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EFFECT OF HEALTH EDUCATION INTERVENTION ON KNOWLEDGE OF INTERMITTENT PREVENTIVE TREATMENT OF MALARIA AMONG PREGNANT WOMEN IN BENUE STATE

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Abstract

Malaria in pregnancy is a disease that worsens pregnancy conditions leading to anaemia, spontaneous abortions, stillbirth, low birth weight, intrauterine growth restriction and congenital malaria. Effect of Health Education Intervention on Knowledge of Intermittent Preventive Treatment of Malaria among Pregnant Women in Benue State. Quasi-experimental design with Pretest -posttest component was used. A Semi structured questionnaire was developed to assess pregnant mothers' knowledge of intermittent preventive treatment (IPT) Fansidar for malaria. The study found that health educational intervention had positive effects on the mother's level of knowledge to intermittent preventive treatment (IPT) with p-values less than alpha level of significance (p = .000). After health educational intervention, pregnant mothers' aggregated mean percentages knowledge of Fansider IPT was 95% and 28% for the study group and control group respectively. The test of hypotheses further showed t-value of -9.909, p = .000, with 137 degree of freedom at 5 % level of significance. Hence, it was concluded that health educational intervention has significant effects on the mother's level of knowledge about intermittent preventive treatment for malaria in pregnancy.

KEY WORDS: Educational intervention, Fansider, intermittent preventive treatment, knowledge, malaria in pregnancy, pregnant mothers,.

Summary Statement:

What is already known about this topic?

- Knowledge about malaria transmission and complications is low
- Knowledge of IPT among pregnant women is very low

What this paper adds:

- Health educational intervention had positive effects on the mother's level of knowledge of malaria transmission, and Complications.
- Health educational intervention had positive effects on the mother's level of knowledge of Fansider IPT.
- Health educational interventions are effective and remain a valuable tool in community-based malaria prevention and control.

The Nursing implications of this paper:

- There should be constant malaria health education to pregnant women by nurses and midwives
- Nurses and Midwives should apply behavioural change Communication principles to influence pregnant women to improve their adherence of intermittent preventive treatment.
- Nurses and midwives should update their knowledge and required skills of educating pregnant women about IPT current regimen prevention of malaria in pregnancy

Introduction

Malaria in pregnancy is a global health problem with adverse pregnancy outcomes including aneamia in the mother and may result in uterine growth retardation, abortion, still birth, and low birth weight, in the newborn. Globally, WHO (2021) reported an estimated 241 million cases of malaria in 2020, CDC (2018) reported an estimated 216 million cases of malaria. In 2017, 219 million cases of malaria occurred compared with 217 million cases in 2016 and 239 million cases in 2010 (WHO, 2018). The estimated number of malaria deaths stood at 627 000 in 2020 WHO (2021). The WHO African Region carries a disproportionately high share of the global malaria burden of 95% of malaria cases and 96% of malaria deaths. (WHO 2021).

Malaria is responsible for 20 per cent of still births and 11 per cent of global maternal deaths by way of spontaneous abortion, maternal anaemia, placental pathologies, infant mortality and morbidity, intrauterine growth retardation and low birth weight. Other effects include: threatened abortion, miscarriage, premature delivery and low birth weight which all have serious public health implications for the mother, the fetus and newborn (Omang et al 2020). WHO calls for a reduction in global malaria incidence and mortality rates of at least 90% by 2030 in line with the SDG 3 (WHO, 2018). The Global Technical Strategy for Malaria 2016-2030 also seeks for a reduction in global malaria incidence and mortality rates of at least 90% by 2030 in line with the Sustainable Development Goals 3 (WHO, 2018).

An estimated 11 million pregnant women in sub-Saharan Africa were infected with malaria. This resulted in nearly 900 000 children born with a low birth weight. In Nigeria, an estimated 97% of the population of 160 million residents are at risk of malaria infection of which children under age 5 and pregnant women are the groups most vulnerable to illness and death from malaria infection in Nigeria (Nigeria National Demographic Health Survey NDHS, 2018). The Statistical Research Development (2019) reported that about 480 thousand pregnant women, 452 thousand pregnant women and about 373 thousand pregnant women in Nigeria experienced MIP in 2017, 2018 and 2019 respectively.

Overall malaria prevalence of malaria in pregnancy stood at 79.5 % , in Lagos and Enugu States, the prevalence during pregnancy was reported to be 52 and 99 per cent respectively, and having devastating effects on pregnant women, the fetus and the new born (Omang et al 2020). According to Okafor et al, (2019), Malaria accounts for approximately 1 million deaths annually and about 300,000 deaths in Nigeria alone. Pregnant women and their unborn babies are particularly vulnerable to the adverse consequences of malaria.

Intermittent preventive treatment (IPT) using Fansider (Sulphadoxinepyrimethamine) - up to 6 doses under Direct Observed Therapy is recommended as one of the prong approaches for prevention of malaria in pregnancy (WHO, 2016). Health education intervention HEI has been identified as a key intervention to improve women's knowledge to of Fansider IPT.

In Ghana, Ayiisi (2017) assessed the knowledge of Intermittent Preventive Treatment (IPT) for malaria control among pregnant women attending antenatal clinics in the Primary Health

Care Centers in the Sunyani West District of Ghana whereby it was reported that the knowledge and utilization of IPT among pregnant women in Sunyani West District were very low. The study recommended that healthcare providers in the district should intensify health education on the use of Intermittent Preventive Treatment of malaria in pregnant women through community durbars, radio and television programs. In Rwanda, it was reported that malaria health education given to pregnant women by nurses improved these women's malaria knowledge and enabled them to make effective decisions to reduce the incidence of malaria in Rwanda among pregnant women (Kerr, 2016).

A study report in Nigeria showed that Mothers' knowledge of malaria is not satisfactory. Although respondents were aware of Malaria in pregnancy, and almost all the respondents (96.2%) were aware that malaria is caused by infected mosquito bite. A little over half (55.5%) had good knowledge of Malaria in pregnancy. There was poor knowledge of the complications of Malaria in pregnancy in mothers, with 27% unaware of any complications. Majority (51.6%) of them did not know the complications of malaria in the fetus.

Better educated respondents had statistically significant better knowledge of Malaria in pregnancy (P = 0.001). Only two-fifths of the respondents (39.8%) agreed that Malaria in pregnancy can lead to death of the fetus. Most (41.9%) used insecticide spray and coils in the prevention of Malaria in pregnancy, whereas only 36.9% used intermittent preventive treatment. Only 24.1% used insecticide-treated nets and almost 20% used no form of prevention. Public health education on Malaria in pregnancy was recommended at the community level in order to improve knowledge of Malaria in pregnancy (Okafor et al, 2019)

The National malaria policy launched in February 2015 expressed commitment to the achievement of a malaria free Nigeria and hence addresses issues related to malaria prevention (NDHS, 2018). In Benue State, malaria in pregnancy still persists despite several interventions undertaken by the State Ministry of Health (SMOH) to curb it. The burden of the disease lies particularly among pregnant women with its attendant adverse pregnancy outcomes (Benue SMOH, Annual Operation Plan AOP, 2017). Hence, this study sought to assess the effects of health educational intervention on Fansider IPT of malaria among ANC attendees at selected secondary health facilities in Benue.

Method

Design and Setting

The study adopted Quasi-experimental design with Pretest -posttest component.

Sample size Determination

The study adopted Fox, Hunn, and Mothers (2009) sample size formula for comparing proportions in two equally sized groups:

$$n = \frac{[P_1(1-P_1)+P_2(1-P_2)]}{(P_1-P_2)^2} x\ K$$

Where, P_1 = expected sample proportion for study group = 95%

P_2 = expected sample proportion for control group = 90%

K = a constant which is a function of a and β (see table 3.1 for details)

a = 0.05

β = 0.2

Thus, $n = \frac{[0.95(1-0.95)+0.90(1-0.90)]}{(0.95-0.90)^2} x\ 7.9$

- $= \frac{[0.95(0.05)+0.90(0.1)]}{(0.05)^2} x\ 7.9$
- $= \frac{[(0.0475)+(0.09)]}{0.0025} x\ 7.9$
- $= \frac{0.1375}{0.0025} x\ 7.9$
- $= 55x7.9$
- $= 434.5$
- $= 435$

Therefore, n = 435 pregnant mothers in each group (both groups sample 435+435 = 870 pregnant women)

Sample in a facility

$$= \frac{\text{Total representative population in a facility}}{\text{determined sample for the study}} \text{ x sample in a group}$$

Value of k as used for sample size calculations (Fox, et al., 2009)

	Power: 50% **b = 0.5**	**80%** **b = 0.2**	**90%** **b = 0.1**	**95%** **b = 0.05**
a: 0.10	2.7	6.2	8.6	10.8
0.05	3.8	7.9	10.5	13.0
0.02	5.4	10.0	13.0	15.8
0.01	6.6	11.7	14.9	17.8

Hence, the proportion of each sample in respective health facilities was computed using the formula given below.

Proportion of samples in a facility

$$= \frac{\textit{Total representative population in a facility}}{\textit{Grand total in all facilities}} \times \textit{sample size}$$

For study group:

General Hospital Lessel = $\frac{179}{3032} x\ 435 = 26$

General Hospital Wannune = $\frac{199}{3032} x\ 435 = 29$

General Hospital Otukpo = $\frac{2654}{3032} x\ 435 = 381$

For Control group:

General Hospital Adikpo = $\frac{176}{3032} x\ 435 = 25$

General Hospital Okpoga = $\frac{192}{3032} x\ 435 = 28$

General Hospital Makurdi = $\frac{2664}{3032} x\ 435 = 382$

Sampling Technique

Multistage sampling was used to recruit 871 pregnant women into the study (436 study group and 435 control group)..

Tools and instruments

Three main tools were used in data collection as the follows:

- Semi structured questionnaire to elicit Knowledge
- Follow up sheet
- Health education module

Validity of the tools

In establishing the face and content validity of the tools, the research tools and research objectives were submitted to jury of two experts in the Department of Nursing Sciences and one expert from the Faculty of Allied Health Sciences, College of Medical Sciences, Ahmadu Bello University Zaria. A content validity survey was then generated and items on the instruments were critically assessed for relevance of content, clarity of statement, feasibility of the instrument, consistency of style, and logical accuracy. Their observations and corrections were used to modify the instruments and arrive at final copies of instruments

Reliability of the tools

To test for reliability of the tools, a pilot study was conducted with mothers attending Antenatal Clinic at Family Support Program, Makurdi. This was to determine how valid and appropriate, as well as the index of stability (internal consistency).

Method of Data Collection

Ethical clearance for the research was obtained from the Executive Secretary of Benue State Hospitals Management Board (HMB) after which data collection from the facilities was done in three phases: Data collection was done by the researcher and research assistants between February 2020- May 2020.

Phase I: Selection and training of research Assistants

The researcher visited each of the six selected facilities and presented the letter of ethical clearance from HMB to the medical Officer in charge of each hospital before proceeding with the research. Six (6) research assistants were selected by the researcher (one for each facility) to assisted in the data collection. The research assistants (one for each facility) were trained to assist in the data collection. Training of research assistants covered the study objectives, the use of health education module for ANC women in the study group during intervention phase, administration of pre and post tests and the use of follow up sheet.

Phase II: Pre- Intervention
Informed consent was obtained from the pregnant mothers who come for booking at antenatal care after due explanation of the aim of the research. Women who meet the criteria for study were recruited into the study. The researcher and the research assistants explained to the pregnant women at antenatal clinics about the study objectives and the procedure in carrying out the study as well as their right to participate or refuse or withdraw from participating in the study. Oral consent was obtained from each of respondent before involving them in the study.

At the study groups (General Hospital Lessel, General Hospital North Bank, Makurdi and General Hospital, Otukpo), pretest questionnaires were administered to the ANC women at booking. At the control groups namely (General Hospital, Adikpo, General Hospital, Wannune, and General Hospital Okpoga), pregnant mothers also had pretests at booking.

Phase III: Intervention
At the study groups (General Hospital Lessel, General Hospital North Bank, Makurdi and General Hospital, Otukpo), health education intervention was administered using the researchers' self-developed health education module: Health education intervention was not administered in the control groups (General Hospital, Adikpo, General Hospital, Wannune, and General Hospital Okpoga). Researcher's self-developed health education module was designed to guide the researcher for presentation of fact about about malaria in pregnancy and administration of IPT to pregnant women in study groups during health education at antenatal visits The health education training module contained information about the program as follows: time of implementation, duration was 30 minutes. The module also specified the topics such as definition of malaria, causative organism of malaria, the mode of transmission of malaria, the risk factors for MIP, the signs and symptom of MIP, complications of MIP, the drug of Choice (Sulphadoxine Pyramithamine SP) for IPT of MIP, dose regimen of SP- IPT, ANC contacts by direct Observed therapy (DOT), and the importance of adherence to IPT protocol.

Learning objectives and instructional materials to be used were also spelt out in the module. In addition, the module specified that the researcher would introduce the topic before proceeding to health educate the clients in line with the objectives. The researcher and trained research assistants carried the mothers along by entertaining contributions and questions. At the end of the health educational intervention, questions were entertained for feedback and answers were provided before the conclusion were made by summarizing the topic.

The trained research assistants also assisted with follow-up ANC visits to reinforce health educational intervention using the researcher's self- developed health educational training module in line with Behavioural Change Communication strategy.

Phase IV: Post- Intervention
At the study groups (General Hospital Lessel, General Hospital North Bank, Makurdi and General Hospital, Otukpo), posttest questionnaires were administered. Post- tests were administered at a fixed ANC visit for each respondent during the third trimester of pregnancy. At the control groups, posttest questionnaires were also administered at a fixed ANC visit for each respondent during the third trimester of pregnancy followed by health education about IPT just to ensure ethical consideration on the human subjects.

As posited in the Health Belief Model, questionnaire to assess pregnant mothers own perceived barriers to IPT adherence was administered to pregnant mothers along with post- test in both study group and control group. After post- tests for both study group and control group, the result was analysed and compared in line with the study objectives and hypotheses tested.

All study participants in study groups had pretest questionnaires were administered to them during booking (first ANC visit). At the control groups, pregnant mothers also had pretests during booking. All study groups had health education intervention administered using the researchers' self-developed health education module. All control groups, posttest questionnaires were also administered at a fixed ANC visit during the third trimester of pregnancy followed by health education about IPT just to ensure ethical consideration on the human subjects.

Method of Data Analysis
Data collected was analyzed using descriptive and inferential statistics. Research questions were analyzed using mean and standard

deviation. In that regard any item that is positively worded which had a mean rating of 2.5 (aggregated mean score) and above was accepted. A paired (samples) t-test was also used for the study. A paired t-test is used when a researcher has two related observations (two observations per subject in this situation, before and after) and the researcher want to see if the means on these two normally distributed interval variables differ from one another. Scoring system for knowledge was as follows: Good knowledge = 2 scores, average knowledge = 1 scores, poor knowledge 0 scores. The scores were calculated as follows: below 50% = poor knowledge, 51-59% = average knowledge, while above 60% = good knowledge.

Ethical Considerations

An ethical clearance was obtained from Ethics and Research Committee of the Benue State Hospitals Management Board, Makurdi ref. No. HMB/OFF/215/VOL/II/282 prior to commencement of the study. The letter of ethical approval was taken the Medical Officer in charge of each facility before commencing the study. An informed consent obtained from each participant. Respondents were assured that their responses would be treated with utmost privacy, anonymity and confidentiality and that their fundamental human rights will not be violated.

Results:

Demographic Characteristic of Respondents

Out of 871 respondents in both study and control groups, 54.1% and were in the age bracket 20-29 years Considering their tribes, a higher percentage of the respondents were Tivs 42.5% and Idoma 42.3%. For the religious status of the respondents, 94.1 were Christians. The marital status of the respondents showed that 98.3% were married. For the educational level, a greater percentage of the respondents attained secondary education only (47.4%). Similarly, 92.7% of the respondents were housewives of which only 8.8 of them had very good income.

Study Group Responses according to their Level of Knowledge before and after HEI

Out of the 435 respondents in the study group, 41.0% had good knowledge about malaria before HEI while they had 93.9% good knowledge after HEI.

About mode of transmission, out of the 436 respondents in the study group, 93.8% had good knowledge after HEI as against (4.0%) in the study group had good knowledge before HEI.

On knowledge of the signs and symptoms of malaria in pregnancy, 44 (10.0%) had good knowledge and On the signs and symptoms of malaria in pregnancy, 416 (95.3%) of study group had good knowledge after HEI as against 87 (20.0%) before HEI.

For the complications of malaria in pregnancy, majority of respondents 95(.6%) in the study group showed good knowledge against only 20.0%) had good knowledge before HEI.

Regarding their knowledge about malaria prevention for the study group, 414 (95%) of the respondents had good knowledge after HEI as against only 9.8% of respondents who had good knowledge before HEI .

In assessing knowledge about Fansider IPT in the study group, most (95.4%) of the respondents had good knowledge after HEI as against 52.0% who had good knowledge before HEI.

Knowledge assessment about the number of doses of Fansider IPT in the study group showed that most (94.3%) had good knowledge, about the number of doses of IPT they are expected to take during pregnancy, whereas only 53.3%) had good knowledge about the number of doses of IPT before HEI

Considering benefits of IPT to the mothers in the study group, most (95.6%) of the respondents had good knowledge after HEI as against 42.0% of the respondents who had good knowledge before HEI.

For the benefits of IPT to the baby, majority (94.3%) of respondents had good knowledge after HEI as against only 6.0% of respondents who had good knowledge about the benefits of IPT to the baby before HEI.

The results also indicated that after HEI most (95.4%) of the respondents in the study group had good knowledge about the interval they are expected to take their first dose of IPT and subsequent doses as against 59.2% of the respondents who had good knowledge about the drug interval before HEI.

On the aspect of side effects of IPT, majority (95%) of the respondents had good knowledge after HEI whereas only 29.2% of the respondents had good knowledge of side effect of IPT before HEI.

Also. after HEI, the study group also revealed that most (95.7%) of the respondents had good knowledge on the steps they are supposed to take when they experience side effects from IPT after HEI whereas before HEI, only 44.3% of respondents had good knowledge on the steps they are supposed to take when they experience side effects

Furthermore, 409 (94.0%) of the respondents in study group had good knowledge about other measures used to prevent malaria as against only 9.2%) of respondents had good knowledge of other measures used to prevent mosquito bites.

Summary of the Level of Knowledge between Studied and Control Groups Post Intervention

An aggregated mean percentage of 95% knowledge was obtained for the study group after health education intervention. In contrast, an aggregated mean percentage of only 33% for good level of knowledge was obtained for the control group which received no HEI. The chi-square and p-values showed there is significant difference among pregnant mother's level of knowledge between the study and control group post HEI.

The drastic improvement in the level of knowledge about malaria, methods of transmission of malaria, signs and symptoms of malaria, complications of malaria in pregnancy and methods for malaria prevention in the same study group after HEI shows that HEI was effective in influencing their knowledge in these aspects.

Similarly, after HEI, there was drastic improvement in the knowledge by respondents of IPT drug used to prevent malaria in pregnancy, IPT doses to be taken during pregnancy, benefits of IPT to the mother, benefits of IPT to the baby, interval for first dose of IPT and its subsequent doses, side effects of IPT, and on the steps they are supposed to take when they experience side effects from IPT. Their knowledge was influenced due to the HEI.

Paired T-Test for Research Hypotheses

The t-test results in Table 7 indicated a mean of 1.10 for pre-test scores of mother level of knowledge about malaria before the HEI and a mean of 1.49 for post-test scores of mother level of knowledge about malaria IPT during pregnancy. The results further showed t-value of (-9.909, $p = .000$)) with 137 df at 5 % level of significance. Based on the results obtained from table 4.16 the study therefore rejected the null hypothesis (H_0) and concluded that there is a significant effect of HEI on the mother's level of knowledge about malaria IPT during pregnancy.

Discussion

The current study showed that only 28.0% of ANC pregnant women had good knowledge of malaria before HEI. This depicts that their level of knowledge about malaria in pregnancy before HEI was low. Similarly, low knowledge of malaria was observed by Adamu, (2016) among pregnant women attending ANC in Jigawa State, Nigeria (52.6%) and Yaya et al, (2017) among women in Burkina Faso (56.1%). The finding of the current study however contradicts the finding of Singh et al, (2014) whose study on knowledge, Attitude and Practices on Malaria in Northern Nigeria found that comprehensive knowledge about malaria prevention measures was high (90%). It was however observed from their study that knowledge about preventive measures does not necessarily translate into improvement in practice of preventive measures, hence health education intervention was recommended.

The finding in this current study also correlates with the findings of Ayiisi, (2017) in a study to assess the knowledge and utilization of IPT for malaria control among pregnant ANC women at Sunyani West District Ghana. The study showed that the knowledge of IPT among pregnant women in were very low. The study recommended that healthcare providers in the district should intensify education on the use of Intermittent Preventive Treatment of malaria in pregnant women through community durbars, and radio and Television programs. This recommendation of health education has been upheld by many researchers in different countries including Nigeria.

The current study further shows that after HEI, knowledge ofs IPT among women attending ANC was 95.0% as against 28% level of knowledge of IPT before HEI. This finding clearly shows that HEI had positive effect on the women's knowledge of IPT. The current study finding correlates with the findings of Balami et al (2019) in a study on effects of a HEI on malaria knowledge in North-Eastern Nigeria which revealed that the HEI was effective in improving the knowledge of pregnant mothers whereby the intervention was significant in achieving a 12.75%, higher total knowledge scores for the intervention group over the control group.

Similar findings were obtained by Ayefabi et al, (2015) at Zaria, Nigeria during their study on effect of primary health care workers training on the knowledge and utilization of intermittent preventive therapy for malaria. During the baseline assessment of the study group, only 11.8% of the respondents had good knowledge of the IPT. This however increased significantly to 87.4% clients post intervention. The study demonstrated significant improvement in the knowledge of the IPT by the clients in the study group compared with the control group where such training was not conducted.

A strong support of this study is Uwusu Addoetal, (2014) in Kumasi Ghana whose study concluded that health education interventions are effective and remain a valuable tool in community-based malaria prevention and control intervention in that HEI influence knowledge about malaria and generally reduce malaria prevalence and mortality among pregnant women.

Conclusion

The aim of this study was to assess the Education Effect on Pregnant Mothers Knowledge of Fansider in Benue State, Nigeria. The study concluded that HEI remains a valuable tool in improving the Knowledge on IPT of malaria in pregnancy. Also, that there is a significant effect of a health education intervention on the mother's level of knowledge about malaria amd Fansider IPT during pregnancy.

Recommendations

The following recommendations were made based on the research findings:

1. Nurses and Midwives should intensify Health education (HEI) intervention on Fansider IPT to ANC attendees to improve their knowledge of IPT .This because HEI has been identified as a key intervention to improve the uptake and adherence to IPT
2. In house workshops, seminars and conferences should be organized in the health facilities to update the knowledge of health care providers on IPT in line with WHO current recommendations, best practices of ANC, and Behavioural Change Communication skills to influence behavioural change in ANC attendees along with their knowledge malaria and IPT.

Tables:

Table I: Demographic characteristics of respondents in study and control groups

Variables	Study, n = 436		Control, n = 435		χ^2	*P*
	F	%	F	%		
Age					540.742	*0.000*
15-19	26	5.9	45	10.3		
20-29	236	54.1	246	56.5		
30-39	158	36.2	137	31.4		
40-49	17	3.8	7	1.6		
>= 50			1	0.3		
Tribe					951.635	*0.000*
Tiv	164	37.6	224	51.4		
Idoma	177	40.5	199	45.7		
Igede	13	3				
Hausa	33	7.6				
Others	50	11.4	131	30.0		
Religion					1283.37	*0.000*
Christianity	396	90.9	434	99.7		
Islam	35	8.0	1	0.3		
Traditional	5	1.1				
Marital Status					700.82	*0.000*
Married	427	97.9	432	99.2		
Single	4	0.9	2	0.5		
Divorced	1	0.3				
Separated	3	0.6				
Widowed	1	0.3	1	0.3		

Educational Level					721.855	*0.000*
Primary	57	13.0	144	33.2		
Middle/J.S.S	25	5.8	66	15.1		
Secondary	220	50.5	182	41.9		
Tertiary	91	20.8	35	8.1		
No formal education	44	10.0	7	1.6		
Occupation					540.742	*0.000*
Housewife	392	89.8	425	97.8		
Civil Servants	21	4.8	10	2.2		
Others	23	5.3				
Income					951.635	*0.000*
Not adequate	155	35.5	288	66.2		
Adequate	230	52.7	132	30.3		
Very Good	51	11.8	15	3.5		
Others	5.3	23				
Income					951.635	*0.000*
Not adequate	35.5	155	66.2	288		
Adequate	52.7	230	30.3	132		
Very Good	11.8	51	3.5	15		

Table II: Distribution of responses of both studied groups according to their knowledge before HEI

Pre-Test Study, n = 436							**Pre-Test Control, n = 435**						**Statistical test of sig.**	
Variables	**Poor**		**Average**		**Good**		**Poor**		**Average**		**Good**		**χ^2**	***p***
	Freq	**(%)**	**Freq**	**(%)**	**Freq**	**(%)**	**Freq**	**(%)**	**Freq**	**(%)**	**Freq**	**(%)**		
Meaning of Malaria	44	10	214	49	179	41	74	17	274	63	87	20	192	.291
Mode of transmission	148	34	270	62	17	4	39	9	313	72	83	19	192	.291
Signs and symptoms of malaria in pregnancy	140	32	253	58	44	10	30	7	318	73	87	20	192	.291
complications of malaria in pregnancy	139	31.8	273	62.6	24	5.6	42	9.7	211	48.4	182	41.9	208	.265
Methods of prevent malaria in pregnancy	140	32.1	253	58	43	9.8	17	3.8	306	70.3	113	25.9	208	.265
Drugs used to treat and prevent malaria in pregnancy	39	9	170	39.1	227	52	37	8.4	267	61.3	132	30.3	208	.265
Doses of malaria IPT drug during pregnancy	110	25.3	93	21.4	232	53.3	46	10.5	227	52.2	162	37.3	224	.242
Benefits of IPT for the mother	140	32	113	26	183	42	22	5	261	60	152	35	224	.242
Benefits of IPT for the baby	135	31	275	63	26	6	30	7	274	63	131	30	224	.242
When should pregnant mothers take first dose of IPT and subsequent doses of IPT	78	18	99	22.8	258	59.2	46	10.5	260	59.8	129	29.7	240	.235
Side effects of IPT	175	40.2	133	30.6	127	29.2	82	18.9	298	68.4	55	12.7	240	.235
Steps to take when side effects from IPT are experienced	59	13.6	184	42.2	193	44.3	23	5.4	316	72.7	95	21.9	240	.235

Other measures used to prevent mosquito bites	145	33.2	252	57.7	40	9.2	15	3.5	263	60.5	157	36	240	.235
Aggregated mean percentage score		**26**		**46**		**28**		**9**		**63**		**28**		

Table III: Summary of aggregated mean knowledge scores before HEI

Variables	**Study Pre-test**	**Control Pre-test**	**t p**
Meaning of Malaria	1.31	1.03	*12.621, .000*
Mode of transmission	.70	1.10	
Signs and symptoms of malaria in pregnancy	.78	1.13	
Complications of malaria in pregnancy	.74	1.32	
Methods of prevent malaria in pregnancy	.78	1.22	
Drugs used to treat and prevent malaria in pregnancy	1.43	1.22	
Doses of malaria drug during pregnancy	1.28	1.27	
Benefits of IPT for the mother	1.10	1.30	
Benefits of IPT for the baby	.75	1.23	
When should pregnant mothers take first dose of IPT and subsequent doses of IPT SP	1.41	1.19	
Side effects of IPT	.89	.94	
Steps to take when side effects from IPT are experienced	1.31	1.16	
Other measures used to prevent mosquito bites	.76	1.33	
Statistical test of significance		**χ^2** ***p* =**	**120. 250,** **.237**

Table IV: Distribution of the both studied groups according to their knowledge after HEI

	Post-test study, n = 436						**Post-test control, n = 435**					
Variables	**Poor Knowledge**		**Average Knowledge**		**Good Knowledge**		**Poor Knowledge**		**Average Knowledge**		**Good Knowledge**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Meaning of Malaria	4	0.9	23	5.2	409	93.9	24	5.5	296	68	115	26.5
Mode of transmission	3	0.6	24	5.6	409	93.8	19	4.4	304	69.9	112	25.7
Signs and symptoms of MIP	3	0.6	18	4.1	416	95.3	26	6	293	67.3	116	26.7
complications of malaria in pregnancy	1	0.3	17	4	417	95.6	16	3.6	206	47.3	214	49.1
Methods of preventing MIP	4	1	17	4	414	95	21	4.9	279	64.2	134	30.9
Drug used to prevent MIP	3	0.8	17	3.8	416	95.4	24	5.5	257	59	154	35.5
Doses of malaria drug during pregnancy	7	1.5	18	4.2	411	94.3	17	3.8	235	54.1	183	42.1
Benefits of IPT to the mother	3	0.6	17	3.8	417	95.6	10	2.2	248	57.1	177	40.7
Benefits of IPT to the baby	3	0.6	22	5.1	411	94.3	28	6.5	259	59.6	147	33.9
When should pregnant mothers take first dose of IPT and subsequent doses of IPT	2	0.5	18	4.1	416	95.4	25	5.7	259	59.6	151	34.7
Side effects of IPT	4	0.9	18	4.1	414	95	43	9.8	308	70.8	84	19.4

Steps to take when side effects from IPT are experienced	4	0.9	15	3.4	417	95.7	33	7.7	279	64.2	122	28.1
Other measures used to prevent mosquito bites	4	0.9	23	5.2	409	93.9	19	4.4	238	54.6	178	41

Table V:Summary of the levels of knowledge among both studied group** post **intervention

	Study n = 436		**Control n = 435**		**$\chi^2 p$**
	F	**%**	**F**	**%**	
Poor <50 %	4	1.0	22	5.0	41.920, .097
Average 50 t- 60%	17	4.0	265	61.0	42.933, .073
Good > 60%	409	93.9	144	33.0	48.000, .094

TableVI : Distribution of the study group according to their pre and post intervention levels of knowledge

	Study Group Before, n = 436							**Study Group After, n = 436**						**Statistical test of sig.**	
Variables	**Poor Knowledge**		**Average Knowledge**		**Good Knowledge**			**Poor Knowledge**		**Average Knowledge**		**Good Knowledge**			
	F	**%**	**F**	**%**	**F**	**%**	**$\chi^2 P$**	**F**	**%**	**F**	**%**	**F**	**%**	**χ^2**	***P***
Meaning of Malaria	44	10	214	49	179	41	1360.832, .000	4	0.9	23	5.2	408	93.9	2291.881	< 0.001
Mode of transmission	148	34	270	62	17	4	1167.880, .000	3	0.6	24	5.6	408	93.8	1880.197	< 0.001
Signs and symptoms of MIP	140	32	253	58	44	10	2341.600, .000	3	0.6	18	4.1	415	95.3	2688.156	< 0.001
Complicatio ns of MIP	139	31.8	273	62.6	24	5.6	787.963, .000	1	0.3	17	4	416	95.6	2472.506	< 0.001
Methods of prevent MIP	140	32.1	253	58	43	9.8	1445.931, .000	4	1	17	4	413	95	1985.759	< 0.001
Drugs used to prevent MIP	39	9	170	39.1	227	52	2304.408, .000	3	0.8	17	3.8	415	95.4	1856.680	< 0.001
Doses of malaria drug during MIP	110	25.3	93	21.4	232	53.3	1198.083, .000	7	1.5	18	4.2	410	94.3	2527.806	< 0.001
Benefits of SP-IPT to the mother	140	32	113	26	183	42	1277.720, .000	3	0.6	17	3.8	416	95.6	2877.822	< 0.001
Benefits of SP-IPT to the baby	135	31	275	63	26	6	837.275, .000	3	0.6	22	5.1	410	94.3	2094.404	< 0.001

When should pregnant mothers take 1st dose of IPT and subsequent doses	78	18	99	22.8	258	59.2	2072.163, .000	2	0.5	18	4.1	415	95.4	1893.529	< 0.001
Side effects of IPT	175	40.2	133	30.6	127	29.2	1678.148, .000	4	0.9	18	4.1	413	95	2582.459	< 0.001
Steps to take when side effects from IPT are	59	13.6	184	42.2	193	44.3	2295.671, .000	4	0.9	15	3.4	416	95.7	1681.590	< 0.001

Table VII: Effect of HEI on the mother's level of knowledge about IPT during pregnancy

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test scores knowledge	1.10	138	.346	.029
	Post-test scores knowledge	1.49	138	.1514	.0312

Paired Samples Test									
		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		T	Df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pre-test scores knowledge - Post-test scores knowledge	-.392	.464	.039	-.469	-.314	-9.909	137	.000

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