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Effect of Innovative Interventions on the Utilization of Insecticide Treated Bed-Nets among Pregnant Women in Gezira, Sudan

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Abstract: ***Background: Malaria is a prevailing public health problem in the tropical courtiers. In Sudan malaria is presenting a heavy burden to the national economy and health services. Application of preventive measures is known to reduce malaria mortality and morbidity significantly. Objective: This study aims to assess the effect of innovative interventions on the utilization rate of Insecticide Treated-Nets and pregnant women knowledge, attitude and practices. Methods: A pre and post study was conducted among400 pregnant women. They were randomly selected from eight villages from East Gezira Locality. The intervention based on Communication for behavioral changes and utilization of Insecticide Treated Bed-Nets and continues for one year. The data were collected before and after intervention, compared and analyzed using SPSS-20. Results: The result revealed that, there is a significant change in practices concern method used in fixing mosquito bed nets with wood, and the daily usage of Insecticide Treated Bed-Nets. There are also significant modifications of knowledge and attitudes towards the benefits of Insecticide Treated Bed-Nets. Conclusion: The effective innovative intervention which aims to translate the existing knowledge into practice, therefore, yields good results.***

Keywords: Insecticide Treated Bed-Nets, Malaria, Innovative, Utilization.

1. Introduction

Each year malaria result in 300 to 500 million clinical cases globally, 90% occur in Sub-Saharan Africa (1). Malaria is a public health problem in Sudan, presenting a heavy burden to the national economy and health services, as 22% of labor time is lost due to malaria (1), 98% of the population at risk to the disease, and 40% of the outpatient attendance is due to malaria. In Sudan malaria causes one death every 50 minutes (2). During pregnancy malaria poses substantial risk to mothers, the fetus and the neonate as it can lead to severe clinical illness, anemia and low birth weight (3).

Free distribution of Insecticide Treated Bed-Nets (ITNs) required effective health education intervention to promote utilization through increasing awareness about the benefits of ITNs. A survey done in 69 various regions of Africa revealed that the use of ITNs during the preceding night by children under 5 years old was about 55% and 30% of free distributed ITNs were unused and adequate follow-up and utilization of ITNs is almost lacking or questionable (4). The awareness and understanding about ITNs are low in many parts of Sudan. The Sudan KAPs survey in 1997 indicated that in the 26 states mosquito bed-nets were only used by 4% of the communities (3).

Free distribution of ITNs required effective health education intervention to promote utilization through increasing awareness about their benefits. ITNs tend to reduce the burden of malaria significantly; and it is a cost-effective means of controlling malaria, it is also associated with improved growth and weight gain in infant and reduce maternal and placental malaria. Awareness and understanding about ITNs are low in many parts of Sudan. The Sudan KAP survey in 1997 indicated that in the 26 states mosquito bed-nets were only used by 4% of the communities (3).

This study aims to assess the effect of innovative interventions on the utilization rate of Insecticide Treated-Nets and pregnant women's knowledge, attitude and practices in Gazira State, Sudan.

2. Materials and Methods

Apre and post study was conducted among pregnant women in two villages of Eastern Gezira locality, Gezira State. The pregnant women were selected by simple randomization and 400 pregnant women out of 674 pregnant women in the two villages were selected (5).

The distribution of the sample:

Village name	*Total households*	*Sample size*
Elfadnia	1472	42
Elshegale	256	07
Gad Kareem	1502	42
ElmahasBrekia	2446	70
Wad Balola	383	10
Wad Esheab	3684	103
El Rekabe	2506	72
ElmahasElamarab	1636	54
Total	13945	400

The interventions were conducted in three phases; introductory phase includes meetings with the concerned community leaders, authorities to gain ethical clearance, political and technical support, preparatory phase includes preparation of training material and media, including colored malaria prevention leaflets and pamphlets, posters and training manuals. A two days training sessions held in May 2013, targeting community health workers, to conduct the intervention; they were subjected to effective training and participated in a comprehensive ITNs and malaria prevention training workshop, and of the training community health workers were conducting the intervention using different approaches and strategies, as Information, Education and Communication, (IEC), advocacy, social mobilization and promotional activities, the interventions continued for six months.

Data were collected by questionnaires, focus group discussion, and observational checklist. At the beginning of the study and post- test was carried out, after two months of the end of the intervention (intervention for 6 months), by using the same pre-test questionnaire, observation and focus group discussion to collect data after the intervention. The indicators were; the changes in knowledge, attitudes and practices, percentage of pregnant and children under 5 years old and within a household sleeping consistently under effective ITNs every night, especially during the transmission season (August – October and February – April) and percentage of effective nets used (properly hanged, free of tears and spores)

The data that collected before and after the intervention was compared and analyzed by computer using the SPSS software program, version 20.

This study was approved by the Ethical Committee of the Faculty of Public Health, Alzaem Al-Azhari University. The consents forms were filled by all pregnant women. The right of the participants to withdraw at any time was explained and preserved during the study.

3. Results

This study was conducted to assess the practices concerning the use of ITNs by determining the level of existing knowledge, attitude and practices in relation to different issues related to ITNs uses, increasing the awareness of the target women towards the use of ITNs and assessing the effectiveness of ITNs.

The result revealed that the average age of respondents is 27.5 years, almost all participants are literate(97.25%)**figure (1),**the range of family size of households is about 5-6 individuals, the majority of respondents (94.2%) were house wife's who were not engaged in any work.

Knowledge: The result revealed that there were significant increase in knowledge concerning types of insect transmitting malaria from 97.3% to 100%, mosquito types from46.7% to 92.2%, malaria mode of transmission from 35.4% to 81.5% see **figure (2)**, the existence of ITNs from 97.5% to 100%, but there was insignificant differences concerning the suitable time for fixing the nets from 99% to 100%**figure (3)**.

Attitudes: The result revealed that there were significant modification of attitudes towards the daily usage of ITN from 6.2% to 99.5%**figure (4),** the consequences of malaria during pregnancy from 43.2% to 83.8%**table (1),** feeling of protection with ITN possession from 86.5% to 99.8%.

Practice/utilization: The results revealed that there was a significant promotion of practices concerning the use of ITN as follow; the practice of using ITN continuous, increase from26.8% to 81.5%, the daily practice to ensure that their children sleep under the net from 53.5% to 98.5%**figure (5),** keeping ITNs inside home from1.5% to 84.5, the pregnant mother slept under the ITN regularly from1.5 % to 23.5%.

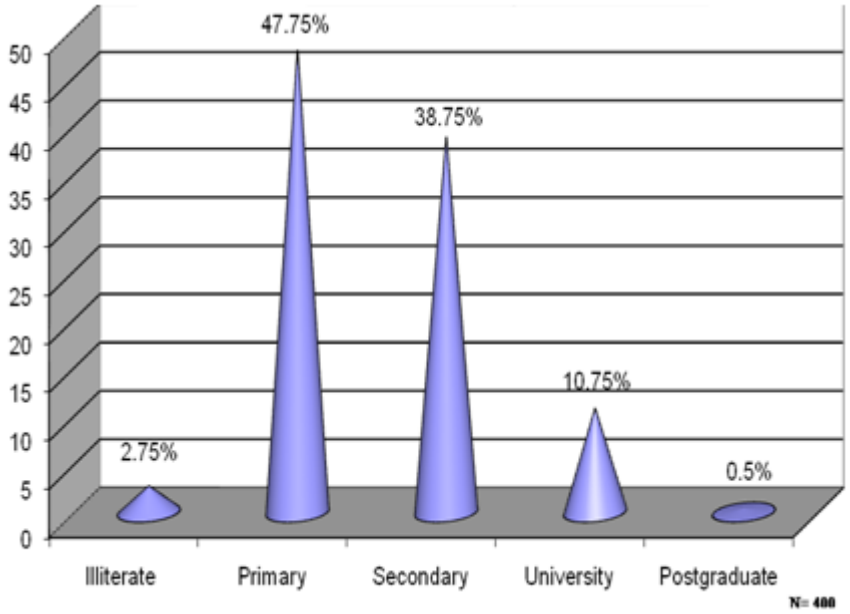

Figure 1: Educational levels of pregnant women in Eastern Gazira, Sudan.

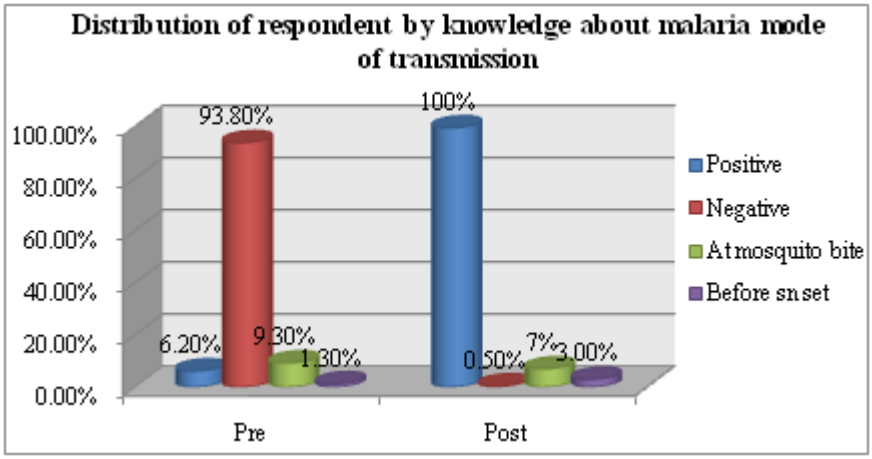

Figure 2: Pregnant women's knowledge about mode of transmission malaria Vector before and after intervention, in Eastern Gazira, Sudan.

Chi-square = 6.91, Degree of freedom, P value = 0.000

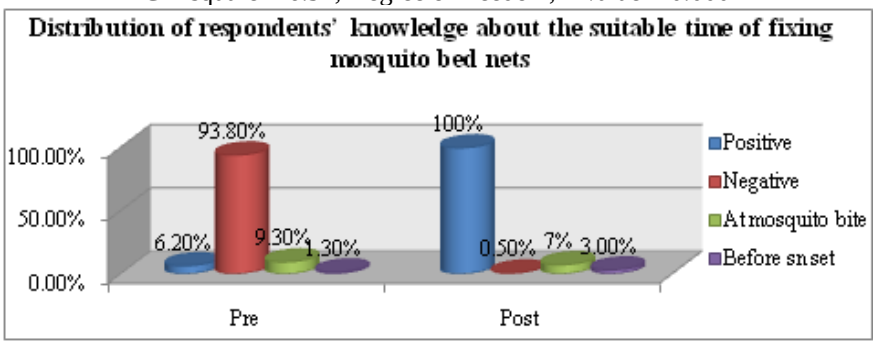

Figure 3: The respondents' knowledge about the suitable time of fixing mosquito bed nets before and after intervention, in Eastern Gazira, Sudan

Chi-square =.960, degree of freedom = 3, P value = 1.000

Table 1: Pregnant women's knowledge of consequences of malaria infection during pregnancy before and after intervention, in Eastern Gazira, Sudan

Consequences	Pre.		Post	
	No	%	No	%
Death	154	38.9	51	12.9
Impaired economy	14	3.5	0	0
Absenteeism from work /Learning	53	13.4	11	2.8
All above is true	171	43.2	332	83.8
Other	4	1	2	0.5
Total	**396**	**100**	**400**	**100**

Chi-square = 145.51, degree of freedom = 4, P value = 0.000

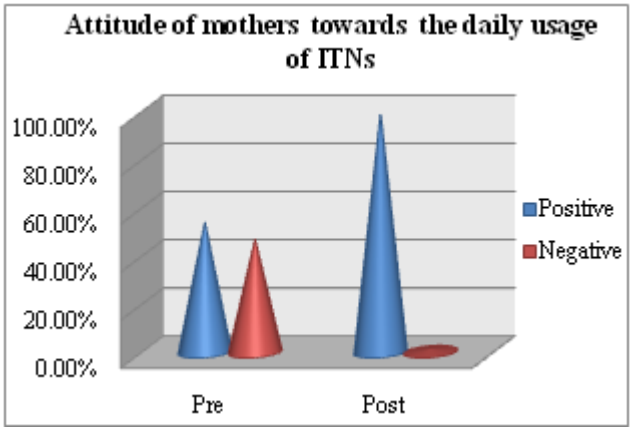

Figure 4: Attitude of Mothers towards the daily usage of ITNs prevents Malaria infection before and after intervention, in Eastern Gazira, Sudan.

Chi-square = 894.21, degree of freedom = 1, P value = 0.000

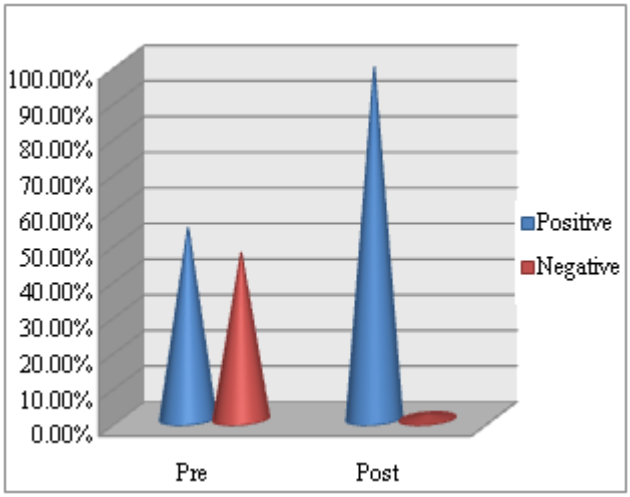

Figure 5: The utilization of mothers in making sure that the children sleeps daily under ITNs before and after intervention, in Eastern Gazira, Sudan.

Chi-square = 219.58, degree of freedom = 1, P value = 0.000

4. Discussions

Long lasting insecticide nets (LLINs) currently gaining a huge promotion in vector control programs, particularly in hyper-endemic malaria zones worldwide, WHO advocated LLINs as protective measures against malaria and promoter tool in child health and survival, however, mass distributing of free LLINs in absence of effective malaria and LLINs

education, the interventions will not lead to increase in its utilization as proved by many studies in African countries. This quasi experimental study was undertaken to promote practices concerning the use of ITNs. The study adopted many methods, approaches and strategies (6).

The study found that literacy was 97.7% and the average age was 27.5% years, these demographic variables were confirmed to influence the utilization of ITN in a study conducted by SaadEldeenHussien et al, 2008 in Eastern Sudan, who concluded that the educated individuals sleep more under the net, and letting more under-fives and pregnant women sleep under the net (8). Also, Julie, 2010, in his study conducted in Kinshasa – Congo, found that education level of family head of household is a major factor affecting the use of ITNs. The majority of respondents have good knowledge concerning the vector and mode of transmission of malaria, such satisfactory knowledge was gained before receiving malaria and ITN education interventions. After the health education interventions, the level of malaria related knowledge was found increased, where methods of malaria transmission, malaria vectors and seasonality effect were observed satisfactory for all the respondents (7,8). The knowledge improvement was statistically proved highly significant (P. value < 0.001) increasing ITNs utilization, this finding agrees with the study by Amina, A. 2008, that conducted in El Hosh – South Gezira State, the study concluded that the improved knowledge, attitudes and practices lead to promote towards the utilization of ITNs. The findings also agree with the study conducted by Ssenganzi and Makumbi, in Uganda among 202 households having children under five and owned at least one ITN. The study aimed at examining the role of malaria health education in increasing the rate of ITNs utilization and reduction of malaria burden among children under five. The study concluded that a significant drop in the incidence of malaria in children under five was reported in the area having a malaria education compared to that received ITNs without health education (9).

The results revealed that there was a significant promotion of the practice of using ITNs from 26.8% to 81.5%, this means the intervention led to a significant increase in ITNs use. The results revealed that there was a significant promotion of the practice of proper using of net from 70.2% to 95% the proper net fixing could be attributed to the health intervention held in the area.

The strengths of this study include innovative interventions for long period (6 months) and the long evaluation period (12 months). The study limitations were; the study was conducted among only two villages in Eastern Gazira, such studies will yield more useful results if conducted on more sample size with complete randomization all over the Gazira State or Sudan.

5. Conclusions

The study concluded that**;** malaria innovative intervention is found to be the most important factors affecting ITNs use and the educational communication were found to play a significant role in promoting the proper use and utilization of ITNs in the study area. The communication activities conducted among the study population inflicted significant improvement knowledge about malaria vector and this will enhance community participation in its control. It is very important to associate the distribution of ITNs with well panned and effective health education at all levels.

6. Competing on Interest

We declare that this study is one of my own works. It was not submitted to any other journal. We also declare that We have no competing interests related to this study.

7. Acknowledgement

We are grateful to the pregnant women participated in this study.

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