

Effectiveness of Small Group Discussion Sessions in Teaching Biochemistry for Undergraduate Medical Students

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Abstract

Background: Group discussions are at the centre of medical education as students learn more efficiently by small group discussions. Small group discussion (SGD) session as an instructional method is included in the curriculum of USM-KLE International medical program. The purpose of this paper is to depict student's perceptions in learning biochemistry through SGD, aimed at continuous medical educational development and will also be useful in other medical curriculum.

Methods: The study was conducted for first year undergraduate medical students of USM-KLE International medical program. An anonymous questionnaire was given to the group to elicit their perceptions about SGD. Forty students participated. The responses were obtained on a Likert scale to indicate their degree of agreement with the statements in the questionnaire.

Results: Analysis showed that 62.5% students strongly agreed that by virtue of the SGD sessions understanding of the subject was better. 55% students strongly agreed that SGD facilitated active learning. However, 37.5% students strongly agreed that SGD sessions facilitated promoting clinical reasoning and communication skills. 65% students strongly agreed that SGD sessions enabled them to correlate biochemical concepts in context of a medical problem.

Conclusion: In order to overcome the limitations of only lectures in a basic science subject, inclusion of an active teaching-learning SGD session facilitated students in better understanding of the subject, ability to apply biochemical principles to clinical cases and development of communication skills.

Introduction

Little opportunity and time are left after a lecture for the students to clarify their doubts and to reinforce the concepts they have learned. As a result, students often find it difficult to relate a clinical condition with its basic biochemical concepts during their clinical training (Bobby *et al.*, 2007). As noted, lectures can function as an anchor for student discussion of issues that are relevant to clinical problem-solving and biochemical report interpretations in small group discussion (SGD) sessions.

However in lectures one cannot expect each student's concerns to be addressed. The objectives covered in the lectures can be revised and reinforced by an active small group discussion which includes the questionnaires, case scenarios and relevant biochemistry laboratory data. By examining a case history with the relevant biochemical and clinical data, students will learn to correlate the biochemical concepts learnt in lectures to the case. In a small group the students are able to first express their ideas and then receive input from group peers. There are many examples by which lecture can work in combination with supporting instructional processes.

In some studies authors have found that students were not involved in lectures, being often passive and lecturers presume that all students learn at the same pace and are at the same level of understanding. Hence they are of the opinion that medical students require being educated keeping in view the

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application, analysis and to correlate learnt biochemical principles to clinical cases (Bonwell, 1996; Cashin, 1985). Several authors have also identified disadvantages of lectures which include; lack of student preparedness and lack of meta-cognition. Other disadvantages are; little chance for active student engagement with course material and lack of immediate feedback on student understanding (Cuseo, 2007; Stanley & Porter, 2002; Bligh, 2000; Slavin, 1991; Milton *et al.*, 1986; Penner, 1984). Research in the arena of cognitive sciences suggests that knowledge gained through activity is more useful than knowledge gained through memorization (Moran, 1997).

Auret & Starmer *et al.* (2008) have demonstrated the necessity for applying basic science principles in clinical settings by using case discussions. Other studies have shown the importance of teaching skills in clinical contexts within basic science subjects as a means of promoting clinical reasoning (Elizondo-Omana *et al.*, 2010). Development of higher order thinking skills, such as analysing, synthesis, evaluation, decision making and problem solving are commonly not employed through traditional lecturing (Chapman, 2006). As Bransford *et al.* (2004) suggest, this is also an instructional problem as it appears to actually hamper learning and is likely not considered "learner centred". Group discussions are at the centre of medical education because most adults learn the clinical aspects more efficiently when small group discussions are conducted, and what they learn is retained longer when they are able to engage in active learning (Gelula, 1997). Most of the students do not understand or apply learning, unless they are actively involved in it, as suggested by few articles on active and deep learning (Ramsden, 1992; Gibbs & Jenkins, 1992; Bligh, 1998).

In order to overcome the above limitations of only lecturing, SGD sessions are included in the present curriculum. The purpose of this paper is to describe student perceptions in learning biochemistry through small group discussion, aimed at continuous medical educational development.

One study investigating the relationship between lecture-based and small group teaching indicated that, lecture material functions as a conceptual source of information and small group sessions were the favoured method of instruction (Patel *et al.*, 2004). Kibble *et al.* (2006) emphasized use of

peer-led small-group discussion and their subjective, objective, assessment of physiology (SOAP) notes were effective forms of instruction, in which students succeeded in learning. Another study showed the effectiveness of small group discussion in which authors emphasised the importance of clinical relevance in undergraduate medical education (Steinert, 2004). Bobby *et al.* (2004) reported that student dominated small group discussion followed by a faculty-moderated presentation is an effective, revision exercise for undergraduate medical students. Dason and Brown (2009) state the benefits of "working in group" such as collective knowledge and skill will be more than the individual knowledge. In a study on students' perception of small group teaching, authors concluded that all the participants must be prepared and share knowledge for understanding the topic (Salam, 2008).

Rehman *et al.*, (2012) showed the usefulness of small group interactive sessions in both conventional and problem based learning curricula. Benefits of teaching students by SGD method include: enhancing knowledge, acting as a revision exercise following theory class, improving reasoning skills in interpretation of biochemical parameters and ability to apply biochemical principles to clinical cases. Students develop communication skills and team work. In SGD sessions, students analyse the problem given, brainstorm possible hypothesis and every student participates in discussion by presenting answers to the assignments given.

The tutor/facilitator need to be trained to conduct SGD sessions. The tutor should encourage students to ask for reasons, comments and statements. Tutors should intervene when indicated to keep discussion on track and to stimulate thinking. In a study authors emphasize on "cognitive congruence", the tutor being able to express him/herself at the student's level of understanding (Schmidt & Moust, 2000).

Method

Ethical clearance was obtained by the J.N.M.C Institutional Ethics Committee for human subject research before conducting the study. The study was conducted for batch 2010-11, phase – I undergraduate medical students of USM-KLE International medical program, India. There were 43 students enrolled for phase I. Written informed consent was

obtained from all the students. 40 students consented to participate in the study.

The prepared modules on SGD sessions were given one week prior to the students consisting of well-structured questions on the concepts covered in lectures. Five such similar SGD sessions lasting for 2 hours covering diverse topics in the biochemistry syllabus were conducted over a period of seven months. The students were divided using random number table into 6 groups each consisting of 6-7 students.

The SGD module consisted of:

- Hand-outs containing well-structured questions related to the objectives of the lecture classes to be prepared by the students
- Case scenario
- Interpretation of biochemical parameters

At the end of the fifth SGD session, an anonymous questionnaire validated by subject experts was given to the group to elicit their perceptions on SGD. The questionnaire covered areas pertaining to the relevancy, interest stimulation, and assistance in understanding of the lecture concepts and to correlate with clinical cases, learning opportunity, and acceptance of SGD. The

responses were obtained on a Likert scale (strongly agree = 5 to strongly disagree=1) to indicate their degree of agreement with the statements in the questionnaire. It is calculated using the percentage distribution of the Likert response items obtained by the recordings of the students and analysed.

Results

Analysis showed that 25 out of 40 (62.5%) students strongly agreed that by virtue of the SGD sessions understanding of the subject was better, 14 out 40 (35%) agreed to the statement and the remaining 1 out of 40 (2.5%) were of no opinion. 22 out of 40 (55%) students strongly agreed and the rest 18 out of 40 (45%) agreed that SGD facilitated active learning. Whereas 15 out of 40 (37.5%) students strongly agreed, 20 out of 40 (50%) of students agreed that SGD sessions facilitated in promoting clinical reasoning and communication skills and the rest 5 out of 40 (12.5%) students neither agreed or disagreed to the statement. 26 out of 40 (65%) students strongly agreed and the remaining 14 out of 40 (35%) agreed that SGD sessions enabled them to correlate biochemical concepts in context of a medical problem. Results are summarised in Table 1.

Table 1: Distribution of respondents based on the basis of usefulness of SGD as an instructional method in learning Biochemistry

Learning characteristics on usefulness of SGD sessions	Number and percentage (%) distribution of students on Likert scale				
	Strongly agree	Agree	No Opinion	Disagree	Strongly disagree
Understanding of the subject was better	25 62.5%	14 35%	1 2.5%	-	-
Facilitated in active learning	22 55%	18 45%	-	-	-
Promoted clinical reasoning and communication skills	15 37.5%	20 50%	5 12.5%	-	-
To correlate biochemical concepts in context of a medical problem	26 65%	14 35%	-	-	-

Discussion

In order to overcome the limitations of only lectures, the introduction of teaching-learning SGD sessions will benefit the students in meaningful learning. The concepts covered in the lectures are revised by active and interactive small group discussion. Similar to the other studies on student's perception

about SGD sessions, students highlighted the benefits of effective small group teaching.

By presenting a case history and providing the relevant data, students were be able to correlate the biochemical concepts learnt in lectures to the case. In a small group, the students were able to express their ideas and then receive input from the group members.

Some of the important ethical and cultural issues can also be discussed which serves as an added advantage in SGDs. Hence SGD sessions are needed to be continued in the curriculum.

In comparing with other study authors as well it was found that small group interactive sessions helps students in understanding contents and facilitates active learning (Rehman *et al.*, 2012). In another study showed formulation of short answer questions followed by small group discussion is an effective revision exercise for improving their understanding on a selected topic (Bobby *et al.*, 2007).

The major limitation for this approach is the necessity of an optimum teacher-student ratio, which demands recruitment of more number of staff. Moreover poorly prepared groups results in ineffective SGD, which can be overcome by grading the students based on their performance.

Conclusion

Combination of lectures and small group sessions seems to offer the student the most appropriate means of education. Through questionnaire feedback students emphasised on the usefulness of small group discussion sessions in biochemistry which helped them in promoting knowledge, interest and better understanding of the subject and to correlate biochemical concepts in context of medical problem. Similarly they also commented on acquisition of good communication skills, to develop leadership qualities and team work skills. It is quite clear that an integrative approach to instruction for the health disciplines is a step toward more effective medical education.

Conflicts of interest: None

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