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Original Article

Education Section

A Prospective Interventional Study on Modified One-minute Preceptor Model: An Effective Teaching-learning Tool for Early Clinical Exposure in Biochemistry

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ABSTRACT

Introduction: Early Clinical Exposure (ECE) was incorporated into the Competency-based Medical Education (CBME) curriculum in 2019. ECE in a classroom setting is conducted through Clinical Case Discussion (CCD) using paper-based clinical case scenarios. The assessment pattern of CBME and Maharashtra University of Health Sciences (MUHS) includes clinical case-based questions. Therefore, assessing and developing clinical reasoning skills and critical thinking has become the need of the hour.

Aim: To measure the effectiveness of the modified One-minute Preceptor (OMP) model as a teaching-learning tool for CCD to enhance the knowledge and reasoning skills of Phase I Bachelor of Medicine Bachelor of Surgery (MBBS) students and to assess the perception of students and faculty towards the modified OMP model.

Materials and Methods: This prospective interventional study was conducted in the Department of Biochemistry at Seth GS Medical College and KEM Hospital, Mumbai, Maharashtra, India from February 2020 to May 2020. Out of 250 Phase I MBBS students, 180 who had given consent and participated in all the sessions were included. Eight faculty members voluntarily participated in the study. The faculty involved in CCD for the control and study groups were different and selected through randomisation. After a didactic lecture, a pretest was administered, and then students were divided into Control group A (n=90) and Study group B (n=90). For CCD, the modified OMP model was used for the study group and the traditional unstructured method for the control group. A post-test was given after CCD, and feedback was collected from faculty and students. Quantitative analysis of the feedback was done using a 5-point Likert scale, and open-ended questions were qualitatively assessed. Pretest and post-test scores were analysed using an unpaired t-test. Learning gain was measured, and program evaluation was conducted using Kirkpatrick's model.

Results: There was a statistically significant difference in the post-test scores obtained by the control group and study group (p-value <0.001). A higher normalised learning gain (0.83) was observed in the study group. The modified OMP model was perceived as an effective, interactive teaching-learning tool for CCD by both students and faculty.

Conclusion: CCD using the modified OMP model significantly improved knowledge, critical thinking, and reasoning skills of students. Even after modifications to the original OMP model, the effectiveness of this model for preclinical subjects remains unaffected.

Keywords: Assessment, Clinical reasoning, Competency-based medical education, Didactic lecture, Kirkpatrick's model

INTRODUCTION

The CBME curriculum is learner-centred and outcome-oriented. It has been designed to make Indian medical graduates competent clinicians. ECE has been incorporated into the CBME curriculum in the preclinical phase to recognise the relevance and correlation of basic sciences to clinical situations [1]. ECE is designed to develop analytical reasoning skills for the systematic application of previously acquired knowledge [1].

As per the CBME and Maharashtra University of Health Sciences (MUHS), the new assessment pattern for Phase I MBBS students includes clinical case-based questions (Theory-15%, Practical-60%) [2]. To solve such questions, students are required to apply their analytical reasoning and critical thinking skills. ECE activity in Biochemistry is conducted in a classroom setting using paper-based clinical case scenarios. However, there is no standard process for teaching and assessing learners for their knowledge and reasoning skills. No method ensures the active participation of every learner. Furthermore, there is no standard process for giving feedback to learners about their performance.

The OMP model was first proposed by Neher JO et al., for teaching clinical reasoning in busy practices [3]. It has been proven to be an efficient and effective model for teaching in clinical outpatient settings to diagnose and manage common clinical conditions in a short span of time [4]. The OMP model has been used to develop clinical reasoning skills and to assess the gaps in the knowledge of students [5,6]. This model guides the preceptor-student encounter via a structured teaching tool that fosters knowledge and reasoning skills through five microskills: 1) Get a commitment; 2) Probe for supporting evidence; 3) Reinforce what was done right; 4) Correct mistakes; 5) Teach general principles [7,8]. These are referred to as microskills because they are very simple and easy to acquire and use [9]. Learners are encouraged to process and correlate previously acquired knowledge through microskills 1 and 2, allowing both learners and preceptors to identify gaps in the learner's knowledge and reasoning skills for improvement. Microskills 3 and 4 enable the preceptor to provide constructive feedback to the learner for further improvement and error minimisation in the future. Micro-skill 5 helps learners understand the 'clinical pearls' of the condition [10,11]. Studies on the OMP model have mainly focused on clinical subjects and postgraduate students [12-15]. The OMP model can also be utilised for preclinical and paraclinical subjects to teach clinical reasoning [10]. While there have been a few studies in other pre and paraclinical subjects such as Anatomy and Pharmacology [10,16], it has not yet been used for Phase I MBBS students in Biochemistry. The new assessment module of the National Medical Commission encourages the use of the OMP model as one of the methods for teaching and assessing learners [17].

Neher JO et al., in 1992 stated that the OMP model can be more beneficial to learners if it is not used as a static model and allows the flexibility of shuffling the set of guidelines [3]. The OMP model cannot be used as it is in a preclinical setting as it is not convenient to always conduct CCD in a hospital setting for preclinical students. It is also not feasible to use the OMP model as it is when the number of clinical cases is limited, the number of learners is more, and the time allotted for ECE activities is less. The OMP model is not beneficial to students if they don't have basic knowledge about the topic, and in a group of learners, only one learner participates actively at a time. Therefore, to make CCD more structured and effective, the OMP model was used with some modifications (modified OMP model) in preclinical settings as a part of ECE. The aim of the study was to measure the effectiveness of the modified OMP model as a teaching-learning tool for CCD to enhance the knowledge and reasoning skills of Phase I MBBS students and to assess the perception of students and faculty towards the modified OMP model.

MATERIALS AND METHODS

This prospective interventional study was conducted in the Department of Biochemistry, Seth GS Medical College, and KEM Hospital, Mumbai, Maharashtra, India from February 2020 to May 2020. Informed written consent was obtained from all participants. The study began after obtaining approval from the Ethics Committee (EC/ OA-157/2019).

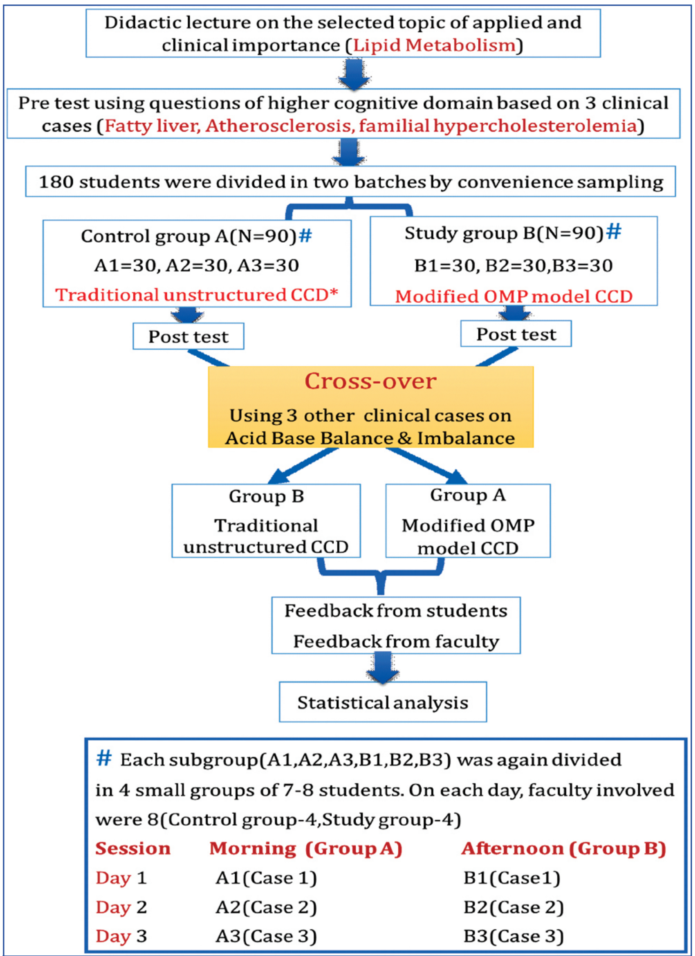
Inclusion and Exclusion criteria: Out of the 250 Phase I MBBS students, 180 students who had given consent and participated in all the sessions (didactic lecture, pretest, CCD, post-test) were included, while students who remained absent during any of the sessions were excluded.

Study Procedure

A total of 180 students were divided into Control Group A (N=90) and Study Group B (N=90) by convenience sampling. Eight faculty members voluntarily took part in the study. The faculty involved in CCD for the control and study groups were different and selected by randomisation. Four faculties used the modified OMP method, and the other four used the traditional unstructured method for CCD. The faculty involved in preparing and validating the pretest, post-test, and feedback questionnaire were different from the eight faculty members involved in the study.

Six paper-based clinical case scenarios (three on Lipid metabolism and three on acid-base balance and imbalance), along with pretest and post-test question papers, were prepared and validated using the Focused Group Discussion (FGD) method by senior faculty members with more than 10 years of teaching experience in biochemistry. The questions asked were of a higher cognitive domain to assess knowledge and reasoning skills. Feedback questionnaires for students and faculty were prepared and validated using the FGD method by senior faculty members trained in medical education. The faculty feedback questionnaire had eight closed-ended questions and three open-ended questions, while the student feedback questionnaire had ten closed-ended questions and three open-ended questions.

Sensitisation and training of faculty selected for implementing the modified OMP model were conducted by senior faculty members trained in medical education in the Department of Biochemistry. It was an interactive session that included role-playing. Faculty for the control group were sensitised about the modified OMP model after the intervention was over to prevent the unintentional use of the modified OMP model by the control group faculty. The flowchart depicting the steps of the study plan is shown in [Table/Fig-1].



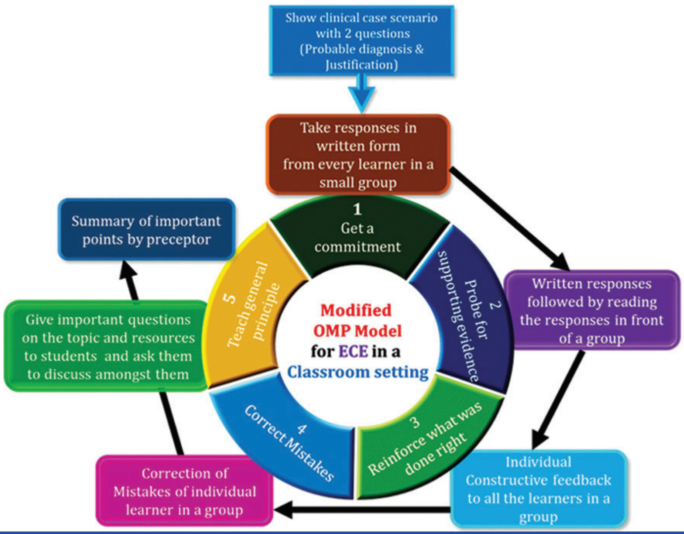
[Table/Fig-1]: Flowchart showing steps of study plan.

The objectives of identified competencies, specifically 'Lipid metabolism,' were covered in a didactic lecture for all 180 students. The didactic lecture focused on teaching the theoretical aspects of clinical conditions.

Following the lectures, a pretest was administered, consisting of application-based questions of a higher cognitive domain related to three clinical cases (Fatty liver, atherosclerosis, familial hypercholesterolemia), to assess the knowledge and reasoning skills of students. Subsequently, students were divided into two groups: Group A (Control, 90 students) and Group B (study, 90 students). Control Group A was further divided into three batches (A1, A2, A3), each with an equal number of students (N=30). Each batch of 30 students was then divided into four small groups of seven or eight students, resulting in a total of 12 small groups for both the control and study groups.

On day 1, four small groups from Batch A1 in the control group and Batch B1 in the study group were taught by four different faculties using the case on 'Fatty liver.' Similarly, on day 2, the next four groups (Batch A2 and Batch B2) were taught by four faculties using a case on 'Atherosclerosis.' Again, on day 3, the remaining four groups in both Batch A3 and Batch B3 were taught by four faculty members using a case on 'familial hypercholesterolemia.'

The paper-based CCD sessions were conducted as part of the ECE activity during its allotted time slot (routine practical sessions). The modified OMP model implemented for Study Group B is illustrated in [Table/Fig-2].



[Table/Fig-2]: Steps for implementation of modified OMP model.

Microskills 1 and 2 were implemented together. In a small group of 7 or 8 students, a paper-based clinical case scenario was provided with two questions. The first question was 'Mention the probable diagnosis in the given case.' The second question was 'Write the justification for the probable diagnosis.' Students were instructed to write their responses individually and then present their answers to the group. In the original OMP model, responses for microskills 1 and 2 were obtained verbally, while in the modified OMP model, responses were obtained in written form to allow each student to think and answer independently. Microskills 3 and 4 were followed the same as in the original OMP model. After all students had presented their answers, feedback was provided to each student, and any mistakes were corrected. This process helped students learn from their own feedback and that of their peers. In the original OMP model, feedback is typically given to one learner who answers the question. To implement microskill 5, each group of 7-8 students was divided into subgroups. One set of 2-3 questions was given to the first subgroup, while a different set was given to the second subgroup. The questions in both sets were related to the given case, covering topics such as the biochemical basis of clinical features, laboratory findings, management modalities, complications, and preventive measures. Students were provided with study resources (books) and allowed to use internet resources. Subsequently, students discussed their answers within their subgroups for 10 minutes before sharing and comparing their responses with the other subgroup. This approach enabled every student to review and reinforce their understanding of the topic in a short period. Additionally, students who lacked basic knowledge about the topic had the opportunity to learn from their peers and available resources. Finally, the preceptor discussed clinical pearls and provided an overall summary. The post-test was conducted using the same three clinical scenario-based questions used in the pretest. Groups A1 and B1 took the post-test on the topic of 'Fatty liver,' Groups A2 and B2 on 'Atherosclerosis,' and Groups A3 and B3 on 'familial hypercholesterolemia.' The scores from the post-test on the case taught to each group were used for evaluation.

A cross-over was conducted in both the study group and the control group using three additional clinical case scenarios focused on the topic of 'acid-base balance and imbalance.' During the cross-over, the control group was exposed to CCD using a modified OMP model. Feedback questionnaires were distributed to both students and faculty after the sessions to assess their perceptions of the modified OMP model as a teaching-learning tool. Closed-ended questions for students and faculty are displayed in [Table/Fig-3,4], respectively. The three open-ended questions asked were about the advantages of the OMP model, disadvantages of the OMP model, and suggestions for improvement.

Evaluation of the impact of the modified OMP model was conducted using Kirkpatrick's Evaluation Model [18]. In level 1 evaluation, perceptions of faculty and students were assessed

S. No.	Items	1	2	3	4	5	Score >3
1	It is a good tool for Clinical Case Discussion (CCD)	0	0	20 (11.11)	40 (22.22)	120 (66.67)	160 (88.89)
2	It motivated me for further learning	0	0	18 (10)	60 (33.33)	102 (56.67)	162 (90)
3	It improved my confidence in expressing knowledge	0	0	16 (8.88)	64 (35.56)	100 (55.56)	164 (91.11)
4	It made learning of basic sciences relevant	0	0	20 (11.11)	70 (38.89)	90 (50)	160 (88.89)
5	It helped me correlating basic science with clinical condition	0	0	20 (11.11)	60 (33.33)	100 (55.56)	160 (88.89)
6	It helped me in better interaction with faculty	0	0	24 (13.33)	40 (22.22)	116 (64.44)	156 (86.67)
7	It helped me in identifying gaps in my knowledge and reasoning skills	0	0	20 (11.11)	56 (31.11)	104 (57.78)	160 (88.89)
8	It helped me enhance my clinical reasoning skills	0	0	24 (13.33)	60 (33.33)	96 (53.33)	156 (86.67)
9	It will enhance my performance during my clinical years	0	0	12 (6.67)	60 (33.33)	108 (60)	168 (93.33)
10	It should be regularly used for Clinical Case Discussion (CCD) as a part of Early Clinical Exposure (ECE) for phase I MBBS students	0	0	14 (7.78)	40 (22.22)	126 (70)	166 (92.22)

[Table/Fig-3]: Number of students (N=180) responding to each item on Modified OMP model on 5-point Likert scale (1- Strongly disagree, 2- Disagree, 3-Neutral, 4-Agree, 5- Strongly agree). Values have been presented as n (%).

S. No.	Items	1	2	3	4	5	Score >3
1	It improves interaction between students and faculty	0	0	0	2 (25)	6 (75)	8 (100)
2	It has enhanced my confidence in delivery of teaching of clinical cases	0	0	1 (12.50)	5 (62.50)	2 (25)	7 (87.50)
3	It has improved my clinical teaching skills	0	0	1 (12.50)	5 (62.50)	2 (25)	7 (87.50)
4	It allows every learner to think individually	0	0	0	0	8 (100)	8 (100)
5	It helps to identify gaps in knowledge and reasoning skills of students	0	0	0	0	8 (100)	8 (100)
6	It helps in providing constructive feedback to the students	0	0	0	0	8 (100)	8 (100)
7	It is feasible for teaching clinical cases for phase I MBBS students	0	0	1 (12.50)	2 (25)	5 (62.50)	7 (87.50)
8	It should be used for all the clinical cases as a part of Early Clinical Exposure (ECE) for phase I MBBS students	0	0	1 (12.50)	3 (37.50)	4 (50)	7 (87.50)

[Table/Fig-4]: Number of faculty (N=8) responding to each item on Modified OMP model on 5-point Likert scale (1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly agree). Values have been presented as n (%).

through a feedback questionnaire. Responses to closed-ended items, recorded on a 5-point Likert scale (5-strongly agree, 4-agree, 3-neutral, 2-disagree, 1-strongly disagree), were expressed as percentages. A minimum percentage of 75% was set to indicate agreement on any particular item on the 5-point Likert scale, with a score >3.

In level 2 evaluation [19], the response rate was calculated for those students who had attended a didactic lecture on the topic and had completed both the pretest and post-test.

STATISTICAL ANALYSIS

The pretest scores of the control and study groups, as well as the post-test scores of both groups, were compared using an unpaired t-test. The difference in scores (post-test score-pretest score) between the two groups was also compared using an unpaired t-test. Within-group comparisons of the pretest and post-test scores were conducted using a paired t-test. A p-value <0.05 was considered statistically significant. The normalised learning gain was calculated using the formula Normalised gain g = {(% post-test-% pretest)}/100-(% pretest). The effectiveness of the intervention was assessed based on the range of normalised gain: 0-0.29 indicated low gain, 0.30-0.69 indicated medium gain, and 0.70-1.0 indicated high gain [20]. Quantitative data analysis was performed using Statistical Package for Social Sciences (SPSS) software version 21.0 and Microsoft excel version 2007.

RESULTS

Level 1: Evaluation of Reaction

Students' feedback: A total of 168 (93.33%) students reported that the 'Modified OMP model' would enhance their performance during their clinical years. A total of 164 (91.11%) students felt that the modified OMP model improved their confidence in expressing knowledge. A total of 162 (90%) students were of the opinion that it motivated them for further learning. A total of 160 (88.89%) students reported that it is a good tool for CCD, which made learning of basic sciences relevant and helped them in correlating basic science with a clinical condition. It also helped them in identifying gaps in their knowledge and reasoning skills. A total of 156 (86.67%) students felt that it helped them enhance their clinical reasoning skills and also improved interaction with faculty. A total of 166 (92.22%) students wanted it to be regularly used for CCD as a part of ECE [Table/Fig-3]. Responses to open-ended questions were analysed by coding comparable comments expressed by two or more respondents as key points. The key points were organised into categories, e.g., advantages, disadvantages, suggestions for improvement. According to the analysis of open-ended questions, the modified OMP model was perceived as an effective model because it promoted individual thinking through the active participation of all learners, constructive feedback was given to all participants, their mistakes were corrected, and suggestions were provided to avoid mistakes in the future. Learning for a whole topic occurred within the allotted time. Students reported that they should know the theory related to the topic before CCD, and some introverted students might feel intimidated to speak in front of a group. Students suggested that it should be a regular activity for all CCD and laboratory report interpretation as well.

Faculty feedback: All 8 (100%) faculty members opined that the 'Modified OMP model' facilitated individual learners' thinking, improved interaction between students and faculty, and helped them to identify gaps in the knowledge and reasoning skills of students so that they could correct mistakes and provide constructive feedback to the students. 7 (87.50%) faculty members felt that it enhanced their confidence in teaching clinical cases, and they considered it feasible and recommended it to be used for all clinical cases as a part of ECE [Table/Fig-4].

The advantages of the modified OMP model were that it encouraged active participation by all learners, helped develop students' skills in group learning, speaking, and critical thinking, made the subject more relevant and interesting, and promoted retention of important concepts. Faculty felt that the increased number of faculty required to conduct small group activities and infrastructure were limitations. The faculty suggested that the Modified OMP model should be implemented for all clinical cases in ECE, laboratory report interpretation, special techniques, and case-based quantitative estimation in biochemistry practicals.

Level 2: Evaluation of Learning

The total score of the pretest and post-test was 10. There was no statistically significant difference in the pretest scores of the control and study groups (p-value=0.63) [Table/Fig-5].

Variables	Group	N	Mean	SD	p-value
Pre test	Control (A)	90	2.07	0.92	0.637
	Study (B)	90	2.14	1.12	
Post-test	Control (A)	90	5.56	1.03	<0.001
	Study (B)	90	8.72	0.65	
Difference of post-test and pretest	Control (A)	90	3.49	1.18	<0.001
	Study (B)	90	6.58	1.18	

[Table/Fig-5]: Comparison of scores of pre-test, post-test and difference of pre-test and post-test scores in control group and study group by unpaired t-test.
SD: Standard deviation

However, there was a statistically significant difference in the post-test scores obtained by the control group and study group (p-value <0.001) [Table/Fig-5,6]. The difference in scores (Post-test score-Pretest score) was calculated for both the control and study groups. A highly significant improvement was seen in the study group (p<0.001) [Table/Fig-5,6]. The comparison of mean scores of the pretest and post-test within the groups was statistically significant (p<0.001) [Table/Fig-5,6]. The normalised gain of the control group was 0.44 for the topic 'lipid metabolism' and 0.42 for 'acid-base balance'. The normalised gain of the study group was 0.83 for 'lipid metabolism' and 0.80 for 'acid-base balance'.

Variables	Group	N	Mean	SD	p-value
Pre-test	Control (B)	90	2.95	0.76	0.73
	Study (A)	90	2.99	0.75	
Post-Test	Control (B)	90	5.99	0.85	<0.001
	Study (A)	90	8.63	0.50	
Difference of post-test and pretest	Control (B)	90	3.04	1.08	<0.001
	Study (A)	90	5.64	0.76	

[Table/Fig-6]: Comparison of scores of pre-test, post-test and difference of post-test and pretest scores in control group and study group after crossover by unpaired t-test.

DISCUSSION

In the present study, the modified OMP model had been used for the first time in the biochemistry subject for a CCD in a classroom setting. It was observed that the modified OMP model significantly improved the knowledge, critical thinking, and reasoning skills of students.

A higher normalised learning gain by the modified OMP method compared to the medium normalised learning gain by the traditional method indicates that the modified OMP model ensures a high improvement in the knowledge and reasoning skills of every learner. The medium learning gain in a traditional unstructured method can be attributed to CCD in a small group. The present study also confirms that even after the modifications in the original OMP model, the effectiveness of this model remains unaffected for preclinical subjects.

Modifications made in the original OMP model ensured the active participation of every learner in the group. It has not only allowed every student to think individually in the group setting but also provided the opportunity to involve every learner in all the cases they have encountered. No student remained deprived of their right to participate in the learning process. Thus, individualistic learning at their own pace as well as self-directed learning was encouraged.

The present study focused on implementing the process rather than the time factor of the original OMP model. The process of implementation is more important for effective learning, as supported by another study conducted by Chandra S et al., [10]. The cumulative time spent on a group of 7 or 8 students in the present study was 70 minutes. However, per student, it was approximately 10 minutes. In the modified OMP model, microskills 1 and 2 required 15 minutes, while 3 and 4 required 30 minutes, and 5 required 25 minutes. Microskill 5 in the present study has ensured the opportunity for maximum real-time learning from peers, faculty, and provided resources. This is very useful for students with no prior basic knowledge about the topic. Some introverted students might feel intimidated as they have to participate every time during CCD. However, this can be overcome by counselling and encouraging such students.

In a study conducted for a para clinical subject (Pharmacology), the OMP model was used for phase II MBBS students to teach competencies by framing clinical case scenarios to mimic realistic clinical settings. The results revealed that the OMP group's scores were significantly higher ($p<0.001$) than the traditional group, and the OMP model was preferred by students and preceptors [10].

In another study conducted by Waseem N et al., the OMP model was used for gross anatomy teaching during cadaveric dissection. The means of overall collective marks obtained by students exposed to spotting (group I) and students exposed to both spotting and the OMP model (group II) were insignificant. However, students found the OMP model effective in combination with spotting for the improvement of various aspects of learning in gross Anatomy [16].

The effectiveness of the modified OMP model is attributed to learners' active participation, constructive feedback, and corrective support provided by preceptors. Encouraging students to think critically and correlate previously learned concepts with clinical situations can help make them competent clinicians and lifelong learners. Uniformity in teaching by the modified OMP method during ECE activities is the biggest advantage. Faculty could develop teaching skills, making it a tool for faculty development. Faculty learned to give constructive feedback to learners, helping to build bonds and rapport with students.

Limitation(s)

The present was a single-centric study conducted in one preclinical subject. Before the modified OMP model can be implemented on a larger scale, validation of findings is required by Biochemistry Departments of other medical colleges as well as by other preclinical and paraclinical subjects. Infrastructure for conducting small group sessions and involvement of more faculty were the major challenges. Effective implementation of the present model requires faculty development and practice. Junior faculty members may find it challenging due to a lack of confidence or limitations in their own knowledge base. The success of the present model also involves active participation by all learners; hence, some introverted learners may feel less comfortable in this learning process.

CONCLUSION(S)

The CCD using the modified OMP model significantly improved the knowledge, critical thinking, and reasoning skills of students. The modified OMP model was perceived as an effective teaching-learning tool for ECE activities by both students and faculty. Active participation of all learners, constructive feedback, corrective support, and uniformity in the process of implementation were the key components of the Modified OMP model. It can also be effectively used for laboratory report interpretation teaching, assessment, and during practical examinations for case-based quantitative estimation. More studies are needed to ascertain the utility of the modified OMP model for teaching as well as assessment.

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REFERENCES

[1] Medical Council of India. Early Clinical Exposure for the Undergraduate Medical Education Training Program [Internet]. New Delhi; 2019 [cited 2023 Dec 30] 1-43p. Available from: https://www.nmc.org.in/wp-content/uploads/2020/08/Early_Clinical_Exposure-MBBS-07.08.2019.pdf.
[2] Maharashtra University of Health Science. First MBBS Biochemistry syllabus w.e.f.2019-2020 [Internet]. Nashik; 2019 [cited 2023 Dec 30] 1-31p. Available from: https://www.muhs.ac.in/upload/syllabus/Biochemistry%20090819.pdf.
[3] Neher JO, Gordon KC, Meyer B, Stevens N. A five-step "microskills" model of clinical teaching. J Am Board Fam Pract. 1992;5(4):419-24. PMID: 1496899.
[4] Cheema HK, Arora R, Kumar R. Evaluation of One Minute Preceptor (OMP) as a teaching tool for interns in the department of obstetrics & gynaecology - A cross-sectional study in Punjab Institute of Medical Sciences. J Evid Based Med Healthc. 2021;8(23):1970-76.
[5] Gatewood E, De Gagne JC. The one-minute preceptor model: A systematic review. J Am Assoc Nurse Pract. 2019;31(1):46-57.
[6] Modi JN, Anshu, Gupta P, Singh T. Teaching and assessing clinical reasoning skills. Indian Paediatrics. 2015;52:787-94
[7] Furney SL, Orsini AN, Orsetti KE, Stern DT, Gruppen LD, Irby DM. Teaching the one-minute preceptor. A randomized controlled trial. J Gen Intern Med. 2001;16(9):620-24.
[8] Ong MMA, Yow M, Tan J, Compton S. Perceived effectiveness of one-minute preceptor in microskills by residents in dental residency training at National Dental Centre Singapore. Proceedings of Singapore Healthcare. 2017;26(1):35-41.
[9] Singh T, Gupta P, Singh D. Principles of Medical Education. 4th ed. New Delhi, India: Jaypee Brothers Medical Publishers (P) Ltd; 2013. Pp. 56.
[10] Chandra S, Ahsan M, Chandra S, Shaifali I, Koul R. Effect of one minute preceptor (OMP) model in learning of core competencies in Pharmacology. J Educ Technol Health Sci. 2018;5(1):49-56.
[11] Gulati HK. One minute preceptor – Introduction and perception evaluation of a novel teaching tool for teaching routine histopathology slides to postgraduate students in pathology. Indian J Pathol Oncol. 2016;3(3):503-07.
[12] Aagaard E, Teherani A, Irby DM. Effectiveness of the one-minute preceptor model for diagnosing the patient and the learner: Proof of concept. Acad Med. 2004;79(1):42-49.
[13] Harkare V, Deosthale N, Dhoke P, Khadakkar S. Use of One Minute Preceptor (OMP) for effective clinical teaching in ENT for Final MBBS students. PJMS. 2013;2(3):50-52.
[14] Iyer CR, Nanditha G, Raman J. One minute preceptor as an effective teaching and learning method for pediatric internship: An interventional study. Indian J Child Health. 2017;4(2):184-87.
[15] Teherani A, O'Sullivan P, Aagaard EM, Morrison EH, Irby DM. Student perceptions of the one minute preceptor and traditional preceptor models. Med Teach. 2007;29(4):323-27.
[16] Waseem N, Iqbal K, Kundi H, Rehman I, Zaigham N, Qamar A. Teaching anatomy using OMP in combination with spotting: Re-Shaping the subject. Professional Med J. 2020;27(4):730-36.
[17] Medical Council of India. Competency Based Assessment Module for Undergraduate Medical Education Training program [Internet]. New Delhi; 2019 [cited 2023 Dec 30]: Pp 17. Available from: https://www.nmc.org.in/wp-content/uploads/2020/08/Module_Competence_based_02.09.2019.pdf.
[18] Kirkpatrick DL, Kirkpatrick JD. Evaluating Training Programs: The Four Levels [Internet]. San Francisco, CA: Berrett-Koehler Publishers; 2006 [Cited 2023 Dec 30]. Chapter 3. Available from: https://search.worldcat.org/title/evaluating-training-programs-the-four-levels/oclc/318612381.

[19] Colt HG, Davoudi M, Murgu S, Zamanian Rohani N. Measuring learning gain during a one-day introductory bronchoscopy course. Surg Endosc. 2011;25(1):207-16.

[20] Lohe VK, Singh A. Evaluation of effectiveness of syndicate learning in oral medicine and radiology: Cardinal findings in a batch of final-year students. Astrocyte. 2015;1(4):301-04.

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