

## IMPACT OF QUIZ IN TEACHING HOSPITAL WASTE MANAGEMENT TO UNDER GRADUATE MEDICAL STUDENTS

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### Abstract:

**Research question:** Whether Quiz method can serve as an alternative and innovative method to teach “Hospital Waste Management” for undergraduate medical students.

**Methods:** Descriptive study was undertaken among 30 MBBS students in the Department of Community medicine, MAPIMS. A series of 4 sessions by quiz method was conducted to teach “Hospital Waste Management”. There were 3 teams in which 4 students were selected as participants. Pretest and post test was conducted to evaluate their performance and in addition feedback was elicited. **Results:** The performance of the students in quiz was encouraging with winner team scoring 90%. The average score in pretest and posttest was 47.14% and 90.71% respectively. The students appreciated the method as it was different from routine lectures, innovative, interesting, interactive, informative, helped them to come prepared and scope for participation. They suggested to have more quiz sessions for other topics as well. **Conclusion:** Quiz method was successfully used to teach “Hospital Waste Management” to undergraduate medical students.

**Keywords:** Quiz method, hospital waste management, community medicine, undergraduate medical students, Pretest, posttest.

### Introduction:

Learning is a complicated phenomenon as it involves complex mental activities such as critical thinking and ability to solve problems. The goal for the learning methodology personnel is to provide the developers with the best learning tools available, so that they in turn can have thorough understanding, knowledge and relevant skills for their career. The term "Best Evidence Medical Education" was

coined to describe the implementation of methods and approaches to education based on the best available evidence.<sup>1</sup>

According to The Medical Council of India, under “Regulations on Medical Education, 1997, there is scope for trying innovative approaches. They had also observed that lectures alone are not generally adequate as a method of training and it is a poor method of transferring or acquiring information even

less effective at skill development and in generating the appropriate attitudes. It recommends that every efforts should be made to encourage the use of active methods of teaching.<sup>6</sup>

Community Medicine is taught across seven semesters in most of the MCI regulated Medical institutions, it is often seen that students start reading the subject only towards final year. To make the subject interesting, it is important to try out innovative methods for teaching and learning in which Quiz<sup>2,3</sup> is one the various methods<sup>4,5</sup> described in the literature. In line with this there is scope for trying innovative approaches like quizzes especially where the intake of students is 150 and staff- student ratio is good. Hence the topic on "Hospital Waste Management" was taught using a series of four one hour quizzes conducted in the existing time table of lectures. Though quizzes are conducted to hold competitions among teams, some modifications were made to serve the elements of indepthness in the topic and concurrent evaluation of all student in the class. Assessment is an educational tool that serves multiple roles; for example, it can provide feedback to learners on areas of strength or weakness and it can provide the teacher insight into the effectiveness of a given approach.<sup>7</sup>

The objective was 1) to increase the awareness and interest in the topic. 2) To increase their knowledge in the applied aspects of "Hospital Waste Management" and 3) to enhance students participation in acquiring knowledge.

#### **Materials and methods:**

The quiz competition was conducted for MBBS students studying IIIrd semester during the month of April, 2014 in the Department of Community Medicine, Melmaruvathur Adhi Parasakthi Institute Of Medical Sciences And Research (MAPIMS) as an alternative to the usual lecture method. The topic was "Hospital Waste Management". The topic and schedule of the quizzes was announced

two weeks in advance. They were also instructed to gain extra knowledge regarding the topic from the internet and other available sources.

Totally, there were 30 students. The whole batch was divided into three. 4 students in each group was selected as quizzers. If someone was absent on the day of quiz, other student from respective groups was chosen as quizzers. In any particular session students of each groups other than the quizzers formed the audience. The question not answered by a particular team would not be passed to the next team, instead it would be asked to the audience from the same group, failing which Quiz master will answer. This process ensured equal chances for every student to participate. There are no negative marks for wrong answers. The decision of the Quiz master will be final in deciding the correct answer and awarding marks. Cumulative scores of all the rounds would be taken to decide the winning team. At the end of Quiz a suitable prize was given to the winning team and audience if the question was passed.

There were four sessions:

- MCQs
- Visual round
- Short answers
- Rapid fire round

Session I had 6 rounds. Session II and III had 2 round. Session four had only one round. The details of the contents of each round, time allotment, maximum marks for each round and one example of each is given in Table 1.

To evaluate the students performance pretest and post test evaluation was conducted for all the students. A set of ten multiple choice questions was administered for evaluation of all the students using a over head projector for the pretest and the same questions was repeated in post test. Each question carried 5 marks and time allotted was 5 minutes and the maximum marks was 50. The performance of the individual

students was assessed by the cumulative total of answers obtained in pretest and post test.

Feedback was also elicited by asking questions like:

- 1) What are the factors which facilitated learning?
- 2) What are the factors which hindered learning?
- 3) Which round was liked the most?
- 4) Suggestions or comments to improve the sessions.

**Table 1:** Details of contents of each round, time allotment, maximum marks and examples:

CATEGORY	TIME	MARKS	EXAMPLES
<b>Session I MCQ round</b>	30 sec for each question	6 rounds with 5 marks each (Max marks = 30)	Which of the following is not included in biomedical waste management and handling rule? a) Human anatomical waste b) Animal waste c) Liquid waste from laboratory and washing d) Trace of volatile anaesthetic with expired gases
<b>Session II Visual round</b>	1 min for each question	2 rounds with 10 marks each (Max marks = 20)	Identify and answer to the question below? *Colour coded bags was visually displayed 1) What are the type of disposal in these colour coded containers?
<b>Session III Short-answer round</b>	1 min for each question	2 round with 10 marks each (Max marks = 20)	Define "Bio-medical waste"?
<b>Session IV Rapid fire round</b>	1 min for all questions	1 round with 3 questions each carrying 10 marks (Max marks = 30)	1) Biomedical waste management and handling rule were notified by Ministry of environment and forest in the year? 2) What is the colour coding of bag in hospitals to dispose of human anatomical wastes? 3) Incineration is high temperature reduction process? True/False

#### Data analysis:

Data was analyzed using the Statistical Package using Microsoft Excel. Proportion, mean and standard deviation was determined as appropriate.

#### Results:

Out of 30 students enrolled in the batch, all the students attended the Quiz. Hence the attendance rate was 100%.

Table 1 gives the content, time allotment and marks allotted in each round.

Table 2 gives the winning team and their score. The overall performance was

encouraging. The winning team (Team A) scored 90%.

**Table 2:** Winning teams with their performances:

Session	Round	Team A	Team B	Team C
Session I	Round I	5	5	5
	Round II	5	0	5
	Round III	5	0	0
	Round IV	5	5	5
	Round V	5	5	5
	Round VI	5	5	5
Session II	Round I	10	10	10
	Round II	10	0	10
Session III	Round I	5	0	5
	Round II	5	10	10
Session IV	Round I	30	20	20
<b>Total</b>		<b>90</b>	<b>60</b>	<b>80</b>

Table 3 gives the evaluation of students by pretest and posttest. In Pretest, majority of the students 104 (73%) scored less than 40%. Another 34 students (24%) had scores between 41 - 60%. In the post

test evaluation, 132 (93%) obtained 81 - 100% and the rest 10 (7%) between 61 - 80%. None of the students scored less than 60% in post test evaluation.

**Table 3.** Mean score of pre-test and post-test by Quiz method:

Method	Group	Mean	N	Std. Deviation	t- value	t- test (Sig)
Quiz method	Pretest scores	47.14	28	14.105	-13.358	0.000*
	Posttest scores	90.71	28	10.862		

\*p value of <0.05 is significant

Table 4 gives the summary of feedback from the students regarding the Quiz method. The responses were encouraging. They facilitated learning as they ensured active participation of the students, interesting, interactive, inovative, informative, clear, different from routine classes, helped them to come prepared, more learning, more analytical thinking, scope for active participation, building healthy competition, strong mode of teaching, more effective, entertaing, friendly, enjoyable, wish every class has the same tempo, evaluation. The factors

which hindered learning was that Some questions were very easy, round required reference from outside (internet). Suggestions for improvemnet is to that such programes should be conducted often, they also suggested to have more round in each session especially in visual and MCQs round. Almost 18(59%) of students liked the visual round the most. 11(36%) of students liked the MCQ round and the remaining 1 student prefered the Rapid fire round. None of student had prefered the short answer round.

**Table 4:** Details of feedback given by the students

<b>Feedback</b>	<b>Responses</b>
What factors facilitated learning?	Interesting, interactive, inovative, informative, clear, different from routine classes, helped them to come prepared, more learning, more analytical thinking, scope for active participation, building healthy competition, strong mode of teaching, more effective, entertaing, friendly, enjoyable, wish every class has the same tempo, evaluation.
What factors hindered learning?	Some questions were very easy, round required reference from outside (internet)
Which round was liked the most?	Visual round, MCQs, Rapid fire round and short answer round in decreasing order
Suggestions for improvement?	Should be conducted often, they also suggested to have more round in each session especially in visual and MCQs round.

**DISCUSSION:**

The concept of 'active learning' is gaining much momentum, especially in the field of Medicine. Lectures alone are not generally adequate as a method of training and are poor means of transferring and acquiring information, even less effective at skill development and in generating the appropriate attitudes. It is recommended that every effort should be made to encourage the use of active methods related to demonstration and on firsthand experience. Medical teachers stretch their extent of information and knowledge in a logical, planned, integrated and sequential manner to the students through different approaches.<sup>8</sup> New methods like Problem-based learning, Quiz to name a few, are being introduced, based on the above said concept. It is already reported that group discussions have been employed successfully to teach majority of the topics in Community Medicine in the pre-clinical years.<sup>9</sup> Small student research projects have been used as a tool to teach epidemiology<sup>10</sup>. There are very few reports of using quiz as a method of teaching/ learning for Undergratuante medical students

The subject of community medicine is taught from Ist MBBS to Preclinical year almost throughout the MBBS career. The students start learning the subject only towards the Prefinal year. Hence to inculcate interest in the subject the present study was undertaken to effectively use quiz method to teach community medicine. In the present study, we wanted to investigate the role of quiz as a learning Tool in Medical education and to find out whether quiz can serve as an active learning method to undergraduate medical students. Through this method we wanted to increase the awareness and interest in the topic. By this method the students had an opportunity to gain deep insight in the topic by referring other sources like internet for preparation. It also enhanced their capacity to apply their knowledge critically especially in the visual round. Moreover it also helped them in building a healthy competitive spirit among the teams as well as to evaluate each student by MCQs after the quiz. This approach ensured greater participation of the students in teaching/ learning process. In a study from Michigan, USA, interactive video disc units were used for teaching pathology

laboratory cases. Each of these units had case studies followed by a quiz. These units were extremely valuable supplemental tools for the students.<sup>11</sup> Case based learning (CBL) with clinical problems as a source of stimulus concluded to be an effective tool by Jamkar and associates.<sup>12</sup> In another study from Australia, case study was used as a novel teaching/ learning format. The learning experience consisted of a quiz followed by a class discussion. This format was beneficial both to the students and the teacher. It also served as an additional option for teaching/ learning methods acceptable to students.<sup>13</sup> Finley et al used quiz format for learning about auscultation of heart sounds through computer based independent learning, which was compared with classroom teaching. Both CD-ROM and class room teaching methods were highly rated by the students.<sup>14</sup>

To evaluate the student's learning, new teaching strategies should be scientifically investigated through questionnaire, student's comments and evaluation of assessment outcome.<sup>15</sup> Once the deficiencies of teaching curriculum are identified, reinforcement can be applied by various methods which is the principle of value-added adult learning.

#### Limitations:

Most important problem was that it was very much time consuming. Much of the time was devoted mainly for framing the questions in quiz. Hence this method cannot be organized frequently. Equality of opportunity is less as all the students cannot act as quizers.

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