

Impact of Health Education on KAP towards Malaria among Basic Schools Pupils in Taiz Governorate. Republic of Yemen 2013: Pre and Post Intervention Study

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Abstract

Background: Malaria is one of the main health problems in Yemen. School-age children represent 25% of Yemen's population and an increased proportion of these children are going to school. Schools provide a good entry point for community malaria prevention and control. **Aim:** To assess the impact of HE campaign towards malaria prevention and control. **Methods:** We conducted a community-based trial (pre-post intervention study), in two randomly selected districts (rural and urban) of Taiz governorate. The sample size was calculated using Epi Info version7 to be 1065 pupils from 6th - 8th grades in randomly selected basic schools. Data was collected using questionnaire before and after the intervention (three months apart). χ^2 was used to analyze differences. **Results:** Health education activities in schools were associated with the increased knowledge of malaria symptoms and methods of prevention from 24.5% to be 60.2% among pre and post intervention respectively, with statistically significant difference ($p < 0.001$), also an increase in the positive attitude and practice toward malaria from 45% to be 60% among pre and post intervention. The rate of having bed-nets increased from 10.1% to 16.7% pre and post intervention respectively. **Conclusions and Recommendation:** Health education intervention in schools had a positive impact on the knowledge and attitude of pupils. We recommend conducting health education activities to improve the role of school pupils in malaria prevention.

Keywords

Component, Formatting, Style, Styling, Community-Based Trial, Health Education, School Children, Impact of Health Education Campaign

1. Introduction

Malaria is endemic in 109 countries and territories in tropical and sub-tropical zones, spanning all continents of the world except Antarctica and Australia, with intensities of transmission that vary from very low to extremely high [1]. Every 45 seconds, a child dies from malaria, these deaths are avoidable [2]. In 2008, there were an estimated 243 million cases of malaria worldwide. The vast majority of cases (85%) were in the African Region, followed by the South-East Asia (10%) and Eastern Mediterranean Regions [3].

In the Eastern Mediterranean Region, there are six countries with areas of high malaria transmission (Afghanistan, Djibouti, Pakistan, Somalia, Sudan and Yemen), and three countries with low malaria transmission and effective malaria programs (Islamic Republic of Iran, Iraq and Saudi Arabia) [4].

Malaria is considered as one of the main health problems in the Republic of Yemen [5]. The first National Malaria Indicators Survey (MIS 2009) revealed nationwide malaria prevalence of 1.5% and 4.5% in Tehama region in Yemen [6], while the second Malaria Indicators Survey (MIS 2013) revealed that the nationwide malaria prevalence of 1.4% [7].

In some settings in Yemen, it is estimated that up to 40% of severe pediatric admissions can be due to malaria during the malaria transmission season, with appreciable mortality [8].

Female sex is a risk factor for mortality from malaria in Yemen [9]. A study conducted in Hadhra-mout-Yemen revealed that prevalence of malaria among school children was 12.8%, it was higher among school children aged 10 - 11 years (15.5%) than children aged 8 - 9 years and 6 - 7 years (13.9% and 8.3%) respectively [10].

School children in Yemen form about 25% of the total population. There are about 5,000,000 schoolchildren. This huge number of educated groups can convey correct information easily to their community; these lead to increase awareness of community about risk of malaria and how to control the prevention of malaria [11].

2. Methodology/Subjects and Methods

Community-based trial (pre-post intervention) was conducted in Taiz governorate, Yemen. The sample size was calculated using Epi Info. version 3.5.1(August 2008) to be 1065 pupils.

A sample was calculated using epi-info version 3.5.1(August 2008), according to the following criteria:

- The population size of Taiz basic school children = 593,246 pupils.
- The expected prevalence = 50% (since we don't have previous study that showed behavior change, so select 50% to give us maximum sample size).
- The worst acceptable results = 3% (percent that we can accept the division of the study result (sample statistics) from population parameters. (Corresponds to the level of significance 95%).

Based on that, calculated sample size was found to be 1065 pupils. Multistage sampling technique was used. Random selection of one urban (Al-Qaherah) and one rural (Attaezzeiah) districts **Figure 1**, along with random selection of 2 schools (one male and one female schools) from each district was performed.

-Specially designed Arabic questionnaire was prepared, includes demographic, knowledge, attitudes and practice data, the same questionnaire was used in pre and post intervention by the same trained data collection team.

The completed questionnaires were checked for completeness, the data was coded and entered to the computer. Quality control of the data was ensured by rechecking 25% of entered data.

The statistical analysis was performed using the Statistical Package for Social sciences (SPSS) program V.17.0, chi-square test was used to analyze categorical variables, P value < 0.05 was considered as statistical significant difference. T-test was used to analyze variables that have mean scores. Informed consent was obtained from parents/caretakers along with the children's assets. Institutional approval was obtained from the Ministry of Education Office in Taiz Governorate, district education offices, and headmasters of targeted schools before the start of data collection.

3. Result

In our study 1065, pupils were included; half of them from urban (Al-Qaherah district) and another half from rural (Attaezzeiah district). Females constituted 50%, and males constituted 50%. The mean age of the included pupils was 12.9 ± 1.4 years. It was differed according to sex; the mean age of females was 12.8 ± 1.4 and 13.1 ± 1.4 for males.

According to the level of schooling 360, 360, 345 pupils were from 6th, 7th, and 8th schooling levels respectively.

Regarding the knowledge of malaria mode of transmission, only less than half of pupils mentioned the correct mode of transmission (mosquito bit) in the pre intervention 513 (48.2%), while the remaining mentioned incorrect modes of transmission, after the intervention the number and percent of correct answer was higher compared with pre intervention, it was 918 (86.2%) with statistical significant difference (p value < 0.001).

Table 1 Knowledge of pupils about the signs and symptoms of malaria pre and post intervention.

From the above table, it is clear that the statistical significant difference was observed in all symptoms, the highest difference occurred in mentioning the

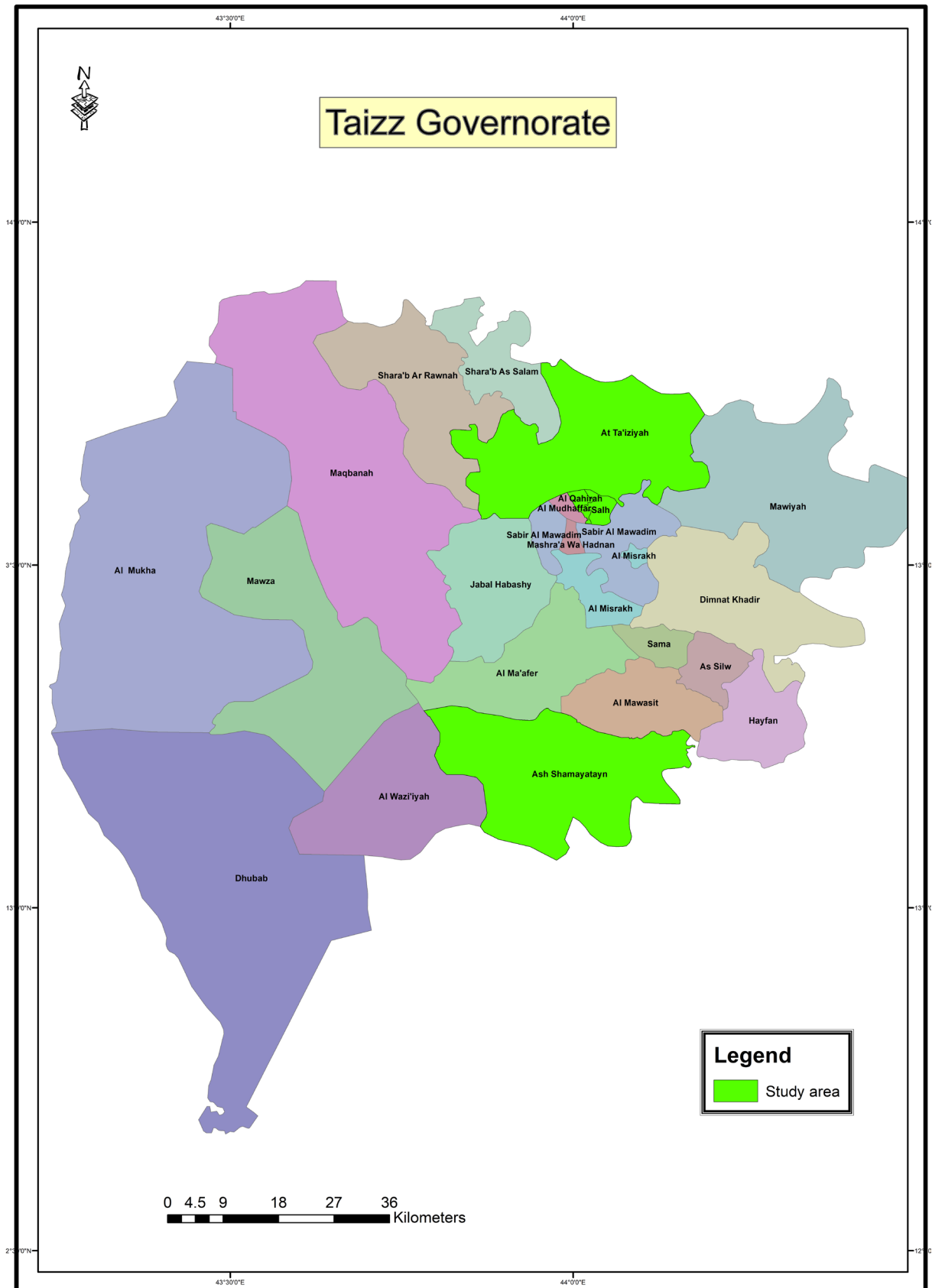


Figure 1. Map: Taiz Governorate. Republic of Yemen- Study area.

Table 1. Knowledge of malaria symptoms among pupils Pre and Post Health Education activities.

Symptoms	Pre Intervention		Post Intervention		P value
	Freq.	%	Freq.	%	
Fever	539	50.6	963	90.4	<0.001
Vomiting	216	20.3	700	65.7	<0.001
Sweating	165	15.5	466	48.3	<0.001
Shivering	200	18.8	396	37.2	<0.001
Headache	271	25.4	709	66.6	<0.001
Arthralgia	105	9.9	377	35.4	<0.001
Anemia	22	2.1	399	37.5	<0.001

Table 2. Knowledge of malaria complications among pupils Pre and Post Health Education activities.

Complications	Pre Intervention		Post Intervention		P value
	Freq.	%	Freq.	%	
High fever	548	51.5	952	89.4	<0.001
Convulsion	177	16.6	691	64.9	<0.001
Coma	154	14.5	368	34.6	<0.001
Renal failure	38	3.6	313	29.4	<0.001
cerebral malaria	285	26.8	544	51.1	<0.001
Low birth weight	138	13	618	58	<0.001
Abortion	113	10.6	563	32.9	<0.001
Don't know	345	32.4	27	2.5	<0.001

cardinal symptoms of malaria like fever, headache, anemia, and vomiting.

Knowledge of malaria complications varied during pre and post intervention, details are presented in **Table 2**.

After introducing malaria education campaign (the intervention) the knowledge of malaria protection increased with statistical significant difference for all items. Details are illustrated in **Table 3**.

The attitudes of pupils have been improved after our intervention (health education), comparing numbers and percent of those pupils who mentioned strongly agree of some attitudes towards malaria pre and post intervention is presented in **Table 4**.

Almost all items were with statically significant differences except using indoor residual spray (IRS).

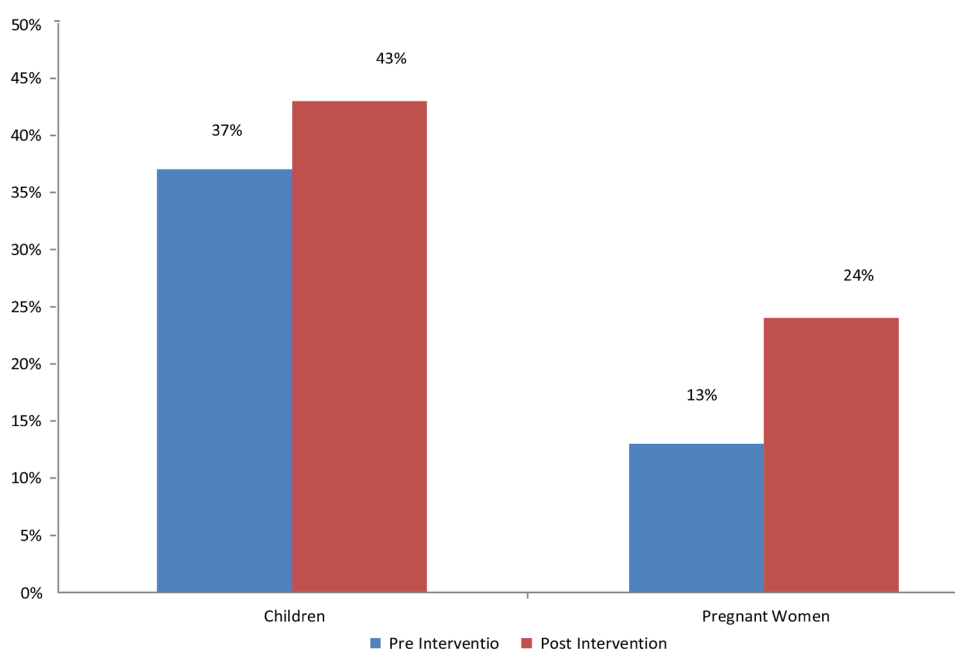
The pupils who have bed nets (BN) increased from 108 (10.1%) to 179 (16.8%) before and after the intervention respectively. The number of pregnant women and children who slept under BN increased but without statistically significant difference. Details about sleeping of pregnancy and children are presented in **Figure 2**.

Table 3. Knowledge of the malaria protection among pupils Pre and Post Health Education activities.

Protection methods	Pre Intervention		Post Intervention		P. Value
	Freq.	%	Freq.	%	
Cover tank	609	57.2	924	86.8	<0.001
Fill up pond	303	28.5	702	65.9	<0.001
Dealing water	254	23	590	55.4	<0.001
Using bed nets	407	38.2	957	89.9	<0.001
Using nets on window	434	40.8	900	84.5	<0.001
IRS	75	7.0	512	48.1	<0.001
Repellent	187	17.6	515	48.4	<0.001
Don't know	196	18.4	23	2.2	<0.001

Table 4. Change in attitudes of pupils towards malaria among Pre and post Intervention.

Strongly believe that	Pre Intervention		Post Intervention		P. Value
	Freq.	%	Freq.	%	
Fever is the important symptom	407	38.2%	592	55.6%	<0.001
Health education is important	511	48%	771	72.4%	<0.001
Usefulness of BNs	305	28.6%	585	54.9%	<0.001
Usefulness of IRS	276	25.9%	311	29.2%	=0.089
Usefulness of appropriate use of anti-malaria drugs	428	40.2%	502	47.1%	=0.001

**Figure 2.** Utilization of Bed nets by categories Pre and Post Intervention.

4. Discussion

These data demonstrate that implementation of the Health Education activities in schools were associated with an increase in the knowledge from 24.5% to be 60.2%, the difference was statistically significant ($p < 0.001$).

Before the intervention, we observed that pupils believed that not only mosquito bites, but also some mentioned that drinking dirty water and eating dirty food cause of malaria. This misconception among our study population was similar to the misconceptions observed in previous studies conducted in Nigeria [12].

Tanzania [13]. These misconceptions among our study population was more than the misconceptions observed in previous studies conducted in India [14], Zimbabwe [15] and in Nigeria [16] where the misconceptions were (32.8%), (19.2%) and (42.7%) respectively.

In our study the knowledge of correct mode of transmission was improved significantly after intervention, it was 48.2% and 86.2% during pre and post intervention respectively, the difference was statistically significant P value < 0.001 . This positive impact of intervention was in agreement with studies conducted in Thailand in which the improvement was from 42.7% during pre-intervention to be 62.1% post intervention [17], and in Ghana where the positive change was from 76.2% during pre-intervention to 99% post intervention [18].

Good knowledge of the symptoms of Malaria is crucial to recognizing the disease and to seek appropriate health care [19].

Comparing our baseline data regarding the cardinal symptoms, mentioning fever among our study population was higher than in findings of a study conducted in Nigeria 49.2% and 22.3% respectively, while mentioning headache was higher in the Nigerian study than in our study 49.6% and 18% respectively [16]. The initial knowledge of symptoms in our study population was less than the findings of a study conducted in southeastern Iran which obtained that (80% - 90%) of the respondents were aware about signs and symptoms of malaria [20].

The percent of pre intervention knowledge in our study findings is less than the findings of a study conducted in Lagos in Nigeria [12], where fever was the most recognized symptom (85%) among of respondents. Our results in this regard also are much less than of other study conducted in Uganda where the knowledge of fever was (91.3%) [21].

In our study the knowledge of fever as a cardinal symptom of malaria increased from (49.2%) pre intervention to be (90.4%) post intervention, the difference was statistically significant (P value < 0.001), this is in agreement with the study conducted in Thailand, where the knowledge of fever as a symptom of malaria was increased with statistical significant difference from (36%) [17] to be (56%).

We observed before the intervention that, 55.3% of pupils mentioned the cover of the water tank was a protective method, while 4.9%, 29.2% and 12.3% for IRS, BN and used repellent respectively. This result was nearly similar to a result

in the MIS (Malaria Indicator Survey in 2009) in Yemen, where one third of respondents (34.2%) identified sleeping under the bed net as a malaria preventive method and 9.5% for used repellent. The result of our study was similar to a study conducted in Zimbabwe which revealed that the knowledge of malaria preventive methods was high to residual house spraying, and low to mosquito [15] nets and repellents.

Pre intervention survey revealed that 48.6% agreed that health education was useful in malaria prevention, this was less than a study conducted in India which confirmed that 76.26% of the respondents affirmed that health education is the best way to promote the prevention of malaria [22].

After the intervention survey, the knowledge of mode of transmission was significantly improved from 48.2% pre intervention to be 86.2% post intervention, with statistical significant difference P value < 0.001. This agrees with studies conducted in Thailand the improvement was from 42.7% pre intervention to be to 62.1% post intervention [17], and in Ghana where the positive change was from 76.2% pre intervention to be 99% post intervention [18] while in Rural Areas in China the improvement was from 49% pre intervention to be 76.31% post intervention [23].

5. Conclusion and Recommendation

This study concludes that health education intervention in schools had a positive impact on the knowledge attitude and preventive practices of pupils towards malaria. We recommend periodically conducting health education activities to improve the role of school pupils in prevention from and control of malaria.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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