



EFFECTIVENESS OF STUDENTS' SEMINAR IN IMPROVING THE KNOWLEDGE ABOUT ZIKA DISEASE AMONG MEDICAL STUDENTS

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ABSTRACT

Zika disease-an emerging disease caused by zika virus and transmitted through infected aedes mosquito. The disease has a potential for international spread and World Health Organization declared the disease as Public health Emergency of International Concern on February 1, 2016. A cross sectional study was done among medical students to assess the level of knowledge about Zika disease and to evaluate the effect of students' seminar in improving the knowledge about the disease. A pre and post Quasi-experimental study were done using a self-administered structured questionnaire among 135 third MBBS medical students in the month of Feb 2016. Students' seminar with didactic lecture and open discussion was used as a teaching method. Post test was conducted. McNemar's test and paired t-test were used to analyze the pre and post-test difference in proportion and mean score respectively. The significant increase in the proportion of correct response was observed in all aspects of Zika disease, i.e., epidemiological factors involved in transmission, clinical features, prevention and control of the disease. The Baseline mean total score was 10.24±2.3. The mean total score after the seminar was 15.39±1.3 and the difference was statistically significant ($p < 0.001$). Students seminar can be used as a teaching method to impart scientific knowledge in the large group of medical students regarding the new entity like Zika.

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INTRODUCTION

Globally there are few infectious diseases that have been eradicated. On the other hand, there is a threat of newly appearing diseases, and diseases tend to spread to new geographic areas creating a crisis and alert worldwide. Some of these diseases are deadly too. No country or population can be spared if at all measures are taken for prevention. Without in-depth knowledge about the emerging diseases and immediate non-availability of treatment and vaccines, it is difficult to manage and prevent the occurrence of such diseases. These diseases not only have an impact on health of the individuals, but also affect national and global economy due to the effects of travel and trade, loss of work days for large group of population if outbreak occurs and needs for additional funds for health system to address the problem in the form of prevention and also treatment of affected persons. Zika is also a disease of this entity. Zika infection is an emerging infectious disease of international concern which is transmitted through the bite of infected female Aedes mosquitoes. Zika infection is not new to mankind. It is a viral disease known since 1947 when it was first identified. In the year 2013 and 2015 large outbreaks have been recorded in French Polynesia and Brazil respectively.¹ Zika virus belongs

to Flaviviridae and the principal vector for transmission is Aedes aegypti mosquito. The symptoms include fever, rash, malaise, joint pain. The symptoms last for 2-7 days and occurrence of fatality is rare.² Though the symptoms of Zika disease are usually mild, a risk of occurrence of microcephaly in the children born to pregnant women in the high transmission regions has increased the concern towards Zika disease.³⁻⁵ The disease was accepted as a Public Health Emergency of International Concern on February 1, 2016.⁵ Prevention of Zika disease includes reducing the breeding sites for Aedes aegypti mosquito and preventing man mosquito contact. Considering the presence of mosquito vector over a wide geographical area, the disease has a potential for international spread through travel and trade. Since India is one of the countries where Aedes aegypti mosquito is widely prevalent, India is at risk of Zika disease spread. Prevention and control of the disease lie in integrated vector control methods for Aedes mosquito species.⁶

Kaufman *et al*, 2003 has reported that active involvement of students in learning activities improves problem solving and constructivism among medical students.⁷ Exchange of information/knowledge will occur when the students learn in a nonthreatening environment as described by Anderson *et al*, 2002⁸ and teachers can act as facilitators and motivators to

improve self-directed learning among students (Hanharan M, 1998; Grasha AF, 1994).^{9,10} Utilizing various teaching methods and techniques create a constructive teaching-learning environment in medical teaching and would help students in learning medical information in various ways (Vaughn *et al*, 2011).¹¹ Medical education is based on three interrelated domains of knowledge, attitude, and skills. Knowledge of the scientific facts of a health problem remains the basis for other two domains. Hence, providing authentic information about the disease is essential. Since medical education involves theory and practice, assessing different modalities of teaching will be of great value in teaching students. Padgett RD *et al*, 2013 proved that seminars are effective in improving the intellectual and cognitive ability of the students there by fosters student's development.¹² Moreover, to tackle the diseases like Zika, which has a potential for international occurrence the health system of the particular country has to improve the knowledge of the health care providers as well as the infrastructure of the health system, before educating and providing awareness to the general public. The Ministry of Health and Family Welfare, Government of India is conducting training programs, workshops, and other educational activities to different cadres of health care providers working in various Government health facilities and private health facilities, i.e., the Medical Officers, Nurses, Health inspectors and others. Besides that the future generations of health care providers' i.e., MBBS and Nursing students are missed in these types of training activities. Medical students have to be trained in such a way that they are capable enough to identify the occurrence of outbreaks well in advance before it reaches a threshold level where it becomes difficult for the health system to control the further spread and manage the already affected cases. In this context, authors of this study assessed the knowledge of medical students on Zika disease and also the effect of student's seminar for a large group of students in increasing the scientific knowledge about the disease.

Objectives

1. To assess the level of knowledge about Zika disease among medical students
2. To evaluate the effect of students' seminar in improving the knowledge about the disease.

METHODOLOGY

The present study was a pre and post Quasi-experimental study conducted among 135 third MBBS (Pre-final year) medical students of Chennai Medical College Hospital and Research Centre (CMCH&RC), Irungalur, Trichy, Tamil Nadu, India in the month of February 2016. CMCH&RC is a rural-based private medical college with students coming from 4 southern states of India and is located at Irungalur village, Manachanallur Taluk, Trichy District, which is at a distance of about 22 Kms from Trichy. The college enrolls a batch of 150 students each year for MBBS, and the enrollment is on merit basis.

A pre-designed structured self-administered questionnaire was used to collect information on knowledge about the disease. The proforma included questions on agent, vector, modes of transmission, clinical manifestations, public health effects, treatment, and prevention of Zika infection. Consent from individual student was obtained. After obtaining the pretest information, student's seminar on Zika disease was conducted.

The session was initially a didactic lecture which was followed by an open discussion and clarification at the end of the lecture. A total of 5 students were involved in the preparation of the contents of the seminar. Contents of the seminar were prepared well in advance and were reviewed by the authors before the seminar and corrections were made where ever necessary. The session was facilitated by the faculty members of Community Medicine department during the open discussion. Post seminar evaluation was done following the open discussion.

The data was entered in MS Excel and SPSS version 20 was used for analysis. The result for each question before and after the seminar session was presented in the form of proportion, i.e., the proportion of students who gave the correct response. Change in proportion of students having correct knowledge in pre-test and post-test was analyzed using McNemar's test. A p-value less than 0.05 were taken as the significant increase in knowledge. Scoring was done for each question. Each correct response was given a score of 1, and a wrong response was given a score of zero.

Table 1 Students response for the questions related to agent factors and transmission of Zika disease

Questions and responses	Students response for each option	
	PRETEST (n=135)	POSTEST (n=135)
Agent		
Bacteria	2(1.5%)	-
Fungi	-	-
Virus	133(98.5%)	-
Protozoa	-	135(100%)
Term "Zika" comes from		
Place where first identified	89(65.9%)	132(97.8%)
Person isolated the agent	15(11%)	-
First patient	20(14.8%)	2(1.5%)
None	11(8.1%)	1(0.7%)
Current Epidemic occurred in		
Mexico	14(10.4%)	-
Brazil	71(52.6%)	134(99.3%)
Ghana	44(32.6%)	1(0.7%)
France	6(4.4%)	-
Most common mode of transmission		
Mosquito bite	126(93.3%)	133(98.5%)
Blood transfusion	-	2(1.5%)
Sexual	3(2.2%)	-
Air borne	6(4.4%)	-
Transmitted by		
Culex	15(11.1%)	2(1.5%)
Aedes	82(60.7%)	133(98.5%)
Anopheles	5(3.7%)	-
Mansonia	33(24.4%)	-
Reservoir other than human		
Yes	90 (66.7%)	84(62.2%)
No	45(33%)	51(37.8%)
Placental transmission		
Agree	86(63.7%)	135(100%)
Disagree	14(10.4%)	-
Don't know	35(25.9%)	-
Important in which population group		
Infants	44(32.6%)	-
Children	26(19.3%)	-
Pregnancy	58(43.0%)	135(100%)
Elderly	7(5.2%)	-
Transmission through breast feeding		
Yes	66(48.9%)	71(52.6%)
No	69(51.1%)	64(47.4%)
Longer life in body fluid		
Blood	48(35.6%)	19(14.1%)
Saliva	12(8.9%)	-
Semen	20(14.8%)	108(80%)
CSF	55(40%)	8(5.9%)

The mean score was calculated before and after the seminar. Paired t-test was used to analyze the mean difference before and after. The result for scores was presented in the form of mean.

RESULTS

A total of 135 medical students of pre-final MBBS completed the pre and post-test questionnaire.

Table 1 shows the results on the questions related to epidemiological factors involved in transmission. The majority (98.5%) of the students were aware that the disease is caused by a virus even before the conduct of seminar. Almost half of the students (52%) were aware that the current outbreak occurred in Brazil, and this knowledge has increased to 99.3% after the seminar. Though the disease can spread through sexual contact and blood transfusion, a mosquito bite is the most common mode of transmission. It was observed that 93.3% of the students had knowledge about transmission of the disease, and this proportion has increased to 98.5% after the seminar. Only 43% of the students were aware that the occurrence of infection in pregnant women is important and this proportion increased to 100% after the seminar. Post seminar all the students agreed that the infection can be transmitted through the placenta and would have the effect on growing fetus. In post-test, 80% of the students responded that the virus lives longer in semen which plays a role in sexual transmission of the disease. There was a proportionate increase in some students under correct response category for all questions except for two.

Table 2 Students’ response for questions related to clinical manifestation of Zika disease

Questions and responses	Students response for each option	
	PRETEST(n=135)	POSTEST(n=135)
Incubation period		
18-25 days	20(14.8%)	-
10-18 days	54(40.0%)	-
2-7 days	45(33.3%)	134(99.3%)
20-25 days	16(11.9%)	1(0.7%)
Not a symptom		
Fever	1(0.7%)	3(2.2%)
Rash	21(15.6%)	3(2.2%)
Haemorrhage	71(52.6%)	127(94.1%)
Joint pain	42(31.1%)	2(1.5%)
CNS complication		
Encephalitis	66(48.9%)	1(0.7%)
Ataxia	15(11.1%)	-
GB syndrome	41(30.4%)	134(99.3%)
Neuropathy	13(9.6%)	-
Not a birth defect		
Congenital	15(11.1%)	14(0.4%)
Contracture	19(14.1%)	8(5.9%)
Microcephaly	63(46.7%)	71(52.16%)
Club Foot	38(28.1%)	42(31.1%)
Cleft Palate		

Table 2 shows the responses on the issues related to clinical features of the disease. Knowledge about incubation period was known only to one-third of the students before the seminar, and this has increased to almost cent percent (99.3%) after the seminar session. The proportion of students who gained knowledge about the symptoms of the disease increased to 94%, and the difference was statistically significant. The students understood that hemorrhage was not a manifestation of Zika disease. This would help in differentiating Zika disease from other Arbo-viral diseases transmitted through Aedes mosquito.

Table 3 Students’ response for questions related to investigation, prevention and control of Zika disease

Questions and responses	Students response for each option	
	PRETEST(n=135)	POSTEST(n=135)
Not a diagnostic test		
RT PCR	15(11.1%)	1(0.7%)
Serology using IgG	22(16.3%)	16(11.9%)
Virus isolation	40(29.6%)	107(79.3%)
PRNT	58(43.0%)	11(8.1%)
Temperature for sample transport		
-20 ^o c	29(21.5%)	26(19.3%)
2-8 ^o c	75(55.6%)	81(60.0%)
10-15 ^o c	18(13.3%)	18(13.3%)
>20 ^o c	13(9.6%)	10(7.4%)
Specific treatment		
Yes	15(11.1%)	-
No	120(88.9%)	135(100%)
Vaccine for Zika		
Yes	20(14.8%)	5(3.7%)
No	115(85.2%)	130(96.3%)
Zika can spread to		
Indians		
Agree	77(57%)	118(87.4%)
Disagree	31(23%)	15(11.1%)
Don't know	27(20%)	2(1.5%)

Table 3 shows the results for the questions related to investigation, treatment, prevention and control. Every student agreed that there is no specific treatment for Zika infection at present and symptomatic management has to be done. There was a significant increase in knowledge about the availability of vaccine for Zika. There was a significant increase in the proportion of students who agreed that the disease can spread to the Indian population.

As per Table 4, there was a significant increase in knowledge in all aspects of the disease except for investigation, i.e., epidemiological factors involved in transmission, clinical features of the disease, prevention, and control. The difference in proportion of correct response was noted in the questions related to investigations, but it was insignificant. Cent percent students have given correct responses to the questions on agent factor, the importance of Zika disease in pregnant women, placental transmission of the agent and non-availability of treatment for the disease at present. The overall mean knowledge score and standard deviation before the seminar were 10.24± 2.3. After the conduct of seminar the mean knowledge score and the standard deviation was 15.39 ± 1.3. This shows that there was a significant increase in the knowledge of Zika disease after the seminar session with the t value of -26.1 and p-value of 0.001(Figure 1).

DISCUSSION

India is one of the countries receptive for Zika disease due to the susceptibility of the population to the disease, abundance of Aedes mosquito throughout the country, international travel and trade. Since Indians are at risk of acquiring the disease, imparting scientific knowledge about the factors promoting and preventing the disease is need of the hour. Medical professionals are the key persons who directly deal with the health problems of the community. Thus, the present study was conducted among the medical students to assess the level of awareness of medical students on Zika disease and also evaluated the effectiveness of students’ seminar for a large group of medical students.

Table 4 Pre and post test difference in the proportion of correct and incorrect responses (McNemar's test)

Questions	Pretest		Post test		p VALUE
	Correct N (%)	Incorrect N (%)	Correct N (%)	Incorrect N (%)	
Agent	133 (98.5)	2(1.5)	135(100)	0	
Term "Zika" comes from	89 (65.9)	46(34.1)	132(97.8)	3 (2.2)	<0.001*
Current epidemic occurred in	71 (52.6)	64(47.41)	134(99.3)	1(0.7)	<0.001*
Common mode of transmission	126 (93.3)	9(6.7)	133 (98.5)	2 (1.5)	0.065
Mosquito involved	82 (60.7)	53 (39.3)	133 (98.5)	2(1.5)	<0.001*
Reservoir other than human	45 (33)	90(66.7)	51 (37.8)	84(62.2)	0.480
Placental transmission	86(63.7)	49 (36.3)	135(100)	0	
Severity in population groups	58 (43.0)	77 (57)	135(100)	0	
Transmission through breast feeding	69 (51.1)	66(48.9)	64 (47.4)	71(52.6)	0.635
Longer life in body fluid	20 (14.8)	115(85.2)	108 (80)	27 (20)	<0.001*
Incubation period	45 (33.3)	90 (66.7)	134(99.3)	1(0.7)	<0.001*
CNS complication	41 (30.4)	94(69.6)	134(99.3)	1 (0.7)	<0.001*
Not a symptom	71 (52.6)	64 (47.1)	127 (94.1)	8(5.9)	<0.001*
Not a birth defect	38 (28.1)	97(71.9)	42(31.1)	93(68.9)	0.597
Not a diagnostic test	22 (16.3)	113(83.7)	16 (11.9)	119(88.1)	0.405
Temperature for sample transport	75 (55.6)	60(44.4)	81(60.0)	54 (40)	0.392
Specific treatment	120(88.9)	15 (11.1)	135(100)	0	
Vaccine for Zika	115(85.2)	20(14.8)	130(96.3)	5(3.7)	0.001*
Zika can spread to Indians	77 (57)	58 (43.0)	118(87.4)	17(12.6)	<0.001*

*p value significant

Over past few decades, there were several reports of the occurrence of emerging and reemerging diseases from various countries worldwide. In most of these instances medical and paramedical workers were the persons who were more at risk to acquire the disease due to direct interaction with the affected people. The significance of including emerging infectious disease into medical curriculum had been recognized even before a decade when annual medical school survey conducted by Association of American Medical Colleges (AAMC) which indicated that only 1 out of 125 medical schools offered a separate course in biological and medical terrorism. Following which training in terrorism and emerging infectious diseases was included in the medical curriculum as mentioned by Cassoobhoy *et al*, 2005.¹³ This emphasized the need to teach medical students on emerging diseases. The First step in any teaching activity is to assess the learners need, and then only a teacher can proceed with selecting an appropriate mode of teaching for a particular subject of interest (Abela 2009).¹⁴ Hence, the present study involved students in teaching activity who will know their needs in learning and understanding medical knowledge and skills.

In the present study during pretest, almost 50% of the students had knowledge about the issues addressed. The seminar had shown a significant effect in improving students' knowledge i.e., more than 80% of the students had correct knowledge about the disease after the seminar. The mean score has increased to 15.39 from the mean baseline score of 10.24. Thus, the present study showed a significant increase in mean score after conducting the seminar. The seminar has been included as a method of teaching for small as well as large group learners, and most of the research studies on teaching methods in medical education have shown that seminar will be effective for a small group of audience or students. Studies on evaluation of teaching performance in the seminar have shown that the level of interaction in the group and content of the seminar had positive effects on teaching performance (Spruijt *et al*, 2014; Jaarsma *et al*, 2008).^{15,16} The present study evaluated the effectiveness of seminar in the large group of students by using didactic lecture and interaction between the students in the way of open discussion at the end. The results

showed a significant improvement in knowledge scores after the seminar session.

Usefulness of students' seminar in improving knowledge and attitude for a large group of students was shown by another study on financial education which showed a significant increase in effective financial behavior and reduction in risky behaviour (Borden *et al*, 2008).¹⁷ The result of the current study was similar to another study which evaluated the effect of the seminar on knowledge and attitude towards the use of medical literature among the large group of medical students and reported a significant improvement in knowledge on critical appraisal of medical literature (Landry *et al*, 1994).¹⁸ Thus, students' seminar could be used as an effective method for improving the knowledge of the large group of students if it is coupled with interactive sessions.

CONCLUSION

The study showed that students' seminar is an effective method for improving knowledge of medical students regarding the new entity like Zika disease. Apart from providing training to health care providers the Government of India, Ministry of Health and Family Welfare should encourage that the medical colleges should conduct these types of activities to medical students and also paramedical students to improve their knowledge on emerging diseases of public health concern like Zika disease. Thus, the future generations of health care providers will gain knowledge regarding these diseases and tackle the emerging diseases in future.

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