

# Effect of Flipped Classroom Model on Knowledge of Medical Students in Context of Community Medicine

Rahul Ramesh Bogam

Assistant Professor, Dept. of Community Medicine, Bharati Vidyapeeth Uni. Medical College, Pune

## Abstract

The flipped classroom is a new blended form of pedagogical method; which employs asynchronous video lectures and practice problems as homework, and active, group-based problem solving activities in the classroom. A study with pre and post intervention was conducted at Bharati Vidyapeeth University Medical College, Pune. All participants were provided with specific learning objectives of the session. Two days prior to lecture, all of them were asked to watch lecture video on vector borne diseases on specific session which was recorded and uploaded on 'You Tube. It was followed by interactive session on the day of lecture where participants were told to submit the questions they had about concerned session after watching video or a summary if they understood the lecture and had no questions. Present study reported statistically significant improvement in knowledge of participants about various components of National Vector Borne Disease Control Programme from pre to post intervention as a result of 'Flipped Teaching Model' ( $t = 20.99, p < 0.001$ ).

## I. Introduction

Recent advances in technology and in ideology have unlocked entirely new directions for education research. (Prober CG and Khan S.). There have been burgeoning developments and changes in medical education also. Various newer teaching methodologies are being used for medical education. The basic reason to look for these alternatives is the dissatisfaction with the conventional mode of education, which is losing its relevance in this era of information explosion. (Singh Tejinder, Gupta Piyush, Singh Daljit.)

The flipped classroom is a new blended form of pedagogical method; which employs asynchronous video lectures and practice problems as homework, and active, group-based problem solving activities in the classroom. (Prober CG and Khan S.). The flipped classroom intensifies the interaction between students and teachers where students are able to ask questions and interact in real-time with their teachers and fellow classmates, increasing student engagement.

Several studies reiterate that 'Flipped Teaching' can benefit medical students which is being used in grade schools. (Prober CG and Khan S.). Charles G. Prober and Chip Heath also emphasized the importance of incorporation of 'Flipped Teaching' in medical education to enhance the active learning of students. (Charles G. Prober and Chip Heath).

Community Medicine is an important subject in medical curriculum. Owing to vastness of this subject, it can be interesting and understandable, if it is supplemented with innovative methodology like 'Flipped Teaching.'

To the best of my knowledge, no study has been so far undertaken to evaluate the effect of 'Flipped Teaching' on the knowledge of medical students in context of Community Medicine subject.

The present study attempted to assess an effectiveness of 'Flipped Classroom Teaching' on knowledge of undergraduate MBBS medical students about National Vector Borne Disease Control Programme which is an important health programme in the curriculum of Community Medicine subject.

## II. Objective

To assess the effect of 'Flipped Classroom Model' on the knowledge of undergraduate medical students about National Vector Borne Disease Control Programme of India.

## III. Material and Methods

A study with pre and post intervention was conducted at Bharati Vidyapeeth University Medical College, Pune. A total of 30 undergraduate MBBS medical students belonging to fifth semester, posted at Community Medicine Department participated in study. Written permission was obtained from participants after explaining the purpose of study and also anonymity of participants was maintained.

A Structured pretested self administered questionnaire consisting of 10 questions was distributed to all 30 participants. They were allowed 15 minutes to complete pretest questionnaire under strict supervision. A questionnaire comprised of basic aspects of National Vector Borne Disease Control Programme like scope, targeted diseases under programme, three pronged strategy etc.

All participants were provided with specific learning objectives of the session. Two days prior to lecture, all of them were asked to watch lecture video on vector borne diseases on specific session which was recorded and uploaded on 'You Tube. It was followed by interactive session on the day of lecture where participants were told to submit the questions they had about concerned session after watching video or a summary if they understood the lecture and had no questions. These questions or summaries were used to stimulate classroom discussion. On the same day, same questionnaire was administered to participants as a post-test and responses were collected. The marking system for each complete question was assigned. Data was entered into Microsoft Excel Sheet and analysed by using 'Paired t test'.

## IV. Results and Discussion

In present study, of 30 participants, 18 were males and 12 were female students. All (100%) students were in age bracket of 19-22 years. Out of 30. Six students could not give post-test due to absenteeism; hence they were excluded from study and data analysis was done for 24 students. Present study reported statistically significant improvement in knowledge of participants about various components of National Vector Borne Disease Control Programme from pre to post intervention as a result of 'Flipped Teaching Model' ( $t = 20.99, p < 0.001$ ) (Table 1).

Table 1: Mean marks of participants. (n = 24)

	Mean marks (out of 20)	S.D.	t value	p-value
Pre intervention	1.66	0.96	20.99	< 0.001
Post intervention	6.87	0.94		

Table 2: Pre and Post intervention knowledge based questions with correct response. (n = 24)

Question No.	Question	Correct Response
1.	Full form of RDK	Rapid Diagnostic kit
2.	Targeted diseases under NVBDCP	Malaria, Dengue, Chickungunya Filaria, JE and Kala-Azar
3.	First choice of insecticide under NVBDCP	DDT
4.	Three pronged strategy under NVBDCP	Disease management, Integrated vector control & Supportive interventions
5.	Preferred drug for short term chemoprophylaxis for Malaria as per drug policy	Doxycycline
6.	Presumptive treatment for Malaria is no more recommended	True
7.	As per National Health Policy 2002, elimination of Lymphatic Filariasis is by year	2015
8.	Full form of NVBDCP	National Vector Borne Disease Control Programme
9.	Responsible vector for Japanese Encephalitis	Culex mosquito
10.	Components of 'Disease Management' of three pronged strategy under NVBDCP	Early diagnosis and treatment, Epidemic Preparedness, strengthening of referral services

Present study attempted to highlight the importance of innovative teaching methodology i.e. Flipped Teaching. Flipped, classroom is "Inverting the classroom means that events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa". (M.J. Lage, G.J. Platt, and M. Treglia.) Teaching based on a "flipped classroom" approach occurs when students conduct significant preclass preparation; including watching prerecorded lectures, while traditional class time is reserved for discussion and/or problem solving of the relevant topics. (Pierce R, Fox J.)

In present study, majority of participants gave positive response by watching assigned online video. De Grazia et al. (Janet L. DeGrazia, John L. Falconer, Garret Nicodemus, and Will Medlin) also noted that students supplied with optional video lectures came to class much better prepared than when they had been given textbook readings. The two important flipped classroom studies Moravec et al. (M. Moravec, A. Williams, N. Aguilar-Roca, and D.K. O'Dowd) and Day and Foley (A. Day and J. D. Foley.) examined student performance after applying 'Flipped teaching method' and reported significant change in knowledge of students.

Johnathan D. Tune et al. also reported statistically significant improvement in knowledge of medical students about Cardiovascular, Respiratory and Renal Physiology with flipped teaching methodology. (Johnathan D. Tune, Michael Sturek, and David P. Basile.)

Our experience with introduction of a version of a flipped classroom model for National Vector Borne Diseases Control Programme was largely positive. Such a model could be adapted fairly easily at institutions with adequate technical support to facilitate active learning of students. Based on student feedback, It may be suggested that the use of homework and in-class interactive discussion are motivating factors that can contribute to the better

student participation and ultimately leads to enhanced student's performance.

#### V. Limitations

There were limitations of present study. We cannot definitively conclude that the post-intervention significant differences, that we found, are attributable to an intervention only. Second limitation was small sample size in present study. Various similar multicentric studies in larger samples are required for generalisation of findings.

#### VI. Conclusion

Simple innovative intervention i.e. 'Flipped Teaching Model' can make significant change in knowledge of medical students about National Vector Borne Disease Control Programme of India and It can also be implemented to sensitize students about other essential topics in Community Medicine subject.

#### Acknowledgement

I heartily acknowledge the cooperation and support of faculty members of Community Medicine Department for conduction of this study.

#### References

- [1]. Prober CG, Khan S. Medical education reimaged: A call to action. *Acad Med.* 2013; 88:1407-10.
- [2]. Singh Tejinder, Gupta Piyush, Singh Daljit. *Principles of Medical Education.* 4<sup>th</sup> ed. New Delhi, India: Jaypee Brothers Medical Publishers (P) Ltd.; 2013.
- [3]. Charles G. Prober and Chip Heath. *Lecture Halls without Lectures — A Proposal for Medical Education.* *The New England Journal of Medicine* 2012; 18:1657-59.
- [4]. M.J. Lage, G.J. Platt, and M. Treglia. *Inverting the classroom:*

- A gateway to creating an inclusive learning environment. The Journal of Economic Education, 2000; 31(1):30–43.*
- [5]. Pierce R, Fox J. *Vodcasts and active-learning exercises in a “flipped classroom” model of a renal pharmacotherapy module. Am J Pharm Educ 2012; 76: 196.*
- [6]. Janet L. DeGrazia, John L. Falconer, Garret Nicodemus, and Will Medlin. *Incorporating screen casts into chemical engineering courses. In Proceedings of the ASEE Annual Conference & Exposition, 2012.*
- [7]. M. Moravec, A. Williams, N. Aguilar-Roca, and D.K. O’Dowd. *Learn before lecture: a strategy that improves learning outcomes in a large introductory biology class. CBE-Life Sciences Education 2010; 9:473–481.*
- [8]. A. Day and J. D. Foley. *Evaluating a web lecture intervention in a human–computer interaction course. IEEE Transactions on Education 2006; 49 :420–431.*
- [9]. Johnathan D. Tune, Michael Sturek, and David P. Basile. *Flipped classroom model improves graduate student performance in cardiovascular, respiratory, and renal physiology. Adv Physiol Educ 2013; 37: 316–320.*