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CASE OF THE MONTH SERIES – OUR EXPERIENCE WITH A NEW MODULE IN PHARMACOLOGY.

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ABSTRACT

Introduction: Clinical exposure to assist pharmacology teaching is essential for training the medical students to apply the pharmacological therapeutic principles in medical practice. In view of this, we planned to introduce and implement a new module in pharmacology – case of the month series and get the feedback of undergraduate medical students. **Materials and methods:** The study was conducted on second-year MBBS students after obtaining permission from Institutional Ethics Committee. Topics for the case of the month series were predefined and announced to the students. During their clinical posting, the students were given a proforma to collect the details, including the patient details, presenting illness, past history, provisional diagnosis, investigations, and treatment chart. The case of the month had to be submitted to the faculty who would then discuss it with the batch after practical classes. The students' feedback was collected at the end of four such case-of-the-month series as a questionnaire with a few open-ended questions. **Results:** A total of 204 students submitted the responses online; their mean age was 20.6±1.4 years. 56.3% of students were of the opinion that this exercise was helpful for rational prescription of drugs in the future. 52% of the students opined that the series was interesting and stimulating. **Conclusion:** The case of the month series was well perceived by students and faculty. It also stimulated the interest of medical students in learning the importance of clinical pharmacology.

Keywords: Case studies, Learning, Medical-education, Pharmacology, Teaching.

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INTRODUCTION

Teaching and learning pharmacology during the undergraduate Bachelor of Medicine and Bachelor of Surgery (MBBS) course is considered theoretical without being clinically

relevant.¹ With conventional modes of teaching like didactic lectures, it becomes difficult to make the contents interesting, meaningful, and clinically relevant.² There has been a constant evolution of teaching-learning methods where medical and healthcare-related education is concerned. Also, the enormous need to inculcate problem-solving, critical thinking and reasoning, and other skills, paved the way for

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the use of Case-based Learning (CBL) as an effective approach.³

In India as per the traditional curriculum (before the competency-based curriculum), Pharmacology is taught from the third to fifth semester wherein the students also learn pathology, microbiology and forensic medicine. They also have clinical postings to learn the basics of bedside examination. But there is no integration between what is being taught in clinics and theory classes. Clinical orientation of MBBS teaching in pharmacology is essential as it has a repercussion on their concepts as well as the training in final professional year and internship. Good training in pharmacology which is clinically relevant can help in molding clinically sound physicians.⁴ The pharmacology curriculum has been modified to include prescription writing, problem-solving exercises, case-based learning, integrated teaching, etc. to make the subject clinically oriented.⁵

Currently, The National Medical Commission (NMC) for graduate medical education regulations in India states that, maximal efforts have to be made to encourage integrated teaching between various preclinical and clinical disciplines.⁵ Any teaching module be it a didactic lecture, small group teaching or self-directed learning have their limitations. Didactic lectures are often teacher-centered with minimal interaction and tend to exceed the attention span of the students. Small group teachings are time-consuming and require a large number of faculty and classrooms. Self-directed learning is student-centered and relies heavily on intrinsic motivation.^{6,7}

To cultivate students' ability to use the pharmacology principles in medical practice, case-based learning followed by discussion and review has helped students improve their analytic skills and make the subject more clinically relevant. This module was im-

plemented to teach basic medical sciences in a coherent manner closely related to topics in clinical practice and re-enforcing the reasoning, collaborative and communication skills of the students. With this background, it was decided to introduce the concept of the case of the month series in order to integrate with clinics as well as get trained in the individualization of drug therapy. The aim of the present study was to implement the module on the case of the month series and obtain feedback from students regarding the same.

METHODS

A prospective educational interventional study was conducted on second-year MBBS students. All the students from second-year MBBS were included in the study after obtaining clearance from the Institutional Ethics Committee (IEC). A waiver for written informed consent was given as it was an educational project and all the students would benefit from the intervention. However, those students who did not want to participate in the study were excluded. The students were divided into 14 batches with nearly 18 students in each batch (total strength of the class =250). The topic for the case of the month was announced in the first week of the month. Topics like hypertension, diabetes mellitus, bacterial respiratory infections, malaria, tuberculosis were given. During their clinical posting, the students were expected to collect details of patients diagnosed with the disease or presenting as a comorbid condition. The students were given a proforma to collect the details which included the patient details, presenting illness, past history, provisional diagnosis, investigations, and treatment chart. The case of the month had to be submitted to the faculty who would then discuss a case with the entire batch. During the discussion, the students had to report the generic name of each of the drugs prescribed, its dose, mechanism of action, adverse effects, and rationale of the drug in this pa-

tient. The details of each drug would be discussed regarding the rationale of the drug prescribed for this particular patient in each batch at the end of the practical classes. The students' feedback was collected at the end of four such case of the month series in the form of a validated questionnaire with a few open-ended questions. The questionnaire was validated by administering the questionnaire to a group of 10 students and 10 faculty from the department of medical education. Based on their inputs, modifications were made to the questionnaire.

Data Analyses

Data analysis was done using SPSS version 20. The results were expressed in frequencies and percentages. The answers to the open-ended questions were subjected to thematic analysis. The authors read and reread the student reflections and coded the information. The codes were used to recognize the pattern and themes were identified.

RESULTS

A total of 204 out of 250 students submitted the responses through an online form, the rate of responders being 81.6%. The mean age of the students was 20.6 ± 1.4 years. The responses were collected on a five-point Likert scale. The percentage of responses is described in Table I.

92.61% of students thought that this exercise would help them in the future for rational prescription of drugs. Only 8.93% of the students did not find the series to be interesting and stimulating. Most students appreciated the Integration with clinical subjects (60.1% agreed and 26.6% strongly agreed). 91.3% of the students felt that further modules on therapeutics would be required. 67.65% of students also felt that the series helped them develop their problem-solving skills, not mere recollection of facts. The series did motivate 75% of the students for self-directed learning.

Table I: Student responses about case-based modules.

Statements	Responses rate (%)				
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1 The subject has created the knowledge base which will help me in choosing drugs rationally in my future practice.	35.96	56.65	6.40	0.5	0.5
2 Case of the month series was interesting and stimulating.	17.82	51.98	21.29	7.43	1.5
3 This series closely integrated with the clinical sciences	26.60	60.10	8.87	4.43	0
4 The subject has helped me to develop my problem-solving and logical-reasoning skills.	21.57	53.92	19.12	4.90	0.5
5 I would like practical session on rationality of prescription	36.3	50	10.8	2.45	0.5
6 I would like to welcome modules on Pharmacology and therapeutics during the clinical years of my training.	36.3	55	7.8	1	0
7 The discussion helped me to develop my problem-solving skills.	25.49	42.16	22.06	10.29	0.0
8 The Pharmacology teaching has inculcated in me a capacity for self-directed learning.	20.59	54.41	19.12	5.39	0.49

The responses to the open-ended questions have been summarized into the following key themes:

- a) Clinical application
- b) Knowledge of pharmacology
- c) Real patient experience
- d) Motivated self-learning
- e) Not useful

a) Clinical application: The case of the month series was liked by the students as they felt that it had clinical relevance (54.77%). They could easily understand a case as a whole. The students did find the integration of various clinical subjects useful. The drugs they had studied in the textbooks were being prescribed which was an excitement in itself. Some of the responses were as follows:

"Personally, I feel it's one of the best introductions to us. It's really helpful, and we are able to co-relate clinical pharmacology with Medicine, Surgery".

"We get to see how a physician treats a patient first hand".

"It tries to link what we learn in the class with the clinical side".

b) Knowledge of Pharmacology: Around 42.72% of the students did feel that their pharmacology knowledge had improved by the discussions conducted. These sessions revisited various drugs, their names, mechanism, and adverse effects which the students felt helped them recall and comprehend better. The brand names of various drugs and their cost were learned through this exercise, which otherwise they wouldn't have learned at all.

c) Real patient experience: The students found this series unique as they liked patient interaction, taking a case, and relating with real patients. This was reported by 11.56 % of the students. The cases used in other instances were either constructed by faculty or taken from textbooks. The following

statements express the views of the students in this regard:

"Gives us an idea about how the theory is actually put into use in the clinical scenario. Also helps put in the economic and social factors into consideration".

"We can correlate with actual case and know how contraindications and adverse effects are balanced".

d) Motivated self-learning: Few students (8.03%) did report that the entire series motivated them to learn as they realized that treating a patient as a whole was difficult as the number of drugs, doses, and interactions were extensive.

"Learning case history taking well and also having a better idea about drugs prescribed in case of a particular disease along with the information regarding the same makes our future career as a doctor who will be prescribing drugs simpler as we are more aware of the present-day regimes".

e) Not useful: 18.09% of the students felt that the entire session was not useful. The reasons quoted were, spending a lot of time on writing the entire case was not required, only a drug list would suffice, and that they had copied the cases from their peers and hence did not motivate self-learning.

"Good at times when I actually take the effort to study and complete it. Other times when we just copy from textbooks it doesn't look reasonable."

The students were also asked to give suggestions for modification of the entire series; two important suggestions have been quoted below:

"Make it more interesting by discussing a pre-determined case, and eliciting information on what drugs needs to be administered as per the students' knowledge. After which, the actual prescription could be revealed. This will help us see how accurate we were".

"Making sure that everyone in the group participates".

DISCUSSION

In the present study, the case of the month series was well received by most of the students. Students were able to clinically correlate the pharmacology knowledge with clinical insights as was evidenced by the results of the study. Certain changes were introduced in the medical pharmacology curriculum which include exercises on pharmacoeconomics, critical appraisal of drug advertisements, drug interactions studies, pharmacokinetic exercises, prescription writing, problem-solving exercises, etc. to give students a clinical orientation to pharmacology.

Case-based presentations are an essential part of teaching medicine. In our current educational set-up, the students are exposed to discussion of clinical cases from the third professional year onwards, wherein the entire case is discussed bedside. Yet this format of teaching has its pros and cons and is often criticized for containing lengthy case presentations. Its failure to actively involve the entire group would be another matter of concern. Most of the time the discussion at the bedside during clinical posting restricts to the case history, investigations, and diagnosis. Rarely does it progress to treatment and detailed discussion of the pharmacotherapeutics.

The very fact to address the above concern was to implement this case of the month series so that there is involvement of every student in the group and implementation of a new case study every month which would unarguably be the best mode to learn the wisdom of practice and develop cognitive flexibility. The case of the series module if well perceived by the students would be an effective pedagogy to help the medical students of pre and para-clinical years for their

transition to the clinical years and thereby benefit the medical student community across the globe. Case-based learning (CBL) helps in a better understanding of the concepts, promotes the integration of subjects, and stimulates critical thinking.⁸

A previous study has shown that case-based learning with real-life problems found in clinical workplaces relies on the active engagement of students to think about and determine possible solutions.⁹ Hence in the present study, the medical students were provided with real-life case scenarios followed by a detailed discussion on rational prescribing. CBL aims to teach basic medical sciences in a coherent manner closely related to topics in clinical sciences and re-enforcing the reasoning, collaboration, and communication skills of the students.¹⁰

Another was conducted to assess the impact of case-based teaching on learning rational prescribing when compared with the traditional method of teaching wherein case-based teaching was found to be better in facilitating the learning process.¹¹ This was in coherence with the results of the present study where 86% of medical students did find that integration with clinical subjects motivated them to learn the subject of pharmacology better. A small percentage of students (approximately 9%) did not find the series interesting, which was observed in other case-based studies as well.⁸ Probably, improvement of the sessions based on the feedback received can help reduce the number of such students further.

A study conducted previously concluded that there was a positive shift in students' perspective towards the subject of microbiology to being perceived as appealing and clinically relevant by using CBL.¹² An interventional cross-over study conducted hitherto also indicated that CBL as a teaching-learning method is more effective for improv-

proving as well as retention of knowledge.¹³ Introduction of cases generated interest, promoted active learning and helped in the development of critical thinking and analysis amongst undergraduate medical students which was noted in an earlier study.¹⁴

A review of worldwide literature on the application of CBL in medical and healthcare fields, concluded that when CBL is used as a teaching tool it not only aids in connecting theory to practice but also has far-reaching effects ranging from simple knowledge gains to changing patient care outcomes.¹⁵ In accordance, the effectiveness of CBL in health professional education was studied, and it concluded that not only did CBL lead to increased engagement and motivation for learning, but it also fostered effective learning in small groups perhaps through having more structured learning activities closely linked to authentic clinical practice scenarios.¹⁶

In a way, the case of the month series is comparable to bringing the patient to the classroom. As with any other teaching methodology, this method is also not perfect. It was also reported that the amount of extraneous load potentially presented by case-based learning might overwhelm the cognitive abilities of inexperienced students¹⁷ and could be one of the reasons for disinterest amongst students who are not able to cope with the cognitive load during the session. Hence CBL requires a lot of planning, coordination, and organization in advance, not only at the departmental but also inter-departmental level. The students suggested that faculty should provide the case for which they would chart the treatment, and then substantiate whether it was comparable with the bedside therapy. Further involvement of faculty from the clinical subjects would have fostered the process of integration. Suggestions given by various students will be considered for further modification of

the teaching-learning process.

This study did have some limitations. The involvement of faculty from different specialties and the incorporation of their inputs to the cases would have ensured vertical integration. This was done in a previous study called modified case-based learning wherein they had faculty from different specialties who had discussions with students.¹⁸ Hence vertical integration would have enhanced the learning process. This module could also have been implemented for the students of the third and final year to analyze the progression of learning. However, these can provide us with scope for improvising the program and also scope for further research.

CONCLUSION

In conclusion, in the present study, the case of the month series stimulated the interest of the students in learning pharmacology, facilitated the process of rational pharmacotherapy, and helped them to integrate the clinical sciences with pharmacology. However, modification of teaching strategies which is more learner-centric, giving the students opportunities for discussion and participation, would help to make this program more effective and thereby aid the prescribing patterns of medical students, the physicians of tomorrow.

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DECLARATION OF CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

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