria infection may impede normal development in children due to absence from school and play⁴. Thus, malaria may have long term consequences even for survivors.

Preventive measures are mainly focused on the use of different kinds of bed nets and Indoor Residual Spraying (IRS). IRS is a widely used preventive measure, aiming at vector control⁹. The measure consists of applying insecticide to walls and ceilings of houses to reduce the number of mosquitoes inside community homes. IRS, if applied consistently, reduces the mosquito density and is thereby interrupting malaria transmission¹⁰. The use of different forms of bed nets is the most widely spread preventive strategy. Bed nets are tent-like sheets of mesh which are often hung over a bed to provide a physical barrier against mosquitoes. Some bed nets are Insecticide Treated Nets (LLINs), and thus more efficient in repelling mosquitoes. In a large review of the research on the efficacy of LLINs in malaria prevention, Lengeler concludes that LLINs can reduce deaths in children by one fifth and episodes of malaria by half¹¹.

The Nigerian government has stepped up its efforts to tackle malaria, with a renewed interest in the past decade. As a result, an integrated approach has been adopted. For instance, Nigeria was a signatory to the Roll Back Malaria Summit (widely known as the Abuja Summit) to achieve universal coverage of insecticide treated bed nets (LLINs) for children younger than five years of age¹². Consequently, as part of the efforts to encourage mothers to use the bed nets, government of Nigeria, at various levels of governance, has embarked on free distribution of LLINs to caregivers of children younger than five years of age using multiple outlets¹³. However, research outputs have consistently shown that apart from limited access to LLIN, most parents across the different Nigerian communities have negative attitudes towards the use of the treated nets^{14,15,16}.

It can be stated that incorrect or non-scientific traditional beliefs and inappropriate behavior can interfere with the effectiveness of a control measure such as vector control or the use of bio-medical drugs¹⁷. These issues are particularly important in communities where the success of malaria control programs is inhibited by low level of knowledge in the disease and negative attitudes and practices of the people. In such cases, an understanding of the community's perceptions and behavior would be crucial to the success of specific prevention and control measures. The influence of people's knowledge, values, attitudes and practices are so unique to every given community that one must understand and incorporate them into the design and implementation of malaria prevention and control programs. Unfortunately, research into these areas has not gained the needed popularity and the few ones conducted are not well published to enable access by institutions and organizations in malaria control¹⁸. As a response to this dilemma, Long Lasting Insecticide Treated Nets (LLINs) have been developed.

These nets have the same malaria preventive efficacy as LLINs, but do not have to be retreated for five years.

Materials and method

Study Design

The study adopted descriptive cross-sectional survey research design to assess utilization of IPT among parents of under-5 children in Adeoyo Maternity Teaching hospital, Ibadan, Nigeria.

Research setting

This study took place in Adeoyo Maternity Teaching hospital, Ibadan North Local Government Area. Adeoyo General Hospital as formally known was established by the whites in the year 1927. Adeoyo General Hospital metamorphosed into several hospitals amongst were Adeoyo maternity hospital, the ring road state -specialist hospital. Then, it finally metamorphosed into Adeoyo Maternity Teaching Hospital in the year 2008 with expanding roles in teaching and research.

Study population

The study population comprised of parents of under-five children attending Adeoyo Maternity Teaching Hospital. The research was conducted among 215 participants. Any parent who was not willing to participate in the study was excluded from the study. Those who came with seriously ill children were excluded as well.

Instrument for data collection

A structured questionnaire designed by the researcher used for data collection. The questionnaire has two sections (sections A and B). The Section "A" elicited for personal/general information, while section "B" captured the items which provided information about the research topic. Respondents were required to tick the appropriate column which represents their opinions about the items raised.

Data collection procedure

The questionnaire was administered to the respondents after verbal informed consent was obtained from them. The questionnaires were retrieved and checked for completeness on the spot. The Yoruba (local language) version of the questionnaire was completed by respondents who could not comprehend the English version. Respondents who could not read and write were assisted to complete the questionnaires by the researchers.

Statistical analysis

Data obtained was coded and entered into SPSS spreadsheet. Both descriptive and inferential statistics were performed for analysis. The results were presented texts, tables and charts; the mean and the standard deviation were also

reported. The level of significant was set at $P \leq 0.05$.

Ethical considerations

Ethical clearance was obtained for the study from the UI/UCH Ethics Committee. Verbal informed consent was obtained from the mothers. All relevant ethical issues were observed appropriately.

Results

Socio-demographic variables of participants

Out of the participants, 137 (63.7%) were females. Six (2.8%) and 83 (38.6%) of the respondents were teenagers and elderly mothers, respectively. Besides, 81 (37.7%) were self-employed. Table 1 presents the socio-demographic characteristics of the respondents.

Table 1: Socio-demographic variables of participants (N= 215)

Socio-demographic variables	Frequency	Percent
Gender: Male	78	36.3
Female	137	63.7
Age: <20yrs	6	2.8
20-35yrs	126	56.6
36 years	83	38.6
Occupation: Self-employed	81	37.7
Civil servants	40	18.6
Students	30	14.0
Corporate organizational workers	64	29.8
Ethnicity: Igbo	79	36.7
Hausa	37	17.2
Yoruba	99	46.0
Religion: Muslims	126	58.6
Christians	89	41.4
Marital Status: Single	90	41.9
Married	125	58.1

The findings show that 82.3% of the respondents were aware of malaria infection. Furthermore, table 2 shows the sources of information on malarial infection to the respondents

Table 2: Awareness of malaria infection among participants

Sources of information	Frequency	Percentage
Radio	70	32.6
Personal experience	48	22.3
Public enlightenment on malaria infection	57	26.5
When others contacted malaria infection	40	18.6
Total	215	100.0

Different factors were implicated for causes of malaria illness by the mothers of the under. A total of 120(55.8%) implicated exposure to sunlight as a cause of malaria, while 68 (31.6%)

correctly indicated mosquito bites as a cause of the disease. Table 3 shows identified causes of malaria infection in the under-5 by their mothers.

Table 3: Causes of malaria infection identified by respondents

Identified causes	Frequency	Percentage
Mosquitoes	68	31.6
Sunlight	120	55.8
Dirty water	18	8.4
Unhygienic surrounding	9	4.2
Total	215	100.0

Among the mothers of the under-five, 145 (67.4%) were believed in the use of insecticide nets (LLINs) as a means of protecting their under-5 children from mosquito bites. Same proportion (67.4%) claimed that their under-5 children were sleeping under LLINs. The mothers of the under-five children were

observed to be using various modalities to prevent mosquitoes from coming in contact with their households. Such modalities include environmental sanitation, fixing of window and door nets, and wearing of protective clothing at bedtime. Table 4 presents the modalities used as mosquito barriers for household protection.

Table 4: Malarial preventive measures adopted by participants

Preventive measures	Frequency	Percent
Insecticide treated net is good	49	22.8
Window/door net	59	27.4
Environmental sanitation	63	29.3
Wearing protective clothing	44	20.5
Total	215	100.0

In addition, 161(74.9%) of the mothers viewed sleeping under LLINs as comfortable, while the remaining were of the view that sleeping under LLINs was associated with certain discomforts. Besides, 63(29.3%) did not trust the efficacy of LLINs as a means of household malarial prevention. Specifically, 106 (50.2%) of the

mothers claimed that their under-5 children often have episodes of malaria infection despite ensuring that they sleep under LLINs. Table 5 shows the recentness of malarial symptoms observed by mothers in their under-5 as at the time of data collection.

Table 5: Recentness of the last malaria symptoms observed by mothers in their under-5

Recentness of the last malaria symptoms	Frequency	Percent
Two weeks ago	74	34.4
One Month ago	28	13.0
Three months ago	106	49.3
Six months ago	7	5.0
Total	215	100.0

Consequently, the mothers were used to employ various remedies for the treatment of malarial infection in their under-5 children. While 51 (23.7%) of the mothers used malarial prophylaxis for their under-five, 33 (15.3%) were used to giving local herbs to their children

or members of their household. A total of 146 (67.9%) were using modern antimalarial medications in the form of either prophylaxis or treatment, while 69 (32.1%) used local herbs or faith-based remedies (Table 6).

Table 6: Mothers' preferred malaria remedies for their under-5

Preferred malaria remedies	Frequency	Percent
Antimalarial medicine as prophylaxis	51	23.7
Antimalarial injections/syrups/tablets for cure	95	44.2
Local herbs	33	15.3
Faith and prayers	36	16.7
Total	215	100.0

However, the mothers of the under-5 sometimes or often used various orthodox antimalarial agents as IPT for their under-5. Orthodox antimalarial agents commonly use as alternative to the preferred remedies include Artemisinin-based tablets/syrups (Coartem, Lumartem, Artesunate), Sulphadoxin/pyrithiamine (Fansidar), and Chloroquine tablets/injections. Table 6 present the instances of antimalarial use for the under-5 by their mothers.

Discussion

Clearly, there is no simple, valid way to evaluate the impact of malaria control efforts in countries with a high malaria burden in Africa¹. The introduction of insecticide treated nets as preventive measures for malaria still remains one of the most effective methods for the masses. All options described in this document have important shortcomings. However, despite these shortcomings, given the substantial resources that the IPT and other malaria initiatives are mobilizing and the high priority placed on showing real public health impact, it is equally clear that a rigorous evaluation plan must be adopted and implemented.

The results have proven that, parents of under-five children attending Adeoyo Maternity Teaching Hospital, Ibadan, Nigeria had high knowledge of, and awareness about malaria infections. The most of information they obtained about malaria and its prevention were gotten from the media such as radio and television, though some heard from friends and only few people mentioned personal experience.

This is an evidence that media is an effective means of dissemination of health information to human population. Therefore, health workers are encouraged to utilize it prolifically. However, other means of communication of health information could be reinforced for effective dissemination of

health information for health promotion and illness prevention.

There was clear evidence that people's actions towards malaria prevention and control were not informed by the knowledge of the disease they have. Thus, knowledge of the malarial infection did not translate into the desired malarial prevention actions. Health education regarding malaria often fails to address the ethno-medical perceptions and socio-economic realities of the target audience¹⁸. Therefore, these realities should be considered in every malaria education program. One of such socio-economic realities is the finding which reveals a gap between peoples' knowledge of malaria and desired actions or practices of its prevention and control. Most knowledge, attitude and practice (KAP) studies on malaria and IPT use stressed on affordability and availability of IPT rather than knowledge and attitudes which powerfully shape behaviour¹⁹. There is something more than just understanding the knowledge level of people and their actions. Some factors like the source of such knowledge whether it is through formal or informal education, determines how well they can act in the right way. If communities are educated only through informal sources such as the mass media and advertisements of product marketing organizations, they are more likely to pick misconceptions along with true knowledge.

Malaria is a serious health problem and one of the major childhood diseases in Nigeria. Following the World Health Organization's recommendation, IPT has been proposed for all people vulnerable to malaria infection with a special focus on children younger than five years of age by the Nigerian government²⁰. Thus, an increased public awareness and health benefits of the LLINs have been reported and documented across African indigenous communities^{5,6,7}. For example, in Kenya, LLIN coverage increased

rapidly from 7% in 2004 to more than 60% in 2006, leading to a significant reduction in childhood mortality²⁰.

In addition, as malaria initiatives have similar donors and are likely to work in the same countries. When the causes of malaria were explored, the respondents indicated that mosquito bite was the major cause of malaria and with other factors in the environment where the people live. It would be efficient and desirable for all initiatives to use the same evaluation plan. This approach agrees with the "Three Ones" principle that has been used by AIDS programs (one national AIDS framework, one national AIDS authority, and one system for monitoring and evaluation)²¹.

A number of articles and reports have been published on evaluating the impact of malaria control programs. Most have addressed the topic in more conceptual terms; and to a large extent, this study has simply refined and operationalized the concepts already described²²⁻²⁶. Among these articles and reports, there is considerable agreement that people still express biases towards the use of IPT in some developing nations²²⁻²⁶. This issue arises when some of the respondents could not afford to sleep under LLINs to prevent mosquito bites and their refusal to take oral medications in the form of IPT for prevention of malaria infection.

The results of the study showed that mothers devised varying malarial prevention and treatment approaches. Apart from the use of LLINs, some used window and/or door nets, environmental cleaning, wearing of protective clothes against mosquitoes

regularly, bush clearing and drying stagnated waters in the surroundings. However, making the under-5 to sleep under LLINs should be promoted. This study showed that the respondents all agreed to the use of IPT for malaria prevention and that it has many advantages which can help maintain good health and functioning. In addition, most of

Moreover, the appropriateness of the modalities the mothers used for either prophylaxis or treatment of malarial infection is doubtful and thus questionable. The researchers were of the view that provision of health information on home prevention and treatment of malaria in the under-five and the entire household would be an effective tool for reduction of malaria cases among the under-5. The appropriate and correct use of IPT and LLINs has been proven to be very effective and efficient in bringing about reduction in the incidence of malaria infections among the vulnerable population such as under-5 and pregnant women²⁷.

Conclusion

Although close to 85% of the mothers were aware of malarial infection among the under-5, very few of them knew that the disease is caused by mosquito bites. Besides, lesser than one-quarters of the under-5 children were actually made to sleep LLINs and use modern antimalarial for prophylaxis and treatment. Therefore, health information on appropriate and correct use of LLINs/orthodox medications for home treatment and prevention of malaria infection for the under-5 and other members of household is crucial to reduction of malarial burden in all endemic region of Africa, including Nigeria.

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