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Research Article

EFFECT OF SIMULATION BASED EDUCATION ON KNOWLEDGE OF MEDICAL STUDENTS IN CONTEXT OF COMMUNITY MEDICINE

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ABSTRACT

Simulations are being increasingly used to train medical students in diverse clinical skills. Simulation is arguably the most prominent innovation in medical education over the past 15 years. Role play is a simulation technique which can potentially strengthen knowledge that will lead to improved expertise. The present study was undertaken to assess an effectiveness of simple intervention, in the form of 'Role Play Simulation' on the knowledge of undergraduate MBBS medical students of one of randomly selected medical colleges in Maharashtra is regarding 'Epidemics Investigations.' **Methods:** A cross-sectional study consisting of pre and post test intervention was conducted at one of the randomly selected medical colleges in Western Maharashtra. A structured pretested self administered questionnaire consisting of 15 close ended questions was distributed to all 144 participants. The present study attempted to incorporate simulation based role play which was based on epidemic/outbreak investigations for food poisoning. Immediately after this intervention, same questionnaire was distributed to participants as a post test and responses were collected. 'Paired t-test' was used to assess pre and post intervention knowledge of participants. **Results:** Present study revealed significant improvement in knowledge of participants about epidemic investigations from pre to post intervention as a result of 'Role Play Simulation Based Education' ($t = 42.87$, $p < 0.001$).Statistically significant difference was observed for all fifteen questions. **Conclusion:** A simple simulation form like role play can make significant change in knowledge of medical students about very important topic i.e. 'Epidemic Investigation' in Community Medicine subject.

Key words: Simulations, Community Medicine, Knowledge, Medical students, Role play

INTRODUCTION

There have been burgeoning developments and changes in medical education.[1] The information and communication technology has revolutionized the teaching and learning process.[1] various new teaching methodologies are being used to impart medical education to the students in a more effective way. The basic reason to look for these methodologies is the dis-satisfaction with conventional mode of education, which is losing its relevance in this era of information explosion.[1]

Simulations are being increasingly used to train medical students in diverse clinical skills. Simulation is arguably the most prominent innovation in medical education over the past 15 years.[2] They help us to replicate situations which may not possible to get into real settings or where it may be logistically difficult to work on real patients. [1] Role play is a simulation

technique which can potentially strengthen knowledge that will lead to improved expertise. Despite of an effectiveness of role play in providing medical education, its use in educating medical students is limited. [3-5]

'Epidemic Investigation' is not only an essential aspect in Community Medicine subject but also it has public health relevance. Even though very few studies have been conducted so far in India to evaluate the knowledge of medical students pertaining to investigations of epidemic, some evidences have shown that 'Simulation Based Education' can be an effective teaching tool to educate medical students about emergency situation like epidemics. Clinical situations for teaching and learning purposes are created using various forms of simulation like mannequins, part-task trainers, simulated patients or computer-generated simulations.

Multiple studies have demonstrated the effectiveness of simulation in the teaching of basic science and clinical knowledge, procedural skills, teamwork, and communication as well as assessment at the undergraduate and graduate medical education levels.[4]

The present study was undertaken to assess an effectiveness of simple intervention, in the form of 'Role Play Simulation' on the knowledge of undergraduate MBBS medical students of one of randomly selected medical colleges in Maharashtra is regarding 'Epidemics Investigations.'

Objective: To assess an effectiveness of 'Role Play Simulation' on knowledge of undergraduate MBBS medical students about 'Epidemics Investigations"

MATERIAL AND METHODS

A cross-sectional study consisting of pre and post test intervention was conducted at one of the randomly selected medical colleges in Western Maharashtra. The inclusion criteria were all 144 undergraduate medical students from 7th semester who were present on the day of an intervention. Those who did not attend the class on the day of an intervention were excluded from the study. Written permission was also obtained from participants after explaining the purpose of study to them. Since the study did not involve any invasive intervention or procedure and it was related to only educational intervention.

A structured pretested self administered questionnaire consisting of 15 close ended questions was distributed to all participants. They were allowed 15 minutes to complete questionnaire under strict supervision. A questionnaire consisted of questions based on various aspects of epidemic investigations like essential criteria for confirmation of existence of an epidemic, spot map, epidemiological case sheet etc.

The present study attempted to incorporate simulation based role play which was based on epidemic/ outbreak investigations for food poisoning. Few volunteer medical students were selected and trained to participate in simulation based role play. They were asked to focus on ten important steps in investigation of an epidemic i.e. verification of diagnosis, confirmation of an existence of an epidemic, defining the population at risk, rapid search for all cases and their characteristics, data analysis, formulation of hypothesis, testing of hypothesis, evaluation of ecological factors, further investigation of population at risk and writing the report (Table 1).

Remaining students were asked to watch this simulation based role play. Total duration of role play was about 20 minutes. Immediately after this intervention, same questionnaire was distributed to participants as a post test and responses were collected.

Data Analysis: The scoring system for each complete question was assigned for pre and post intervention. Statistical analysis was done using Microsoft Office Excel Sheet. 'Paired t-test' was used to assess pre and post intervention knowledge of participants.

Table 1: Pre and Post intervention questions with correct response (n = 144)

Question	Correct Response
In case of an epidemic, epidemiological investigations should be delayed until the laboratory results are available.	False
First step in investigation of an epidemic is	Verification of diagnosis
What is the basic and essential criterion for confirmation of existence of an Epidemic?	Observed frequency is in excess of the expected frequency of disease
During epidemic investigation, till how long search for new cases to be done?	Period twice the incubation period of suspected disease since the occurrence of last case.
The document used to collect the data from cases and exposed persons during epidemic investigations is	Epidemiological case sheet
During epidemics investigation, there is no need to conduct medical survey for those people who are exposed to disease but do not develop disease. It is applicable only for cases (those who develop disease).	False
Epidemiological case sheet can be administered by trained lay health workers for collecting data during epidemic	True
'Control measures' is not a part of investigation of an epidemic	False
If large numbers of people are affected at same time with similar manifestations and common source, it can be an epidemic	True
Ideally how many steps are there for investigation of an epidemic?	Ten
During epidemic situations, geographical information is best displayed by	Spot Map
What will be the ideal step after 'defining the population at risk' during investigation of an epidemic?	Rapid search for all cases and their characteristics
Epidemic/Outbreak 'is confined to only communicable diseases.	False
Data analysis should be in preference to time, place and person	True
In case of food poisoning epidemic, there is no need of comparison of observed frequency and expected frequency	True

RESULTS

In the present study, of 144 participants 78 (54.16%) were males and 66 (45.83%) were females. All (100%) participants were in the age bracket of 20-23 years. Simulation method like role play is a cost effective educational intervention which can create maximum impact on learning abilities of medical students.

Table 2: Mean marks of participants (n = 144)

	Mean Score ±SD (out of 15)	t value	P value
Pre test	5.16± 2.06	42.87	<0.001**
Post test	12.01± 1.18		

**highly significant

The P value or calculated probability is the estimated probability of rejecting the null hypothesis (H_0) of a study question when that hypothesis is true. A *p* value of less than 0.05 was considered significant. A t-test tells the probability that two sets of values come from different groups.

DISCUSSION

In contemporary medical education, there is strong emphasis on the use of innovative teaching methods like Problem Based Learning, One Minute Preceptor (OMP), Computer Assisted Learning, Flipped Teaching etc. Uses of these types of methods help students to learn various clinical skills in a more effective way.

The present study attempted to impart knowledge to undergraduate medical students about investigations of an epidemic by using 'Role Play Method' rather than using traditional teaching methods.

The present study showed that simple simulation form like role play made improvement in the knowledge of participants about 'Epidemic Investigation.' The major objectives of epidemic investigations are to define the magnitude of the epidemic outbreak in terms of time, place and person and to determine the particular conditions and factors responsible for the occurrence of an epidemic.[7]

Similarly, other Studies also reported that the use of simulations as a teaching tool increases student's comprehension of complex theoretical concepts in relation to modules that are taught solely with the traditional lecture/seminar format. [7] Jennifer M Weller et al. [8] also recommended that 'Simulation Based Education' needs to be integrated into medical curricula at the development stage, with careful attention paid to transfer of skills learnt to the real clinical environment. In a Malaysian medical school, role plays have been used to teach communication skills in primary care medicine. [9] Simulation has a vital role in strengthening clinical reasoning skills, communication skills as well as formative and summative assessment of medical students.

Present study revealed significant improvement in knowledge of participants about epidemic investigations from pre to post intervention as a result of 'Role Play Simulation Based Education' ($t = 42.87$, $p < 0.001$) (Table 2). Statistically significant difference was observed for all fifteen questions.

However prior to an intervention, poor level of knowledge was found amongst participants regarding certain aspects of epidemic investigations like Spot Map, criteria for confirmation of epidemic, period of investigation of an epidemic etc.(Table 2).

The present study reiterates the need for incorporation of innovative methodologies like simulations along with traditional methods for better learning of students. At some places, methodology like 'Role Play' has been regular teaching method in medical colleges.[10] At the University of Heidelberg, Germany, introducing role plays augmented the realism of technical training and improved doctor-patient communication and to teach students to obtain a sexual history and discuss sexual health issues.[11] Role-play is simple form of simulation which can be a valuable teaching tool for medical education, requiring few resources and allowing students to look at the material they are learning in a new light.

CONCLUSIONS

Present study reported significant improvement in knowledge of undergraduate medical students pertaining to epidemic investigation from pre to post-intervention as a result of role play method. It shows that even a simple simulation form like role play can make significant change in knowledge of medical students about very important topic i.e. 'Epidemic Investigation' in Community Medicine subject.

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