



INTRODUCING VERTICAL INTEGRATED TEACHING FOR 3RD M.B.B.S. PHASE II STUDENTS

Nitin R. Mudiraj¹, Priya S. Patil², Manisha R. Dhobale³

¹Professor, Department of Anatomy, Bharati Vidyapeeth Deemed University Medical College & Hospital, Sangli; ²Assistant Professor, Department of Anatomy, Bharati Vidyapeeth Deemed University Medical College & Hospital, Sangli; ³Associate Professor, Department of Anatomy, Bharati Vidyapeeth Deemed University Medical College & Hospital, Sangli.

ABSTRACT

Aims: Current medical education imparts knowledge in a disjointed manner so that it is difficult for undergraduates to co-relate information in clinical context. The aim of this study was to introduce vertical integration for undergraduate medical students and to analyse its impact on the students and faculty.

Materials and Methods: An innovative Vertical integrated teaching module was carried out at our Medical College with the co-operation of Surgery and Anatomy departments. Framing of proposed time table and curriculum design was done. 40 students and 19 faculties participated in this project. Pre-test and post-test assessment was carried out after each session. A separate questionnaire was given to students and faculties for their feedback.

Result: Statistical analysis showed that there was a significant improvement in the students' mean scores, knowledge and understanding level. The students were highly satisfied with this method of teaching and interestingly 95 % of students showed positive behavioural changes. The response of the faculty was of mixed type but most of them responded positively to the exercise of integrated teaching.

Conclusion: We conclude that vertical integrated teaching in a medical curriculum is found to facilitate attainment of knowledge and improve the affective and psychomotor domains along-with creating a positive behavioural change in the students. The results of VIT are encouraging so that it can be expanded to many more topics to enable a smooth transition from traditional to integrated teaching over the coming years

Key Words: Vertical integrated teaching, Medical curriculum, Curriculum design

INTRODUCTION

Current medical education imparts knowledge in a disjointed manner. The undergraduate students are unable to co-relate and analyse information and aptly use it in clinical context. Vertical integration is defined as the integration between the clinical and basic science sections of the curriculum.^[1,2] Integration can occur throughout the curriculum with the basic medical and clinical sciences beginning in the early years of the curriculum and continuing until the later years.^[1] Integrated teaching is considered as the best reform in the medical curriculum.^[2] It is found to be beneficial in facilitation of attainment of knowledge. It enables the students to correlate the topic taught in a clinical subject to biological principals and mechanisms, as taught in basic medical sciences. It is

thought to enhance the skill of clinico- pathological correlation and also help to improve the cognitive and psychomotor domains of the students.^[3] In 1997 the regulation on undergraduate medical education recommended efforts to encourage integrated teaching between the traditional subject areas.^[2] Using a problem based learning approach would avoid compartmentalization of various disciplines and achieve both horizontal and vertical integration in the different phases.^[3,4] Considering this the present study was undertaken with the aim of introducing the method of vertical integrated teaching [VIT] for undergraduate medical students and to analyse its impact on students' knowledge level and components of affective domain (satisfaction level and behavioural changes) as well as to assess the impact of VIT on the faculty.

Corresponding Author:

Nitin R. Mudiraj, Professor, Department of Anatomy, Bharati Vidyapeeth Deemed University Medical College & Hospital, Sangli;
E-mail: dr.nitinmudiraj09@gmail.com

Received: 02.08.2016

Revised: 20.08.2016

Accepted: 13.09.2016

Methodology

An innovative vertical integrated teaching module was carried out at our Medical College with the co-operation and active participation of departments of Surgery and Anatomy.

Framing of proposed time table: The head of departments and faculty from departments of Surgery and Anatomy together framed a time table. At the same time the faculty was sensitized regarding such an activity. The interested faculty volunteered to conduct the sessions.

Work flow charts and curriculum design: Curriculum committee consisted heads of department of Anatomy and Surgery. Series of meetings were held and the four topics selected for Vertical integrated teaching were Anatomy and Surgery of inguinal canal, mammary gland, venous drainage of lower limb and thyroid gland. The time-table was finalized accordingly.

Implementation and execution: 40 students and 19 faculties participated in this project. Pre-test and post-test assessment was carried out for each vertical integrated session. A separate questionnaire was given to students and faculty for their feedback on such integrated teaching methodology.

Observations

The data obtained from the pre and post-test questionnaire and feedback from students and faculties was analysed statistically. The observations were tabulated and results were drawn.

RESULTS

Impact of VIT on Students: Statistical analysis of the pre-test and post-test questionnaire was performed to assess the impact of VIT on students at three different levels through separate questionnaires. The following levels were assessed and analysed.

- i. Knowledge level
- ii. Satisfaction level
- iii. Behavioural change

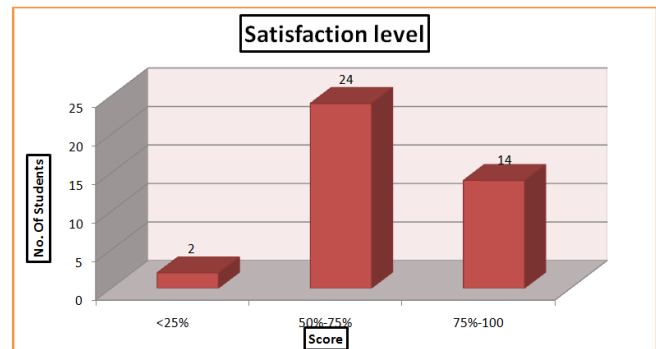
Impact of VIT on Faculty: The perception of faculty regarding VIT and their feedback was taken through questionnaire and was also analysed.

i] **Assessment of knowledge level:** Statistical analysis of the pre-test and post-test questionnaire showed that there was a significant improvement in the mean scores of students as well as their knowledge and understanding level. The p value was < 0.001 which was statistically highly significant. [Table 1]

Table 1: Assessment of students' knowledge level after VIT

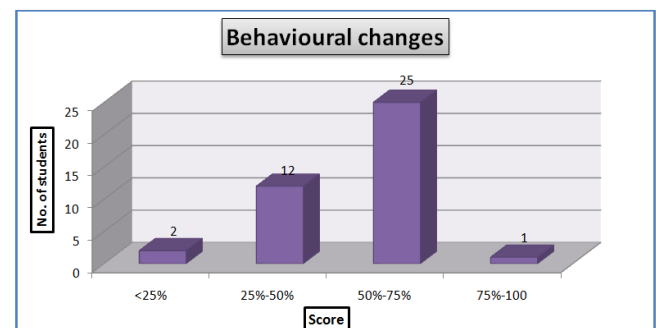
Response of students	Mean	Std. Deviation	Std. Error Mean	T	p value
Pre-Test	5.80	1.65	0.26	-8.473	0.000
Post-Test	8.23	1.95	0.31		

ii] **Assessment of satisfaction level:** On the basis of the feedback of students it was seen that 35 % students were highly satisfied and 60 % were satisfied with vertical integrated teaching program while only 5 % students felt that it did not matter to them, as shown in Graph 1.



Graph 1: Assessment of Satisfaction level of students after VIT

iii] **Assessment of behavioural change:** The behavioural changes were divided into three categories as follows- those showing no or slight behavioural change, positive change and excellent behavioural change. 65 % students showed excellent behavioural change, 30 % showed positive change while 5 % students showed no behavioural changes. Graph 2



Graph 2: Assessment of behavioural change of students after VIT

iv] **Assessment of faculty:** The response of the faculty was of mixed type. 35 % responded positively to the exercise of sequential teaching. 64 % faculty revised the basic of Anatomy, Physiology and other subjects prior to the lecture. 94% faculty agreed that Anatomy is a conjoint subject for Surgery. 82% faculty supported the fact that integrated teaching

brought about favourable behavioural changes in students, 70 % felt that such teaching sessions made students more inquisitive and 94 % agreed that students' queries were more relevant after vertical integrated teaching.

DISCUSSION

Curriculum renewal through integration is promoted by many medical educational organizations. The challenge that we as educationists face today is the successful integration across medical disciplines in order to obtain maximum benefit to our students. [5] Vertical integrated teaching [VIT] involves the combination and correlation of basic sciences knowledge to clinical scenarios so as to deepen the understanding and stimulate advanced learning and problem solving attitude. [6,7] Such an approach might aptly be called as holistic learning as it adds to student perception as well as satisfaction. In our study we have also seen that VIT brings about changes in student's attitude towards learning and positive changes in their behaviour.

In this study while assessing the impact of VIT on knowledge level of the students it was seen that VIT improved the knowledge level and student performance so that it was superior to traditional teaching to some extent. It makes understanding of the topic easier and correlation of clinical cases with basic science knowledge gives clarity of concepts.

Though these are the advantages of VIT there are a few shortcomings too. Integration cannot be applied to all topics and many times integration leads to content overload as too much knowledge is given in short period of time. Similar observations are noted by other authors in their studies. [1,3,4]

Success of any innovative teaching learning method depends on satisfaction of both the teacher or facilitator and the student or benefactor. In this study we assessed the faculty feedback in relation with the relevance of VIT, the usefulness of integration, change in students' behaviour and attitude in class as well as their perception in terms of preparation of the topic, efforts and time required and whether such activity could be continued in future. Almost all the faculty involved in this module agreed that integrated teaching required more efforts in planning of the session; it is time consuming and needs devotion to execute it successfully. Hence only enthusiastic and voluntary faculty if involved can do the proper planning, organization and execution of VIT to make the sessions more interesting and rewarding. In the studies by other authors like Vidic et al, Bryhildsen et al have also emphasized on efforts of faculty, need for interdepartmental cooperation and time and effort needed for integrated teaching. [8,9]

The students on the other hand were highly satisfied with VIT and 95% students found integrated teaching rewarding.

They were happy with the planning and execution of the VIT module and thought that the interaction with the teachers helped them to get their ideas clear. The topics were well balanced, information was relevant and it encouraged their critical thinking. Most of the studies have also agreed that students found such integrated teaching sessions helpful in their bedside clinics. [4,5]

Interestingly in the present study 95 % of students showed some positive behavioural changes. These were assessed through the questionnaire which highlighted their shift in attitude towards teaching learning. Most of them positively accepted that VIT enhanced their critical thinking, motivated them to modify their method of study and improved their approach to difficult topics. VIT made them more curious to explore topics in depth and this helped to uplift their confidence. Such an aspect of integrated teaching is not dealt with by many authors and it forms an asset of our study.

The results of introducing integrated teaching to final year MBBS students are promising as they show some obvious advantages like: a) integration reduces fragmentation and compartmentalization of topics, b) it prevents repetition and c) stimulates students to apply knowledge to clinical concepts. Some of the advantages for the faculty involved are integration promotes interdepartmental collaboration and rationalization of teaching resources. However some difficulties that could be encountered during planning of such sessions are that it requires cooperation of faculty and additional inputs from them. The students also may feel burdened and there is paucity of data on long term benefits of integrated teaching. We are now prepared to introduce such modules for many more topics and more studies in the near future will help us to be ready for a transition from traditional to integrated teaching for undergraduate medical students.

CONCLUSION

We conclude that vertical integrated teaching [VIT] in a medical curriculum is found to facilitate attainment of knowledge and improve the affective and psychomotor domains along with creating a positive behavioural change in the students. The present era requires a paradigm shift from independent to interdependent teaching to develop competent medical graduates. VIT is encouraging, so that it can be inculcated in the curriculum and enable a smooth transition from traditional to integrated teaching over the coming years.

ACKNOWLEDGEMENT

Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors/

editors/publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed. I sincerely thank the institute as well as all the students, colleagues, office clerk and non-teaching staff for their co-operation during this study.

Sources of funding: Nil

Conflict of interest: Nil

REFERENCES

1. Nazish Rafique. Importance of vertical integration in teaching and assessment of physiological concepts. *Journal of Taibah University Medical Sciences* 2014; 9(4), 282-288.
2. Medical Council of India (1992) Recommendations of the workshop on Need based Curriculum for undergraduate medical education, MCI: New Delhi.
3. Joglekar S., Bhuiyan, P.S. & Kishore, S. Integrated Teaching—our experience, *Journal of Postgraduate Medicine* 1994, 40, 4, pp 231-232.
4. Kalpana Kumari M. K., Vijaya V. Mysorekar, Seema Raja. Student's Perception About Integrated Teaching In An Undergraduate Medical Curriculum *Journal of Clinical and Diagnostic Research*. 2011 November (Suppl-1), Vol-5(6): 1256-1259
5. David G. Brauer, Kristi J. Ferguson. The integrated curriculum in medical education: AMEE Guide No. 96. *AMEE GUIDE* 2015, 37: 312–322.
6. Rajan SJ, Jacob TM, Sathyendra S. Vertical integration of basic science in final year of medical education. *Int J App Basic Med Res* 2016;6:182-5.
7. Vyas R, Jacob M, Faith M, Isacc B, Rabi S, Satish Kumar S, Selvakumar D, Ganesh.A. An effective, integrated learning programme in the first year of the medical course. *The National Medical Journal of India*. 2008; 21:1-6.
8. Vidic B, Weitlauf HM. The horizontal and vertical integration of academic disciplines in the medical school curriculum. *Clin Anat* 15:233-5.
9. Brynhildsen J, Dahle LO, Behrbohm Fallsberg M, Rundquist I, Hammar M. Attitudes among students and teachers on vertical integration between clinical medicine and basic science within a problem-based undergraduate medical curriculum. *Med Teach* 2002;24:286-8.

Questionnaire prepared according to Likert scale

Sr. No	Questions to assess the level of satisfaction of students	Questions to assess the Behavioural Change in students	Questions to assess the feedback of Faculty
1	Module was well organized	I remember clinical anatomy & its clinical relevance taught in 1 st MBBS completely	The exercise of sequential teaching is burden
2	Facilitators gave clear explanations and relevant information	This mode of teaching and assessment motivated & helped critical thinking	The basic of Anatomy, Physiology, biochemistry, Pharmacology & Pathology are usually revised before clinical sessions
3	Facilitators interacted with the students	This mode of teaching would be helpful in the future years for better understanding of the clinical concepts	Anatomy is a conjoint subject for surgery
4	Facilitator encouraged critical thinking	This mode of teaching will make me more confident	Favourable behavioural changes are noticed in students
5	Facilitator encouraged participation	This mode of integrated teaching has improved my method of study	The students are now more inquisitive
6	Teaching Anatomical concepts in integration with clinical scenarios is a better approach than the traditional teaching	This mode of integrated teaching has made me more curious to explore the topic in depth	Students' queries are more relevant after this module
7	Integrated approach makes learning and understanding easy		This mode of teaching has restricted the freedom of teaching
8	Your present knowledge level after integrated teaching has improved		Dependency and involvement of preclinical departments is usually not required
9	In this module there was a good balance between basic & clinical concepts		This mode of teaching is time consuming
10	This integrated mode of teaching and assessment be continued in future		Assessment of anatomical knowledge by the use of clinical scenario based questions is a better way of judging the knowledge of the students
11.			This integrated mode of teaching and assessment be continued in future