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Clinically Oriented Physiology Teaching to Reinforce Basic Physiological Concepts

Medical Science

KEYWORDS : Medical education, physiology, integrated teaching, critical thinking

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ABSTRACT

Context: Medical education has seen major changes which redefine the role of conventional approaches. Integrated approach to basic sciences in the form of clinical case discussions will develop better comprehension of basic sciences concepts, development of clinical skills and higher order thinking.

Aims: Our study aimed to assess students' skills in critical-appraisal and level of knowledge before and after implementation of clinical oriented physiology teaching; Settings and Design: This cross sectional study was conducted in Physiology department, PSGIMS&R, Coimbatore among I year MBBS students.

Methods and Material: Teaching module consisting of case histories with set of critical thinking questions, list of learning objectives for topic in gastrointestinal physiology, students and facilitators guide were developed and validated. Faculty and students were oriented to teaching methodology. After 2 hours of didactic lecture pretest was conducted. Teaching module was implemented to the class of 120 students in three sessions. Post test was conducted to assess their knowledge after intervention. Set of critical thinking questions in the form of Short Answer Questions was administered to assess the students' ability in critical appraisal.

Statistical analysis: Students' performance before and after implementation of clinically oriented teaching were analyzed using paired t test and critical thinking ability using descriptive statistics

Results: Out of 120 students, 94 students attended three sessions of case discussions, pre and post test. Significant difference in scores of students before (8.92±2.25) and after (11.36±2.74) the implementation of clinically oriented teaching was observed with p<0.01.80% of the students had secured above 50% in assessment of their critical thinking ability.

Conclusions: Inculcating clinical oriented teaching along with didactic lectures reinforced and facilitated better comprehension and retention of knowledge among students.

Introduction

In the advent of innovations in the field of medical education there is an ultimate need for the revision of traditional medical curriculum being in practice to provide better health care providers. It is necessary to reinforce and link basic science concepts with that of respective clinical discipline to enhance knowledge retention.[1] In order to overcome short comings of traditional basic science curriculum such as lack of clinical applicability and curricular fragmentation there is need to introduce innovations in teaching strategy which supplements the didactic lectures, which fails to engage the students in active learning process.[2, 3] Our study aimed to assess students' performance before and after implementation of clinically oriented physiology teaching strategy and to assess students' skills in critical-appraisal and application of previously learned physiological concepts.

Methods

This cross sectional study was conducted in Physiology department of PSGIMS&R, Coimbatore among I year MBBS students of 2014-2015 batch. Literature review solved the paradox of the need for this study, as students' attitude towards medical knowledge has changed and are seen as passive recipients of information and as a result not engaged in the active learning process.

Teaching module

Teaching module comprises of case histories with set of critical thinking questions for topic in Gastrointestinal Physiology (Gastric secretion), students and facilitators guide and list of learning objectives were developed and validated. Lesson plan for the topic gastric secretion was framed according to university guidelines and recommendations. Specific learning objectives were developed to attain the outcome of the module

A case with three scenarios was developed; First scenario projects the history and presenting complaints of peptic ulcer patient. Second scenario gives the picture of clinical features and investigation reports. Third scenario deals with management and complications. Along with case scenarios students were given the questions which will guide them to prepare the basic physiological concepts pertaining to it. Set of critical thinking questions in the form of short answer questions (SAQs) were developed which paved way for their inquiry based learning as well as kindled their interest towards self directed learning process. Students' performance before and after incorporation of new teaching strategy was done by administering pre and post test questionnaires in the form of MCQs

Implementation of the module

This teaching module was implemented to the class of 120 students during small group tutorial sessions assigned for teaching physiology in three sessions after obtaining clearance from the Institution ethics committee. Faculty members in the department and students were given orientation about the teaching methodology. After attending two hours of didactic lecture on gastric secretion students were given with guide in form of printed material. After obtaining the informed consent from the students pre test was conducted to assess their knowledge after conventional lecture on gastric secretion. Case scenarios and set of critical thinking questions were administered and students were asked to come prepared for forthcoming sessions. During the sessions facilitator guided the students to discuss the case scenario and related physiological concepts. After three case scenarios being discussed set of critical thinking questions was administered to evaluate their higher order thinking ability.Students' level of knowledge before and after implementation of clinically oriented teaching was analyzed using paired t test. Descriptive statistics was employed to analyze their critical thinking ability.

Results

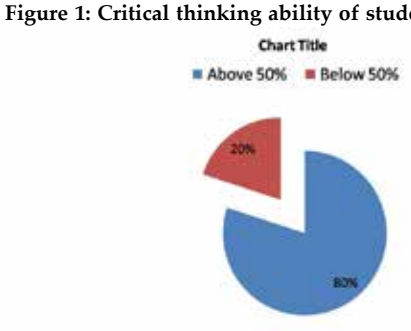
Out of 120 students recruited for the study only 96 students were able to present themselves for all three sessions of case discussions and attended both the pre test and post test. Out of those 96 students 68% were females and 32% were males. There was a significant difference in the scores of students before (8.92±2.25) and after (11.36±2.74) the implementation of clinically oriented teaching with statistically significant p value (p<0.01) (Table.1).

Mean		Paired Differences					t	df	Sig. (2-tailed)
		StdDeviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	pretest - posttest	-2.44211	2.66465	.27339	-2.98492	-1.89929	-8.933	94	.000

Table 1: Students performance after and before the implementation of the teaching module

Critical thinking questions have motivated them to learn applied physiology and improved their reasoning ability. 80% of the students had secured above 50% in the assessment of their critical thinking ability (Figure.1).

Figure 1: Critical thinking ability of students



Discussion

Integrated approach to teach basic science concepts in the form of clinical case discussions motivated and created interest among the students to learn the basic sciences.[4,5] Students had scored well in the post tests when compared to the pretest. McParland et al, also proposed in his study that undergraduate psychiatry students were able to score better after they had been introduced with problem based curriculum.[6] When they are introduced to the clinical scenarios and critical thinking questions, developed in a meaningful and relevant manner, it reinforced their theoretical knowledge and also placed them in a better position to think and apply the basic concepts to find the solution to the clinical problem and facilitated the retention of basic science knowledge. Dolmans et al has suggested that for the knowledge to be integrated with reasoning skills basic science concepts should be presented in the form of a clinical problem, [7] thus teaching basic science concepts in integration with clinical concepts will facilitate the learning to take place by activating prior knowledge among students.[8] 80% of the students secured above 50% in the critical thinking assessment test shows students are able to apply the previous learnt physiological concepts in problem solving and also guided them into analytical thinking. Early clinical exposure (ECE) involves an active, experiential learning from patients with practicing clinicians, designed to be the 'beginning of a life-time of learning focused on the patient'.[9]Most of students commented that they were very much benefitted out of this new teaching module. They appreciated that the clinically oriented physiology teaching had directed much towards their active learning process. Abramovitch Het al in his study compared two Early Clinical Exposures (ECEs) programs using student questionnaires, faculty questionnaires, focus groups and participant-observations and concluded that very high levels of satisfaction and perceived impact on medical training were attained by students, preceptors and group leaders in both ECEs.[10]

Conclusion

To conclude, this module helped the students to become self motivated learner and also enhanced active learning process and retention of knowledge among the students. It challenges the faculty engaged in these exercises to stretch their ideas on teaching methodologies. This method of teaching helps the institution to establish policy and practice the higher standard of medical education.

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