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Opinion and Feedback of Students and Faculty Regarding Case-Based Learning as Small Group Teaching in Pharmacology

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Abstract

Introduction: In recent years, small-group teaching has achieved popularity in medical education and is considered as effective for encouraging active and deep learning. Case-based learning (CBL) could be a valuable tool as small group teaching method in pharmacology at undergraduate level. Fostering of development of clinical reasoning, self-directed learning, critical thinking, problem-solving and decision-making skills are the major advantages of CBL, and all these leads to higher-level learning outcomes. As investment of more time is required for preparedness and conduction of CBL sessions, firm commitment of learners and educators is the key for successful incorporation of this teaching methodology in medical science. **Objective:** To evaluate the opinion and feedback of medical students and faculty regarding CBL as small group teaching in pharmacology. **Materials and Methods:** This qualitative study was conducted in 02 medical colleges (Army Medical College Bogura and BGC Trust Medical College) of Bangladesh from January 2024 to December 2024. Undergraduate medical students (3rd year and 4th year) of selected medical colleges were included as study population. Total 259 medical students and 12 faculty members of Department of Pharmacology & Therapeutics participated in this study. Each student participated one CBL session. After the CBL session, opinion and feedback of 3rd and 4th year students regarding the session was evaluated through a feedback questionnaire. Opinion and feedback of faculty members who conducted CBL sessions regarding CBL was done with a structured questionnaire. **Result:** Most of the students strongly agreed that CBL improved their understanding of pharmacology and learning skill along with the ability to apply basic sciences knowledge in clinical context. Participants expressed their agreement in terms of their progress in retention of information, analytical skill, problem solving ability as well as communication skill. Both faculty and teacher were positive regarding motivation, engagement, enjoyment and active learning environment offered by CBL. More time, preparations, efforts and faculty are needed for successful conduction of CBL sessions were expressed by participants. Both teachers and students were positive to adopt other topics of pharmacology in CBL (mean score: 4.17 ± 2.2 and 4.12 ± 0.8). Most of the students (mean score: 4.12 ± 0.7) felt that CBL session can be introduced as a new teaching-learning method in pharmacology. More positive attitude towards CBL was observed among 3rd year students in comparison with 4th year students in all questions. **Conclusion:** Case-based learning was positively received by both students and faculty, enhancing understanding, problem-solving, and clinical application of pharmacology. Despite requiring greater preparation and resources, CBL is viewed as an effective and engaging method that can be adopted more widely in undergraduate pharmacology teaching.

Keywords: Case based learning, faculty, feedback, medical students, opinion, pharmacology, perception, small group teaching

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Introduction

Over the decades, small-group teaching and learning has achieved popularity in medical education, and is regarded as a means of encouraging students and enhances the process of deep learning. Active participation, work towards a specific task and reflection are the three cardinal characteristics of small group teaching. Discussion rather than instruction is the main mode of learning in this type of instructional method.^{1, 2} It provides productive academic environment and strategy for dynamic and collaborative learning both in basic and clinical medical science. This session offers increase retention of knowledge, enhancement of transfer of concepts to new problems, increase student interest as well as engagement, improve the self-directed learning and critical skills along with increase teamwork ability.^{3, 4} Development of self-motivation, exploration of problems, deep learning, higher-order activities and enhancement of student-faculty and peer-peer interaction as well as communication skills can be attributed through small group sessions.⁵

A wide ranges of methods can be used with small groups like tutorials, free discussion, seminar, snow balling, problem based learning, problem solving, brain storming, case based learning, team based learning etc.^{1,3, 4}

Pharmacology is an integral component of medical education.⁶ Basic and clinical pharmacology provides the foundations for therapeutics. Pharmacology offers the essential framework for understanding how drug molecules interact within the human body, guiding the process of drug development, therapeutic decision-making for both individual patients and populations, ensuring the safe administration of medications, and evaluating safety and efficacy of medicines.⁷ Thus pharmacology aids as the scientific basis for all aspects of medication management, including prescribing and monitoring the safety and efficacy of medicines.⁸ Physicians' competence in these tasks pivots on fundamental knowledge in pharmacology, along with clinical reasoning, analytical decision-making, and an obligation for safety of

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patients. While each of these learning domains is crucial, establishing a firm foundation in pharmacology is one of the first critical steps for becoming a good prescriber.⁹ Prescriber's sound knowledge of pharmacology is indispensable to enhance drug safety, avoid medication errors, and prevent adverse drug interactions.⁶ Information overload, rapid drug development, lack of adequate teaching hours and approaches are making pharmacology education quite challenging.^{6, 7, 9, 10, 11, 12, 13} Variations in prescribing attitudes and decision-making among future physician further specify the importance of clinically oriented learning during undergraduate study.¹⁴ Striving for solutions, educators around the world have been introducing and adopting newer teaching methodologies and techniques in active learning of therapeutics.^{6, 7, 9} Case-based learning (CBL) could be a valuable tool as small group teaching method in undergraduate level.

CBL uses real or hypothetical patient case scenarios to promote the application of knowledge and discussion. It supports learning new skills and knowledge more effectively by integrating factual knowledge in the context of applying it to a real-life situation. Retention of learning will

be increased as CBL stimulates learners to correlate concepts, synthesize information, and have a deeper understanding of the facts.⁹ One of the important feature of CBL is it stimulates learner's engagement and deep approach to learning. As real life situations are used as problems/scenarios, it motivates medical students learning drive. By emphasizing the clinical relevance of content, CBL makes learning more meaningful and relatable.¹⁵ Fostering of development of clinical reasoning, self-directed learning, critical thinking, problem-solving and decision-making skills are the major advantages of CBL, and all these leads to higher-level learning outcomes. As CBL is focused on constructive inquiry rather than memorization of facts, it could play an excellent role in making pharmacology palatable.^{9, 16, 17} As investment of more time is required for preparedness and conduction of CBL sessions, firm commitment of learners and educators is the key for successful incorporation of this teaching methodology in medical science.⁹ It can be resource-intensive if multiple facilitators are involved.^{15, 17}

In Bangladesh, few researches were conducted with the aim to improve pharmacology teaching.^{18, 19, 20} Current

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study was conducted in this context to assess the opinion and feedback of medical students and faculty regarding CBL which might provide future direction about adoption of this type of small group teaching in undergraduate pharmacology education of Bangladesh.

Materials and Methods

This qualitative study was conducted in the Department of Pharmacology & Therapeutics of two non-government medical colleges (Army Medical College Bogura and BGC Trust Medical College) of Bangladesh from May 2024 to April 2025. The objective of the study was to assess the opinion and feedback of medical students and faculty regarding CBL in undergraduate pharmacology. Study was conducted among the 3rd year and 4th year MBBS students of studied medical colleges, and the faculty of Department of Pharmacology & Therapeutics. Total 259 medical students and 12 faculty members participated in this study.

Procedure of the study: Ethical approval of the study was obtained from the Institutional Ethical Review Board (IERB) of Army Medical College Bogura. Permission was taken from college authorities and informed consent was taken from the participants. The respective

medical colleges were clearly informed about the study and its objectives.

Before starting the small group sessions (tutorials), theme lectures on the selected topics as well as on concept of P-drug and rational use of medicines were conducted. The faculty and students were sensitized regarding CBL. Both groups of students participated one CBL session. Factual case scenario was prepared by pharmacologists, and validated by clinicians and medical educationists. Each tutorial group was divided into 5-6 small groups consisting of 4-5 students and spoke-person for each group was selected by the opinion of group members. After the CBL session, opinion and feedback of 3rd and 4th year students regarding the session was evaluated. A pretested, self-administered feedback questionnaire was circulated among students who participated in CBL session. The questionnaire consisted of 20 questions based on a 5-point Likert scale (strongly disagree, disagree, neutral, agree and strongly agree). To maintain confidentiality, responses were anonymous. Opinion and feedback of faculty members who conducted CBL sessions regarding CBL was done with a structured questionnaire. The questionnaire consisted of 08 questions based on a 5-point

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Likert scale (strongly disagree, disagree, neutral, agree and strongly agree).

Data interpretation and Statistical analysis

Statistical analysis was done by SPSS version 24. Continuous data were expressed as mean $\pm$ standard deviation (SD). The results between the groups were analyzed using an independent-sample t-test. Calculated 'p' value may suggest the level of significance (* significant at p

≤ 0.05 , ** significant at $p \leq 0.01$, *** significant at $p \leq 0.001$).

Result

Table I showed that majority of study population were female (64.09%). Proportions of 3rd and 4th year medical students were 50.58% and 49.42% respectively. More than half of the faculty (58.33%) were female. Among them, 50% graduated less than 5 years and 50% graduated 5-10 years ago.

Table I Distribution of demographic characteristics of participants

Participant type	Variables	Frequency	Percentage
Students (n=259)	Gender		
	Male	93	35.91
	Female	166	64.09
	Academic year		
	3 rd year	131	50.58
	4 th year	128	49.42
Faculty (n=12)	Gender		
	Male	05	41.67
	Female	07	58.33
	Year after graduation (years)		
	<5	06	50.00
	5-10	06	50.00
	11-15	00	0.00
	>15	00	0.00

Figure 1 showed students feedback on CBL sessions. In case of improvement of learning skill through CBL, 28.57% and 60.23% of students strongly agreed and agreed respectively. Regarding usefulness of CBL in the understanding of the topic, Bangladesh Journal of Medical Education 2026; 17(2); Johora et al., publisher and licensee Association for Medical Education. This is an Open Access article which permits unrestricted non-commercial use, provided the original work is properly cited.

31.67% and 57.52% of students strongly agreed and agreed respectively. Majority of the students (61.39%) agreed that CBL improved their ability to retain information, where 25.1% strongly agreed. Positive

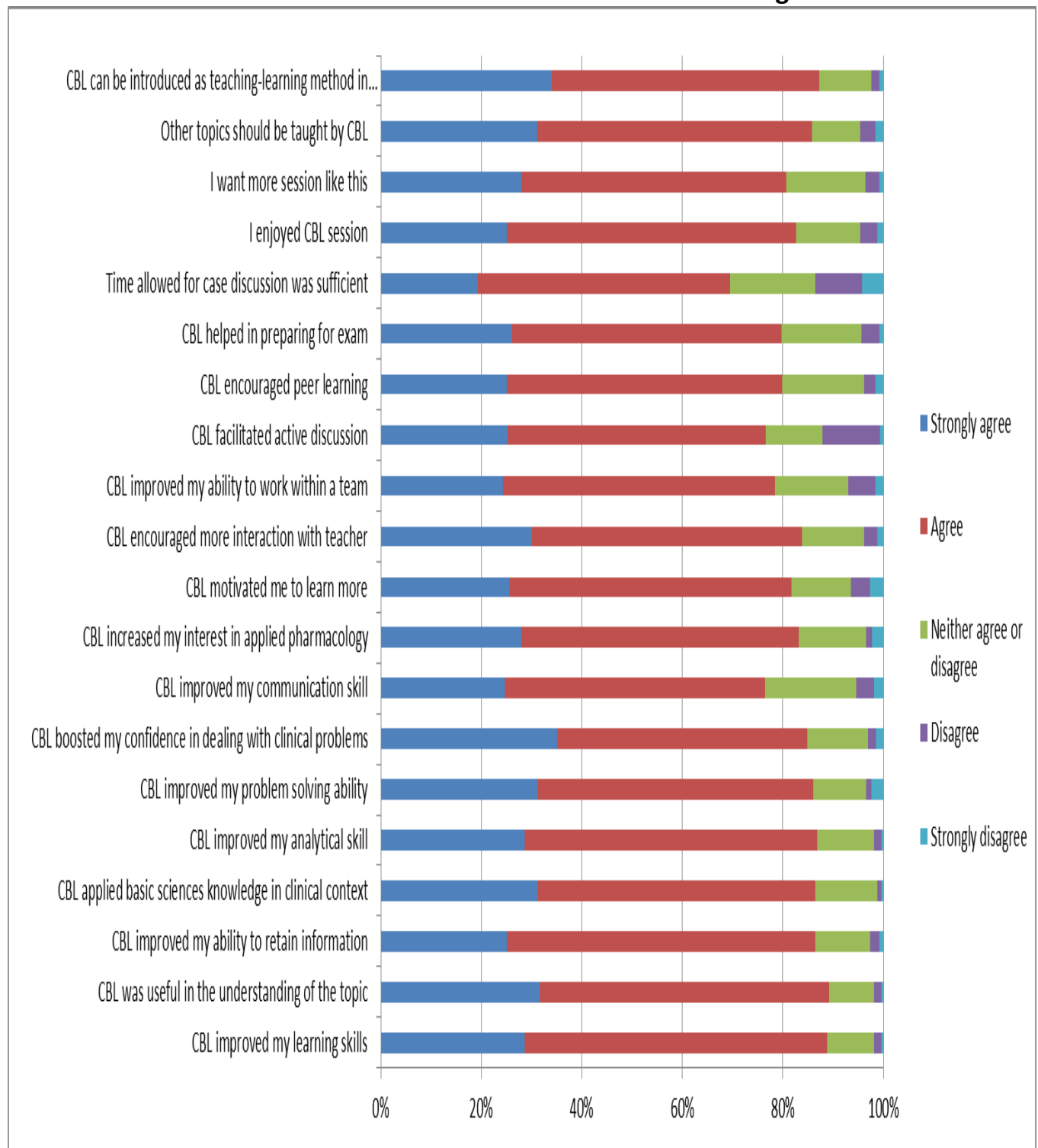
attitudes towards application of basic

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sciences knowledge in clinical context through CBL were cited among respondents (55.21% strongly agreed and 31.28% agreed). More than half (58.3%) of the students agreed that CBL improved their analytical skill, where 28.6% strongly agreed. Majority of the students (54.83%) agreed that CBL improved their problem solving ability, where 31.28% strongly agreed. Almost half of the respondents (49.8%) agreed that CBL boosted their confidence in dealing with clinical problems, where 35.1% strongly agreed. Positive attitudes towards improvement of communication skill through CBL were expressed among respondents (24.71% strongly agreed and 51.73 % agreed). More than half of the respondents (55.6%) agreed that CBL increase their interest in applied pharmacology, where 28.19% strongly agreed. More than half of the respondents (56.76%) agreed that CBL motivated them to learn more, where 25.87 % strongly agreed. Positive attitudes towards encouragement of interaction with teacher through CBL were expressed by respondents (30.12% strongly agreed and

53.67 % agreed). Regarding improvement of their ability to work within a team, 24.33% strongly agreed and 54.06 % agreed respectively. In case of facilitation of active discussion, 27.41% strongly agreed and 55.98% agreed respectively. More than half of the respondents (54.83%) agreed that CBL encouraged peer learning, where 25.01% strongly agreed. More than half of the respondents (53.28%) agreed that CBL helped in preparing for exam, where 25.87% strongly agreed. Regarding time allocation for case discussion, 19.31 % strongly agreed and 50.19% agreed respectively. More than half of the respondents (57.53%) agreed that they enjoyed CBL sessions, where 25.1% strongly agreed. Regarding attending more sessions like this, 27.8% strongly agreed and 52.51 % agreed respectively. More than half of the respondents (54.83%) agreed that other topics should be taught by CBL, where 31.28% strongly agreed. Positive attitudes towards incorporation of CBL as teaching-learning method in pharmacology were expressed by respondents (33.98% strongly agreed and 53.28% agreed).

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*CBL= Case-based learning

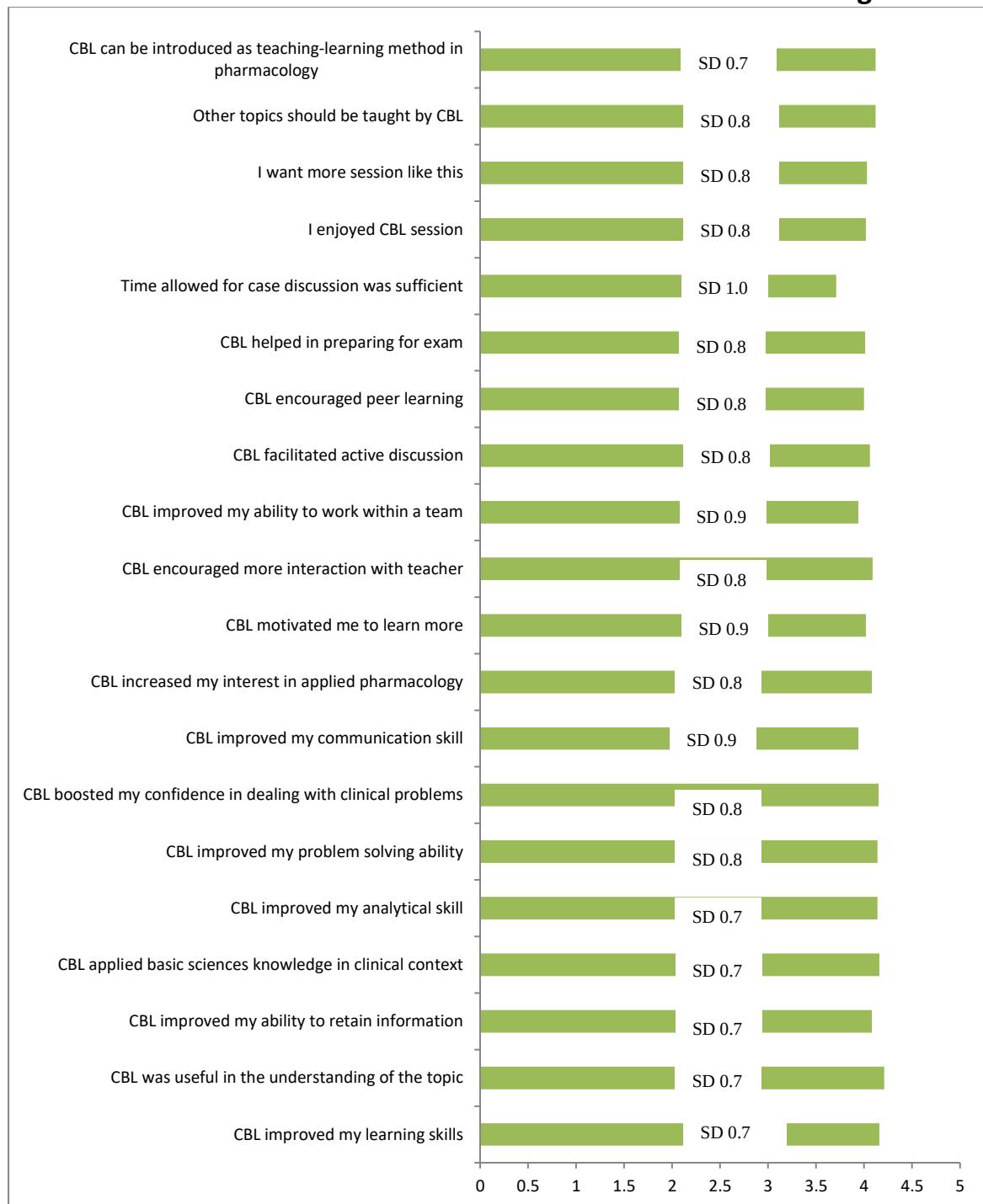
Figure 1 Student's feedback (percentage) on CBL sessions (n=259)

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Figure 2 showed positive response towards CBL sessions. In case of statement “CBL improved my learning skills”, mean score was 4.16 ± 0.7 . In case of statement “CBL was useful in the understanding of the topic”, “CBL improved my ability to retain information” and “CBL applied basic sciences knowledge in clinical context”, mean score were 4.21 ± 0.7 , 4.08 ± 0.7 and 4.16 ± 0.7 respectively. Regarding improvement of analytical skill, problem solving ability and communication skill, mean score were 4.14 ± 0.7 , 4.14 ± 0.8 and 3.94 ± 0.9 respectively. In case of statement, “CBL boosted my confidence in dealing with clinical problems”, “CBL increased my interest in applied pharmacology”, “CBL facilitated active discussion”, mean score were 4.15 ± 0.8 , 4.08 ± 0.8 and

4.06 ± 0.8 respectively. Regarding “CBL motivated me to learn more”, “CBL encouraged more interaction with teacher”, “CBL improved my ability to work within a team”, “CBL encouraged peer learning” and “CBL helped in preparing for exam”, mean score were 4.02 ± 0.9 , 4.09 ± 0.8 , 3.94 ± 0.9 , 4.00 ± 0.8 and 4.01 ± 0.8 respectively. In response to statement, “Time allowed for case discussion was sufficient”, “I enjoyed CBL session”, “I want more session like this” and “Other topics should be taught by CBL”, mean score were 3.71 ± 1.0 , 4.02 ± 0.8 , 4.03 ± 0.8 and 4.12 ± 0.8 respectively. When students were asked whether CBL can be introduced as teaching-learning method in pharmacology, mean score was 4.12 ± 0.7 .

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1= Strongly disagree, 2= Disagree, 3= Neither agree or disagree, 4= Agree, 5= Strogly agree
Figure 2 Student's response (mean score) on CBL sessions (n=259)

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Table II showed that more positive attitude towards CBL was observed among 3rd year students in comparison with 4th year students in all 20 questions. There was statistically significant difference present between 3rd year and 4th year students in response of “CBL can be applied basic sciences knowledge in clinical context” (4.28±0.8 vs 4.04±0.6, p value 0.003), “CBL boosted my confidence in dealing with clinical problems” (4.27±0.8 vs 4.04±0.8, p value 0.02), “CBL improved

my communication skill” (4.04±0.8 vs 3.84±0.9, p value 0.03), “CBL improved my ability to work within a team” (4.05±0.9 vs 3.84±0.8, p value 0.03), CBL encouraged peer learning (4.11±0.8 vs 3.88±0.8, p value 0.01), “other topics should be taught by CBL” (4.23±0.9 vs 4.00±0.7, p value 0.01) and “CBL can be introduced as teaching-learning method in pharmacology” (4.29±0.8 vs 4.09±0.7, p value 0.02).

Table II Comparison between the responses of 3rd year and 4th year students

Question	Response		P value
	3 rd year students Mean ± SD (n=131)	4 th year students Mean ± SD (n=128)	
CBL improved my learning skills	4.16± 0.8	4.14± 0.5	0.41
CBL was useful in the understanding of the topic	4.23±0.7	4.16± 0.6	0.2
CBL improved my ability to retain information	4.13±0.7	4.03±0.7	0.13
CBL applied basic sciences knowledge in clinical context	4.28±0.8	4.04±0.6	0.003*
CBL improved my analytical skill	4.20±0.8	4.05±0.6	0.06
CBL improved my problem solving ability	4.16±0.9	4.07±0.7	0.19
CBL boosted my confidence in dealing with clinical problems	4.27±0.8	4.04±0.8	0.02*
CBL improved my communication skill	4.04±0.8	3.84±0.9	0.03*
CBL increased my interest in applied pharmacology	4.13±0.8	4.02±0.7	0.12
CBL motivated me to learn more	4.10±0.9	3.93±0.8	0.06
CBL encouraged more interaction with teacher	4.14±0.8	4.04±0.7	0.14
CBL improved my ability to work within a team	4.05±0.9	3.84±0.8	0.03*

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CBL facilitated active discussion	4.11±0.9	4.00±0.7	0.14
CBL encouraged peer learning	4.11±0.8	3.88±0.8	0.01*
CBL helped in preparing for exam	4.06±0.8	3.95±0.8	0.14
Time allowed for case discussion was sufficient	3.77±1.1	3.65±1.0	0.18
I enjoyed CBL session	4.03±0.9	4.01±0.7	0.42
I want more session like this	4.08±0.9	4.01±0.6	0.23
Other topics should be taught by CBL	4.23±0.9	4.00±0.7	0.01*
CBL can be introduced as teaching-learning method in pharmacology	4.29±0.8	4.09±0.7	0.02*

*Unaired t-test was done; $P \leq 0.05$ = Statistically significant

1= Strongly disagree, 2= Disagree,
3= Neither agree or disagree, 4= Agree,
5= Strongly agree

Figure 3 showed teacher's feedback on CBL sessions. In case of student's involvement, engagement, engaged and interest in CBL sessions, 8.33% and 83.33% of faculty strongly agreed and agreed respectively. Regarding students motivation, 8.33% and 83.33% of faculties strongly agreed and agreed respectively. More than half of the faculty (75.00%) agreed that CBL increase students interaction with faculties, where 25%

strongly agreed. Mixed attitude was found in response to question "Too much time is needed for preparation of CBL session" (33.33% agreed vs 41.67% disagreed). More than half of the faculty (58.33%) agreed that more facilitators are required for proper implantation of CBL sessions, where 33.33% strongly agreed. Majority of the faculty (83.33%) agreed that other topics of pharmacology can be taught by CBL, where 16.67% strongly agreed. Positive attitude towards recommendation of CBL as method of teaching-learning in undergraduate pharmacology education was found among respondents (25% strongly agreed and 75% agreed).

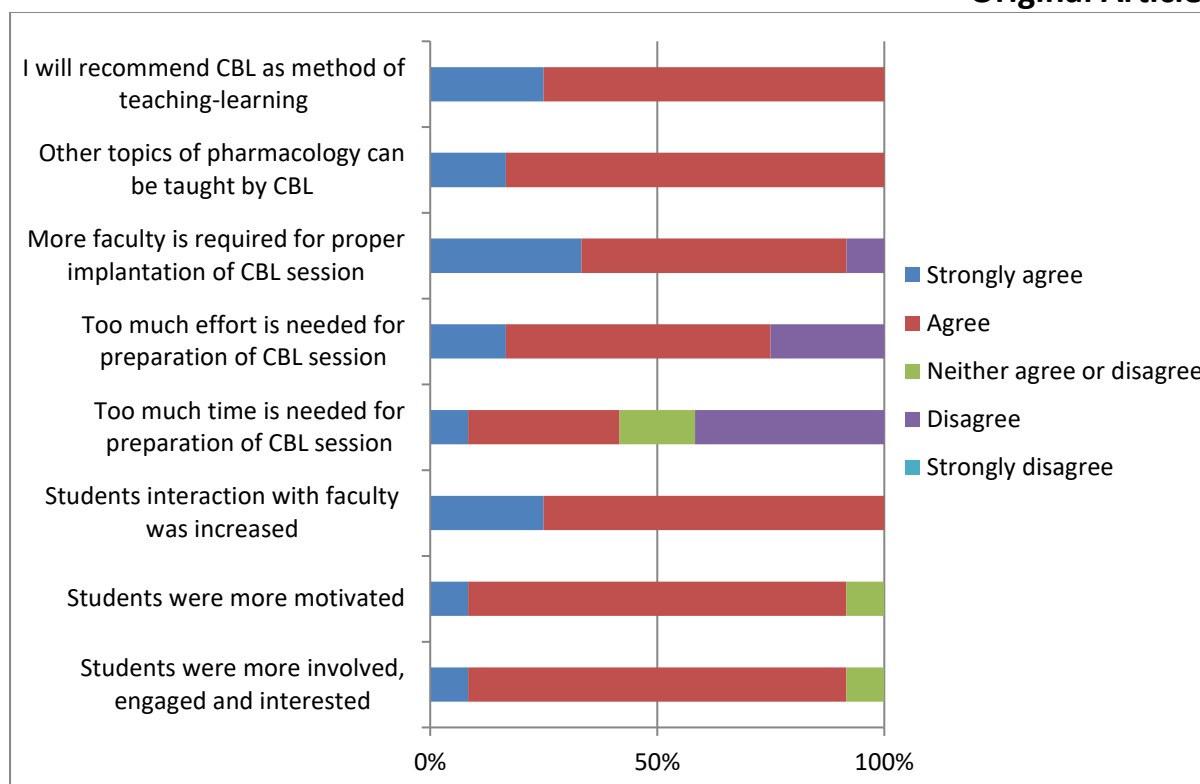
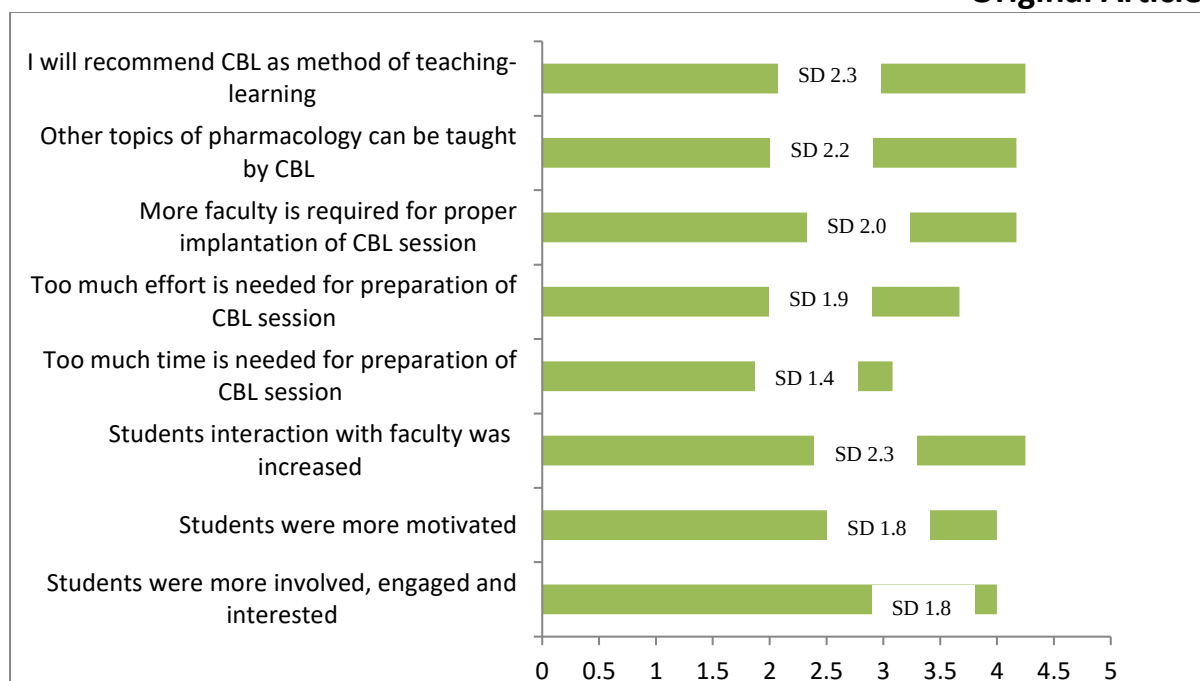


Figure 3 Teacher's feedback (in percentage) on CBL sessions

Figure 4 showed that in case of statement “Students were more involved, engaged and interested”, “Students were more motivated” and “Students interaction with faculty was increased”, mean score were 4.0 ± 1.8 , 4.0 ± 1.8 and 4.25 ± 2.3 respectively. Regarding “Too much time is needed for preparation of CBL session”,

“Too much effort is needed for preparation of CBL session” and More faculty is required for proper implantation of CBL session, mean score were 3.08 ± 1.4 , 3.67 ± 1.9 and 4.17 ± 2.0 respectively. In response to the statement “Other topics of pharmacology can be taught by CBL” and “I will recommend CBL as method of teaching-learning”, mean score were 4.17 ± 2.2 and 4.25 ± 2.3 respectively.



1= Strongly disagree, 2= Disagree, 3= Neither agree or disagree, 4= Agree, 5= Strongly agree

Figure 4 Teachers' response (mean score) on CBL sessions (n=12)

Discussion

Over the years, there has been a shift in teaching methods from passive to active learning strategies. This shift is in response to evidence that active learning leads to enhanced student outcomes than traditional approaches.²¹ In active learning, the focus is on the learner rather than the educator. Students are in charge for their individual learning and are the vital ones to review if a new approach is of any help to them or not. It is in fact essential to recognize their perception, attitude, experience and feedback about CBL before endorsing it as teaching method at undergraduate level. In CBL, faculty act as facilitators and play

active role in guiding students through clinical reasoning. Opinion and feedback of faculty will offer future direction about acceptance of CBL in undergraduate pharmacology education.^{21,22} CBL has been termed as having many theoretical benefits in medical education and has been increasingly incorporated into medical curriculum.²³

Teaching and learning pharmacology can be a difficult task. Based on the discipline and the content to be taught, pharmacology can be abstract. The fundamental mechanistic principles of drug actions often seem hypothetical and complex.²⁴ Students who count on primarily on superficial

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learning approaches, such as memorization, often face challenges in recalling complicated pharmacological concepts.²⁵ Majority of the participants of this study recognized CBL as a worthy way of learning which increased their understanding of the subject (mean score: 4.21 ± 0.7), and this finding is similar to earlier studies conducted in pharmacology.^{26, 27, 28}

Pharmacology is a discipline more applicable and related to clinical science; the strategy of learning cases and the integration of clinical applicability in them should be more understandable and easier to make. In current study, majority of the students (mean score: 4.16 ± 0.7) felt that CBL improve their learning skill as well as applied basic sciences knowledge in clinical context, (mean score: 4.16 ± 0.7) and that was concordance with existing literatures.^{26, 28, 29}

One important aspects of CBL is it encourages active learning.⁴ In current study, majority of the students stated that CBL motivated them to learn further (mean score: 4.02 ± 0.9). And educational research highlights active approaches to learning are more effective in knowledge retention and problem-solving.³⁰ After attending one session on CBL, our participants expressed

their agreement in terms of their progress in retention of information (mean score: 4.08 ± 0.7), analytical skill (mean score: 4.14 ± 0.7) as well as problem solving ability (mean score: 4.14 ± 0.8), and these findings were concordance with relevant literatures.^{28, 29, 30,31} As existing undergraduate pharmacology education of Bangladesh does not provide adequate emphasis on development of critical appraisal skill and problem-solving ability of future prescribers, CBL could be a valuable addition to improve the current scenario.^{11, 12, 13}

Case-based learning is effective, relatively, because learners find it enjoyable (mean score: 4.02 ± 0.8).¹⁵ While it can be debatable that enjoyment is not a prerequisite for effective learning but it cannot be denied that when learners prefer the method it eliminates obstacles to learning, improves motivation, and offer students with a more persistent long-standing concern in the material. Students enjoyed CBL sessions because they're actively engaged with the material and had liberty to move over and done with discussions while forming thoughts and enthusiastically challenging one another.³⁰ Our faculty found student as more motivated (mean score: 4.0 ± 1.8) as well as

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involved, engaged and interested in learning (mean score: 4.0 ± 1.8) in CBL session, and similar kind of view was observed in an earlier study.²⁹

Prescribing is a complex task that necessitates diagnostic skills, knowledge of medicines, communication skills, a thorough understanding of the principles of clinical pharmacology, appreciation of risk and benefits, and critical judgments. It is expected that undergraduate pharmacology education will enable students to incorporate basic science knowledge in clinical context as well as enhancement of confidence in dealing with clinical problems.⁸ Students insight about assimilation of topic, self-assurance and generating of interest in applied pharmacology were prominent as positive features of CBL session, and same kind of optimistic outlook was perceived in earlier studies regarding CBL as small group teaching in pharmacology.^{28, 32, 33, 34}

As CBL is a way of active participation, it improves communication skill, more interaction with faculty and peer. In the long run, all these lead to enhance learners' ability to work within a team.³¹ Positive attitudes towards improvement of communication skill (mean score: 3.94 ± 0.9), peer learning (mean score:

4.00 ± 0.8) through CBL were expressed among respondents, and that was similar to views expressed in earlier studies.^{32, 34, 35} In our study, participating faculty also has positive attitude of students interaction with faculty (mean score: 4.25 ± 2.3).^{36, 37, 38}

In medical education, assessment or exams are considered as the main driving force of learning. Majority of the participants of the study (mean score: 4.01 ± 0.8) thought that CBL would be helpful for taking preparation for exams. Similar kind of opinion was observed in earlier studies.^{28, 35, 36 39, 40 ,41}

CBL clandestinely practices the competence of medical students to elucidate and deduce better from the cases discussed. It requires the students to have an extent of preceding knowledge that can then help in solving the cases. Here, faculty acts as an expert who facilitates feedback on student performance in not only communication skills but also knowledge attainment and cognitive reasoning without dominating the discussion. So more time, preparations, efforts and faculty are needed for successful conduction of CBL sessions.^{28, 35, 37, 40} And all these were expressed by the participating students and faculty of our study.

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Both teachers and students were positive to adopt other topics of pharmacology in CBL (mean score: 4.17 ± 2.2 and 4.12 ± 0.8). Most of the students (mean score: 4.12 ± 0.7) felt that CBL session can be introduced as a new teaching-learning method in pharmacology and that was similar to studies conducted around the world.^{28, 36 39, 40, 42} More positive attitude towards CBL was observed among 3rd year students in comparison with 4th year students in all questions. This could be due to the fact that learners in the earlier stage easily adopt new methods of learning than their seniors.^{2, 3}

Reference

1. Crosby J. Learning in small group: AMEE Medical Education Booklet No 8. *Med Teach*. 1996; 19: 189–2002.
2. Torre D, Conran RM, Durning SJ. Learning in small groups, in: Dent JA & Harden RM (Eds) *A Practical Guide for Medical Teachers*, 5th Ed. (Edinburgh, Churchill Livingstone), 2017:52–55.
3. Meo SA. Basic steps in establishing effective small group teaching sessions in medical schools. *Pak J Med Sci*. 2013; 29(4):1071-6.
4. Walton H. Small group methods in medical teaching. *Medical education*, 1997, 31;459-464
5. van Diggele C, Burgess A, Mellis C. Planning, preparing and structuring a small group teaching session. *BMC Med Educ* 2020; 20 (Suppl 2), 462

Conclusion:

This study demonstrated that Case-based learning is an acceptable and relevant approach to small-group teaching in pharmacology. The findings also indicate a general willingness among participants to continue and expand this approach within the subject. However, the need for additional time, preparation, and teaching support remains an important consideration for its routine use. Overall, the findings reflect that CBL can be a useful addition to existing teaching methodology when supported by adequate resources and commitment.

6. Fasinu PS, Wilborn TW. Pharmacology education in the medical curriculum: Challenges and opportunities for improvement. *Pharmacol Res Perspect*. 2024; 12(1):e1178.
7. Engels F. Pharmacology education: Reflection and challenges. *Euro J Pharmacol*. 2018;833: 392-395
8. Maxwell, SRJ. How should teaching of undergraduates in clinical pharmacology and therapeutics be delivered and assessed? *Br. J. Clin. Pharmacol* 2012; 73 (6), 893–899.
9. Crowley FC, Restini C, Burke K, Rieder MJ. Exploring the landscape of pharmacology education in Health Professions Programs: From historical perspectives to current approaches to teaching. *Eur J Pharmacol* 2025; 994:177386
10. Ferdoush J, Johora F, Jeenia F, Chowdhury TM, Sadia H, Arifina R, Abbasy AA, Rahman MS. Evaluation of the Weightage on Pain Management in Pharmacology Curricula of the Undergraduate Medical Program

Original Article

- (MBBS) of Bangladesh. *Chatt Maa Shi Hosp Med Coll J*. 2022;21(2):48-51.
11. Johora F, Rahman MS. Pharmacology education in the perspective of pharmaceutical promotion: A Bangladesh experience. *Bangabandhu Sheikh Mujib Medical University Journal*. 2019; 12 (3): 128-32.
 12. Johora F, Abbasy AA, Mahboob S, Jeenia FT, Ferdoush J, Rahman MS. Trend and weightage of problem-based questions in undergraduate pharmacology written question papers of Bangladesh. *BGC Trust Medical College Journal*. 2021; 6 (2): 19-22.
 13. Johora F, Abbasy AA, Mahboob S, Jeenia FT, Ferdoush J, Rahman MS. Pharmacology written questions of one decade: Evaluation of curricular objectives and content coverage. *Bangladesh Journal of Medical Education*. 2023; 14 (1):43-49.
 14. Ferdoush J, Chowdhury A, Parveen K, Ata M, Alam SS, Reza FH. A Survey of Factors Influencing Drug Choice and the Prescribing Attitudes Among Junior Doctors of Two Major Tertiary Care Hospitals in Chittagong City. *Chattogram Maa-O-Shishu Hosp Med Coll J* 2018; 17(1): 17-21.
 15. McLean SF. Case-based learning and its application in medical and health-care fields: a review of worldwide literature. *J Med Educ Curric Dev*. 2016; 3:39–49.
 16. Dickinson BL, Lackey W, Sheakley M, Miller L, Jevett S, Shattuck B. Involving a real patient in the design and implementation of case-based learning to engage learners. *Adv. Physiol. Educ* 2018; 42 (1), 118–122.
 17. Malau-Aduli BS, Lee AY, Cooling N, Catchpole M, Jose M, Turner R.. Retention of knowledge and perceived relevance of basic sciences in an integrated case-based learning (CBL) curriculum. *BMC Med. Educ*. 2013; 13 (1).
 18. Rahman MS, Kamal ASMA, Chowdhury S, Khan IA, Islam AMZ, Sultana R, Begum M, Akhter N, Anwar AKMN. Exercise on selection of P-drug: Preliminary evaluation of a newer method of pharmacotherapy teaching in Bangladesh. *Bangladesh J Physiol Pharmacol*. 2000; 16: 50-54.
 19. Setu MS, Rahman MS. Application of selected components of “SPICES” model as teaching-learning method in pharmacology. *Bangladesh J Pharmacol*. 2021; 16(4):117-21.
 20. Jeenia FT, Hoque A, Khanom M, Md Jahangir S, Hoque R, Parveen K, Ferdoush J, Ata M, Tanin MJU. Introducing Problem- Based Learning as an Effective Learning Tool to Medical Students: An Approach in Bangladesh. *Bangla J Med Educ* 2021; 12(1):22-31.
 21. Goodman BE, Barker MK, Cooke JE. Best practices in active and student-centered learning in physiology classes. *Adv. Physiol. Educ* 2018; 42 (3), 417–423.
 22. Szarek JL, Guilding C, Maxwell S. Transforming pharmacology education: Insights from the pharmacology education project in the era of digital learning. *Eur J Pharmacol*. 2025; 989:177258.
 23. Dai A, Wu LQ, Jacobs RC, Raghuram A, Dhar SU. Implementation of a Medical School Elective Course Incorporating Case-Based Learning: a Pilot Study. *Med Sci Educ*. 2020;30(1):339-344.
 24. Ahmed MW, Dass P, Gulabani M, Ahmed R, Javedar P, Mishra R. Undergraduate MBBS and BDS students' opinion-based survey on current teaching practices in pharmacology and changes recommended for betterment of the same. *J Evol Med Dent Sci*. 2014; 3(70):14923-14929.
 25. Ghanbari, S. et al. A systematized review of cognitive load theory in health sciences education and a perspective from cognitive neuroscience. *J. Educ. Health Promot* 2020; .9(1), 1–13 (2020).
 26. Tushar CB, Gajanan D, Gaurav C, Vishal K. Student perception and

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- effectiveness of case-based learning in pharmacology. *Pravara Med Rev.* 2020; 12(4):57-64.
27. Hasamnis AA, Arya A, Patil SS. Case-based Learning: Our Experience in Clinical Pharmacology Teaching. *J Pharm Bioallied Sci.* 2019; 11(2):187-189.
28. Tayem YI. The Impact of Small Group Case-based Learning on Traditional Pharmacology Teaching. *Sultan Qaboos Univ Med J.* 2013; 13 (1):115-20.
29. Kaur G, Rehnc J, Kahal KS, Singh J, Sharma V, Matreja PS, Grewal H. Case-Based Learning as an Effective Tool in Teaching Pharmacology to Undergraduate Medical Students in a Large Group Setting. *J Med Educ Curric Dev.* 2020; 7:2382120520920640.
30. Bruen C, Illing J, Daly R *et al.* Medical student experiences of Case-Based Learning (CBL) at a multicultural medical school. *BMC Med Educ* 2025; 25, 152.
31. Williams B. Case based learning--a review of the literature: is there scope for this educational paradigm in prehospital education? *Emerg Med J.* 2005; 22(8):577-81.
32. Vora MB, Shah CJ. Case-based learning in pharmacology: Moving from teaching to learning. *Int J Appl Basic Med Res.* 2015; 5 (Suppl 1):S21-3.
33. Besche HC, King RW, Shafer KM, Fleet SE, Charles JF, Kaplan TB *et al.* Effective and Engaging Active Learning in the Medical School Classroom: Lessons from Case-Based Collaborative Learning. *Journal of Medical Education and Curricular Development* 2025; 12.
34. Garg P, Bhanwra S. Case Based Learning in Teaching Pharmacology to Undergraduate Medical Students. *Cureus.* 2022; 14(9):e29187.
35. Patrick S, Vishwakarma K, Singh P, Matreja P. Case Based Learning: An Effective Teaching Learning Method in Pharmacology for MBBS Students. *International Journal of Health and Clinical Research,* 2021; 4(18):378-381.
36. Kumar A, Aslami AN. Introduction of "case-based learning" for teaching pharmacology in a rural medical college in Bihar. *National Journal of Physiology, Pharmacy and Pharmacology.* 2016; 6(5):427.
37. Gupta K, Arora S, Kaushal S. Modified case based learning: Our experience with a new module for pharmacology undergraduate teaching. *Int J Appl Basic Med Res.* 2014; 4(2):90-4.
38. Kamat SK, Marathe PA, Patel TC, Shetty YC, Rege NN. Introduction of case based teaching to impart rational pharmacotherapy skills in undergraduate medical students. *Indian J Pharmacol.* 2012; 44(5):634-8.
39. Sood M, Kaur K, Arora R. Introduction of case-based learning to teach Pharmacology to second year MBBS students. *International Journal of Basic & Clinical Pharmacology,* 2021; 10(2), 176–181.
40. Chiranjeevi UK, Gedela V, G HJR. A comparative study of case-based learning with conventional teaching in undergraduate training of pharmacology. *Natl J Physiol Pharm Pharmacol.* 2022; 12(5): 712-716.
41. Ferdoush J, Alam, SS, Jeenia FT, Haque A, Johora F, Parveen MK, Rahman MS. Written Versus Oral Assessment Are Both Equally Effective in Pharmacology? *Bangladesh Journal of Medical Education.* 2025; 16(1), 26–39.
42. Srinivasan M, Wilkes M, Stevenson F, Nguyen T, Slavin S. Comparing problem-based learning with case-based learning: effects of a major curricular shift at two institutions. *Acad Med.* 2007; 82(1):74–82.