Original Research Article

Integration of case based learning and bedside teaching in undergraduate students in pediatrics

Suhas P. Kulkarni*, Anil B. Kurane

Department of Pediatrics, D Y Patil Medical College Kolhapur, Maharashtra, India

*Correspondence:
Dr. Suhas P. Kulkarni,
E-mail: drspk_2000@yahoo.com

ABSTRACT

Background: Teaching undergraduate students by bedside clinics has remained cornerstone of medical education because it imparts knowledge, teaches proper behaviour and can be used to teach skills effectively. Case based learning (CBL) is a newer modality of teaching in medical education. CBL involves preparing students for clinical practice through use of authentic clinical cases. Aim of the study is to study the effect of integration of case based learning and bed side clinic on motivation, deep thinking and cognitive improvement in final MBBS students

Methods: The study group was undergraduate students of final MBBS posted for clinical posting in pediatric ward. The study was carried out on 59 students posted from March 2018 to September 2018. MCQ based pretest was done initially. The students were taught the topic by case based learning method for one hour. They were asked to take the case and bedside clinic was conducted. Relevant clinical examination was demonstrated to the students. Students were asked to practice the skills in front of the teacher. This was followed by the post-test and   questionnaires.

Results: 88.67% students thought that this method was motivating. 82.7 % students perceived that it increases deep thinking. 52.83% students showed more than 20% improvement in score of pre-test and post-test.

Conclusions: Integration of case based learning with bed side clinic was associated with Better motivation of final year MBBS students and development of deep thinking in students. 3. Significant change in cognitive learning in final MBBS students.

Keywords: Bedside teaching, Case based learning, Deep thinking, Integration, Motivation, Undergraduate

INTRODUCTION

Medical education is undergoing a change from previous one way lectures and bedside clinics. New methods of teaching and learning are being tried. Teaching undergraduate students by bedside clinics has remained cornerstone of medical education because it imparts knowledge, teaches proper behavior and can be used to teach skills effectively.[1] Significant amount of time 3 hours per day for 6 days a week are allotted for bedside teaching.[2] As per Sir William Osler, to study phenomenon of disease without books is to sail an unchartered sea, while to study the books without patients is not going to sea at all. This bedside clinic is however totally dependent on the skill and experience of the teacher. Sometimes inappropriate comments, lack of preparation, absence of student's participation, less number of patients in the ward and increased number of students affects the quality of clinical teaching[2]. Junior faculties are finding it difficult to conduct the bedside clinics. Case based learning (CBL) is a newer modality of teaching in medical education. CBL involves preparing students for clinical practice through use of authentic clinical cases.[3] With the goal of Medical Council of India of creating

Indian Medical Graduate who is globally informed and locally relevant and who is prepared to see actual patients, CBL may be helpful for undergraduate students to understand real life situations.[4,5,6] CBL has benefits as it utilizes collaborative learning, facilitates integration of learning ,develops students, intrinsic and extrinsic motivation to learn, encourage learners self-reflection and critical reflection, allows for scientific enquiry, integrates knowledge and practice.[7] It is also seen that CBL helps in the development of critical thinking and analysis in undergraduate medical students.[8] Motivation in education is the process by which goal directed activity is started and sustained. It can be intrinsic motivation or extrinsic motivation. According to self determination theory motivation can be intrinsic motivation which involves studying for genuine interest and for personal satisfaction. Extrinsic motivation includes studying with the idea of getting fame, money or due to some external regulation.[2] Integration of different methods of teaching has been shown to be useful for the students.[8,9,10] As per the Harasym et al, there is a difference in the student and the expert in the approach about the diagnosis.[11] It is important for the students to see the whole picture first so that they understand the topic. The knowledge of students is fragmented hence just sending them for taking case and bedside discussion sometimes does not lead to fruitful education as students are not aware of various possibilities and methods of examination which they are supposed to know and practice themselves. This may be the disadvantage in bed side teaching which is practiced presently. The idea was to give the whole and real life picture first and then conduct the bedside teaching. With this view a study was designed to assess effect of integrated bedside teaching and case based learning in undergraduate students.

Aim of the study is to study the effect of integration of case based learning and bed side clinic on motivation, deep thinking and cognitive improvement in final MBBS students. Objective of the study is:

- To study the perception of students of final MBBS about integrated bedside teaching on motivation

- To study perception of final MBBS students about development of deep thinking after integrated teaching by case base learning and bedside clinics

- To study the effect of integrated approach with case based learning and bedside clinics on the cognitive improvement in students of the final MBBS.

METHODS

The study group was undergraduate students of final MBBS posted for clinical posting in pediatric ward. The study was carried out on 59 students posted from March 2018 to September 2018.

The 5 case based scenarios covering various aspects of pediatric respiratory problems were created. They were peer reviewed in the department of pediatrics and modified after suggestion from the peers. The questionnaire for MCQ based pre-test and post test were created and were validated by experts. The questionnaires for perception of motivation was designed based on the study by Pintrich et al.[12] We studied the motivation by the questionnaire with 10 questions which involved questions about intrinsic and extrinsic motivation. It also contains 2 questions which were negative so as to remove the chance of error. The questions were to be answered on likert scale.

The deep thinking or critical thinking involves gathering information through all senses, raises vital clearly defined questions, gathers and assess relevant information, uses abstract ideas that are interpreted and used effectively, comes to well –reasoned conclusions and solutions, test outcomes against relevant criteria and standards. With this idea a scale consisting of 10 questions was designed which was to be answered on likert scale. Thus perception about deep thinking was assessed. The deep thinking scale was based on ASSIST inventory by Entwistle et al.[13] Informed consent was taken from the students participating in the study. The study was approved by the Institutional Review board (IRB) and ethical committee of the college.

The students were asked to come prepared for the topic. MCQ based pretest was done initially. The students were taught the topic by case based learning method for one hour. The topic was prepared by the teacher in such a way that real life scenario were created and relevant questions were asked. Students were asked to go the ward and take the case. Bedside clinic was conducted and clinical examination was demonstrated to the students by the same teacher. Students were allowed to practice the skills in front of the teacher.

This was followed by the post test and filling of questionnaires regarding their perception of the motivation and deep thinking. The same study was repeated on another batch of 30 students coming for the next clinical posting.

RESULTS

Analysis for perception of motivation

A cut off of 55 (75% of total marks) on total marks was set based on the box plot of total score of test for perception of motivation by clusters. The clustering of scores on 10 questions to identify perception of motivation was carried out using k-mediods clustering (partitioning around mediod (PAM) algorithm) with k=3. K-mediods clustering was implemented in R-software using package '*cluster*'. Value of k was chosen using Silhouette analysis. (figure 1) Box plot of perception of motivation.

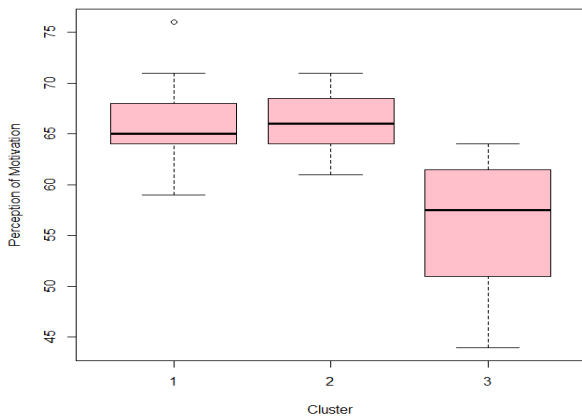88.67% students scored total marks greater than 55 in the test on motivation.

Figure 1: Box plot of perception of motivation.

88.67% students scored total marks greater than 55 in the test on motivation.

Analysis for perception of deep thinking

A cut off of 30 (60% of total marks) on total marks was set based on the box plot of total score of test for perception of deep thinking by clusters. The clustering of scores on 10 questions to identify perception of deep thinking was carried out using k-mediods clustering (partitioning around mediod (PAM) algorithm) with k=4. K-mediods clustering was implemented in R-software using package '*cluster*'. Value of k was chosen using Silhouette analysis. (figure 2) Box plot of deep thinking.
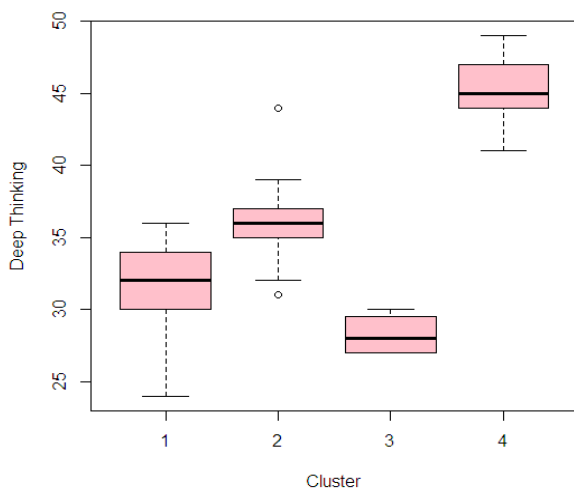

Figure 2: Box plot of deep thinking.

82.7 % students scored total marks greater than 30 in the test on deep thinking.

Pre and Post test result analysis

As the marks in pre and post tests are actually measured on ordinal scale, Wilcoxon sign rank test for paired samples is used to check whether there is any significant change in the average marks of the students. The value of test statistic is 107 and two sided p-value (adjusted for ties) is 6.713e-05 (<0.05). The test is significant at 6.713e-05.

52.83% students showed more than 20% improvement in score of pretest and post test.

DISCUSSION

Bedside teaching is very important but underutilized modality in medical education.[14] It has decreased from 75% of all clinical training in 1960 to 8-19 % presently.[3] Certain new models have been proposed considering patient comfort, focused teaching and using group dynamics which can help to improve the bedside teaching 1.15 Medical council of India has amended regulations on Graduate Medical Education 1997 in July 2017. It suggests that the curriculum is oriented towards training students to undertake the responsibilities of a physician of first contact. Lectures alone are generally not adequate as method of training. Hence every effort should be made to encourage the use of active methods related to demonstration and firsthand experience. Students should learn in small groups. Maximum efforts should be made to encourage integrated and problem based approach starting with clinical and community cases. Faculty members should avail of modern educational technology.[5]

The study indicated that the case based learning when integrated with bedside teaching leads to motivation of students. This could be because prior discussion on case scenarios simulates actual practice. Students enjoyed the process of learning. This was similar to observed by Brown et al.[11]

The students liked the way of teaching probably because they are more screen friendly and like to perform activities together. Motivation of the students to learn is very important in medical education. Integration of bed side clinic and case based learning has resulted in 88% student feeling motivated. Dubey et al observed 74% students felt case based learning lead to motivation to use additional learning resources.[9] Nair et al found 98% felt motivated after case based learning.[7]

The perception about deep thinking was very significant. The students learned to think and analyze the facts. Wittich et al used CBL to teach most common types of adverse events in internal medicine.[16] They found that physicians had the lowest scores in reaching higher level of reflective thinking. Ilguy et al found significant benefit in higher level of learning using CBL program.[17]

In a study by Nair et al, case based learning lead to diagnostic skills and lateral thinking in biochemistry students.[7] Kireeti et al found improved diagnosis and case management skill in pediatric students taught by case based learning.[6] Dubey et al, also found higher order of cognition in students taught with case based learning method.[9]

The pre and post test difference was present in 52% student which was definitely encouraging. But the reason could be the high level of questions which also were intended to assess the effectiveness. Similar findings were observed by Kireeti et al, in which significant improvement occurred in CBL group.[6] Nair et al, also observed statistically significant improvement in pre and post test (p value <0.0001) which showed improvement in cognition.[7] Bhardwaj et al, observed while using integrated teaching, case based learning lead to significant cognitive improvement in students.[10]

CONCLUSION

Integration of case based learning with bed side clinic was associated with better motivation of final year MBBS students. The integration of Case based learning with bedside clinic lead to development of deep thinking in students. The integration of case based learning with bedside clinic resulted in significant change in cognitive learning in final MBBS students. Limitations of the study: The limitations to our study were small sample size, only two sessions were studied, involvement of multiple faculties should have been there and result should be tested after teaching for at least one term.

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