An Intervention Study for Factors behind Underutilization of Mosquito Nets in Malaria Control.

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بسم الله الرحمن الرحيم

وانزل الله عليك الكتاب والحكمة

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Abstract and Key words

Introduction

This is an intervention study aimed to identify the factors that lead to underutilization of mosquito nets in Alkabashi area in north Khartoum. (Sudan)

Objectives

To encourage residents to utilize mosquito net, to compare the utilization rate before and after implementation of health education sessions.

Methodology

The study employed a cross sectional design. **The target population was all** residents living in Alkabashi area regardless of their sex, who had mosquito nets. **Predesigned structured questionnaire was developed for data collection, pre and post intervention.**

Results

Generally there was increase in knowledge after intervention about impregnated nets. There was highly significant increase in knowledge after intervention about diseases that could be prevented by impregnated net (Malaria, Filarial and Kalaazar), p values were (0.008, 0.000 and 0.000) respectively.

On the other hand the four main causes of underutilization after intervention were laziness, lack of convention, forgetting and high temperature (28%, 22%, 19% and 17%) respectively.

Recommendations

Similar studies and research intervention should be done in the rainy season; so that it may reflect the real utilization of protective net. Modifications to mosquito nets or the mosquito net using environment that render the mosquito net more comfortable would usefully complement any educational or BCC campaign. Radio and TV message was found to be the most important source to convey message in the prevention and control of malaria in the study area.

Key words: Long-lasting insecticide-treated nets, under-utilization, malaria.

List of Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
BCC	Behavior Change Communication
CSP	Circum Sporozoite Protein
DDT	Dichloro Difloro Tetrachloroethane
Hb	Hemoglobin
HIV	Human Immune-deficiency virus
IRS	Indoor Residual Spraying
ITNS	Insecticide Treated mosquito Nets
LLITNs	Long Lasting Insecticide Treated Nets
MDGs	Millennium Development Goals
P	Plasmodium
RBM	Roll Back Malaria
$	Dollar
SPSS	Statistical Package for Social Science
UN	United Nations
UNDP	United Nations Development Program
UNICEF	United Nations Children's Emergency Fund
US	United States
WHO	World Health Organization

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List of important Definitions

Term	Definition
ITNs	Insecticide Treated Nets (ITNs) are nets that need to be treated once a year with a special chemical solution that ensures their continued effectiveness **(Lim et al., 2011).**
LL I Ns	Long Life Insecticide treated Nets (LLINs), are *a factory treated mosquito net that is expected to retain full insecticidal efficacy after at least 20 washes and for at least 3 years in the field under recommended conditions of use* **(Bonner et al.,2011).**
Malaria	It is an infectious disease caused by protozoan parasites from the Plasmodium family that can be transmitted by the bite of the Anopheles mosquito or by a contaminated needle or transfusion. **(Ngufor et al., 2014).**
Malaria Control Programme	It is a comprehensive programme include strategies , activities, guidance, facilitate planning and training with evidence-based antimalarial interventions in Malaria control. **(Ranson et al., 2011).**
Underutilization	It is to utilize less than fully or below the potential use **(An Encyclopedia Britanica Company)**

Introduction

Malaria is one of the most common infectious diseases and at the same time it represents a great public health problem worldwide, particularly in Africa and South Asia .Nearly three billion people are at risk of infection in 109 countries. Each year there are an estimated 250 million cases of malaria leading to approximately one million deaths, mostly in children under five years of age (**WHO, 2009 c).**

Malaria often afflicts population that is both impoverished and, malnourished and a large burden of malaria falls upon the most vulnerable within the population, children and pregnant women **(Shankar, 2000).**

Malaria remains a major public health problem particularly in many tropical countries resulting in decreased productive capacity and increased poverty despite the intensive attempts, exerted to control it (**WHO, 1993).** Also it is of public health concern in countries having endemic malaria, as well as in areas that have the disease eliminated, as it is reemerging disease **(WHO, 2000).**

Malaria is an extremely complex condition that manifests differently in different parts of the world depending on the infecting parasite species, susceptibility to antimalarial drugs, efficiency of the insect vector, environmental and climatic condition, genetic factors, acquired immunity and behavior of the population (**Paul et al., 2010).**

A variety of interventions were used to compact malaria, including insecticide-treated bed nets, environmental control, chemoprophylaxis, and prompt, appropriate case management. There exists no single solutions or program to combat malaria, rather a comprehensive approach is required with concurrent interventions on many levels **(Jones et al., 2003).**

Currently, insecticide treated mosquito nets (ITNs) have received serious attention and have raised renewed interest to serve as tools in malaria control. In Africa, the use of this control strategy has been proved to be cost-effective means for control of malaria, especially among children under five years of age and pregnant women **(Jima et al., 2005).**

Insecticide treated bed net are a form of personal protection that has been shown to reduce malaria illness, severe disease, and death due to malaria in endemic regions. In community -wide trials in several African settings, ITNs have been shown to reduce the death of children less than five years from all causes by about 20% **(WHO, 2012).**

I Epidemiology of Malaria

Introduction

Malaria remains one of the widest spread, potentially fatal infectious disease which has important public health concern in countries having endemic malaria, as well as in areas that have the disease eliminated, as it is a re-emerging disease **(Public Health and Community Medicine, 2014).**

Malaria is an extremely complex condition that manifests differently in different parts of the world depending on the infecting parasite species, susceptibility to antimalarial drugs, efficiency of the insect vector, environmental and climatic condition, genetic factors ,acquired immunity and behavior of the population **(Charlwood et al . ,1998).**

There are 3.4 billion people are at risk on malaria, 1.2 billion are at high risk. In high-risk areas more than one malaria case occurs per every 1000 population. There were an estimated 207 million cases of malaria in 2012 and an estimated 627. 000 deaths (90%) of all malaria deaths occur in Sub-Saharan Africa, and 77% occur in children under- five. In 2012, malaria killed 483 000 children under five years of age. That is 1300 children every day or one child almost every minute **(WHO, 2003).**

Malaria can be fatal, particularly in tropical parts of Africa. The Centers for Disease Control and Prevention estimated that 90 percent of all malaria deaths occur in Africa , most commonly in children under the

age of five. Malaria deaths are related to these serious complications**:** Cerebral malaria, Breathing problems, e.g. **(**pulmonary edema), Organ failure, Severe anemia, Low blood sugar**.** Severe forms of malaria itself can result in coma or death **(CDC, 2013).**

Definition of Malaria

Malaria is a serious infectious disease, caused by protozoan parasites from the Plasmodium family that can be transmitted by the bite of the Anopheles mosquito or by a contaminated needle or blood transfusion; it is most common in tropical climates. It is characterized by recurrent symptoms of chills, fever, and enlarged spleen, it can be treated with medication, but it often recurs **(Wells, 2009).**

Atypical attack comprise 3 distinct stages namely, cold stage, hot stage and sweating stage .The clinical features of malaria vary from mild to severe and complicated according to species, stage of immunity, nutritional state and other disease pre - existing before malaria attack **(Hegazy, 2010).**

Historical Background

Malaria comes from “mal” and “aria,” means “bad air.” Before the parasite that caused malaria was discovered, people thought the disease was caused by foul air, and associated it with marshes and low-lying swamps. They were not 100% wrong, those areas are perfect breeding grounds for the mosquitoes which transmit malaria, and so infection often

occurs in these areas. The documented history of malaria in parts of Asia goes back more than 2,000 years, during which the disease has been a major player on the socioeconomic stages **(WHO, 2000).**

Infectious Agent

Malaria **is caused** by a protozoan parasite with a sexual and sexual man phase that has four species of plasmodium (P) which can infect namely:

-P.vivax which has the widest geographical distribution throughout the world.

-P. ovale which is a rare parasite in man and it confined to Tropical Africa.

-P. malariae that has an intermediate distribution between P. vivax and P. falciparum, and

-P. falciparum which comes next to vivax in distribution and is responsible for the most severe forms of malaria .It must be taken into consideration that mixed infection can occur **(Yotoko, 2006 and Hegazy, 2010).**

Reservoir of Infection

Humans are the only reservoir of human malaria .A case may have several plasmodia species at the same time. The human reservoir is the one who harbours the sexual forms (gametocytes). Children are more likely to be gametocytes carriers than adults and thus the child is