

Students' perceptions about the use of case based learning during dissections in an Indian medical college

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SUMMARY

A good knowledge of anatomy is essential to ensure safe and efficient clinical practice. The Medical Council of India (MCI) in its 'Vision 2015' document emphasized the need for early clinical exposure (ECE) and recommended that there should be sufficient clinical exposure and an integration of basic sciences with the laboratory and clinical sciences. Literature shows that clinical case scenarios can encourage student learning and motivate them for self-directed learning. The aim was to introduce case-based learning during dissection in anatomy by formulating clinical case scenarios with focused questions based on the applied anatomy related to the dissected region. Hundred and fifty first-year medical students were divided as six groups of 25 each. One group was exposed to four paper-based clinical scenarios in each of the regions that were dissected, namely the upper limb, lower limb, thorax, abdomen, pelvis, head and neck and neuroanatomy. Group discussions were subsequently conducted by the faculty. Anonymous feedback regarding students' perceptions of various aspects of case based learning (CBL) were obtained through a questionnaire designed for this purpose. The reliability of the questionnaire was found to be satisfactory (Cronbach's alpha of 0.70). Almost all students felt that CBL helped

them in understanding the subject, more than 95% were motivated to learn anatomy and recommended the method for future dissections and more than 90% felt that CBL was interesting and interactive. To conclude, anatomy will be better understood, retained and practically applied if the clinical significance is highlighted using case-based scenarios in teaching.

Key words: Early clinical exposure – Case-based learning – Anatomy – Dissection

INTRODUCTION

A good knowledge of anatomy is essential to ensure safe and effective clinical practice (Bergman et al., 2013). The transition from school to medical college is difficult for students, because of the vast amounts of information that they suddenly need to assimilate in the first year. This is especially true for anatomy, which requires the learning of a whole new vocabulary. In the current medical education system in India, the study of anatomy is almost entirely restricted to factual information rather than application and problem solving. Anatomy would be better understood, retained and later practically applied, if its clinical significance is emphasized (Dornan and Bundy, 2004). Full realization of the importance of anatomy comes only after extensive clinical exposure.

The Medical Council of India (MCI) in its 'Vision 2015' document emphasized the need for early clinical exposure (ECE). This document recommended that there should be sufficient clinical ex-

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posure and an integration of basic sciences with the laboratory and clinical sciences. It also suggested the introduction of clinical case scenarios for student learning as a coordinated effort by pre-clinical, para-clinical and clinical faculty (MCI Vision 2015 document). The goal of ECE is to highlight the role of basic sciences in understanding the clinical manifestations of diseases and patient management (Dyrbye et al., 2007). An added advantage of ECE is that it can be used to sensitize students to aspects of professionalism and ethical practice at the very beginning of their careers. These initiatives will motivate students to learn and help them overcome the anxieties and pressures of joining a new course (Vyas and Sathishkumar, 2012).

A style of teaching that provides opportunities in the classroom for students to talk, listen, read, write and reflect as they engage in a variety of learning activities is likely to have a positive effect on a much larger proportion of a class of students than the traditional lecture method (Meyers and Jones, 1994). The ECE is more likely to succeed in its purpose if it follows these principles. The material for ECE can be drawn from several sources, including paper based case scenarios, laboratory reports, photographs, radiographs and ECGs' to name a few. A case-based approach engages students in discussion of specific real world situations. Case-based learning (CBL) is a long established pedagogical method, which is defined as "*learning activities that are commonly based on patient cases associated with real-life situations*" (Thistlethwaite et al., 2012). Case-based learning is a tool which is learner-centered, and involves intense interaction between the participants. It focuses on building of knowledge through group work. Introducing clinically relevant material along with didactic teaching is likely to result in the information being retained longer by the students (Sharadkumar et al., 2015). Case-based learning can encourage application of basic science knowledge, linkage of knowledge between the basic and clinical sciences, deeper understanding of content, and the development of clinical reasoning skills (Thistlethwaite et al., 2012). It therefore stands to reason that dissection sessions will lead

to deeper learning if they are linked to relevant patient case scenarios. In the present study, CBL was incorporated into dissection sessions to enhance student learning. The objective of this study was to assess students' perceptions around the introduction of CBL using paper based clinical scenarios during dissection sessions.

MATERIALS AND METHODS

After obtaining ethical clearance from the institutional ethical review board (IEC number: SIMS&RC/IECC/06/2012), one hundred and fifty first year medical students were divided into six groups of 25 each according to their allotted dissection tables. One group was exposed to four paper-based clinical scenarios in each of the regions that were dissected, namely the upper limb, lower limb, thorax, abdomen, pelvis, head and neck and neuroanatomy. For example, the first group was exposed to the case scenarios for the upper limb, the second group for the lower limb and so on. These case scenarios were given to the students during the appropriate dissection session. The case scenarios were followed by a set of questions that focused on the applied anatomy related to the case. The questions were based on the specific learning objectives of that dissection session. The students were given two days to discuss the case scenario amongst themselves. They were free to use any resources like text books, reference books or the internet to answer the specific questions. This was then followed by a group discussion facilitated by the same faculty member (the first author). An example of a case scenario is shown in Table 1.

The case scenarios that were used for each of the regions are shown in Table 2.

At the end of each region, anonymous feedback was obtained from the students regarding their perceptions about the various aspects of CBL through a self-administered questionnaire. The questionnaire (Table 3) had ten items, each item being scored on a five-point Likert rating scale. The items were developed based on previous literature and were all positively framed (Singh and Bhatt, 2011; Somnath, 2013; Sharmila et al., 2012;

Table 1. Case scenario and questions for the dissection of the pectoral region and breast.

A 55 years old nulliparous female complained to her family physician of a hard, painless lump in the right breast and two swellings in the right axilla (as shown in the picture). On examination, there was an abnormal appearance of skin over the swelling, loss of mobility of the breast, alterations in the position of the nipple, and enlarged lymph nodes in the axilla. The radiograph of the vertebral column revealed shadows in the vertebral bodies of T6 and T7. Fine needle aspiration cytology was done and a diagnosis of carcinoma of the breast was made.

Questions:

- What is the commonest site of carcinoma of the breast?
- What is the name given to the abnormal appearance of skin over the swelling? Explain its anatomical basis.
- What is the terminology that is used to describe the alteration in the position of the nipple?
- Which lymph nodes are most likely to be involved in this patient?
- Can the carcinoma spread to the opposite side? Explain your answer.

Sodhi and Iredell, 2010; Nagaiaha, 2014). Pilot testing of the questionnaire was done on the first group of students. The reliability of the questionnaire was found to be satisfactory (Cronbach's alpha of 0.70). The proportion of students who responded in each category for each item was tabu-

lated.

RESULTS

Of 150 students, 123 (80%) completed the questionnaire. Table 3 summarizes the responses of the students. It was noted that 80% to 100% of students either agreed or strongly agreed to each of the statements in the questionnaire. Seven (1 to 5, 7, 9) of the statements showed agreement levels of over 90%. Three of the statements (6, 8, 10) showed agreement levels between 80% and 90%.

Table 2. Case scenarios that were used for the different regions being dissected.

S.No	Region	Case scenarios
1.	Upper limb	- Breast carcinoma - Erb's palsy - Supracondylar fracture - Wrist drop
2.	Lower limb	- Femoral angiography - Varicose veins - Trendelenburg's gait - Popliteal aneurysm
3.	Thorax	- Coronary angiogram - Mitral stenosis - Pleural effusion - Foreign body trachea
4.	Abdomen and Pelvis	- Cirrhosis liver - Gall stones - Appendicitis - Uterine prolapse
5.	Head and Neck	- Sebaceous cyst - Supraclavicular lymphnode enlargement - Parotid tumour - Carotid massage
6.	Neuroanatomy	- Meningitis - Third cranial nerve palsy - Pontine haemorrhage - Cerebellar lesion

DISCUSSION

The present study showed that a large majority of the students had positive perceptions about the CBL method. The results of our study are comparable with other studies conducted in the subjects of anatomy, biochemistry and pharmacology (Singh and Bhatt, 2011; Somnath, 2013; Sharmila et al., 2012; Sodhi and Iredell, 2010; Nagaiaha et al., 2014) (Table 4). The present study showed higher percentages of agreement on six common items as compared to another study from India conducted in the subject of anatomy (Singh and Bhatt, 2011). In their study too, paper-based case scenarios were discussed in groups of ten students in the presence of a faculty facilitator (Singh and Bhatt, 2011). Another study from India reported that 97% of students expressed that CBL was very useful in clarifying concepts of a particular topic in biochemistry; therefore, CBL would help students to perform better in examinations (Somnath, 2013). The same study also reported

Table 3. Students' responses to the questionnaire regarding CBL.

S.no	Item, Please respond to the following regarding	Strongly agree N (%)	Agree N (%)	Neutral N (%)	Disagree N (%)	Strongly disagree N (%)
1.	Motivated you to learn anatomy	72(58.53)	46(37.39)	5(4.06)	-	-
2.	Helped you to understand the subject better	67(54.47)	56(45.52)	-	-	-
3.	Made learning more interesting	63(51.21)	53(43.09)	7(5.69)	-	-
4.	Made learning more interactive	67(54.47)	48(39.02)	8(6.50)	-	-
5.	Was helpful in the development of critical thinking	66(53.65)	45(36.58)	12(9.75)	-	-
6.	Encouraged independent learning	40(32.52)	58(47.15)	18(14.63)	6(4.87)	1(0.81)
7.	Enabled you to understand the importance of anatomy in the clinical setting	85(69.10)	29(23.57)	9(7.31)	-	-
8*	Made you study harder	51(41.80)	57(46.72)	11(9.10)	2(1.64)	1(0.81)
9.	This method can be recommended for all future dissections	87(70.73)	31(25.20)	4(3.25)	-	1(0.81)
10.	The role of the facilitator is important	71(57.72)	39(31.70)	12(9.75)	-	1(0.81)

*8th item only 122 responses considered (as in one form more than one response was ticked).

that CBL promotes active participation of the students in learning and improves clinical reasoning skills as opposed to rote learning (Somnath, 2013). Another study conducted in the United States found that 82% of students felt CBL sessions were useful as compared to 92% in the present study (Pawlina et al., 2005). A study utilizing CBL in pharmacology in an Indian medical college found that active facilitation and group management was the key to success in small group teaching (Sharmila et al., 2012). Another study found complementing lectures with CBL helped to prime all the students and thereafter encouraged them to prepare independently and explore the study topics through active discussions under the tutors' guidance (Sodhi and Iredell, 2010). The lowest levels of agreement (80%) were noted for the item related to independent learning. This could be because the format that was used for CBL was highly structured, leaving little room for the students to explore beyond the confines of the given questions.

A perusal of the literature shows that CBL provokes interest in the subject and helps in deep and strategic learning (Adiga and Adiga, 2011). The role of the teacher as a facilitator is very important when CBL is utilized for creating a conducive learning environment and ensuring adequate levels of student participation (Kitchen, 2012). The major reasons identified for the relative popularity of CBL were its structured format which encouraged participation, development of clinical problem solving skills and the opportunity to apply skills to cases (Srinivasan et al., 2007; Williams, 2005). In CBL, the learning process is a shared responsibility of both tutors and students (Srinivasan et al.,

2007). Being teacher-directed, the learning outcomes are pre-defined and more focused (Williams, 2005; Tarnvik, 2007). The CBL structure also offers inquisitive and well-prepared students the opportunity to exploit the full potential of the expert tutors, and gain an insight into their clinical experiences (Srinivasan et al., 2007; Williams, 2005; Tarnvik, 2007).

It is well known that assessment drives learning. Therefore, in the existing anatomy curriculum in India, if case based clinical anatomy questions are incorporated in theory or practical examinations, students will show greater interest and enthusiasm to participate in CBL exercises (Albanese and Mitchell, 1993). It has been strongly recommended that critical thinking should be introduced right in the first year of the MBBS course. It stands to reason that learning basic sciences in a clinical context helps in creating a natural bridge to pathophysiology and clinical medicine taught later in the curriculum (Abraham et al., 2009). The authors also state that teaching clinical implications in the classroom and small group settings permits students to learn specific subject material with the appropriate level of attention and intensity (Abraham et al., 2009).

One of the limitations of the present study was that only perceptions of the students were gauged. Evidence for an improvement in content knowledge was not studied. In our college, there is a system where one table teacher oversees one regional dissection for a table of 25 students. There is a rotation of staff from one table to another after the completion of the dissection of a region. As this was a pilot study, only the corresponding author handled the CBL discussion for

Table 4. Comparison of the results of the present study with other studies that utilized CBL.

Sl. No.	Items	Singh & Bhatt (n=83) (%) agree (Anatomy)	Somnath (n=125) (%) agree (Biochemistry)	Nagaiah et al. (n=100) (%) agree (Biochemistry)	Mohammad Ayman Sabbagh (n=165) (%) agree (Anatomy)	Sharmilaeta (n=84) (%) agree (Pharmacology)	Sodhi-Berry & Iredell (n=255) (%) agree (2 and 3 year students)	Present study (n=123) (%) agree (Anatomy)
1.	CBL was useful in learning the subject	69	93	81	100	-	-	96
2.	CBL improves understanding	62	90	78	91	88	85	100
3.	CBL was interactive	74	90	78	-	71	74	93
4.	Facilitators were helpful	73	99	-	-	71	-	89
5.	CBL should be continued in the	67	95	79	-	-	-	96
6.	CBL will help us to perform better in the clinics	87	-	89	83	79	78	93

one table for a region. This could have introduced heterogeneity in the content and therefore the perceptions of the students. Other limitations were related to the students for whom the CBL was introduced. As they were first year students, their lack of knowledge of medical terms may have hindered their learning during the CBL sessions.

To conclude, the objective of the study was to assess students perceptions about the introduction of CBL using paper based clinical scenarios during dissection sessions. The perceptions of the students using a 10-item questionnaire showed that students had agreement levels ranging from 80% to 100% on each of the items. This indicated that a large majority of the students had positive perceptions about the various aspects of CBL. Previous literature suggests that anatomy will be better understood, retained and practically applied if the clinical significance is highlighted using case based scenarios in teaching. The basic aim of the study to make the subject of anatomy more interesting and contextual was achieved. Future hypothesis driven studies with formal sample size calculations to explore whether content knowledge is improved using CBL in similar settings are required. A qualitative study to further explore students' perceptions about facilitating factors and barriers for learning in CBL may also be worthwhile.

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