

Combination of Didactic Lecture with Problem Based Learning Sessions in Anatomy

Vaishali V. Inamdar*, Gourav Dadarao Thakre**

Abstract

Anatomy is a highly dynamic science. It is based on factual knowledge and functional correlation and thinking. For centuries it has been regarded as one of the recognized basic biomedical science. In the traditional method of medical curriculum, anatomy is taught in the first year of the course and involves little interdisciplinary interaction. Anatomy is an important basic science that if deficient in, the student may feel inadequately prepared for clinical courses thus, pinpointing the best teaching method warrants investigation. In recent years many researchers worked on Problem Based learning and found that PBL inculcates better understanding, self-directed learning and analytical skills in students [1]. Also it develops problem solving attitude and analytical skills in students. If PBL is included in the curriculum of basic sciences like Physiology, it can help students to apply knowledge of anatomy in clinical practice [2]. However, recently, most of the medical colleges of other countries have adopted a student-centered, problem-based, integrated, community-based, elective-oriented, systematic (SPICES) medical curriculum [3]. So an attempt was made to combine didactic lecture with problem based learning & observe its effect as a teaching module in anatomy.

Keywords: Didactic Lecture; Problem-Based-Learning; SPICES; Anatomy.

Introduction

Anatomy teaching is an essential part of medical education. It faces tremendous Criticism regarding curriculum design, methods of implementation, and application of knowledge in clinical practice. In the traditional method of medical education, anatomy is taught in the first year and involves little interdisciplinary interaction. Many medical colleges in other countries are teaching along the lines of the student-centered, problem-based, integrated, community-based, elective-oriented, and systematic

(SPICES) medical curriculum. For a particular topic, objectives are clearly defined and priority content areas are identified. Overviews given in a didactic lecture class to the entire batch of 100 students. Tutorial classes are conducted thereafter with smaller groups of students (25/batch) divided further into five subgroups of five students each. In these sessions, a problem is presented to the students as a focus for learning or as an example of what has just been taught. Each problem was accompanied with relevant questions to streamline the students' thought processes. A tutor is present throughout the session not as an instructor but as a facilitator of the learning process. A questionnaire sought students' opinion on the usefulness of this approach, relevance of the combination of problem-based learning (PBL) sessions and didactic lectures in understanding a particular topic and relating clinical conditions to basic mechanisms. The majority of the students opined that the combination of didactic lectures and PBL sessions was definitely beneficial regarding all the above-mentioned aspects of learning. Thus it may be considered that a judicious mixture of didactic lectures and PBL sessions is beneficial as a teaching module

Author's Affiliation: *Associate Professor, Dept. of Anatomy, Dr Shankarrao Chavan Government Medical College (Dr S.C.G.M.C.), Nanded (Maharashtra). **Assistant Professor, Dept. of Anatomy, Shri Shankaracharya Institute of Medical Sciences (S.S.I.M.S.), Junwani, Bhilai (Chattisgarh).

Corresponding Author: Vaishali V. Inamdar, "Sankarshan" 115 & 116, Konark-Vihar Society Pawdewadi Road, Nanded 431602, Maharashtra.
E-mail: kulkarnivaishali19@gmail.com

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of anatomy in medical colleges.

Problem Based Learning

Problem based learning (PBL) has been defined as an educational method which uses carefully constructed clinical problems as a context for students to learn problem solving skills and acquire knowledge about the basic and clinical sciences [4]. McMaster University, pioneers in the problem based learning (PBL) approach, describes PBL as “a pedagogical approach, which uses cases, and problems as the starting point for acquiring the desired learning objectives” [5]. PBL is also stated to be an educational format that is centered on the discussion and learning that emanates from a clinically based problem [6]. It involves the use of clinical problems to motivate students to identify and apply research concepts and information to realistic situations, work collaboratively, and communicate effectively [7]. PBL is student-centered, encouraging students to become more thoughtful problem-solvers. It promotes life-long habits of active learning: the most effective technique for learning, applying, integrating, and retaining information. It is now a well-established method of facilitating basic science education intended for clinical application [8]. Overall, it can be said to promote self-directed learning. Traditional medical curricula which stresses on conservative lecturing and memory based learning, is passé. From its uncertain beginnings around 40 years as a novel teaching strategy in a few established medical schools worldwide, PBL has become relatively mainstream, though not in India.

History

The idea of problem based learning came from Case Western Reserve University in the mid 1950s [9-11]. It was disseminated due to the work of Harold Barrows, a professor at McMaster University, Canada, over the late 1960s.(12-14) In 1974, The Maastricht University became the first in Europe to integrate PBL into course work. At the turn of the 20th century, nearly 150 medical schools worldwide (around 10% of the total number present) had integrated problem-based learning into their curricula [15].

Process

PBL places emphasis not only on the content of what is to be learned, but also the learning process [16]. There are some essential components of PBL which are as follows [17-21]:

(i) There is a *problem* which acts as a “trigger” for

the session

- (ii) *Participants* (students) have discussions in *small groups* for a period of time.
- (iii) A *tutor* guides the learning process, which occurs through PBL sessions.
- (iv) *Lectures* are reduced and only form a part the curriculum.
- (v) *Self-initiated* learning is encouraged.
- (vi) *Self-study* is a crucial part of the process.

The Maastricht University formulated the “seven jump” sequence which is a chief method to execute PBL sessions. The steps in this sequence are as follows:

1. Clarify and agree working definitions and unclear terms and concepts.
2. Define the problems; agree which phenomena need explanation.
3. Analyze the problem (brainstorm)
4. Arrange possible explanations and working hypotheses
5. Generate and prioritize learning objectives
6. Research the learning objectives
7. Report back, synthesize explanations, and apply newly acquired information to the problem [17-21].

An important aspect of the PBL is teaching basic sciences in the context of a clinical problem, whether real or hypothetical. This serves two goals: to make knowledge more relevant and retrievable, and to foster the development of specific reasoning [22].

In PBL, learners come across a problem and make an effort to solve it with information they already possess allowing them to understand what they already know. They also identify what they need to learn to better appreciate the problem and how to resolve it.

Once they have worked with the problem as far as possible and identified what they need to learn, the learners engage in self-directed study to research the information needed finding and using a variety of information resources (books, journals, reports, online information, and a variety of people with appropriate areas of expertise). In this way learning is personalized to the needs and learning styles of the individual.

The learners then return to the problem and apply what they learned to their work with the problem in order to more fully understand and resolve the problem. After they have finished their problem work

the learners assess themselves and each other to develop skills in self assessment and the constructive assessment of peers. Self-assessment is a skill essential to effective independent learning. The responsibility of the teacher in PBL is to provide the educational materials and guidance that facilitate learning. The principle role of the teacher in PBL is that of a facilitator or educational coach (often referred to in jargon of PBL as a “tutor”) guiding the learners in the PBL process. As learners become more proficient in the PBL learning process the tutor becomes less active.

Objectives of PBL

1. Develop an ability to identify relevant health problems that warrant further discussion or self study within the context of a clinical scenario present as a “patient problem”
2. Develop an appreciation for the interrelated nature of the physical, biological and behavioral mechanisms that must be considered with each health problem during the process of generating a management plan.
3. Develop the knowledge base necessary to define and manage the health problems of patients, including the physical, emotional and social aspects, within the context of effective health care provision within the society.
4. Reinforce the development of an effective clinical reasoning process including the skills of problem synthesis, hypothesis generation, critical appraisal of available information, data analysis and decision making.
5. Cultivate the skills necessary to become self directed as a learner, acknowledging personal educational needs and those of group members, and making effective use of available learning resources.
6. Function effectively as an active participant within a small group engaged in learning and the provision of health care.
7. Recognize, develop and maintain the personal characteristics and attitudes necessary for a career in the health professions including the following:
 - Awareness of personal assets, limitations and emotional reactions.
 - Responsibility and dependability.
 - Ability to relate to, and show concern for other individuals and
 - The evaluation of personal progress that of other group members and the group processes itself.

Aims & Objectives

1. The aim of the present study was to try and evolve systems of teaching and learning so that the students could adopt a problem-solving approach by applying the concepts and principles of anatomy to clinical problems [23].

2. It was also aimed at finding out whether a judicious mixture of the didactic lectures and problem-based learning (PBL) sessions would be a better option for making the students understand the anatomical concepts related to clinical cases.

Methodology

This study was performed on the batch of first year students, who were studying the endocrine system gross anatomy, microanatomy & embryology at the time the study was being performed. The entire batch consisted of 100 students from different states. First, didactic lectures on a particular topic were taken. The batch was then divided into smaller groups of 25 each, and tutorial classes were conducted for them. Each small group of 25 came to the class 1 day every week. Every day that these 25 students turned up, they were further subdivided into five groups of five students each. There were absentees, but they were not regular absentees, so they underwent the same training in class at some point. Each batch was given a clinical problem in which the symptoms of a particular endocrinological disorder were made very clear, and some questions were given following the said problem. This was done to ensure that students who had just entered medical college will think in an organized fashion. The problems were brief, correctly formulated, and framed in such a way that they matched the students’ level of previously acquired knowledge [24,25]. One such clinical problem was given; students were given enough time to study the particular problem with reference to the accompanying questions. They discussed among themselves and followed the basic textbooks of anatomy, physiology and biochemistry and some books of clinical medicine depending on what was the case given. They finally arrived at some conclusion regarding the answers to the questions. A tutor was present throughout the class. He went around from table to table to each of the five subgroups and facilitated the learning process of each student [26]. The tutor did not instruct as to how to solve the questions or where in the book they will find the relevant answers. He just streamlined the thought processes of the students by discussing the answers to which the students have arrived and clarifying if

there is any controversy regarding a question.

There was the possibility of some students hiding and not participating in the program. But because the batch of 25 was further subdivided, it was easy for the tutor to keep an eye on almost all of them and force them to work. Despite this effort, 1-3% still hid, and these were the students who stated that the PBL sessions were not useful.

After the tutorial classes on the whole of the endocrine system were over, the students were given a questionnaire about their opinions.

Observations & Results

Questionnaire (Appendix)

The questions were framed in such a way that yielded responses regarding

- usefulness of didactic lectures, PBL in anatomy tutorial classes, and a judicious mixture of both in the context of understanding the system they are currently studying (Table 1).

Table 1: Response of students regarding the usefulness of didactic lectures, PBL in the anatomy tutorial classes, and a judicious mixture of both in the context of understanding the system they are currently studying. Responses of the in relation to question number 1, 2 & 10 are taken into consideration

	Very Useful	Useful	Not Useful
Didactic lecture	34%	58%	08%
PBL (anatomy tutorial)	51%	45%	04%
Didactic lecture + PBL (anatomy tutorial)	80%	13%	07%

Table 2: Response of students regarding the relevance of PBL in the anatomy tutorial classes and a mixture of didactic lecture and tutorial in the context of relating the clinical condition to the basic mechanism. Responses of the in relation to question number 3,6,7,8 & 9 are taken into consideration

	Yes	No	To some extent
PBL (anatomy tutorial)	75%	01%	24%
Didactic lecture + PBL (anatomy tutorial)	80%	07%	13%

Table 3: Response of whether students had valuable exchange of ideas in small-group discussions in the anatomy tutorial classes and whether this would help them to perform better on the university examinations. Responses of the in relation to question number 4,5,11, & 12 are taken into consideration

	Yes	No	To some extent
Exchange of ideas	61%	04%	35%
Better performance in university examinations	66%	03%	31%

- Relevance of PBL in anatomy tutorial classes and didactic lecture + anatomy tutorial classes in the context of relating the clinical condition to the basic mechanism (Table 2)
- Whether there had been valuable exchange of idea in small-group discussions in the tutorial classes and whether this would improve their performance in the university examination (Table 3).

Discussion

Anatomy has historically been a cornerstone in medical education regardless of nation, racial background, or medical school system. By learning gross anatomy, medical students get a first "impression" about the structure of the human body which is the basis for understanding pathologic and clinical problems. Although the importance of teaching anatomy to both undergraduate and

postgraduate students remains undisputed, there is currently a relevant debate concerning methods of anatomy teaching. In the past century, dissection and lectures were its sole pedagogy worldwide. Recently, the time allocated for anatomy teaching was dramatically reduced to such an extent that some suggest that it has fallen below an adequate standard. Traditional anatomy education based on topographical structural anatomy taught in lectures and gross dissection classes has been replaced by a multiple range of study modules, including problem-based learning, plastic models or computer-assisted learning, and curricula integration [27].

Medical Education in India still follows the traditional pattern with efforts by some progressive institutes to pursue newer options. Medical schools in the country have not yet permanently adopted PBL into their syllabi. The Medical Council of India, driven by the observation of a gap between the qualitative and quantitative advancement in medical education and achievements in the field of health care, adopted

the "Regulations on Graduate Medical Education, 1997". It endorses a teaching methodology in which emphasis is placed on encouraging integrated teaching. Traditional teaching is carried out with a PBL approach. There is a reduction in compartmentalization of disciplines so as to achieve both horizontal and vertical integration in various stages. MCI However, it has not released encourages integrated teaching using the PBL approach. Any mandatory guidelines regarding the same.

However, over the majority of the country, PBL is still at a premature stage [28].

Due to unavailability of published data on combination of didactic lecture followed by PBL session on the same topic the results could not be discussed. However according to feedback of the students a didactic lecture followed by PBL session on the same topic helped them to understand the topic more thoroughly motivated them to read more. Students also commented that they could remember the topic better & it helped them to integrate their knowledge.

Eighty percent of the students in the study were of the opinion that a judicious mixture of the didactic lecture and PBL in the anatomy tutorial classes were very useful in understanding the system that they were currently studying. Only 7% felt that this combination was not useful. More than 60% felt that small group discussions led to better exchange of ideas and may help them to perform better in the final examination.

More than 70% of the students opined that the anatomy tutorial classes were helpful in the context of relating the clinical condition to the basic mechanism.

Summary & Conclusion

Anatomy is a distinguished scientific discipline by its emphasis at all levels of organization and its thorough understanding in the study of all the branches of medicine is essential. This study was performed on batch of 100 first year students; a didactic lecture on a particular topic was followed by tutorials on clinical problem on the same topic for which students were divided into smaller groups of 25 each which were further divided into 5 groups of 5 students each. There was a tutor for each subgroup who facilitated the learning process of the students. Then a questionnaire was given to the students & the responses given by the students were analyzed. Eighty percent students opined that judicious mixture

of didactic lecture followed by PBL session helped them to understand the clinical problem & the underlying basic mechanism more clearly.

There is no single method of teaching that can ensure thorough understanding of a topic among the students. However, a judicious mixture of didactic lectures and PBL sessions in the tutorial classes may be considered to be important in that it may

- Motivate the students toward self-directed learning.
- Give them a defined objective along the line of which they will be able to have a constructive approach to apply the knowledge of anatomy to various clinical conditions

This will ultimately be beneficial for their entry into the clinical phase and finally patient management.

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