

EFFECTIVENESS OF CASE-BASED LEARNING USING DIALOGICAL METHOD VS TRADITIONAL TEACHING FOR LEARNING CLINICAL PHARMACOLOGY

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ABSTRACT

Background: Medical teaching and learning are dynamic processes. The main problem in traditional lecture-based teaching methods is that the students listen, read, reproduce in the exams and forget. This type of teaching completely depends on the instructor. It is hypothesized that case based dialogical method may be better for teaching clinical Pharmacology. The Objective is to determine the effectiveness of case-based learning (CBL) using dialogical method compared to traditional method (TM) for teaching clinical Pharmacology. **Materials and Methods:** A mixed method cross over study design was conducted among Phase 2 MBBS students. For Topic 1 (OPC poisoning) Group A students (no=32) were taught by traditional method using power point presentation. Group B (n=20) students were asked to interact with patient/bystanders of OPC poisoning and the dialogical method of discussion with the facilitator was conducted on the next day. For topic 2 (Glaucoma) group A students followed CBL dialogical method and group B was taught with TM. Evaluation was done by pretests, post-tests and feed backs from the students. **Results:** No significant differences were seen when post tests were compared. All (n=52) except one preferred CBL dialogical method. Students feedback revealed better understanding, retention, clinical applications and enhanced problem-solving skills were seen with case based dialogical method. Qualitative analysis found that students valued the active and self-directed learning experience, highlighting better conceptual understanding and increased engagement. **Conclusion:** Students gained knowledge in both methods. However, students preferred Case-Based Learning, reporting enhanced understanding, better retention, increased engagement, and improved ability to connect theory with clinical practice.

INTRODUCTION

Teaching and learning are dynamic phenomena in the medical education. The problem of traditional lecture type teaching methods is that the students listen, read, reproduce in the exams and forget. In this type of teaching, learning highly depends on the instructor. The instructor delivers much information to students within a short time. It may be good for teaching students in larger group, but active participation of students is very less. Remembering and interpretation of the learnt concepts will be minimum at a later point of time.^[1,2]

A multicentric European study revealed that the prescribing competencies among final year students was very poor. Their understanding of drug interactions & contraindications was lacking to the

extent that the most of them chose inappropriate therapies for common diseases with a lot of prescribing errors.^[3]

Problem based learning (PBL) work better than traditional teaching, but a substantial percentage of final year students could not make correct treatment choices even after the PBL programme. Prescriptions were still not appropriate and a lot of errors were recorded on prescriptions.^[4]

Learning is both productive and collaborative when the students and teacher work together to share the knowledge. Effective learning requires creative thinking and a critical approach to a problem.^[5]

Case based learning (CBL) is a teaching-learning process in which clinical cases are incorporated to aid traditional lectures. CBL promotes active learning.^[5]

Dialogue and conversation are crucial aspects of Dialogic teaching. It is facilitated through meaningful interactions between teachers, and students and among the students themselves too. This practice enriches the learning environment and enhances performance as well. Pharmacology courses cover the different pharmacological properties of drugs; mechanisms of action, Pharmacokinetics, dynamics, uses, adverse drug reactions and contraindications, and drug to drug interactions in second year. During final year they learn the clinical and treatment aspects for exam purposes. They may not be able to remember the Pharmacological concepts later when they need to prescribe during internship. Hence it was hypothesized that case based dialogical method of learning may provide a better outcome to learn clinical Pharmacology. Hence this study was planned.

Objectives

The objective was to determine the effectiveness of case-based learning using dialogical approach compared to traditional methods for clinical Pharmacology classes.

MATERIALS AND METHODS

Participants of the study-MBBS Phase 2 students.

Design: Mixed method in a crossover study design.

Sample size: Totally 52 students.

Before the study was begun, approval was obtained from the Institutional Ethical Committee. Informed consents were obtained from the students.

Topic I

Group A students (no=32) were given an opportunity to communicate with patient/bystanders as per the context of organophosphorus poisoning. They were requested to retrieve history, symptoms, signs, procedures for treatment, and current status of the patient. They then read about general managements of poisoning, symptoms, signs and management of organophosphorus poisoning for discussion. The next day the teacher met students and opened the discussion. The students began to talk and share their cases they had seen. The medications used for treatment of those patients, the drug mechanism, signs of atropinization, adverse drug reactions, current status, delayed adverse effects were presented by the learners. Pharmacological and therapeutic aspects were discussed with the facilitator. For another group (Group B) of 20 students the class on organophosphorus poisoning was taken using traditional teaching method in a conventional setting. The learning objectives were similar to the learning objectives of group A. The performance was evaluated by pretest and post-test for both groups and compared. The feedbacks were obtained from both groups.

Topic II (Glaucoma)

For topic II the group A students were taught by traditional instructional approach and group B students had the task to search for the patients with

glaucoma asking the complaints, history of the presenting problem, drug history, and treatment history. They were requested to read about; the physiology of aqueous secretion and drainage, type of glaucoma, clinical features and medications and therapy for the control. The next day there was a discussion by dialogical method among the students and the facilitator.

Outcomes assessed:

1. Knowledge gained was assessed using pretest and post-test questionnaires.
2. Feedbacks were obtained from both groups.
3. At the end of the second session both groups of students were asked to compare their learning experiences over the two occasions (Traditional vs case based dialogical method) using both closed-ended and open-ended questions.

RESULTS

Quantitative analysis:

- [Table 1] shows a significant gain in knowledge (difference between pre-test and post-test mean scores) for knowledge in both groups for both topics.
- The pre-test, on topic 1 (OPC Poisoning) was done just before class for both groups. As the CBL group had previously seen the cases their pretest scores were greater than the Traditional learning. So, there is a significant difference between both the groups when compared. [Table 1]
- The pre-test conducted for topic 2 (Glaucoma) before any exposure to cases showed no significant difference in mean change in scores between groups. [Table 1]
- Mean Post test scores [Table 1 and Figure 1] for both topics, showed no significant difference.
- All 52 students except a single candidate preferred case based dialogical method of teaching to learn the clinical Pharmacology. [Figure 2]
- Student feedback for closed ended questions is as listed in [Figure 3]. Using 5-point Likert scale, it was measured. Most of the participants claimed that CBL provided them with improved understanding (51/52), retention (49/52), and clinical application (49/52). The majority of students were highly satisfied with discussion quality and instructor facilitation.

Qualitative analysis:

According to the responses given by students when asked to compare both types of teaching at the end of Topic II the following themes were generated.

- Learning skill was improved with CBL
- CBL was an active learning and self-directed learning with a greater learning experience.
- CBL enhanced Focus and attention.
- Ability to link theory and clinical dimensions was great with CBL.

- Bedside teaching is needed and we would like to see a lot of cases in future.
- Concepts were very well understood in CBL and will be remembered forever.
- Case presentation and discussion were quite engaging & impressive in CBL.

Table 1: Gain in Knowledge

Topic	Method	Pre-test score	Post-test score	Knowledge Gained (Mean difference)	p-value (within)	p-value (between)
OPC Poisoning (n=52)	Traditional	4.33+1.36	8.16+2.02	3.84+2.11	<0.001*	0.001*
	CBL	6.59+1.91	8.56+1.67	1.98+1.72	<0.001*	
Glaucoma (n=52)	Traditional	2.67+1.32	6.60+2.33	3.92+2.51	<0.001*	0.149
	CBL	1.38+1.18	6.30+1.87	4.93+2.26	<0.001*	
Overall (n=52)	Traditional	3.69+1.56	7.56+2.26	3.87+2.25	<0.001*	0.886
	CBL	3.38+2.96	7.17+2.10	3.79+2.52	<0.001*	

Figure:1 Comparison of post test scores

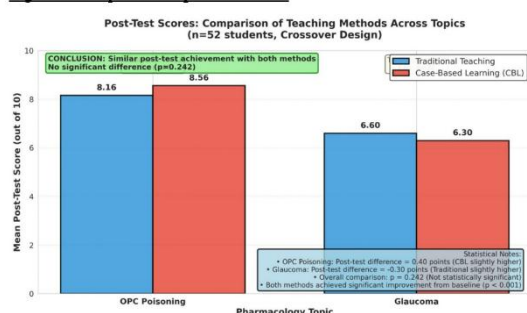


Figure 1: Comparison of post test scores

Figure :2 Preferred Teaching method

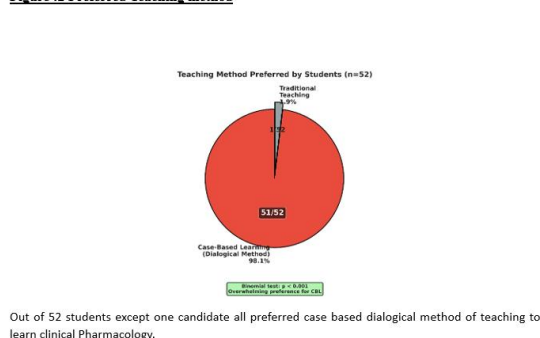


Figure 2: Preferred Teaching method

Out of 52 students except one candidate all preferred case based dialogical method of teaching to learn clinical Pharmacology.

Figure :3 Students feedback- quantitative analysis

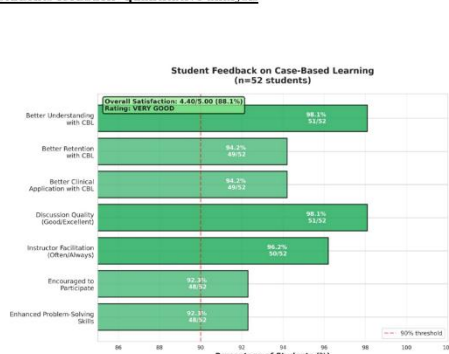


Figure 3: Students feedback- quantitative analysis

DISCUSSION

The effectiveness of Case based dialogical method compared to traditional method to teach and learn clinical Pharmacology has been analysed. Due to similar learning objectives for both methods, in each topic there was no significant difference in immediate gain in knowledge between the methods.^[6] For topic-1 (organophosphorus poisoning) the pre-test was performed just prior to the class for each group. Pre-test scores of the students in case-based learning method (6.59+1.91) was relatively higher than traditional method (4.33+1.36) as they were exposed to cases in previous days. Thus, there is a statistically significant gain in knowledge in traditional method than in CBL approaches. However, given the higher pretest scores on CBL when compared to traditional method, it is very clear that case-based learning improves the elementary knowledge and makes learning more self-directed. Post test scores of both methods as well as topics were not significantly different. In fact, immediate knowledge acquired from both methods is nearly equal. Out of 52 students 51 preferred the CBL.^[7]

At the conclusion of the second session, participants were asked to give feedback comparing CBL versus traditional teaching and the results indicated that CBL had a significant contribution in better understanding and retention. Problem solving skills & clinical application were found to be enhanced with CBL.^[8]

Vasundra et al. conducted a study among interns and found that the greatest number of the interns suggested bedside classes study and the need for Pharmacology teaching integrated with clinical subjects to facilitate better conceptual learning and & skills at the same time.^[9]

Qualitative analysis

The participants also explained that CBL was an active learning process and it supported self-directed learning. It helped them to have better focus and attention. Vora MB also concluded in their study that CBL was an active learning process.^[10] CBL helped them to correlate theory with practical aspects, as explained by many of the participants of this current

study. They claimed that the case presentation & discussion were interesting & that they would not forget the learnt concepts forever.

As the students were asked to see and interact with the real patients with actual illness, they had a chance to improve their communication skills and interpret the theory with real life application.

Almost all the participants insisted for a more substantial number of case-based discussions for Pharmacology classes.

Now a days students give far more importance to learning theory just for examinations. And across Phases, in every subject, there remains a gulf between what they are learning in theory and their clinical practices. One of the findings from a larger study 'Are Medical graduates fully prepared for practice?' found that prescribing was the weakest area of practice of all data sources. The above-mentioned study insisted the need for greater applied and skill-based learning that could enhance the preparedness of the students for prescribing appropriately. Increasing the opportunities to develop the skill-based applied learning in a controlled 'real' environment can increase the preparedness.^[11]

In this current study the students had been given a chance to observe real patients, interact with them, read and then discuss with the facilitator which gave them insight into Clinical Application of Pharmacology among them. Students expressed that being able to learn from real patients assisted them to connect theory with its application in clinical setting.

Limitations

This study was done in a single centre. Retention of memory was not tested.

This study can be extended for other Clinical Pharmacology topics and in different Institutions.

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CONCLUSION

Case-Based Learning using the Dialogical method and Traditional teaching demonstrated equivalent effectiveness for immediate knowledge acquisition, with students showing significant learning gains regardless of the approach. However, students preferred Case-Based Learning, reporting enhanced understanding, better retention, increased engagement and improved ability to connect theory with clinical practice. This study suggests that Clinical Pharmacology for common illnesses can be taught as case-based learning instead of didactic lectures.

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