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Case Scenario Based Teaching in Forensic Medicine to Improve Student Learning

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Abstract

Case scenario method is a powerful student-centred teaching strategy that can impart students with critical thinking, communication, and interpersonal skills and allows students to develop a collaborative, team based approach to their education. A cross sectional study was conducted on 3rd semester students (n=100) at Forensic Medicine department, Hamdard Institute of Medical Sciences & Research, Jamia Hamdard for period of 4 months to use case scenario based (CSB) learning approach as a tool to improve students understanding of applied aspects of Forensic Medicine and encouraging them to actively participate in teaching learning processModules were prepared for case based teaching methodologies on four topics of Forensic Medicine namely medico-legal autopsy, mechanical injury, Thanatology and crime scene investigation.At the end of study program feedback evaluation of the program was done using questionnaire containing items pertaining to student's satisfaction and participation based on Likert's 5 rank scales. The assessment was done using MCQ's and OSPE. More than 75 % of the students reported improvement in learning and engagement due to more active participation, were more organized in learning approach, increased analytical skills and problem solving ability and improved communication skills, collaborative skills by case scenario based (CSB) learning approach.

Keywords: Case Scenario Based Learning; Forensic Medicine; Students Learning.

Introduction

In many medical colleges the teaching is very teacher centred, mainly emphasising on acquiring theoretical knowledge that does not train the students on clinical aspects, therapeutics and hidden evidences. Forensic Medicine is no exception to this. In the past decade or so a number of education programmes have been developed in different institution.

Case method is a powerful student-centred teaching strategy that can impart students with critical thinking, communication, and interpersonal skills.

Case Based Learning (CBL) is an educational paradigm closely related to the more common Problem Bases Learning (PBL). This PBL approach is andragogical (adult teaching/learning), posing contextualised questions that are based upon ''real life'' problems that may be clinical or non-clinical [1]. CBL's main traits derived from PBL are that a case, problem, or inquiry is used to stimulate and underpin the acquisition of knowledge, skills, and attitudes. Cases place events in a context or situation that promote authentic learning [2]. Cases are generally written as problems that provide the student with a background of a patient or other clinical situation. Supporting information is provided, such as latest research articles, vital signs, clinical signs and symptoms, and laboratory results. CBL allows students to develop a collaborative, team based approach to their education.

Having students work through complex, ambiguous, real world problems engages students with the course material, encouraging them to "see it from an action perspective, rather than analyze it

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from a distance" [3]. Case studies are, by their nature, multidisciplinary, and "allow the application of theoretical concepts…bridging the gap between theory and practice" [4]. Working on cases requires students to research and evaluate multiple sources of data, fostering information literacy.

Case method is also effective at developing real world, professional skills. Working on case studies requires good organizational and time management skills. Case method increases student proficiency with written and oral communication, as well as collaboration and team-work. "Case studies force students into real-life situations," training them in managerial skills such as "holding a meeting, negotiating a contract, giving a presentation, etc." [5].

Aim & Objectives

Aim

To use case scenario based (CSB) learning approach as a tool to improve students understanding of applied aspects of Forensic Medicine and encouraging them to actively participate in teaching learning process.

Specific Objectives

1. To ensure students participate actively in teaching learning process.
2. To make students self-directed learners.
3. To improve students understanding of applied aspects of Forensic Medicine.

Methodology

This cross sectional study was conducted on 3rd semester students (n=100) at Forensic Medicine department, Hamdard Institute of Medical Sciences & Research, Jamia Hamdard for period of 3 months. Modules were prepared for case based teaching methodologies on following four topics of Forensic Medicine:

1. Medico-legal autopsy
2. Mechanical injuries,
3. Thanatology and
4. Crime scene investigation.

Students were divided into 10 groups each having 10 members. The topic of discussion from the prepared modules were conveyed to the students seven days in advance. During the session a case scenario pertaining to the topics of discussion e.g. court room scene, crime scene, etc. was put before the groups of the students. Each group was given 10 min to discuss the case scenario amongst their group members. Systematicallyone group was selected and asked to complete the desired task in 20 min and then discuss their findings to rest of groups in next 10 min. Rest of the groups then provided feedback, comments and suggestions moderated by the faculty member to the presenting group during next 20 min. The whole one exercise was completed in 1 hour. It was made sure that all the groups were exposed to all the modules during the study period.

Examples of the Modules

Example 1

A 25 yrs male, found dead at his home on 21.10.2015 at 8:30 am. Your team is assigned to go to the scene of crime and investigate. Your tasks are to:

a. Organize your team and designate specific responsibility to each member clearly mentioningthe role of every member.
b. Secure the crime scene.
c. Collect evidences in scientific manner.

At the end of the task discuss the difficulties you faced in completing the given tasks and provide suggestions to overcome them.

A dummy crime scene was created in the demonstration room of the department. Other groups were asked to observe and provide their feedback in the later part of the module.

Example 2

A 5 years child is brought before you having multiple injuries. His parents told you that he fell from stairs (20-25 in numbers) while running down on the staircase yesterday morning (20 hours before the examination). The child is not telling you anything and crying continuously. Your tasks are:

A. Examine the child and prepare detail injury report.
B. Comment upon the duration and nature of the injuries based on the examination report.
C. What inference/opinion you can derive from the report.

At the end of the task discuss what other points

you want to ask from the parents while taking the history and what investigations you want to advise in this case and why?

A dummy patient (one of the student from other group) was kept for the examination. Injuries were drawn/ painted on the body parts of the patient to provide a touch of reality to the case.

At the end of study program feedback evaluation of the program was done using questionnaire containing items pertaining to student's satisfaction and participation (Annexure 1) based on Likert's 5 rank scales.

The final assessment was done using MCQ's and OSPE. The MCQ and OSPE stations were finalized after consulting with other faculty members of the department to make sure all the desired leaning objectives could be assessed through them. The training of staff members was done before appointing them as observers for the OSPE stations.

Planning

- Permission was taken from the Dean of the Institute and Head of Department to conduct this Project.
- Institution ethical committee clearance was taken for this project.

Counseling of Students

- Before starting the project, the students were counseled regarding the objectives and methodology.
- The counseling sessions were held during the practical and tutorial sessions. Students were counseled in four batches of 25 students each. All their queries related to the project were answered satisfactorily.

Discussion with Faculty and Sensitization

- A presentation was made before the faculty members regarding the project explaining the aims, objectives and methodology. Comments of the faculty members were duly noted. A copy of the project format along with the questionnaire was given to each one of them and were requested to give their suggestions in the next meeting scheduled one week after. This time was given so that they can go through the project thoroughly.
- In the second meeting, held after a week time, suggestions and comments of the faculty members were collected and incorporated related to preparation of modules and assessment.
- MCQs and OSPE stations were planned after consulting with the faculty members. The support staff of the department were sensitized towards their role as observers OSPE stations. The assessment was done in 2 sessions- one session of 30 min in which 50 MCQs were given to the students and in second sessions where students were assessed in batches of 25 on 10 OPSE stations.

Collection of Feedback

- *Students' Feedback*
- At the end of study program feedback evaluation of the program was done using questionnaire containing items pertaining to student's satisfaction and participation based on Likert's 5 rank scales.The questionnaire was prepared and validated.Prior written consent was taken from each student before filling up the feedback Performa.A total of 20 items in the assessment tool coveredall of Bloom's taxonomy of learning domains andwere divided into four key areas: clinical reasoningskills (cognitive), reflection on practice (cognitive/affective), teamwork (affective) and presentation(psychomotor) (Annexure 1).

Observations and Results

A total of 100 medical students in ten groups participated in the study (response rate: 100%); of these, 67% were female and 33% were male. The mean age of the students was 19 years old.

Most students reported positive feelings towards

Table 1: Gender wise distribution of the students

Gender	No of Students
Male	37
Female	63

Table 2: Learning and engagement

Statements	Completely Agree (5)	Agree (4)	Null response (3)	Disagree (2)	Completely Disagree (1)
I found easy to comprehend the topic	52	29	02	12	05
I am more involved in class group discussions than before	54	33	00	09	04
The applied aspect of Forensic Medicine is better understood	46	48	00	06	00
Now I am more systematic in my learning	62	18	05	10	05
I set specific times to study these topics before discussion	41	38	09	08	04
I enjoy learning new information	64	35	00	01	00
Began to use more resources for finding relevant information	46	41	02	09	02
Average	**52.2**	**34.6**	**2.6**	**7.8**	**2.8**

Table 3: Attitude

Statements	Completely Agree (5)	Agree (4)	Null response (3)	Disagree (2)	Completely Disagree (1)
Now I am now more organized in my learning approach	61	28	02	07	02
I enjoyed the challenge	42	36	04	15	03
I learn from my mistakes	56	28	06	07	03
I am aware of my limitations	70	24	06	00	00
Average	**57.3**	**29**	**4.5**	**7.2**	**2**

the case scenario based (CSB) learning approach.

Of the students, 86.8% either agreed or strongly agreed that their learning had improved due to (CSB) learning approach. With regards to the perceived effect of case scenario based (CSB) learning approach on their own performance, the vast majority of respondents agreed or strongly agreed that case scenario based (CSB) learning approach had improved their self-assessment (88.7%).

Students reported that their engagement had improved as a result of their participation in the case scenario based (CSB) learning approachprocess. Most respondents agreed or strongly agreed that they felt more involved in class group discussions than before (87%).

Changes in attitudes as a response to case scenario based (CSB) learning approach were also examined. A large proportion of participants agreed or strongly agreed that now they were more organized in learning approach (89%) and enjoyed the challenges (78%). Participants also agreed or strongly agreed that they had become more aware of their limitations (94%) and learnt from the mistakes committed during completion of tasks (84%) as a result of case scenario

Table 4: Problem analysis

Statements	Completely Agree (5)	Agree (4)	Null response (3)	Disagree (2)	Completely Disagree (1)
I like to gather facts about a problem before I make a decision	56	38	04	02	00
I am able to focus on a problem	38	46	10	04	02
Improved ability to analyze problems	63	28	05	04	00
More able to reach learning objectives	52	39	04	03	02
More able to fulfil tasks related to problem analysis	34	48	09	07	02
Average	**48.6**	**39.8**	**6.4**	**4**	**1.2**

Table 5: Communication, teamwork and collaboration

Statements	Completely Agree (5)	Agree (4)	Null response (3)	Disagree (2)	Completely Disagree (1)
I learned a lot from my classmates.	63	34	02	01	00
Improved communication skills	58	35	02	04	01
Improved teamwork	60	27	06	05	02
More willing to help other group members understand difficult issues	41	48	08	03	00
Average	**55.5**	**36**	**4.5**	**3.3**	**0.7**

based (CSB) learning approach.

The role of case scenario based (CSB) learning approach in the development of problem analysis skills was also investigated. A large percentage of participants agreed or strongly agreed that case scenario based (CSB) learning approach had increased their analytical skills as well as their ability to achieve their learning objectives and fulfil tasks related to the analysis of problems (88.4%).

Regarding the impact of case scenario based (CSB) learning approach on the development of personal and professional skills, 91.5% of respondents agreed or strongly agreed that their communication skills, collaborative skills and ability to work as part of a team had improved as a result of case scenario based (CSB) learning approach.

A total of 83 % students obtained more than 70% marks in the assessment.

Table 6: Result of MCQ and OSPE assessment

Percentage of Marks obtained	80.1-85	75.1-80	70.1-75	65.1-70	60.1-65	55.1-60	50.1-55	< 50
Percentage of Students	11	67	5	3	7	1	4	2

Discussion

Due to unavailability of much published work the results of Case Scenario Based (CSB) learning or its component group discussion in Forensic Medicine could not be discussed. A similar study was done by Wojciech Pawlina et al who got similar response from the students [6]. In their study 82% of the students felt that these sessions were a useful method of providing clinical correlations with basic sciences subject similar to our findings.

As noted by Albanese MA et al [7] & Des Marchais JE [8], most students enjoy the active participation and consider the process to be clinically relevant & stimulating similar to our case. Diana et al were of the view that students in a problem-based curriculum are provided with many clues and directions that directly or indirectly play a role in their decisions on what to study, such as reference literature, course objectives, lectures and tests [9]. In addition, students become better self-directed learners over the four curriculum years. This can help them become lifelong learners.

In a review of study on advantages of problem based learning, Diana Dolmans et al found that there is evidence towards increased retention of knowledge, enhancement of integration of basic science concepts into clinical problems, the development of self-directed learning skills, and enhancement of students' intrinsic interest in the subject matter in PBL [10].

David Vernon in his meta-analysis showed a general approach showing superiority of PBL over the traditional methods [11]. PBL also promotes interdepartmental collaboration particularly between basic & clinical scientists [12].

Conclusions

To conclude it is to be mentioned that CSB is an effective tool to make students understand the applied aspects, improves their analyzing and problem solving abilities and generates more interest amongst them.

Implications

Case Scenario base learning is a very good approach which drives student centered learning & incorporates integration and practical application of the knowledge of basic science, simultaneously helping students become lifelong learner. It can be a very useful method if taken up as a hybrid approach with traditional method.

Outcomes: What this study adds

This study tends to improve the students understanding of applied aspects of Forensic Medicine using modules and scenario based learning approach, something which cannot be learned by using traditional methods.

Limitations

- The time of 4 months is not enough to include all topics of Forensic Medicine in this study.
- Since this type of modules are not exam centric, students tends to lose interest after some time.
- All the case scenarios were not real. It would had been more educative and interesting if students examined actual case or visited actual crime scenes.

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