

Does partially integrated learning program help students learn better: A quasi-experimental study in pharmacology

Sir,

Medical education in India still remains mostly compartmentalized into pre-clinical, para-clinical, and clinical subjects with little scope for integration of disciplines or correlation of knowledge. In this model, students in their initial years go through a rigorous curriculum without scope to understand the practical implications. On the contrary, “Regulations on Graduate Medical Education, 1997” recommend a teaching approach characterized by maximal efforts to encourage integrated teaching between traditional subject areas and de-emphasize compartmentalization of disciplines. It further states that lectures alone are not adequate as a method of training and recommends learning in small groups in a setting of clinical relevance.^[1] A study conducted in Nepal also stressed that certain subjects like pathology and pharmacology require a clinical background and it is important for medical students to see patients of a particular disease when its treatment or pathology is being taught to them in class.^[2]

However, devising a practically feasible module of integrated learning is not a simple task. A study in Pakistan showed that

limited resources, scheduling conflicts, and resistance from faculty members, students, and their parents were major hurdles in implementing the change of integration in the curriculum.^[3] Moreover, integration throughout the whole curriculum is time-consuming for both teachers and students and hard work is required for planning, organization and execution.^[4]

Keeping the encouraging results as well as hurdles in mind, we tried a unique model of learning pharmacology in a setting of clinical relevance in the College of medicine and J.N.M hospital in West Bengal. Following usual lecture classes on endocrine pharmacology chapters as per scheduled curriculum, students were evaluated using a questionnaire, which was earlier pre-tested and validated on 10 volunteer students. It included a set of parameters: Questions probing their perception on various aspects of learning, rated on a 5 point Likert scale with minimum ‘1’ and maximum ‘5’. Then they were taken to medicine and diabetes O.P.D of the hospital in small groups where they came across real life patients with endocrine disorders like diabetes, hypothyroidism, etc., and learnt the history, and clinical features. Management of individual patients with drugs and their pharmacological basis were explained by a clinical and a pharmacology teacher respectively. The pharmacology teacher concentrated on pharmacokinetics, mechanism of action of drugs, adverse effects, and precautions relevant in individual cases. After these hospital visits, which continued for few weeks, the students were again assessed with the same questionnaire.

Median and Interquartile range (IQR) of the scores were calculated. Wilcoxon sum-rank test was used to find out the difference in scores before and after the program. Mann-Whitney U test was used to see the difference between the difference of scores (after-before score) of male and female students. Two-tailed significance test with *P* value of 0.05 or less was considered to be statistically significant. SPSS 16.0 version was used.

Out of 83 students on roll, 67 (80.7%) students participated in the program. The median scores of students in various aspects of learning increased significantly after the sessions [Table 1].

Table 1: Perception of students regarding learning endocrine pharmacology before and after the partial integration program

Item	Median (IQR) score (before)	Median (IQR) score (after)	Z statistics
Interest in endocrine pharmacology	4.00 (1)	4.00 (1)	-5.39*
Understanding of concepts	3.00 (1)	4.00 (1)	-6.33*
Interpretation	3.00 (1)	4.00 (1)	-6.30*
Ability to remember information	3.00 (1)	3.00 (1)	-3.89*

*Based on negative scores, IQR=Interquartile range, (N=67), all *P*=0.0001 (i.e., *P* < 0.05) (Wilcoxon sum-rank test)

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Highest improvement was seen in understanding of the concepts. The scores were higher in males than females in all the aspects but the differences were not significant.

In a study conducted in U.S., the objectives of teaching pharmacology to medical students were to critically evaluate medications, obtain a complete medication history, apply pharmacokinetic principles to clinical practice, recognize, and report adverse drug events and interactions, and prescribe rationally. The course significantly increased the student rating of clinical pharmacology teaching.^[5] In another study on integrated learning of physiology through early clinical exposure, 60.7% students felt that it helped them to a 'great' extent. In comparison to the other systems where only didactic lectures were involved, 95% of the students felt that early clinical exposure helped them to understand the concepts better. Above all, real patient learning helped learners to remember subject matter more easily.^[6] Almost similar results were obtained in the present study where 97% students found clinical exposure to be at least 'useful' while it was 'very useful' to 60% students.

Other than substantiating few already available literatures on usefulness of integrated medical education, the present study makes the unique contribution of devising a short-term module of learning a particular system of pharmacology in an integrated manner in clinics as a supplement to conventional compartmental education instead of replacing it and hence termed a "partially integrated learning program". It promises the scope of being practically implemented even in peripheral medical Colleges of India. It should be equally beneficial to both male and female students with respect to different dimensions of learning. Since other sessions for the same or different subjects are not disturbed, resistance from different sections can be avoided. Further, since the module requires short and less time consuming sessions unlike previous studies, students' cooperation is expected. More than 80% students participated in the present study, which is expected to increase further if tried in other systems due to their positive experience. Following up these students and seeing their performance in professional examination may further strengthen this innovative method of learning pharmacology.

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