National Journal of Physiology, Pharmacy and Pharmacology

RESEARCH ARTICLE

Patient-based integrated teaching program with the inclusion of psychomotor and affective domains

Arunita Tushar Jagzape[1], Tushar Jagzape[2], Alka Rawekar[3]

[1]Department of Physiology, Shri Shankaracharya Institute of Medical Science, Bhilai, Chhattisgarh, India, [2]Department of Pediatrics, All India Institute of Medical Sciences, Raipur, Chhattisgarh, India, [3]Department of Physiology, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha, Maharashtra, India

Correspondence to: Arunita Tushar Jagzape, E-mail: arunitaj4@gmail.com

Received: March 14, 2017; **Accepted:** April 02, 2017

ABSTRACT

Background: Integrated teaching program (ITP) is a solution to the compartmentalized teaching of fragmented and passive learning. However, ITP is conducted mainly in the form of lectures, whereas in our study, we have included affective as well as psychomotor domain with cognitive domain. **Aims and Objectives:** The objectives of the study were to incorporate patient-based ITP with cognitive, psychomotor, and affective domains, to evaluate level 1 of Kirkpatrick model (learning), and to evaluate the level 2 of Kirkpatrick model (reaction) of students. **Materials and Methods:** This was an interventional study with convenience sampling. In this study, ITP was conducted on the topic of nephrotic syndrome by the departments of anatomy, physiology, biochemistry, and pediatrics for 184 students of 1st MBBS, wherein psychomotor domain was included in the form of practical and affective domain was included by showing doctor–patient interaction in the classroom on a real patient of nephrotic syndrome. Learning was assessed by pre- and post-tests, and feedback was collected. Effectiveness of the intervention was evaluated by class-average normalized gain "g." Focus group discussion (FGD) was also conducted to explore further. **Results:** There was a significant difference ($P < 0.05$) in the pre- and post-test scores. The effectiveness of the intervention was medium (46%). The students responded positively for this method in the closed- and open-ended questions. **Conclusion:** FGD revealed that the students preferred this method of conducting ITP to didactic lectures provided that they are conducted in small groups and the interval between the sessions is decreased.

KEY WORDS: Cognitive; Psychomotor; Affective; Integrated Teaching Program; Focus Group Discussion; Class Average Normalized Gain

INTRODUCTION

"Meaningful learning" involves acquisition of knowledge which is well integrated with everything that is known by us.[1] There should be construction of own understanding of concepts, procedures, and relationships by the students. This process can be encouraged by teachers by considering carefully the type of organization and instructional strategies.[2-4]

In medical schools, throughout the world, the technique of giving instruction includes traditional lecture method, problem-based learning (PBL), computer-based learning, teamwork, seminar, and symposium.[5] Although lecturing facilitates the sharing of information with a large audience of students transmitting effective factual information,[4] it exposes the students merely to content, leading to passive reception of information, whereas it is the active processing

Access this article online	
Website: www.njppp.com	Quick Response code
DOI: 10.5455/njppp.2017.7.0306802042017	

of information that leads to learning[4,6-8] and in which students are encouraged to involve in the building and testing their own mental models from information that they attain. Active learning is facilitated if curriculum includes methods to engage students' attention that impact their learning.[9] The possible areas for improvement and modification in the existing curriculum could be related to compartmentalization among departments leading to lack of integration, reduced coordination between basic sciences and clinical subjects, and adherence to traditional didactic methods of instruction.[10]

There are many innovations undertaken globally such as self-directed learning, PBL, community orientation, and integrated teaching.[11-13] Integrated learning is the need of the hour not only to improve the quality of students but also to have effective diagnosis and better treatment of patients[12,14,15] since students are unable to correlate in context of a clinical problem, affecting the quality of diagnosing and treatment of patients.[12]

Integration can be horizontal or vertical.[16] In Jawaharlal Nehru Medical College, DMIMS (DU), Wardha, Department of Physiology is involved in horizontal as well as vertical integration. Conventionally, integrated teaching program (ITP) is carried out in didactic lecture format wherein different departments teach small part related to the topic. This study involves a novel ITP which was patient based and included not only cognitive but also psychomotor and affective domains. The objectives of the study were to incorporate patient-based ITP inclusive of cognitive, psychomotor, and affective domains, to evaluate level 1 of Kirkpatrick model, i.e., learning, and to evaluate level 2 of Kirkpatrick model, i. e., reaction of students.

MATERIALS AND METHODS

The study was conducted after approval from the Institutional Ethics Committee. The study design was non-randomized interventional study with convenience sampling. The study population was 200 students of 1st MBBS of Jawaharlal Nehru Medical College, Wardha. The inclusion criteria were that the students should have attended all ITP sessions, pre-post-test, and feedback. Out of 200, analysis was performed on the data of 184 students based on inclusion criteria.

Preparation Phase

Meeting of curricular committee was scheduled in the Department of Physiology and in order to conduct a patient based ITP with inclusion of cognitive, Psychomotor and affective domains at the level of 1st MBBS, the topic chosen was "nephrotic syndrome." The departments finalized were anatomy, physiology, biochemistry, and pediatrics. The coordinating department was Department of Physiology and the author 1 was the in-charge of the program. The departments of anatomy, biochemistry, and pediatrics were notified and a member from each department was contacted to finalize the topics, learning objectives, and content. The permission from the Head of the Department of Pediatrics was sought and a case was selected.

Implementation Phase

ITP was conducted for 3 days for 2 h each. There is a slot reserved for ITP and PBL during which these sessions were conducted with an interval of 1 week.

On day 1, the students were briefed about the program by in-charge from coordinating department, especially regarding the points to note from the patient contact like the doctor–patient relationship, the way of communication. Pre-test was conducted. Written consent form was attached therewith. The session started with the patient being shown by the clinician from Pediatric Department. The patient was brought to the classroom along with the parent. The sequence of events started with history taking (emphasizing the doctor–patient communication, communication with parents pointing toward the affective domain), and important points in the examination were highlighted. It was also accompanied with the pictures and videos of signs in the patient and also the method of eliciting the signs on PowerPoint presentation already prepared beforehand so that the signs were clearly visible to the last benchers too. The details and concepts of kidney relating to nephrotic syndrome were then explained by anatomy and physiology departments pertaining to cognitive domain.

On day 2, psychomotor domain was addressed by the students performing biochemistry tests relating to nephrotic syndrome such as demonstration of proteins in urine. The batch was divided into three groups. The students were explained the principles behind the tests for two groups while the third group was performing. The other two groups were rotated in a similar manner.

On day 3, lecture was taken by Biochemistry Department relating to aspects of nephrotic syndrome. The whole theme was summarized as a whole and post-test and feedback was taken.

Pre-test and Post-test

These included questions of brief answer-type and multiple-choice questions pertaining to cognitive domain for 10 marks.

Feedback Questionnaire

It consisted of quantitative response questions in the form of closed-ended questions on a 5-point Likert scale and qualitative response questions in the form of open-ended questions. The closed-ended questions were divided into questions pertaining to input, process, and output of the ITP.

Focus Group Discussion (FGD)

After a brief gap of 1 week, an FGD was conducted to probe into the actual perceptions of students regarding the ITP conducted in this manner, its utility and shortcomings if any. Eight 1st year MBBS students participated in the discussion after obtaining written consent from them. They did not consent for audio recording. The participants were selected by purposive sampling. At the start of FGD, the purpose of FGD, its concept was explained to the students. FGD was conducted by Authors 1 and 3 who had an experience of conducting FGD. A rapporteur was present who was noting down the discussions verbatim. FGD started with getting acquainted with the participants. The key themes were then introduced and discussion was noted down verbatim. The FGD lasted for 45 min. FGD guide was prepared with three themes: (i) best points regarding the ITP conducted, (ii) ITP as a teaching method as compared to didactic lecture, and (iii) modifications to improve ITP.

Data Analysis

For Kirkpatrick level 1, quantitative data were analyzed using percentages and qualitative data were analyzed using coding and categorization. For Kirkpatrick level 2, the results of pre-post-test were analyzed using paired *t*-test. The software used in the analysis was Epi-info and $P < 0.05$ was considered as level of significance. Effectiveness of intervention was evaluated using class-average normalized gain (g = % post-test score − % pre-test score/100 − (% pre-test score)). High-g courses are those with g >0.7; medium-g courses are those with 0.7> g >0.3, low-g courses are those with g <0.3. g = 0.3 or 30% was taken as the minimum value where an educational intervention could be regarded as been effective.[17-20] Gender-wise comparison of the responses was not performed.

Table 1: Mean pre and post-test scores of modified ITP and class-average normalized gain "g"

Excretory system	Mean±SD	*t*-test	*P* value	"g"
Modified ITP				
Pre-test	2.88±1.64	9.225	0.001	0.46 (46%)
Post-test	6.18±1.29			

ITP: Integrated teaching program, SD: Standard deviation

RESULTS

The significant difference was noted in pre-test and post-test scores of ITP ($P < 0.05$) with class average normalized gain as 46% (Table 1). Feedback was collected regarding the input, process and output of ITP, in which the participants were affirmative that teaching aids were adequately used and time allotment was adequate. They also agreed that learning objectives were identified before the start with logical sequence of lectures and adequate discussion. Students agreed that it helped in the understanding of the topic and due to the case presentation, they could understand doctor-patient relationship (Table 2).

As per Table 3, students responded that they understood the application of basic knowledge in health and disease and that case presentation concept was excellent. In the section of suggestions, students suggested that ITP should be conducted in two batches due to difficulty for the last benchers (Table 4). According to Table 5, the students responded that this ITP

Table 2: Responses from closed-ended questions of feedback

Items	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)
Inputs for ITP					
Teaching aids were adequately used	29 (16)	133 (72)	22 (12)	0 (0)	0 (0)
Time allotment was adequate	35 (19)	112 (61)	29 (16)	4 (2)	4 (2)
Preparation of topics was satisfactory	61 (33)	103 (56)	20 (11)	0 (0)	0 (0)
Process of ITP					
Learning objectives were identified	57 (31)	118 (64)	9 (5)	0 (0)	0 (0)
Lectures were in logical sequence	77 (42)	90 (49)	17 (9)	0 (0)	0 (0)
Adequate discussion occurred on Nephrotic syndrome during integrated teaching	36 (20)	120 (65)	28 (15)	0 (0)	0 (0)
Incorporation of psychomotor skills (Practical) was helpful.	43 (23)	121 (66)	20 (11)	0 (0)	0 (0)
Output of ITP					
It helped in understanding the concept of nephrotic syndrome	68 (37)	88 (48)	28 (15)	0 (0)	0 (0)
Doctor–patient relationship/behavior was better understood with the help of actual case presentation	110 (60)	72 (39)	2 (1)	0 (0)	0 (0)
Summarization of whole ITP as integration of topic of nephrotic syndrome was useful	79 (43)	98 (53)	7 (4)	0 (0)	0 (0)

ITP: Integrated teaching program

Table 3: Responses to open-ended question what was good about ITP on Nephrotic syndrome

Item (what was good about ITP on nephrotic syndrome)	Responses
	Helped in understanding the concept because we were presented by live example of nephrotic syndrome
	Helped to understand the application of basic science knowledge in health and disease
	It was good that the signs were actually shown on the patient. And if we see any patient having such signs, we can give proper diagnosis
	Case presentation concept was excellent
	This was the first patient seen of our life. Doctor–patient behavior was better understood. I was really motivated
	Case presentation helped me a lot to understand the topic in a better way
	The importance and application of all three subjects was understood
	Made us understand doctor–patient relationship, made our topics clear. Discussions were good and helped in improving topics
	Lectures were very clear and useful

ITP: Integrated teaching program

Table 4: Responses of open-ended questions give suggestions to improve ITP if any

Item (give suggestions to improve ITP if any)	Responses
	There should be two batches. The students in the last bench were having problems
	Should occur more frequently for more topics

ITP: Integrated teaching program

Table 5: FGD responses

Theme	Responses
Best points regarding the ITP conducted	Patient was shown with all signs and symptoms which gave a direct approach to a topic Helped to remember everything about the topic of nephrotic syndrome Helped to analyze the topic clinically and guided us how to approach the patient
ITP as a teaching method as compared to didactic lecture	20% students were of the opinion that ITP is better than didactic, but 80% did not agree to this. The reasons that they gave were: More than 200 students participation in ITP in a single class makes the situation chaotic Though controllable, the last benchers are not attentive at all For lecture class, we divide the students into two batches, but for ITP, the whole batch comes together, so the students are not attentive If ITP is conducted in smaller groups, it is better than lectures
Modifications to improve ITP	Make smaller groups as in PBL All the ITPs should be patient-based-like nephrotic syndrome and actual reports of the patients can also be shown The time interval of 1 week can be reduced between the sessions

ITP: Integrated teaching program, FGD: Focus group discussion, PBL: Problem-based learning

helped to analyze the topic clinically and guided them how to approach the patient. But with regards to class size, they suggested a small class size to increase the attention.

DISCUSSION

Integration is being accepted as an important educational strategy in medical education.[21] Benor had identified six parameters within the methods available for integration which included the three domains of learning (i.e., knowledge, skills, and attitude).[22] The most common method of instruction in ITP is also lecture, at last leading to passive reception of integrated information. Therefore, to engage the senses of the students and result in active learning, patient-based ITP was conceived along with inclusion of cognitive, psychomotor, and affective domains and a real case of nephrotic syndrome. In the present study, in the cognitive domain, there was a significant difference in the pre- and post-test scores ($P < 0.05$). Class-average normalized gain "g" was 46%, i.e., medium effective. Studies have incorporated case-based teaching[10,23-25] to enhance the learning experiences of students. In this study, a real patient was brought to the classroom to enrich the learning experience of the students.

In the closed-ended responses in feedback, majority of the students agreed that teaching aids were adequately used (72%), learning objectives were identified (64%), lectures were in logical sequence (49% agreed, 42% strongly agreed),

helped in understanding the concept of the topic (48% agreed, 37% strongly agreed), adequate discussion occurred (20% strongly agreed, 65% agreed), incorporation of psychomotor skills was helpful (66%), doctor–patient relationship was better understood (60% strongly agreed), and summarization was useful (53%). Discussion on a given topic was also adequate in the study by Kumari et al.[24] where 80.3% of the students gave both agreed and strongly agreed responses.

In the open-ended responses of this study, the students responded that this novel ITP made them understand the concepts and application of basic science knowledge in health and disease. Similar responses were reported by the study conducted by Kumari et al.[24] The real patient who was shown was appreciated by the students as it was the first patient that they reported to have seen. The students also appreciated the lectures. In the FGD, the students were positive about novel method, but there was an area of concern regarding the group size and the interval between the sessions. They preferred integrated teaching over didactic lectures on a condition that it is conducted in smaller groups and is always case-based-like nephrotic syndrome.

Limitations

Psychomotor and affective domains were not analyzed. There was no control group due to time constraint.

CONCLUSION

This study included real patient along with cognitive, psychomotor, and affective domain which had significant gain in the cognitive domain. The psychomotor domain incorporation was labeled as helpful by the students. The affective domain was actualized in the form of doctor–patient relationship which was appreciated by the students.

ACKNOWLEDGMENTS

We thank all the students who were the part of the study.

REFERENCES

1. Michael J. The Claude Bernard distinguished lecture. In pursuit of meaningful learning. Adv Physiol Educ. 2001;25(1-4):145-58.
2. Klionsky D. Constructing knowledge in the lecture hall. J Coll Sci Teach. 2001;31:246-51.
3. Powell K. Science education: Spare me the lecture. Nature. 2003;425(6955):234-6.
4. Lujan HL, DiCarlo SE. Too much teaching, not enough learning: What is the solution? Adv Physiol Educ. 2006;30(1):17-22.
5. Franzoni AL, Assar S. Student learning styles adaptation method based on teaching strategies and electronic media. Educ Technol Soc. 2009;12(4):15-29.
6. Craik FI, Lockhart RS. Levels of processing: A framework for memory research. J Verbal Learn Verbal Behav. 1972;11:671-6.
7. West KM. The case against teaching. J Med Educ. 1966;41(8):766-71.
8. Latif R. Impact of case-based lectures on students performance in vascular physiology module. Adv Physiol Educ. 2014;38(3):268-72.
9. Modell HI. Preparing students to participate in an active learning environment. Am J Physiol. 1996;270:S69-77.
10. Gade S, Chari S. Case-based learning in endocrine physiology: An approach toward self-directed learning and the development of soft skills in medical students. Adv Physiol Educ. 2013;37(4):356-60.
11. Smith SR. Toward an integrated medical curriculum. Med Health R I. 2005;88(8):258-61.
12. Dandannavar VS. Effect of integrated teaching versus conventional lecturing on MBBS phase I students. Recent Res Sci Technol. 2010;2(11):40-8.
13. Ghosh S. Combination of didactic lectures and case-oriented problem-solving tutorials toward better learning: Perceptions of students from a conventional medical curriculum. Adv Physiol Educ. 2007;31:193-7.
14. Ghosh S, Pandya HV. Implementation of integrated learning program in neurosciences during first year of traditional medical course: Perception of students and faculty. BMC Med Educ. 2008;8:44.
15. Vyas R, Jacob M, Faith M, Isaac B, Rabi S, Sathishkumar S, et al. An effective integrated learning programme in the first year of the medical course. Natl Med J India. 2008;21(1):21-6.
16. Harden RM, Sowden S, Dunn WR. Educational strategies in curriculum development: The SPICES model. Med Educ. 1984;18(4):284-97.
17. 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.
18. Hake RR. Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. Am J Phys. 1998;66(1):64-74.
19. Meltzer DE. The relationship between mathematics preparation and conceptual learning gains in physics: A possible "hidden variable" in diagnostic pretest scores. Am J Phys. 2002;70(12):1259-68.
20. Huberth M, Chen P, Tritz J, McKay TA. Computer-tailored student support in introductory Physics. PLoS One. 2015;10(9):e0137001.
21. Harden RM. The integration ladder: A tool for curriculum planning and evaluation. Med Educ. 2000;34(7):551-7.
22. Benor DE. Interdisciplinary integration in medical education: Theory and method. Med Educ. 1982;16(6):355-61.
23. Nair SP, Shah T, Seth S, Pandit N, Shah GV. Case based learning: A method for better understanding of biochemistry in medical students. J Clin Diagn Res. 2013;7(8):1576-8.
24. Kumari MK, Mysorekar VV, Raja S. Student's perception about integrated teaching in an undergraduate medical curriculum. J Clin Diagn Res. 2011;5(6):1256-9.
25. Bhardwaj P, Bhardwaj N, Mahdi F, Srivastava JP, Gupta U. Integrated teaching program using case-based learning. Int J Appl Basic Med Res. 2015;5 Suppl 1:S24-8.

How to cite this article: Jagzape AT, Jagzape T, Rawekar A. Patient-based integrated teaching program with the inclusion of psychomotor and affective domains. Natl J Physiol Pharm Pharmacol 2017;7(8):788-792.

Source of Support: Nil, **Conflict of Interest:** None declared.