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FACTORS INFLUENCING UTILISATION OF INSECTICIDE TREATED NETS AND PREVALENCE OF MALARIA AMONG CHILDREN UNDER FIVE YEARS

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ABSTRACT

Objective: To determine factors influencing the use of Insecticide Treated Nets (ITN) in the prevention of Malaria to children under five years.

Design: A descriptive cross-sectional study

Setting: Kiambu District, Central Province of Kenya.

Results: One hundred and thirty nine (50.7%) attained primary education. Two hundred and seventy two (99.3%) were of Christian faith. One hundred and sixty four (59.8%) didn't have formal employment. Two hundred and forty three (88.7%) were married. One hundred forty two (51.8%) were house wives. Two hundred and forty seven (65.0%) used ITNs. Two hundred and forty one (88.0%) had not received ITN from government. One hundred and eighty three (66.8%) had ITN in households. One hundred and twenty eight (46.7%) indicated price of ITN was affordable. Two hundred and forty eight (90.5%) knew that Malaria is transmitted by Mosquito. One hundred and forty five (52.9%) heard about ITN from Health Workers. Two hundred and fifty six (93.4%) liked using ITN. One hundred and ninten (43.4%) children suffered malaria in previous six month. One hundred and seventy four (63.5%) had their treatment booklet. One hundred and sixty seven (60.9%) had ITN in homestead. Two hundred and forty one (88.0%) had health facility near homestead. Health facility recorded 1062 in - patient Malaria cases in 2006, 1343 in 2007 and 866 in 2008. Case fatality Rate in 2008 was 12.5%. Sixteen (5.8%) kept chemoprophylaxis drugs. Variables significant with ITN utilisation were; mother's χ^2 (P = 0.007), income (P = 0.001), having heard of ITN (P = 0.001), free ITN (P = 0.001), ITN availability (P = 0.001), ITN affordability, Malaria prevention and liking to use ITN. Insignificant variable with utilisation include; Mother's education (P = 0.112), marital status (P = 0.303), religion (P = 0.616), malaria transmission (P = 0.385) and Malaria infection (P = 0.141).

Conclusion: Mothers were young, married and educated. Almost all were Christians. They knew that Malaria was transmitted by Mosquito and utilisation was high. Government of Kenya did not provide ITN to many respondents. ITN was bought because the price was affordable. Majority had ITN in their households. Some children had suffered malaria. Majority indicated it was important for the child to sleep under ITN.

INTRODUCTION

The World Health Organisation has adopted the use of ITN as main strategies for malaria control in the roll back malaria (1). Since its inception in the early 1980's, insecticide impregnated bed nets have raised renewed interest in malaria control (2). The use of ITNs has been effective protection against malaria in Africa. Studies have shown on average a 17% reduction in childhood mortality associated with ITNs use (3).

Knowledge and practice of malaria prevention and socio-demographic plays a key role in the control of the disease. Malaria prevention is better and cheaper than cure. Prevention measures have been related to knowledge and beliefs of people and have found to be low and difficult to implement when malaria risk is perceived to be low (4).

Millennium development goals targets to combat malaria by reversing the incidence and to reduce child mortality by 2015 (5). Kenyan government targets on roll back malaria initiative pledged to increase

coverage of ITNs among the vulnerable population from less than 10% in 2000 to 60% for children and pregnant women by 2005 (6). The division of malaria control reported that the proportion of children sleeping under ITNs increased from 4% in 2001 to 24% in 2005 (7).

Education level has been found to influence malaria prevention among mothers with children less than five years. A study revealed that the likelihood of a mother having ITNs is associated with level of education, occupation and knowledge (8).

Lack of knowledge regarding the importance of ITNs has been found to contribute to low utilisation of the same and vice versa. Some people have been reported as using the nets to protect themselves against nuisance of mosquitoes but not malaria prevention (9).

Knowledge of mothers on malaria transmission and prevention is a factor that influences malaria prevention in children. A study in Nyamira –Kenya, found that many mothers had misconceptions about malaria transmission and were less knowledgeable on most vulnerable groups to malaria (8).

A study in western Kenya found that mothers had varied perceptions on use of ITNs. These included prevention from mosquito nuisance, avoiding roof debris, prevention of malaria and to get warmth (10).

MATERIALS AND METHODS

The study design was cross sectional descriptive study on mothers with children less than five years attending ANC, MCH/FP clinic and outpatient at Kiambu District while seeking Medical care or attending clinic for routine checking. Sample size was 274.

Independent variables; Mother's age, Marital status, Number of children, Education, Occupation, Knowledge on malaria transmission, Knowledge on malaria prevention.

Dependent variable, Mothers with Children less than five years, Sources of getting ITN, ITN affordability, Prevalence of Malaria.

The researcher verified that information provided on ITN is valid. A checklist was used to verify the utilization of ITNs. Patient's records were reviewed to ascertain the prevalence of Malaria.

The data collection tool was pre-tested and amendments made. Assistant interviewers were trained to ensure uniform data collection. All forms filled were handed to the investigator for safe custody. Verification was done. Each questionnaire contained guiding instructions. The researcher also used a checklist on areas that were visited during data collection.

Completed questionnaires were edited before analysis to ensure no omission or bias. Analysis of

measures of central tendencies (mean, median, and mode) was used to describe each variable. Measures of variability (standard deviation, variance and range) were applied where appropriate. Presentation of data was done in form of percentages, frequencies and tables. Data analysis was done by use of SPSS version 16.0 and Excel 2000. Chi-square test was used to determine significance of variables.

Consent was obtained from Ministry of Education, Science and Technology, KNH/ERC/UON ethics Committees and the National Institute of Public Health – Japan research committee. Authority was gotten from Medical Officer of Health, Kiambu District. Informed consent was sought from the respondents.

RESULTS

Two hundred and seventy four mothers with children less than five years were interviewed. All were female of reproductive age. 88.7% were married, 99.3% were Christian and 50.7% completed primary education.

Majority of the mothers 36.9% were between 25 – 29, 20 – 24 years were 27.6% and 12 4.4% less than 20 years.

Many children were between one to three years 36.9% followed by children less six months 32.5%. Children between zero to twelve months were 48.6%.

Mother's age was statistically significantly with the child sleeping under ITN $\chi^2 (6, N = 274) 17.818, P = 0.007$ at 0.05 level. Sex ratio of children was 52.2% female and male 47.8%.

Mother's education level was 139 (50.7%) primary, 109 (39.8%) secondary and 19 (6.9%) tertiary and seven (2.6%) with no form of education. Education level was insignificant in ITN utilisation for children less than five years $\chi^2 (3, N = 274) 6.001, P = 0.112$. 243 (88.7%) mother's were married, 30 (10.9%) single and one (0.4%) widowed.

Marital status was insignificant in the utilisation of ITN at $\chi^2 (2, N = 274) 2.388, P = 0.303272$ (99.3%) were of Christian faith. Muslim and other denomination were only two (0.8%). Mother's religion was insignificant in the utilisation of ITN at $\chi^2 (2, N = 274) 0.969, P = 0.616$. One hundred and forty two (51.8%) mother's were house wives, 75 (27.4%) in business, 23 (8.4%) employed, 27 (9.8%) no occupation and seven (2.6%) small scale farmers.

One hundred and sixty four (59.8%) mother's had no formal earnings. Mother's income was significant in the ITN utilisation at $\chi^2 (4, N = 274) 18.064, P = 0.001$, 248 (90.5%) knew that Malaria is transmitted by Mosquito, four (1.5%) indicated bad air and 22 (8.0%) did not know. Malaria transmission and the utilisation of ITN was insignificant at $\chi^2 (2, N = 274) 2.388, P = 0.385$. Having heard of ITN and utilisation was significance - Fisher's exact test at $P < 0.05$ was 0.001.

One hundred and forty five (52.9%) mother's heard about ITN from the Health Workers, 105 (38.3%) from the local Radio / Television and 11 (4.0%) from "Baraza's" that is, administrative leaders.

Respondents reported use of ITN 247 (65.0%), 61 (16.1%) used Anti Malaria prophylaxis, 48 (12.6%) cleared their push and drainage, 13 (3.4%) used repellants while 11 (2.9%) reported using residual sprays. Malaria prevention and the utilisation of ITN was significant at χ^2 (4, N = 274) 10.551, P = 0.032. Reasons for ITN use was (229) 83.6% for repelling and killing mosquitoes, 37 (13.5%) avoid nuisance from mosquitoes and 8 (2.9%) did not know.

Two hundred and forty one (88.0%) had not been given ITN by the government. Having being given ITN free and the utilisation of ITN was significant at χ^2 (2, N = 274) 11.942, P = 0.001.

One hundred and twenty eight (46.7%) indicated that the price of ITN was affordable while 126 (46.0%) did not.

Affordability of ITN and the utilisation of ITN was significant at χ^2 (2, N = 274) 23.984, P = 0.001.

183 (66.8%) had ITN in their households while 91 (33.2%) did not. Availability of ITN and the utilisation of ITN was significant at χ^2 (1, N = 274) P = 0.001.

78 (28.5%) mother's received ITN one to two years, less than 12 months was 59 (21.5%) and more than three years was 45 (16.4%).

Two hundred and fifty six (93.4%) mother's indicated liked using ITN while 21 (7.7%) did not. Liking to use ITN and the utilisation of ITN was significant at χ^2 (1, N = 274) 24.364, P = 0.001. Those who did not like indicated that it was irritating seven (2.6%) and five (1.8%) not comfortable.

One hundred and nineteen (43.4%) had suffered malaria in the last six month while 155 (56.6%) had never suffered malaria. Malaria infection and the ITN utilisation was insignificant at χ^2 (1, N = 274) 2.165, P = 0.141.

Two hundred and sixty three (96.0%) mothers said it was important for the child to sleep under ITN, four (1.5%) indicated it was not important while seven (2.6%) were not sure.

Knowledge of perception of mothers with the ITN utilisation was significant at χ^2 (2, N = 274), P = 0.001.

One hundred and sixty seven (60.9%) had mosquito net in their homestead. Two hundred and forty one (88.0%) had health facility near their homestead. One hundred and seventy four (63.5%) had their treatment booklet. Ninety one (33.2%) had recorded history of Malaria in the child treatment booklet. Sixteen (5.8%) kept chemoprophylaxis drugs.

Health facility recorded 1062 in patient cases of Malaria in 2006, 1343 in 2007, and 866 in 2008. Case fatality Rate of Malaria in 2008 was 12.5%.

Morbidity for children recorded in the outpatient was 14,762 cases in 2008. Over five years, the

morbidity was 27,653.

DISCUSSION

Majority of the mothers were between 20 – 29 years 64.5%. In early 1997, IDRC approved funding for a new 18-month programme called the Net Gain for Africa Task Force (11). Housed at PATH Canada, the task force aimed to reduce morbidity and mortality from malaria by increasing the proportion of households in sub-Saharan Africa that own and regularly use ITN. The study revealed that most mothers were in their teenage who were the targeted for Malaria prevention and control (12).

Children were between one to three years (36.9%). According to WHO, hardest hit are young children who have not yet developed immunity to the disease. WHO further indicate that, malaria is one of the main causes of illness and death in the developing world and the leading cause in Africa, where one malaria parasite (*Plasmodium falciparum*) accounts for about 25% of all childhood deaths below age five (13).

Mothers who attained primary education were 139 (50.7%). Many factors will influence whether ITN achieve widespread acceptance and use. Among them are access to netting and insecticide for re-dipping, affordability, and public education. Education of mothers was key in the utilisation of ITN (14).

In this study 243 (88.7%) of the respondents were married. There was no indication in other studies were marital status influenced the use of ITN.

Majority were of Christian faith. Mother's religion was insignificant in the ITN utilisation. There was no such finding in other studies.

One hundred and forty two (51.8%) mothers were house wives and 164 (59.8%) earned anything. Mother's income was significant in the ITN utilisation (4, N = 274) 18.064, P = 0.001. In Benin and Côte d'Ivoire, cooperatives are now sewing and selling ITNs. This promotes the use of nets, creates employment for women, and raises their status in the community.

Respondents knew that Malaria is transmitted by Mosquito. Large studies of ITNs in Gambia, Ghana, and Kenya have indicated that the use of this simple technology can reduce overall child mortality by 17 to 63%. In the Kenya study, ITN reduced deaths from life-threatening malaria by 44%, lowered the hospitalisation of children with malaria by 41%, and reduced childhood deaths from all causes by 33%. In Ghana's northern savannah, where malaria transmission rates are even higher, nets reduced childhood deaths by 17%. In this study, majority of the respondents reported use of ITN 247 (65.0%) as Malaria preventive initiative, 61 (16.1%) used Anti Malaria as prophylaxis, 48 (12.6%) Cleared their push and drainage, 13 (3.4%) used repellants while 11 (2.9%) reported using residual sprays. Reasons for the use of mosquito nets were (229) 83.6% for repelling

and killing mosquitoes, 37 (13.5%) avoid nuisance from mosquitoes and 8 (2.9%) did not know. Other studies reveal that ITN are inexpensive and easy to use, but thus far have not reached the recommended coverage level to fulfill their potential as a prevention tool (15).

Two hundred and forty one (88.0%) had not been given ITN by the government. Other studies indicate that unfortunately, neither nets nor the insecticides required are widely available or affordable in most countries of sub-saharan Africa. IDRC-funded projects, governmental and non-governmental health programmes are searching for ways to increase access to nets and insecticides by several means, including reducing their market price. Efforts are also underway to promote the widespread, periodic re-treatment of nets for malaria control. According to PATH Canada, a net costs between CAD \$5 and \$10 un-dipped. The cost varies by country. Polyester nets can last up to five years and have to be re-dipped every six months, a process that can be done locally. Respondent indicated that the price of ITN were affordable 128 (46.7%). Affordability of ITN and the utilisation was significant at $P < 0.05$. Availability of ITN and the ITN utilisation was significant $P = 0.001$. 256 (93.4%) indicated that they liked using ITN. Liking to use ITN and the utilisation of ITN was significant at $P < 0.05$.

One hundred and nineteen (43.4%) children had suffered malaria. Malaria infection and the ITN utilisation was insignificant $P = 0.141$. Reports indicate that, one bite is all it takes to become infected with the deadly disease that claims an estimated 1.5 to 2.7 million lives a year. 90% of malaria cases are in sub-Saharan Africa. Hardest hit are young children who have not yet developed immunity. Malaria continues to represent a life-threatening menace and an economic impediment for about two billion people in the world. Nearly 30 years ago, the WHO predicted that malaria would never be eradicated. But today, there is real hope of controlling the disease based on research funded in part by IDRC. Scientists in Canada and Africa have been studying a new twist on an age-old method of combating malaria sleeping under nets that keep the deadly mosquitoes at bay- (16)

Two hundred and sixty three (96.0%) mothers said it was important for the child to sleep under ITN. Knowledge of perception of mothers with the ITN utilisation was significant.

One hundred and sixty seven (60.9%) had mosquito net in their homestead. Two hundred and forty one (88.0%) had health facility near their homestead. One hundred and seventy four (63.5%) had their treatment booklet at home. Ninety one (33.2%) had recorded history of Malaria in the child treatment booklet. Sixteen (5.8%) had kept chemoprophylaxis drugs for Malaria prevention. Because ITN can be re-used, they are expected to be

less expensive in the long term than the combined cost of other prevention methods and treatment, including anti-malarial drugs, insecticide sprays, coils, and traditional control methods. Some people in Africa currently spend between five and 20% of their income on less effective methods ways to prevent and treat malaria (17).

Study by USAID in developing countries indicated that pregnant women and children under five, particularly infants, are at highest risk for malaria-associated death and morbidity (18).

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