

Evaluating the Impact of Small Group Discussions (SGD) on Pharmacology Learning Outcomes among Phase 2 MBBS students

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Abstract

Background: Small group discussion (SGD) is an active-learning strategy that may enhance learner participation, communication, and application of pharmacological concepts. This study compared SGD with interactive lectures for pharmacology learning among Phase 2 MBBS students.

Objectives: To compare learning outcomes after SGD and interactive lectures and to assess students' and faculty members' perceptions of SGD in pharmacology.

Materials and Methods: An educational interventional pre-test-post-test crossover study was conducted among Phase 2 MBBS students. Four pharmacology topics—drugs for migraine, non-steroidal anti-inflammatory drugs (NSAIDs), drugs for rheumatoid arthritis and gout, and drugs for bronchial asthma—were taught across four sessions. Students crossed over between SGD and interactive lecture methods. Knowledge was assessed using 10-item pre- and post-test multiple-choice questionnaires. Student and faculty perceptions were evaluated using structured feedback forms. Across the four sessions, 200 student-session observations were available for each teaching method.

Results: Both teaching methods produced significant within-method improvement in knowledge scores. The pooled mean score increased from 5.66 ± 1.15 to 7.41 ± 1.21 after SGD ($p < 0.0001$) and from 5.51 ± 1.24 to 7.61 ± 1.08 after interactive lectures ($p < 0.0001$). The difference in pooled post-test scores between SGD and lecture was not statistically significant (7.41 ± 1.21 vs. 7.61 ± 1.08 ; $p = 0.0819$). Topic-specific gains varied: SGD showed a larger gain for NSAIDs, whereas lectures produced larger gains for migraine, rheumatoid arthritis/gout, and bronchial asthma. Student feedback indicated favourable perceptions of active participation and interpersonal/communication skill development with SGD. All seven faculty respondents strongly agreed that SGD promoted deeper understanding, student engagement, and communication skills.

Conclusion: Both SGD and interactive lectures significantly improved pharmacology knowledge, with no significant difference in pooled post-test scores. SGD offered additional perceived benefits for participation and communication, suggesting that it can complement interactive lectures as part of a blended pharmacology teaching strategy.

Keywords: Active learning, Interactive lecture, Medical education, Pharmacology, Small group discussion.

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Introduction

Medical education is a complex and challenging field that requires students to acquire a vast amount of knowledge, develop critical thinking and problem-solving skills, and master effective communication skills. [1]

Traditional lecture-based instruction has been the primary teaching method in medical education, but it has limitations in promoting active learning and critical thinking. [2] Small group discussions have been shown to be an effective teaching method in

various educational settings, including medical education. [3,4] They provide a collaborative learning environment that encourages active participation, critical thinking, and problem-solving. [5,6,7] However, the impact of small group discussions on medical education is not well understood, and further research is needed to explore their effectiveness. [5,6,7,8,9,10]

This study will contribute to the existing body of knowledge on innovative teaching methods in

medical education and provide insights into the effectiveness of small group discussions in promoting essential skills for future doctors. The purpose of this study is to evaluate the effectiveness of small group discussions in improving knowledge retention, critical thinking and problem-solving skills, and communication skills among second-year MBBS students.

The aim of the study was to assess the impact of small group discussions (SGDs) compared with interactive lectures on pharmacology learning outcomes among second-year MBBS students. The objectives were to evaluate students' perceptions of small group discussions in pharmacology and to assess faculty perceptions regarding the use of small group discussions as a teaching-learning method in pharmacology.

Material and Methods

The study was designed as an educational interventional study using a pre-test-post-test control group design. Ethical approval was obtained from the Institutional Ethics Committee before commencement of the study. The study included a total sample size of 400 observations, with 50 participants included in each session.

Inclusion criteria- Phase 2 MBBS students, willing to participate in the study and provide written informed consent.

Exclusion criteria- Phase 2 MBBS students, not providing written informed consent and not willing to participate.

Research Methodology: Mixed-methods (combining quantitative data from pre-test and Pre-selection of Topics: Pharmacology topics were pre-selected, ensuring that they were peer-reviewed and appropriate for the student group. Drugs for Migraine, NSAIDs (non-steroidal anti-inflammatory drugs), Drugs for RA (Rheumatoid Arthritis) and Gout, Drugs for Bronchial Asthma were the selected topics.

Information on the topics was provided to the students well in advance to allow sufficient time for preparation.

Study Groups

Group A: Underwent the Small Group Discussions method facilitated by a trained instructor.

Group B: Participated in Interactive Lecture

Session Design: Each group engaged in an educational session on a pre-selected pharmacology topic.

Pre-test: A 10-question multiple-choice questionnaire was administered to assess baseline knowledge before the session started.

After the educational intervention (Small group discussion for Group A and Interactive lecture for Group B), a post-test was conducted to assess the change in knowledge.

Crossover Design: After the first session, there was a crossover. Group A switched to interactive lecture, and Group B switched to small group discussion for the second session.

Both groups again underwent pre-test and post-test assessments for the second topic.

This was repeated for four different pharmacology topics across four sessions.

Data Collection

Quantitative Data: Pre-test and post-test scores were collected to measure the effectiveness of each teaching method.

Qualitative Data: After each session, feedback forms were distributed to record students' and teachers' perceptions regarding the teaching methods (interactive lectures and small group discussions). Feedback form questions were obtained from literature search and validated by peers and senior faculties from the department. [3,10,13] These forms helped evaluate students' understanding of perceived learning outcomes, knowledge retention, communication skills and satisfaction for method.

Statistical Analysis: The quantitative data were analysed using statistical tests to compare the pre-test and post-test scores within and between groups (e.g., paired t-tests, independent t-tests). The qualitative data from the feedback forms were analysed thematically to capture participants' perceptions of the two teaching methods. Analysis was done using MedCalc Software Ltd. Comparison of means calculator. https://www.medcalc.org/calc/comparison_of_means.php (Version 23.1.1; accessed January 3, 2025)

Results

Table 1: MCQ test-Mean Pre and Post-test score after each session

Sr. no.	Topic	Method (N=50)	Mean Pretest score	Mean Post test score	p-value
1	Drugs for Migraine	Lecture	6.10 ± 1.66	8.36 ± 0.69	< 0.0001
		SGD	5.68 ± 1.33	6.50 ± 1.40	0.0034
2	NSAIDs	Lecture	5.16 ± 1.11	6.90 ± 1.42	< 0.0001
		SGD	6.02 ± 1.17	8.46 ± 1.03	< 0.0001
3	Drugs for RA and Gout	Lecture	5.92 ± 0.94	7.80 ± 0.99	< 0.0001
		SGD	5.88 ± 1.00	7.02 ± 1.22	< 0.0001

4	Drugs for Bronchial Asthma	Lecture	4.86 ± 1.23	7.92 ± 0.90	< 0.0001
		SGD	5.06 ± 1.10	7.64 ± 1.19	< 0.0001

p-value < 0.05 = significant

Table 2: MCQ test-Mean Pre and Post-test score after four sessions in both groups

Sr. no.	Sample size	Mean Pre-test score	Mean Post-test score	p-value
Group A (SGD)	N= 200	5.66 ± 1.15	7.41 ± 1.21	< 0.0001
Group B (Lecture)	N= 200	5.51 ± 1.24	7.61 ± 1.08	< 0.0001

p-value < 0.05 = significant

Table 3: MCQ test-Mean Post-test score comparison between group A (SGD) and group B (Lecture)

Sr. no.	Group A(SGD) Mean Post-test score (N= 200)	Group B(Lecture) Mean Post-test score (N= 200)	p-value
1	7.41 ± 1.21	7.61 ± 1.08	0.0819

p-value < 0.05 = significant

Table 4: Students' Perception in percentage regarding small group discussion and interactive lecture (5- strongly agree, 4- agree, 3- neutral, 2- disagree, 1- strongly disagree)

Sr. no.	Statement	Method	Percentage (%)				
			SGD (N= 200)		Lecture (N= 200)		
			5	4	3	2	1
1	Small group discussions increased my understanding of topic in pharmacology	SGD	55	20	20	3	3
		Lecture	56	36	5	3	1
2	Group discussions provided me opportunity to actively participate in the session	SGD	55	27	16	1	3
		Lecture	48	44	4	4	1
3	I was well prepared for group discussion session	SGD	25	50	8	10	8
		Lecture	18	58	16	3	6
4	Small group discussions are useful for effective interaction among students and other peers	SGD	49	27	19	3	4
		Lecture	52	40	4	4	1
5	Small group discussions helped me to understand the clinical relevance of pharmacology	SGD	44	31	19	4	3
		Lecture	55	37	5	2	2
6	Small group discussions helped me to improve my interpersonal and communication skills	SGD	45	31	21	1	3
		Lecture	38	53	1	7	2
7	Small group discussion method helped me to retain more information in pharmacology	SGD	45	31	18	4	4
		Lecture	49	43	2	5	2
8	Interactive lecture increased my understanding of topic in pharmacology	SGD	41	34	18	4	3
		Lecture	47	44	1	7	2
9	I find interactive lecture method more helpful to the students	SGD	42	34	20	3	3
		Lecture	46	46	1	5	4
10	I prefer interactive lectures as teaching method for learning pharmacology	SGD	47	28	18	5	3
		Lecture	50	42	2	4	4

Table 5: Teachers' Perception in percentage regarding small group discussion and interactive lecture (5- strongly agree, 4- agree, 3- neutral, 2- disagree, 1- strongly disagree)

Sr. no.	Statement	Percentage (%) (N= 7)				
		5	4	3	2	1
1	I find the small group discussion effective in promoting a deeper understanding of the material.	100	0	0	0	0
2	Small group discussion increases student engagement in the classroom.	100	0	0	0	0
3	Small group discussion improved communication skills among students	100	0	0	0	0
4	I prefer using small group discussion over interactive lecture	43	14	43	0	0
5	I find it challenging to manage classroom dynamics during small group discussion.	43	14	43	0	0

Across the four pharmacology sessions, both teaching methods were associated with improvement in mean MCQ scores. For drugs for

migraine, the lecture group improved from 6.10 ± 1.66 to 8.36 ± 0.69 (p<0.0001), while the SGD group improved from 5.68 ± 1.33 to 6.50 ± 1.40

($p=0.0034$). For NSAIDs, scores increased from 5.16 ± 1.11 to 6.90 ± 1.42 with lecture and from 6.02 ± 1.17 to 8.46 ± 1.03 with SGD (both $p<0.0001$). For rheumatoid arthritis and gout, lecture scores increased from 5.92 ± 0.94 to 7.80 ± 0.99 and SGD scores from 5.88 ± 1.00 to 7.02 ± 1.22 (both $p<0.0001$). For bronchial asthma, lecture scores increased from 4.86 ± 1.23 to 7.92 ± 0.90 and SGD scores from 5.06 ± 1.10 to 7.64 ± 1.19 (both $p<0.0001$) (Table 1).

When observations from all four sessions were pooled, the mean score increased from 5.66 ± 1.15 to 7.41 ± 1.21 for SGD and from 5.51 ± 1.24 to 7.61 ± 1.08 for interactive lecture (both $p<0.0001$) (Table 2). The mean post-test score was numerically higher after interactive lecture than after SGD (7.61 ± 1.08 vs. 7.41 ± 1.21), but the between-method difference was not statistically significant ($p=0.0819$) (Table 3). Student perception data showed favourable responses to both approaches. For SGD, 75% of responses agreed or strongly agreed that it increased understanding of pharmacology, 82% that it provided an opportunity for active participation, 76% that it supported effective peer interaction, 75% that it improved understanding of clinical relevance, 76% that it improved interpersonal and communication skills, and 76% that it helped retention of information. Responses also indicated a preference for interactive lectures among many students, demonstrating that learners valued features of both methods (Table 4).

Seven faculty members completed the perception questionnaire. All faculty respondents strongly agreed that SGD promoted deeper understanding, increased student engagement, and improved communication skills. Preference for SGD over interactive lecture was more variable: 43% strongly agreed, 14% agreed, and 43% were neutral. Similar variation was observed regarding the challenge of managing classroom dynamics during SGD (Table 5).

Discussion

Both methods are effective in improving student knowledge on the topics, as indicated by statistically significant p -values (all less than 0.05). Lectures generally lead to higher post-test scores compared to SGD, particularly in topics like Drugs for Migraine and Drugs for Bronchial Asthma. SGD method shows a larger improvement in the NSAIDs topic (SGD has a greater increase in post-test score), indicating that the impact of teaching methods might vary by topic. Both SGD and Lecture show significant improvements in student performance, with p -values less than 0.0001 for both groups. Lecture shows a slightly greater increase in post-test scores compared to SGD (2.10 points vs. 1.75 points).

This suggests that, in this case, Lectures might have a marginally greater impact on student learning compared to SGD. However, the difference in scores is relatively small and both methods seem to be highly effective in improving student understanding. The difference in the mean post-test scores between SGD and Lecture is not statistically significant (p -value = 0.0819). This means that both teaching methods appear to have a similar impact on student performance, at least in terms of post-test scores.

The perception findings complement the knowledge outcomes. Students viewed SGD favourably for participation, peer interaction, and interpersonal and communication skills, while interactive lectures remained highly valued for structured content delivery, clinical relevance, and retention.

These findings support a complementary rather than mutually exclusive role for the two methods. Active-learning research has reported positive effects on academic performance, [11] and small-group settings may facilitate greater participation and perceived learning benefits than large-class discussion. [12] In pharmacology education, Kulkarni et al. reported improved MCQ performance and favourable feedback after small-group teaching compared with didactic lectures and self-directed learning among second-year BDS students. [13]

Arja et al documented small group discussion to be more effective for communication and interpersonal skills. Our study reinforces the documented evidence as majority students' perspectives feedback was found to be strongly agreed and agreed for this question. [3]

Savkar et al suggested small group discussion to be more effective method for teaching in comparison to didactic lectures. Our study did not find small group discussion to be superior in terms of post-test scores but for some pharmacology objectives, it was comparable with interactive lectures. [10]

Sagar et al concluded that students' perception was more favourable towards small group discussion over the other learning methods for participation, engagement, and communication. Our study data reinforces the students' perception positively to be similar. [14] Sadia Maqsood et al concluded that SGD is ineffectively used in our medical colleges due to a shortage of trained staff. So, we should focus on training workshops for our instructors to learn PBL and small group discussions.

Qualitative analysis with faculties and perception feedback from some students' supports the statement and demands need for implication. [15] Desai et al concluded that majority of the students found SGD better than didactic lectures in terms of

learning, involvement, clearing doubts, increasing self-confidence however analysis of the test scores showed no statistically significant difference amongst the marks obtained after didactic lectures or small group discussion.

Our study also did not find significant difference between interactive lecture and SGD method. [16] Study could not include more sample size. These might be the limitation of the study.

Conclusion

To conclude, Both SGD and Lecture methods receive strong ratings, though Lectures tend to edge ahead in aspects of content delivery and understanding. SGD has a slightly stronger impact on communication and interpersonal skills, while Lectures are more favoured for understanding the clinical relevance and retention of information.

Recommendations: In methodology, during the session, we comprehended that better preparedness of students and experienced facilitator for the session could undertake the session more effectively. Better specific topics' suitability for small group discussion should be considered before implementation for student interest and engagement. Orientation towards session by students and experience of faculty is key for successful implementation.

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