



# Effectiveness of School-Based Video-Assisted Health Education Program on Mosquito-Borne Disease among Upper Primary Children

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## Abstract

**Introduction** Malaria and dengue fever are the two major mosquito-borne diseases (MBD) seen in India and these diseases are endemic in many of the Indian states. Educating the public is one of the effective ways to prevent any diseases and school children act as health messengers to their family members. Video-assisted teaching methods help the children to understand the concept better and grasp it easily. The aim of the study was to assess the effectiveness of school-based video-assisted health education on knowledge regarding MBD.

**Materials and Methods** The study design used was cross-sectional one group pre- and posttest design. Ninety-five children studying in 6th and 7th standard of two higher primary schools located in a rural area of southern India have participated in the study. The knowledge level of the children was assessed using a structured knowledge questionnaire before and after the video-assisted health education program. Children were educated using PowerPoints and videos in three sessions on various aspects of MBD.

**Statistical Analysis** Data was analyzed using a statistical software, SPSS-23. Descriptive and inferential statistics were used to analyze the data.

**Results** The mean score was  $23.58 \pm 7.08$  in the pretest and the posttest mean score was  $53.01 \pm 3.90$ . The minimum score was 13 in the pretest and in the posttest it was 44 with a maximum possible score of 60. Intervention was effective and led to 49.05% of gain in knowledge of children from pretest to the posttest and the difference in the mean value was statistically significant ( $t = 36.58, p < 0.001$ ).

**Conclusion** Even though children had the knowledge on MBD, it was not adequate and video-assisted health education was useful to improve their knowledge. More consistent efforts are needed to educate the children on different health issues using various sense stimulating teaching aids to help them develop into healthy future generation.

## Keywords

- ▶ dengue
- ▶ health education
- ▶ malaria
- ▶ mosquito-borne diseases
- ▶ school children
- ▶ video-assisted

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## Introduction

Mosquito is one of the deadliest vectors that transmits a variety of diseases to the human beings and causes more than 700 million people to suffer and about 1 million people to lose their life annually. The common diseases transmitted by mosquitoes are malaria, dengue fever, chikungunya, yellow fever, and Zika virus.<sup>1</sup> Among these diseases, the major public health problems in India are malaria and dengue. About 95% of Indian population resides in malaria-endemic regions, and 80% of malaria cases are reported from areas that have poor health access such as hilly area and tribal areas. Consistent decline was reported from the year 2000 to 2020, yet 1,86,532 malaria positive cases and 93 deaths due to malaria were reported in 2020. Dengue is another major illness transmitted by bite of *Aedes aegypti* mosquito and it is a leading cause of death among some Asian and Latin American countries. It affects the people of all age and gender but the deaths are more among the children during the outbreak of dengue hemorrhagic fever. India reported 39,419 dengue cases and 56 deaths due to dengue fever in the year 2020.<sup>2</sup> The global incidence of dengue has grown dramatically and now approximately 50% of global population is at risk of dengue. Many a times dengue cases are asymptomatic and mild that can be managed without any treatment; hence, dengue cases are under reported. Global figures show that from the past two decades there is an eightfold increase in dengue cases. Prevention of mosquito-borne diseases (MBD) is mainly dependent on vector control with the effective participation of all the members of the community.<sup>3</sup>

Schools invariably play a powerful role in developing children into healthy adults. Appropriate health education programs conducted at school can foster effective healthy behaviors and prevent unhealthy practices in children.<sup>4</sup> School-based health education programs play a vital role in enhancing knowledge of the children and create awareness. Children grasp the concepts easily and share their knowledge with peers and family members. Research in different regions of the world shows that children lack knowledge on the MBD.<sup>5-7</sup> Children learn from parents and imitate them, so the lack of parents' awareness may be one of the reasons why children lack knowledge on the MBD. Studies conducted among the adults to assess their knowledge and practice in regard to MBD found the poor knowledge and practice among the study participants. Even though knowledge was adequate, it was not translated into good practice, which indicates children do not get adequate health information from the adults at their home.<sup>8,9</sup> A primary school-based participatory program conducted in Thailand showed the increase in children's knowledge regarding prevention and control of dengue after the education and the effectiveness of this knowledge was observed as a change in their practice in terms of decrease in larval indices at their households.<sup>10</sup> Some of the other studies conducted to evaluate the effectiveness of dengue awareness program among school children in countries such as Sri Lanka, India, and Malaysia found significant gain in children's knowledge after the awareness programme.<sup>11,12</sup> Another study conducted in

Sri Lanka found inadequate knowledge among children and urged the need for educating children on MBD.<sup>13</sup>

School children act as change agents of their peers and families in various aspects including healthy practices. They share the information with their close associates and they become the effective health messengers if they are made aware of different health issues they may come across and how these can be prevented. Studies from different part of the world confirmed that children act as effective health messengers.<sup>14</sup> The present study was conducted in southern Indian village with the aim to evaluate the effectiveness of school-based video-assisted health education program to improve the knowledge of school children and with the intension that this information would reach their family members through these children.

## Materials and Methods

The study proposal was reviewed and approved by the ethics committee of Yenepoya Deemed to be university. Permission to conduct the study was obtained from the block education officer and the respective school administration priorly. Assent was taken from the children after explaining the study details and the written informed consent was also obtained by the parents. It was emphasized to the participants that their participation is voluntary and the confidentiality and anonymity of the participants will be maintained.

A cross-sectional one group pre- and posttest design was used to assess the effectiveness of school-based video-assisted health education program on MBD. Study population included school children of 10 to 12 years studying in rural Kannada medium schools in Mangalore constituency. Sample size was estimated using G\*Power software. The minimum number of required participants was estimated to be 95 to detect an anticipated effect size of 0.15 as statistically significant with 95% power and 1% level of significance. Two schools were randomly selected and the children studying in 6th and 7th standard in these two schools were included in the study. Self-developed structured and pretested knowledge questionnaire was used to collect the data. Tool consisted of two parts in which part-A had the question on demographic characteristics and part-B included multiple response questions on MBD. Total scores of the knowledge questions were 60. Correct response was scored as 1 and wrong response as zero. Before conducting the actual study, the reliability of the questionnaire was determined by testing it on 10 students and analyzed using Cronbach's alpha. The Cronbach's alpha coefficient 0.8 indicated that the tool was reliable. Pretest was conducted before the video-assisted health education and the posttest was conducted after 7 days of completion of the education program. The intervention was for 3 days with 45 minutes session each day. First 2 days PowerPoint presentation was used to impart the education and third day was video presentation. First session was about the diseases caused by mosquitoes, indoor and outdoor breeding sources, resting and biting habits of mosquitoes, and the preventive and

control measures of mosquitoes on the first day. The second day awareness was given on name of the mosquitoes transmitting malaria and dengue, signs and symptoms, method of diagnosis, and treatment aspects of malaria and dengue. On third day, the learnt information was reinforced with playing a video of 13 minutes that had the combined information of first two sessions. An information booklet containing same information was distributed them so that they can use this for disseminating the learnt information to their peers and family members. Collected data was analyzed using the software SPSS-23. Both the descriptive and inferential statistics were used to analyze the data.

## Results

### Demographic Characteristics of Children

The total number of children participated in the pre- and posttest was 95. Sociodemographic characteristics of the children showed that 62.1% children were 12 years old and 33.7 and 4.2% children were 11 and 10 years old. Among the participants, 57.9% were females and 42.1% were males, while 57.9% were studying in class VI and 42.1% were in class VII. Among the 95 children, 76.8% reported that they have received some information on MBD priorly and most of them received from their teachers (52.1%), while other sources of information were media (32.9%), health workers (11%), family (2.7%), and friends (1.4%).

### Knowledge on MBD

► **Table 1** shows the knowledge scores of children on MBD both in the pre- and posttest as well as the effectiveness

of video-assisted health education program by using “Paired *t*-test.” There was 49.05% of gain in knowledge from pretest to the posttest scores of the children. The mean score was  $23.58 \pm 7.08$  in the pretest and the posttest mean score was  $53.01 \pm 3.90$ . The minimum score was 13 in the pretest and in the posttest, it was 44 with a maximum possible score of 60. In the pretest only 24.2% children were aware that mosquito transmits dengue fever bites at day time, while all (100%) answered correctly in the posttest. Similarly, in the pretest 56% of children answered correctly that mosquitoes transmitting malaria usually bite in the dark and in the posttest all answered correctly. In the pretest, only 11% knew that a bottle cap full of water can be a potential mosquito breeding source, while in the posttest all children knew about it. In the pretest, 72% of children were able to recognize that malaria is a MBD, while only 34 and 11% knew that dengue and chikungunya are also transmitted by mosquitoes, respectively. In the posttest, most of the children could identify all three diseases as MBD. “Paired *t*-test” was used to find the statistical significance between the pre- and posttest scores. The obtained “*t*” value 36.58 was found to be highly significant ( $p < 0.001$ ) that indicated that the video-assisted health education program was effective to improve the knowledge of school children on MBD.

► **Table 2** describes the knowledge scores of the children in relation to various aspects of MBD both in the pre- and posttest. The questionnaire consisted the questions from aspects such as transmission, breeding sources, characteristic habits of mosquitoes, clinical features and treatment of MBD, and prevention and control of MBD. The knowledge

**Table 1** Effectiveness of video-assisted health education on knowledge regarding MBD,  $n = 95$

Knowledge	Mean $\pm$ SD	Paired differences			“ <i>t</i> ” value	df	<i>p</i> -Value
		Mean difference	SD of difference	SE of difference			
Pretest	$23.58 \pm 7.08$	-29.432	7.841	0.804	36.58	94	0.001 <sup>a</sup>
Posttest	$53.01 \pm 3.90$						

Abbreviations: MBD, mosquito-borne disease; SD, standard deviation; SE, standard error.

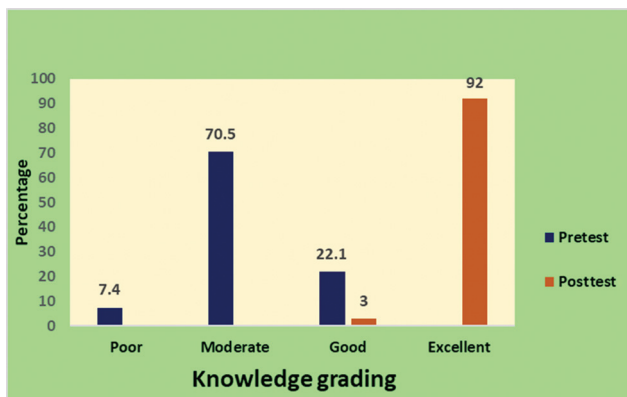
Maximum score = 60.

<sup>a</sup>Highly significant.

**Table 2** Aspect-wise knowledge scores of children on MBD,  $n = 95$

Knowledge aspects		Max. possible score	Mean	SD	SE	Mean (%)	Gain (%)
Transmission of MBD	Pre	11	5.13	1.98	0.20	46.60	48.52
	Post		10.46	0.78	0.08	95.12	
Breeding sources and characteristic habits of mosquitoes	Pre	17	7.78	2.41	0.25	45.76	45.20
	Post		15.46	1.40	0.14	90.96	
Clinical features and treatment of MBD	Pre	15	4.75	1.97	0.20	31.65	49.75
	Post		12.21	1.64	0.17	81.40	
Prevention and control of mosquitoes	Pre	17	5.93	2.87	0.29	34.86	52.63
	Post		14.87	1.59	0.16	87.49	

Abbreviations: MBD, mosquito-borne disease; SD, standard deviation; SE, standard error.



**Fig. 1** Grading of knowledge scores of children on mosquito-borne diseases.

scores are improved in all the aspects, but the highest gain in knowledge was observed in the aspect of prevention and control of MBD (52.63%).

►**Fig. 1** describes the grading of knowledge scores of children before and after the video-assisted health education. The maximum score was 60; score 0 to 15 was graded as poor, 16 to 30 was graded as moderate, 31 to 45 was graded as good, and 46 to 60 was graded as excellent. In the pretest, the moderate level knowledge was seen among majority of the children (70.5%), but in the posttest, 96.8% of children had excellent level of knowledge.

## Discussion

Dengue and malaria are the major endemic diseases and controlling these diseases is a real challenge for the health care officials in India. One of the major aspects of prevention and control of these diseases is educating the public and making them aware of how to remain safe without getting affected by these diseases. The objective of educating children is to make them act as messengers of health information to their family members and peers and children can play a major role in change agents of healthy behavior among their contacts.<sup>15</sup> The present study found that children had a moderate level of knowledge that they have received it from their teachers and other sources such as media and health workers. Having an incomplete information may not be helpful in transforming it into practice.<sup>16</sup>

School-based education has proved to be an effective way to educate the public in various health-related topics. School-based health education programs have succeeded in increasing children's knowledge and improving the practice of prevention of MBD.<sup>17</sup> When the children are educated with the real videos that show the real images and situations that would be more effective in making them understand the concept better.<sup>18–20</sup> Our study findings reveal that video-assisted teaching was effective to improve the knowledge of children that was confirmed by statistically significant gain in knowledge between the pre- and posttest. These findings are consistent with the other studies in which video-assisted teaching helped the children to improve their knowledge as well as their behaviour.<sup>21,22</sup> Hence, we conclude that school-

based health education is one of the effective methods that can help to control the MBD. We recommend that the primary school children can be educated on preventable diseases using different teaching methods with the help of attractive, sense stimulating audio visual aids to help in reducing the incidence of the communicable diseases. Government has to take initiatives to include the local health issues in the school syllabus so that children could be made aware of it and educated on preventing these illnesses and promoting their health that could help them to make informed choices in relation to their health.

## Conflict of Interest

None declared.

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