CASE BASED LEARNING" AS A TEACHING LEARNING METHOD IN AN INTEGRATED "GASTROINTESTINAL SYSTEM" MODULE.

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ABSTRACT:

Objectives: System-wise integrated curriculum for medical students is being practiced at Pramukhswami Medical College Karamsad since 2007. Cases based learning was introduced in 2012 to enhance integration and participant's perceptions towards this as a teaching learning method in integrated gastrointestinal system are shared in this work.**Methods:** Case based learning was planned and conducted in two, weekly sessions, with involvement of nine faculties from para-clinical and clinical departments. All faculties and students (n=100) were oriented to the process. A paper case and facilitator guide was developed with inputs from clinician. The students were divided in heterogeneous groups of 10-12 with one faculty as facilitator for each group. At the end of second session, students and faculty feedback was collected in an anonymous, pre-validated structured questionnaire. **Results:** Eight faculty & 82 students responded to feedback. All the students found case and time given for case discussion as appropriate. Responses on various aspects of feedback ranged from 86.5% (helping in exam preparation and organize studies) to 97.6% (helpful in clinical studies and practice). 91.5- 96.4% student felt that case discussions helped them integrate para clinical subjects, made them interesting, clinically relevant, and also helped to improve certain skills (analytical, communication, peer and self learning). These sessions were rated high in comparison to classroom case discussions (91.46% VS 73%) as a learning tool. Faculty also agreed to most of the above aspects.**Conclusion:** Thus case based learning was perceived as an effective teaching learning method in an integrated module, and is worth implementing.

Key words: Case based learning, integrated teaching, perceptions.

INTRODUCTION

Majority of Indian medical schools are following traditional, discipline wise teaching that has many times failed to develop desired quality in Indian medical graduates.**(1)** MCI document "Vision 2015" in an effort to improve the quality of health care in India has proposed many changes in the structure as well as process of training medical students.**(2)** A number of new

teaching elements have been suggested to achieve the core competencies in an Indian medical graduate (IMG), horizontal and vertical integration between disciplines is one of these new teaching elements strongly recommended in the document along with a number of professional competencies like an effective team member, communicator and a self-directed life-long learner.**(2)** De-compartmentalization of disciplines by increasing integration was also recommended in "Regulations on Graduate Medical Education, 1997"**(3).** An integrated approach to teaching medical subjects has been recommended as it has been found to be an effective educational strategy to provides contextual and holistic learning with a number of additional advantage.**(2,3,4,5)**

System-wise integrated modules have been implemented at Pramukhswami Medical College, Karamsad, Gujarat since 2007 for 2nd MBBS students where major focus is on horizontal integration along with optimal vertical integration. The subjects of pathology, microbiology and pharmacology are taught under 12 systems with a 12-16 week foundation course (that teaches the basics of these subjects) before beginning of the systems along with a miscellaneous module (for teaching of some important topics that could not be included in system-wise modules) of six to eight week at the end of completion of all the systems. There is a well-established system that has been developed with intense brainstorming followed by consensus building among various stakeholder for effective planning, implementation and review of integrated teaching modules. Each system has a team of system coordinators which is formed by a team of three or more faculty members representing pre-clinical (anatomy, physiology & biochemistry), para-clinical (pathology, microbiology and pharmacology) and clinical subjects, who work collectively as a team. Clear guidelines for system coordinators from the stage of planning, implementation, monitoring and evaluation are framed and communicated to make it an effective system.

To enhance learning in integrated manner various student centric teaching learning (TL) methods which can challenge students like case based learning (CBL), tutorial, role plays, seminars, small group discussions, hospital based projects are adopted as students learn better when challenged.**(6-10)** CBL has been identified as a method that can be challenging and enhance integration.**(8-13**) This study was planned to record perceptions of our students and faculty towards CBL as an effective TL method in an integrated module of gastrointestinal system.

Methodology:

This descriptive study was planned as an educational intervention after approval from the institutional research and ethics committee. One hundred medical students in their 2nd MBBS during June-July 2012, were included. The integrated module on gastrointestinal system runs over a period of four weeks and includes acid peptic disease, Infections of mouth, oral cavity and oesophagus, diarrhoea, dysentery, vomiting, constipation, food poisoning, infectious enterocolitis, enteric fever, inflammatory bowel diseases, GIT tumours and appendicitis. Learning objectives along with the teaching learning method for each component were finalized after discussion among faculty

from paraclinical and clinical department. CBL was planned for the most common clinical presentation in GIT system i.e. a case of increased frequency of stool to help students integrate and learn about etiological agents, pathogenesis, complications, management and prevention of the most important diseases in the form of diarrhoea, dysentery and food poisoning across all age groups in hospital as well as community. Team of GIT system coordinators along with faculty from department of microbiology, pharmacology, pathology and medicine were involved in the process of designing the paper case for discussion. One of the system coordinators also became the CBL coordinator, who observed all groups and helped them wherever needed at all times. The facilitator guide was prepared and all facilitators were explained the process before conduct of the sessions. There were nine facilitators which included four residents and five junior faculties. Though students have experienced case based learning sessions in 1st MBBS, the whole batch of students was re-oriented to the plan and conduct of CBL.**(13)**

The students were divided in nine groups with heterogeneous composition of 10-11 members with one faculty each as facilitator. The case discussions were held in two sessions of two hours each at weekly interval, after the students had been taught about various infectious agents that can involve GIT. In the first sessions, students analysed the case, brainstormed and explored their prior knowledge followed by identification of the new learning objectives. This was followed by a week of self learning period. In the second session, each student shared what they had learnt and helped each

other create linkages in the context of the clinical case given to them. Once the groups had satisfactorily completed their discussion points, the different groups were gathered to consolidate the key learning points, take home messages and clear any doubts if required by the team of faculty involved in planning and facilitation process.

At the end of second session, written feedback from students and faculty was collected in an anonymous, pre-validated, self administered structured questionnaire. This was to gather their perceptions towards the CBL sessions. The main themes around which questions were framed for students were; the overall conduct, usefulness & relevance of the case (selection of case, time and resources given, facilitation by faculty), other advantages (creating interest, development of communication skills, team spirit) and their perceptions towards its contribution in helping them integrate knowledge, their exam preparation, clinical studies and practice in future. Themes for faculty feedback were overall planning, conduct, and student's participation along with their perception about likely effect of such sessions on students learning and retention in long term. Response to questionnaire was considered as verbal consent. The feedback was ascertained on four point Likert scale (1=strongly agree, 2=agree, 3= disagree, 4= strongly disagree). Free space at the end of feedback form was provided for any comments and suggestions by the students and faculty.
Descriptive analysis of the data was performed. Responses of all the students and faculty were pooled for each statement in the feedback and expressed as mean score and percentage. Cronbach's alpha reliability coefficient was

calculated for internal consistency of responses.

Result:

Eight faculty & 82 students responded to feedback with a response rate of 88.88% and 82%. Cronbach's alpha reliability coefficient was 0.79. The responses from students and faculty are tabulated in table I & II.

As can be seen in table I, all the students found that case selected was appropriate for the system with optimum time. Mean score for students and faculty perception ranged from 1.34-1.88 and 1.5-2 respectively. Discussion during CBL was focused to achieve the learning objectives. Facilitation by faculty was found to be effective by 98.8% students but only 87.8% students found reference material suggested as relevant, adequate and useful. These discussion did help them generate questions that stimulated them to investigate the case, study about it further and also helped to improve their-self learning skill (96.4%). CBL as a method to make the para clinical subjects interesting, clinically relevant, enhancing integration and improving other skills (analytical, communication, peer and self learning) was felt by 91.5- 96.4%. Only 86.6% students agreed –strongly agreed in terms of helping them organize their studies and prepare for the examination while 97.6% students felt this would help them later in their clinical studies and practice. More than 90% students have felt that CBL provided them with the opportunity to express their thoughts and clarify doubts, cleared some difficult concepts, has worked as an effective learning tool for them and they would like have such sessions more often.

CBL session were rated high i.e. good to excellent in comparison to classroom case discussions (91.46% VS 73%) as a learning tool. Faculty also agreed to most of the above aspects. Points where disagreement was observed was in terms of students preparedness for CBL where two faculty i.e. 25% found students were not well prepared for CBL and one faculty felt it did not enhance interaction among students.

Discussion:

Learning is a complex phenomenon and a combination of strategies need to be adopted for making it an effective process. Various medical institutions across globe have adopted different curricula's to create their own learning environment. Integrated system is one of the strongly recommended approaches as it stimulates deep and lifelong learning.[4,5,8-11] Infectious Disease Society of America (IDSA) has created guidelines for improving teaching of microbiology and infectious diseases and they have identified need for integration, learning in small groups with clinical cases and peer learning as important components for enhancing learning, retention and its application in real life situations.[14]

To enhance integration various student centric activities, alone or in groups, where students are actively engaged in meaningful manner have been tried by various authors.[6,7,15,16] These activities have been found to help students enquire, engage, reflect, develop ideas, solve problems, and convert them into life long active learners.

Case-based learning (CBL) is one of such method which actively involves students, in context of a clinical case and results in development of other desired competencies like

individual and collaborative learning, critical reflection, building up of communication skills, interpersonal relationship, problem solving capacity, team learning, hypothesis generation, the consolidation and integration of learning activities**.(14,15)** This helps in deeper understanding, because it uses a guided inquiry method and provides more structure during small-group sessions and thus it is found to be an effective adjunct to the lecture format to promote students learning**.(17)**

We used CBL to enhance integration in the GIT system and both students and faculty responded positively to the intervention. Various investigators have tried to evaluate students responses to CBL through a combination of Likert Scales and questionnaires and found that CBL was enjoyed and embraced by the majority of students.**(8,10,12,13,15)**

In a study to promote active learning in microbiology by Ciraj Ali *et al,* CBL was used as the active learning strategy and students felt that it improved their understanding of microbiology (77.7 %). **(8)** Comparison of students perceptions on parameters that were measured in their and our studies are improved self-learning skills (75.3 Vs 96.4%), helped retain relevant information (77.1 Vs 93.9%), improve communication skills (57.2 Vs 91.5%) and analytical skills (69.2 Vs 95.1%) respectively. In their study 78.92% students found it as an effective learning tool, which was 92.7% in our study and students wanted to have such session more often. In our study CBL as a method to make the para clinical subjects interesting, clinically relevant that enhanced integration was felt by 93.9% students. CBL session were rated high in comparison to

classroom case discussions (91.46% Vs 73%) as a learning tool by our students. We had 86.6% students finding CBL useful in terms of helping them organize their studies and help them prepare for the examination while only 62.6% students felt that CBL would help them face examination in study by Ciraj Ali *et al*. **(8)** Majority of the students (97.6%) felt that CBL would help them later in their clinical studies and practice, which is one of the most important perception.

In a previous study in our institute conducted in anatomy has also recorded positive perceptions of students.**(13)** Students found CBL as a method of improving understanding of subject (62%), increased interaction (74%), and can be used to teach other subjects (61%). Most of students agreed that such sessions can help them perform better in clinical practice in later days (87%) in comparison to helping them perform better in exams.

Wing Pong *et al* in their Case-Based Integrated Teaching (C-BIT) program collected perceptions from two batches of students and have reported that 30.2 & 40.4% students felt CBL can help in integration of curriculum. **(10)** They also found it to be a method that could increase communication (52, 60.9%), promote active learning (56.7, 61%) and can be overall helpful in their learning (40.2, 43.8%) respectively. Most of their students agree that C-BIT can integrate different unit courses, enhance communications and promote an attitude of active learning. **(10)**

Nathoo AN *et al* created and assessed an Interactive Case-based Online Network (ICON) as a web-based innovation in medical education and found that it allowed students to interact

with each other, faculty and a virtual patient in difficult neurological cases. **(16)**

Self learning module (SLMs) improved understanding and facilitated learning of basic science concepts as perceived by 97% students in a study by Khalil MK *et al.* **(18)** and as mentioned by Malau Aduli *et al,* CBL can help students understand clinical relevance of basic sciences which may improve the retention with better clinical application in future. **(9)**

Thus student's perceptions of CBL in any format as reported in various studies has supported these views and have indicated that CBL can help in acquisition of multiple skills necessary for a student and a future health professional apart from making learning an interesting and participatory process and must be incorporated as an important teaching learning method.

Conflict of interest: Nil

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Table I.Perceptions of students towards CBL as a teaching learning method in integrated gastrointestinal module in an Indian medical school, Gujarat, India 2012 (n=82)

Feedback Statement	Strongly agree n (%)	Agree n (%)	Disagree n (%)	Strongly disagree n (%)	Mean score
Case selected was appropriate for the system	51 (62.2)	31(37.8)	00	00	1.38
Time allotted to the case was optimum	40(48.8)	42(51.2)	00	00	1.51
The reference material suggested for the case was relevant, adequate and useful.	30(36.6)	42(51.2)	10 (12.2)	00	1.76
Faculty present during the session facilitated the discussion effectively.	55 (67.1)	26 (31.7)	1(1.2)	00	1.34
Discussion during CBL was focused to the learning objectives of the case	51 (62.2)	31(37.8)	00	00	1.38
CBL has helped me generate questions that stimulated me to investigate the case and study about it further.	34 (41.5)	45 (54.9)	2 (2.4)	1(1.2)	1.63
CBL would improve my-self learning skill	39 (47.6)	40 (48.8)	2 (2.4)	1(1.2)	1.57
CBL would improve my communication skill	35 (42.7)	40 (48.8)	6 (7.3)	1(1.2)	1.67
Discussions during CBL session has enhanced my analytical skill	33(40.2)	45(54.9)	3(3.7)	1(1.2)	1.88
CBL provided the context that helped me retain & integrate relevant information given in lectures of microbiology, pathology and pharmacology and made the subject interesting.	36 (43.9)	41 (50)	4 (4.9)	1(1.2)	1.63

CBL has helped me organize my studies.	28 (34.1)	43 (52.4)	9 (11.1)	2 (2.4)	1.82
CBL provided opportunity to express my thoughts and clarify doubts	38 (46.3)	38 (46.3)	5 (6.2)	1(1.2)	1.62
CBL helped me understand better some difficult concepts by listening to my friends discuss it.	36 (43.9)	40 (48.8)	5 (6.2)	1(1.2)	1.65
CBL helped me understand difficult concepts by explaining it to my friends.	36 (43.9)	40 (48.8)	5 (6.2)	1(1.2)	1.65
CBL helped me work better with other members of the group	33 (40.2)	46 (56.1)	5 (6.2)	2 (2.4)	1.8
CBL as a whole has worked as an effective learning tool for me.	37(45.1)	39 (47.6)	4 (4.9)	2 (2.4)	1.65
CBL would help me prepare for the examination	37 (45.1)	34 (41.5)	7(8.5)	4 (4.9)	1.73
CBL would help me later in my clinical studies and practice	51(62.1)	29 (35.5)	1(1.2)	1(1.2)	1.41
I would like to have CBL sessions at regular interval in other systems also.	44 (53.7)	32 (39)	4 (4.9)	2 (2.4)	1.56