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Full length research paper

Health education as a tool for improving the knowledge of Malaria and long lasting insecticide treated nets among people living with HIV/AIDS in Bassa local government area of Plateau state, North Central Nigeria

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Malaria is a mosquito borne disease transmitted by female anopheles mosquito; it is life-threatening, preventable and treatable. Approximately 40 percent of the world's population is at risk of malaria. Malaria and HIV/AIDS are two of the most common infections in sub Sahara Africa, an increased prevalence of malaria and increased parasite density in HIV- infected individuals could lead to increased malaria transmission affecting both HIV- positive and – negative individuals. To assess the knowledge of malaria and Long Lasting Insecticide Treated Nets (LLITNs) among People Living with HIV/AIDS (PLHIV). A quasi experimental study conducted among PLHIV in Plateau State, Nigeria. EPI info statistical software version 3.5.4 was used for data analysis and 95% confidence interval was used in this study with a P ≤ 0.05 considered statistically significant. The mean age of the respondents was 33.9 ± 11.5 years. The level of knowledge on malaria improved significantly after the training (P<0.001). Majority (98.8%) of the respondents had good knowledge of LLITNs after the intervention (P < 0.001).This study has demonstrated the effectiveness of health education as veritable tool for improving the knowledge of malaria and LLITNs

Keywords: Health education, Malaria, Long Lasting Insecticide Treated Nets, People Living with HIV

INTRODUCTION

Malaria is a mosquito borne disease transmitted by female anopheles mosquito; it is life-threatening, preventable and treatable (Kliegman *et al*.,2011) Approximately 40 percent of the world's population are at risk of malaria (Ammann A et al., 2007). Every year, more than 500 million people become severely ill with malaria globally (Ammann *et al*., 2007). Most cases and deaths due to malaria are in sub Saharan Africa although Asia, Latin America, the middle East and some parts of Europe are also affected (Ammann *et al*., 2007). Thirty countries in Sub-Saharan Africa account for 90% of global malaria deaths and about 1 out of 5 deaths of children under 5 in Africa is due to malaria (United States Embassy in Nigeria, 2011; Nzayirambaho *et al*.,2013).Malaria and HIV/AIDS are two of the most common infections in sub Sahara Africa, an increased prevalence of malaria and increased parasite density in HIV- infected individuals could lead to increased malaria transmission affecting both HIV- positive and – negative individuals (Oyinbo *et al*., 2009; Whitworth, 2004).It is established that Long Lasting Insecticide-treated Nets (LLITNs) represent a practical and effective means to prevent malaria in Africa (FMOH, 2005). Hence this study was conducted to assess the knowledge of malaria and LLITNs among PLHIV.

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MATERIALS AND METHODS

Study Area

This is study was conducted in Seventh Day Adventist Hospital Jengre in Bassa Local Government Area (LGA) of Plateau state. Plateau State is located in North Central Zone of Nigeria. With an area of 26,899 square kilometres, the State has an estimated population of 3.2 million (Plateau State, 2013; National Bureau of Statistics, 2006). It is bounded by Bauchi State to the Northeast, Kaduna State in to the Northwest, Nassarawa State to the Southwest and Taraba State to the Southeast. Plateau State has 17 LGAs and 3 senatorial zones. It is located between latitude 80°24'N and longitude 80°32' and 100°38' east (Plateau State, 2013).There are a total of forty health facilities offering HIV/AIDS treatment, care and support services in Plateau State of which 21 are secondary health facilities, 16 primary health facilities and 3 tertiary health facilities (Plateau State, 2013). Seventh Day Adventist Hospital Jengre is one of the secondary health facilities in Plateau State providing comprehensive HIV/AIDS treatment, care and support services supported by AIDS Prevention Initiative in Nigeria (APIN) since 2004. It is a mission hospital which was established in 1947 with bed capacity of 75 and staff strength of 70 (SDA, 2011). It is a secondary health care institution which offers specialist and general medical care. The service units in the hospital are the Outpatient Department (OPD), Emergency Unit and comprehensive HIV/AIDS care unit. The hospital has a wide network of clients particularly from the northern part of the country. The hospital has a total of 563 adults of Anti Retroviral Therapy (ART) as at the time of this study. The ART clinic runs on once a week (every Tuesday) (SDA, 2011).

Study Population

This comprised of PLHIV receiving HIV/AIDS treatment, care and support services in Seventh Day Adventist Hospital Jengre who were resident in Bassa LGA.

Study Design

The study was a quasi experimental study with pre – intervention and post-intervention phases using quantitative method of data collection.

Inclusion and Exclusion Criteria

PLHIV who were 18 years and above residing in Bassa LGA enrolled into adult programme for HIV/AIDS treatment, care and support for twelve weeks and above were included in the study. PLHIV below 18 years of age residing outside Bassa LGA enrolled into adult programme less than 12 weeks were excluded from the study. Twelve weeks was used as one of the criteria because the respondents would have made at least three consecutive visits to the hospital since enrolment and the respondents' contact would have been established by the hospital's home based care team

Sample Size Determination

The sample size was calculated using standard acceptable formula and 86% (Uganda Population Service Commission, 2005) proportions of the respondents with knowledge of LLITNs from a previous similar study was used and a minimum sample size of 84 was obtained.

Sampling Technique

A multi-stage sampling technique was used in this study.

Stage I

From the list of seventeen LGAs in Plateau State, Bassa LGAs was selected by balloting using simple random sampling technique.

Stage II

From the list of the three secondary health facilities in Bassa LGA offering HIV/AIDS treatment, care and support services, Seventh-Day Adventist hospital was selected using simple random sampling technique by balloting.

Stage III

A list of 290 PLWHA out of 563 who had met the inclusion criteria was drawn from the monthly clinic booking register of all the clients accessing HIV/AIDS treatment care and support services from Seventh-Day Adventist Hospital. A computer generated table of random numbers using WINPEPI statistical software was used to select 84 participants from the 290 eligible respondents.

Preparation for Data Collection

Advocacy visit was paid to the Medical Director and the management of the Seventh Day Adventist Hospital

Jengre to solicit for the hospital's support. Four resident doctors from the department of Community Medicine Jos University Teaching Hospital (JUTH) were trained as research assistants to aid with the administration of questionnaires as well as participating in the health education. The tool of data collection was pre-tested in a secondary health facility providing HIV/AIDS treatment, care and support services in another LGA of the state. This helped in making appropriate corrections where necessary.

Ethical Consideration

Anonymity and confidentiality of the information obtained was assured and maintained. Ethical clearance was obtained from Ethical Review Committee of JUTH, Jos.

Data Collection Instrument

A semi – structured interviewer administered questionnaire was used to obtain information from the participants.

Data Collection

Four trained research assistants participated in the data collection prior to the intervention after a detailed explanation as to the purpose of the study was given to all the eligible respondents and verbal as well as written informed consent was obtained from each subject before the administration of the questionnaire.

Intervention

Health education intervention was provided to all the participants in a comfortable and conducive area in the Hospital. The health education focused on the cause of malaria, ways of preventing malaria, types of mosquito nets, benefits of insecticide treated bed net and information on the importance of the consistent use of LLITNs and actions to be taken to prevention malaria. The sessions also had demonstration on the way the LLITNs should be mounted and used. Pamphlets and posters (IEC materials) providing relevant information on malaria and LLITNs were also used as tools during the session and was given to all the participants to take home to service as reminder tools. There were two heath education sessions with 42 participants in each session lasting one and half hours and delivered by the same member of the research team who is proficient in Hausa language in order to ensure uniformity and quality of the content as well as method of delivery. All the participants had one health education session.

Post Intervention

Three months after the intervention, quantitative data was again collected with the same data collection instruments from the respondents.

Data Analysis

Data analysis was done using Epi info™ statistical software package version 3.5.4 developed by CDC 1600 Clifton Rd. Atlanta, GA 30333 USA. Chi square test was used to compare the effect of the intervention. Paired student T-test was used to determine difference in mean knowledge score before and after the intervention. Ninety-five (95%) confidence level was used for the study and a $P \leq 0.05$ was considered statistically significant.

Scoring and Grading of Responses

Knowledge of malaria: There were 6 stem questions on knowledge of malaria with 26 possible responses and only 11 of these responses were correct. One mark was awarded for each correct response and no mark was awarded for wrong response or I don't know. A total of 11 maximum attainable scores were used for the assessment of knowledge of malaria. A score of 0 – 5 marks out of 11 marks was graded as poor knowledge of malaria and score of 6 – 11 mark out of 11 marks was graded as good knowledge of malaria.

Knowledge of LLITNs: There were 5 stem questions on knowledge of LLITNs with 15 possible responses and only 6 of these responses were correct. One mark was awarded for each correct response and no mark was awarded for wrong response or I don't know. A total of 6 maximum attainable scores were used for the assessment of knowledge of LLITNs. A score of 0 – 2 marks out of 6 marks was graded as poor knowledge of LLITNs and score of 3 – 6 mark out of 6 marks was graded as good knowledge of LLITNs.

RESULT

Eighty four (84) PLHIV participated at both pre-intervention and post-intervention phases of the study giving a response rate of 100%. The age range of the respondents in this study was 18-67 years with mean age

Table 1: Socio-demographic characteristics of the respondents

	n = 84	
Variables	**Frequency**	**Percentage**
Age (years)		
18-27	30	35.7
28-37	33	39.3
38-47	9	10.7
48-57	6	7.1
58-67	6	7.1
Mean age	**33.9 ± 11.5 years**	
Sex		
Female	66	78.6
Male	18	21.4
Religion		
Christianity	68	81.0
Islam	16	19.0
Marital Status		
Single	9	10.7
Married	54	64.3
Widowed	21	25.0
Level of Education		
Non formal	24	28.6
Primary	39	46.4
Secondary	12	14.3
Tertiary	9	10.7

of 33.9 $\pm$ 11.5 years. Majority (78.6%) of the respondents were female. Christianity was the predominant religion of the respondents while 54 (64.3%) of the respondents were married. The highest level of education attained by respondents (46.4%) was primary (See Table 1). Improvement in knowledge of malaria following the health education intervention was demonstrated in this study as the proportions of respondents who knew malaria as a preventable disease increased from 66 (78.6%) pre-intervention to 78 (92.9%) post-intervention (P = 0.006). The respondents' knowledge on the causes of malaria showed statistically significant improvement after the health education as majority (95.2%) mentioned bite by female anopheles mosquito as the cause of malaria as against 71.4% who mentioned same before the health education sessions (P <0.001). Level of misconceptions about the cause of malaria was found to significantly reduce post-intervention as the proportion of the respondents who mentioned drinking of dirty reduced from 12 (14.3%) to 3 (3.6%) and eating of unripe mangoes form 12 (14.3%) to 5 (5.6%). Majority (96.4%) of the respondents following the intervention knew that the consistent use of LLITNs could be used to prevent malaria (P <0.001). Furthermore, 71 (84.5%) of the respondents knew that cleaning of the environment could be a preventive measure against malaria after the intervention as against 30 (35.7%) before the intervention (P <0.001). Use of insecticide sprays was mentioned as a method of prevention of malaria by 24 (28.6%) of the respondents at baseline and increased to 56 (66.7%) after the intervention. The level of knowledge of malaria in this study was significantly influenced by the health education intervention as majority (97.6%) of the respondents had good knowledge post-intervention as against 60.7% pre-intervention (P <0.001). Similarly, the mean knowledge score on malaria showed statistically significant improvement from 4.8 ± 1.7 pre-intervention to 7.2 ± 1.6 out of 11 marks (T-test = 9.35; P = <0.001) See Table 2. Statistically significant improvement in the knowledge of LLITNs was brought to bear in this study using health education as a driver as all the respondent became aware of LLITNs and its usefulness at the end of the study as against 61 (72.6%) with the same level of awareness at baseline (χ^2 = 39.29; P < 0.001). The overall level of knowledge of LLITNs among the respondents also showed statistically significant improvement at post-intervention with the knowledge score on LLITNs increasing from 3.9 ± 1.3 at pre-intervention to 5.4 ± 0.6 out of 6 marks (T-test = 9.31; P <0.001) See Table 3.

DISCUSSION

The age range of the respondents in this study was 18 – 67 years with age group 28 – 37 years accounting for the highest proportion of 33 (39.3%). The mean age of respondents was 33.9 ± 11.5 years. The findings of this study had similarities with that of a study done in Beira Mozambique which found the mean age to be 38 ± 15 years (Saracino *et a*l., 2012). Another Nigeria study conducted among PLHIV also found the mean age to be 33.5 ± 9 years showing agreement with what was found in this study (Wondimeneh *et al*., 2013). Other studies carried out in Uganda and Cameroon were also in agreement with findings of this study. (Uganda Population Service Commission, 2005; Njunda *et al*., 2012). This study had more female respondents which is in agreement with findings of studies done in Nigeria, Cameroon and Ethiopia which gave a predominantly female respondents (Wondimeneh *et al*., 2013; Njunda *et al*., 2012; Uneke *et al*., 2005; Onyenekwe *et al*., 2007). However, another Nigerian study had a contrary finding of more male respondents (. Akinbo *et al*., 2009). The consistency of the findings of this study with other studies on predominantly female respondents could be due to the fact that women are more likely to be available for participation in both community and facility based surveys because of their availability**.** Most of the

Table 2. Knowledge of LLITNs among the respondents

Variables	Pre-intervention n = 84 Freq (%)	Post intervention n = 84 Freq (%)	χ^2	df	P – value
Awareness of LLITNs			39.29	1	< 0.001
Yes	61 (72.6)	84 (100.0)			
No	23 (27.4)	0 (0.0)			
knowledge of LLITNs			20.92	1	< 0.001
Good	63 (75.0)	83 (98.8)			
Poor	21 (25.0)	1 (1.2)			
Mean knowledge score of LLITNs	3.9 ± 1.3	5.4 ± 0.6	T-test 9.31	df 167	P-value < 0.001

df = degree of freedom

Table 3. Knowledge of malaria among the respondents

Variables	Pre-intervention n = 84 Freq (%)	Post-intervention n = 84 Freq (%)	χ^2	df	P – value
Malaria as a preventable disease			10.39	2	0.006
Yes	66 (78.6)	78 (92.9)			
No	6 (7.1)	5 (6.0)			
Don't know	12 (14.3)	1 (1.2)			
Causes of malaria*					
Mosquito bite	60 (71.4)	80 (95.2)	17.14	1	<0.001
Drinking of dirty water	12 (14.3)	3 (3.6)	5.93	1	0.015
Dirty environment	48 (57.1)	20 (23.8)	19.37	1	<0.001
Eating of unripe mangoes	12 (14.3)	5 (5.6)	3.21	1	0.073
Methods of prevention of malaria*					
Use of LLINs	19 (22.6)	81 (96.4)	91.97	1	<0.001
Cleaning of Environment	30 (35.7)	71 (84.5)		1	<0.001
Use of insecticide Spray	24 (28.6)	56 (66.7)	41.73	1	<0.001
Drinking of cleaning water	12 (14.3)	1(1.2)	24.44	1	0.001
Avoidance of eating of unripe mangoes	12 (14.3)	4 (4.8)	10.09	1	0.035
Level of knowledge on malaria				1	<0.001
Good	51 (60.7)	82 (97.6)	4.42		
Poor	33 (39.3)	2 (2.4)	34.68		
Mean knowledge score on malaria	4.8 ± 1.7	7.2 ± 1.6	T-test 9.35	df 167	P-value < 0.001

*= Multiple responses obtained, df = degree of freedom

respondents in this study were married with about a quarter been widowed, this is at variance with the findings of an Ugandan study which revealed that 51% of the respondents were widowed (Uganda Population Service Commission, 2005). In this study, there was also statistically significant improvement in the knowledge of malaria being a preventable disease at post-intervention phase of the study. In an Indian study, it was found that 65% of the respondents considered malaria a serious but preventable disease which further supported the findings of this study (Vijayakumar *et al*., 2009).

A study conducted in Uganda further buttressed this finding as majority of the respondents knew that malaria could be prevented. The awareness of mosquito bite as the cause of malaria was found to be high as it increased significantly (P =0.006) after the intervention. A study done in India showed that 63% of the respondents knew that bites by female anopheles mosquito cause malaria (Vijayakumar *et al*., 2009). Other Nigeria and Ethiopian studies revealed that less than half of the respondents identified mosquito bite as the cause of malaria (Ekwunife *et al*., 2010; Dagne *et al*., 2008). While studies conducted in Nigeria and Ghana showed that respondents had good knowledge of the cause of malaria (Pettifor *et al*., 2008; Udonwa *et al*., 2010). Also in this study the level of misconceptions of malaria being caused by eating of unripe mangoes reduced among the respondents following the intervention. Similar misconceptions were also expressed in other studies (Dagne G *et al*., 2008; Pettifor *et al*., 2008; Udonwa *et al*., 2010; Sande *et al*., 2012).These misconceptions expressed in this study and other studies could however be due to the socio cultural beliefs of the respondents. Majority of the respondents after the intervention had overall good knowledge of malaria as compared to slightly above half who had overall good knowledge before the intervention which showed statistically significant improvement. The mean knowledge score on malaria also showed statistically significant improvement from 4.8 ± 1.7 before the intervention to 7.2 ± 1.6 after the intervention. This significant improvement in knowledge on malaria brings to light the importance and significance of a well structure health education intervention as a tool for change.

There was statistically significant improvement in the awareness of use of LLITNs as a means of malaria prevention after the intervention (P <0.001). This finding is in tandem with findings of other studies (Wondimeneh *et al*., 2013 Vijayakumar *et al*., 2009; Pettifor *et al*., 2008; Udonwa *et al*., 2010). This may have been due to that fact that health education has been employed in most malaria endemic areas as a tool for marketing the use LLITNs as means of malaria prevention through the use of mass media and other relevant means. However, Contrary to the findings of this study, another Nigerian study had respondents displaying low knowledge of LLITNs (Ekwunife *et al*., 2010).

CONCLUSION

This study has demonstrated the effectiveness of health education as veritable tool for improving the knowledge of malaria and LLITNs.

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