The Connectedness of Students and Facilitator: Small Group Discussion in Biochemistry

Vijetha Shenoy Belle 1*, Monalisa Biswas 2

* 1 Dr. Vijetha Shenoy Belle, MD, Associate Professor, Department of Biochemistry, Kasturba Medical College, Manipal 576104, Manipal Academy of Higher Education, Karnataka, India.

2 Dr. Monalisa Biswas, PhD scholar, Department of Biochemistry, Kasturba Medical College, Manipal 576104, Manipal Academy of Higher Education, Karnataka, India.

Abstract
Small group discussions/teaching/learning is an evolving educational strategy that is being explored widely to promote student-centered education as over the traditional teacher-centered didactic educational approach. Deriving its origin from the principles of focused group discussions, small group discussions aim to maximize student understanding, interactions, involvements, and outcomes in a non-threatening peer interactive and faculty facilitated classroom environment. With the advent of the CBME curriculum, the Medical Council of India which aims to carve competent Indian Medical Graduates (IMGs) as universal clinicians, leaders, effective communicators, lifelong learners, and professionals, has prescribed a paramount shift in the teaching-learning methods. As the Indian Medical Education is at the threshold of witnessing a major transition from pedagogy to heutagogy, it is imperative that we as medical teachers, explore and update ourselves to the best practices of small group teaching and effectively facilitate the generation of able and competent IMGs. In this article, the authors would like to explain the experience of Biochemistry small group discussion with the first batch of MBBS students who are exposed to the new curriculum of CBME.

keywords: Curriculum, Medical Education, Small Group Discussion, Learning

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Introduction
The new Competency-Based Medical Education (CBME) curriculum for the undergraduate medical students by the MCI has mandated only one-third of the allotted teaching hours to be taken as didactic lectures and the remaining two-thirds by other modes of teaching such as practicals, clinical teaching, and small group discussions [1]. The small group discussions are usually facilitated by a trained teacher or a peer to discuss on a designated topic in a subject and to guide the students to opine on the same[2].

In this article, the author would like to share the experience of a session of Biochemistry small group discussion with the first batch of MBBS students admitted under the new CBME curriculum.

In small group discussions (SGDs), a group of students discusses a focused topic. The facilitator will provide the reading materials, topics, and planned questions for discussion before the commencement of SGDs so that the groups can focus on the allotted topics. On the day of the SGD facilitator/teacher introduces the topic and guides the students for presentation and discussion on the same. Group compositions are made to create a non-threatening environment, and all students are actively motivated and encouraged to present/express their understanding of the topic. The objectives of SGDs are, to improve the
communication skills of MBBS students, team building, and simulation of new thoughts to the team members, which otherwise might not have occurred. [3]

Presentation of an SGD from Biochemistry

Before A Facilitator/Teacher Begin

The facilitator/teacher should ask themselves

a. Why do I want to conduct a small group discussion?
b. Which topic to be selected and why?
c. Is the topic best suited for SGDs?
d. How should I plan, and what do I expect from the students?

Steps Involved in Planning for SGDs

- Select the appropriate topics for SGD
- Handling of logistics
- Prior intimations to the students
- Pre-reading materials supply/links

A case on competency BI6.11 was planned for SGD in Biochemistry:

Competency: BI6.11 Describe the functions of haem in the body and describe the processes involved in its metabolism and describe porphyrin metabolism.

Domain: K, Level: KH, Core: Yes

Suggested Teaching Learning method: Lecture, Small group discussion

The facilitator had already taken a didactic lecture related to competency BI6.11. Further, to understand the knowledge gained and application in a clinical scenario, SGD was planned in the succeeding week. The case was displayed in the learning management system three days before the SGDs.

The case given was as follows:

A 15-year-old boy was brought to the emergency department with a five days history of high-grade fever, severe colicky abdominal pain along with vomiting, and constipation. There was a history of consumption of native medicine in the form of syrup for one and a half years for autism. On general physical examination, he was febrile and had pallor. Per abdominal examination revealed a tender abdomen, with no hepatosplenomegaly. The systemic examination was normal. His hemoglobin was 7.5gm%, peripheral smear showed microcytic hypochromic anemia. CT scan of the brain and the CSF analysis were normal. Serum electrolytes were normal. Liver and renal function tests were normal. Urine under UV light tested positive for porphyrin on three separate occasions. The physician started treatment with hematin. The patient did not show signs of recovery.

a. Based on symptoms and lab reports, what could be the diagnosis?
b. Why was hematin started, and what could be the reason for the patient not responding to the treatment?
c. Which mineral should have been measured in this case?
d. How are porphyrins different from porphobilinogen?
e. Enumerate the reactions involved in heme synthesis.
f. Explain the regulation of heme synthesis.
g. Describe the functions of heme.
h. Explain erythropoietic, hepatic, and acquired porphyrias.

On the Day of SGD

The facilitator briefly revised the topic, which was taught in the didactic lecture, and set the floor for discussion for a case. Thirty-two students were randomly divided into four groups. There were eight questions in the case. Each team engaged in a thorough discussion, after which they selected a team leader who presented the answers to the entire batch. After the completion of the presentation, views on the answer, and the presentation, depth of explanations, additional points were discussed with inputs from members of all other groups. The same pattern was followed for the rest of the three groups.

Closing Remarks by the Facilitator

At the end of the presentation and discussion by the students, the facilitator took over the stage and concluded the session by briefly highlighting the essential points discussed during the presentation, its review, and feedback. It is recommended to prepare a facilitator guide before the SGDs for the closure of discussion. The facilitator can provide additional reading materials if the students are interested to know more about the topic.

The facilitator guide for BI6.11 competency is as follows:

- The treating physician diagnosed as Acute Intermittent Porphyria (AIP)
- Hematin provides negative feedback inhibition of ALA synthase leading to decreased formation of heme precursors
The present case may not be AIP as it didn’t respond to hematin.
There is a history of native syrup consumption so estimate the concentration of lead.
Lead/ heavy metals cause acquired porphyria with symptoms similar to AIP.
Congenital porphyrias, in general, are not associated with anemia. Lead inhibits ferrochelatase enzyme decreases the heme with consequently increased activity of ALA synthase. Anemias are associated with an acquired variety of porphyria.

Porphobilinogen are intermediate compounds formed during the heme synthetic pathway.
Porphobilinogen on oxidation form porphyrins.
Erythropoietic porphyria: Enzyme deficiency occurs in RBCs.
Hepatic porphyria: Enzyme defects occurs in the liver.

The Advantages of Small Group Discussions are [2, 4]
1. It challenges the students to think – student-centered learning
2. It creates active learning
3. It encourages the students to organize, structures their understanding of the topic and vocalize and express their understanding
4. Sharing of knowledge
5. Feedback provided at the end of presentation helps in improvisation

Challenges of small group discussions [5]
The main challenge and success of a small group discussion depend on the skills of the facilitator. However, the challenges, based on who experiences it, can be broadly classified into two.

Challenges faced by students
Coordination costs: Represents time and energy invested in group work over and above the time required for individual activity or reflection. Group size and task interdependence are the major factors that influence the coordination costs of SGDs.

Motivation costs
a) Freeriding (one or more group members leave most or all of the work to a few, more diligent, members)
b) Social loafing (the tendency of group members to exert less effort than they can or should because of the reduced sense of accountability)
c) Conflict of ideas in creative or reflective SGDs can sometimes be more harmful than beneficial and can result in draining morale and or withdrawal of vulnerable pupils.

Intellectual costs
a) Groupthink: the tendency of groups to conform to a perceived majority view.
b) Escalation of commitment: the tendency of groups to become more committed to their plans and strategies – even ineffective ones – over time.
c) Transparency illusion: the tendency of group members to believe their thoughts, attitudes, and reasons are more evident to others than is the case.
d) Common information effect: the tendency of groups to focus on information all members share and ignore unique information, however relevant.

Social and emotional costs [6, 7]
a) Students (at least a few) can feel vulnerable and pressurized to always be involved in group dynamics, which might increase anxiety.
b) Dominant students/ group lead may lead the directionality of group dynamics.
c) Introverts or passive listeners fail to participate and gain from SGDs sufficiently.

Challenges faced by the instructor [5]
Allocating time
Teaching process skills: To make the students develop excellent communication, coordination with the team, and resolution of any conflicts needs the facilitator’s guidance. Not all facilitators are qualified to teach these. Some facilitators may be reluctant to devote time to reinforce these skills to the group of students.
Assessing process as well as product: Effective evaluation of process requires thoughtful consideration of learning objectives and a combination of assessment approaches.
Assessing individual as well as group learning: Group grades can mask differences in individual learning.

A rigid and vastly pedagogic curriculum design: This makes non-classical learning challenging, and it is more challenging to encourage a sense of ‘ownership’ among students in a rigid/ hugely theoretical curriculum framework.
Institutional/ departmental challenges: Level of teacher training support provided, informal institutional practices, local politics of one’s institution.

Conclusion

Instructors engaging in small group teaching must recognize that it is perfectly normal to experience hurdles at the outset, and some of the challenges that they face may not be entirely their fault. A complex combination of individual skills, target student group dynamics, social and institutional difficulties might combine to make small group teaching less effective and rewarding than it should be [8]. The key requirement for a fruitful small/ focus group discussion is a skilled and well-trained group instructor who effortlessly assumes the role of an effective facilitator, as facilitation is central to every aspect of SGDss and has the potential to alleviate most of the encountered hurdles. Effective facilitation ensures a low threat environment, directionality in discussions/ activities, enhancement of the sense of group belonging, cooperation and a non-threatening learning environment where misconceptions surface without any apprehension and are resolved effortlessly without any glitches and chaos, thus maximizing conceptual learning and achievement of learning outcomes by one and all. Small group discussion is a flexible teaching technique which offers an opportunity to explore muddy concepts and associated misconceptions and builds on the group dynamics to explore the subject/ topics in context, depth, and detail, freely without imposing a conceptual framework of a traditional didactic classroom environment [9] Making small group instruction effective might be a challenging task, to begin with. Still, with commitment and consistency, instructors are sure to find that this structure is a valuable allocation of instructional time and the teaching-learning process. The preparation time and effort will be worth it when the teacher sees the powerful opportunities provided to each student as well as the overall increase in the achievement of learning outcomes. Irrespective of what might be the current level of success, well-designed small group instructions can make a significant difference for every student genuinely achieving the goal of a learner-centric instructional platform [10]

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References