



ANATOMY PRACTICAL EXAMS; EFFECT OF GUIDED AND MINIMALLY GUIDED TEACHING METHODS ON STUDENTS' PERFORMANCE IN ANATOMY PRACTICAL EXAMS

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ABSTRACT... Objectives: To determine the effect of guided and minimally guided teaching methods in acquiring practical skills in anatomy in Peshawar Medical College. **Study Design:** A randomized control trial. **Setting:** Peshawar Medical College, Peshawar. **Period:** March 2016 to August 2016. **Methods:** 80 students of 2nd year MBBS who gave consent to participate in the study. Students were divided into control & intervention group. Each of the group consisted of 40 students, respectively. OSPE was used as the tool of assessment in this study. Students of both groups appeared in Pre-test OSPE after which controlled group was given 2 weeks time and were minimally guided for the selected anatomy dissection topics, however, intervention group spent 2 weeks under direct instruction and guidance of their teacher who was teaching them in dissection classes the same topics. Post- test was carried out after the completion of the 2 weeks time for both the groups. Cross over of the groups was done to minimize bias. **Results:** There were 20 males and 20 females in the intervention group that were matched according to gender and academic performance with the control group. Pre-test scores of the control group and the intervention groups were 6.15 ± 2.69 and 5.05 ± 1.75 respectively. The post test scores of control and the intervention groups were $(18.95 \pm 2.64 \text{ SD})$ and $(19.20 \pm 2.25 \text{ SD})$ respectively. Independent sample t test was applied to academic scores of OSPE of both the groups. P value of 0.351 depicts that there was no significant difference between academic scores of both the groups taught by guided and minimally guided teaching respectively. Thereby deducing that guided and minimally guided are both good teaching and learning strategies. Further, paired sample t test was applied within respective groups to find out the difference in academic performance between pre and post OSPE test scores, p value of <0.007 & 0.031 was obtained respectively which was signifying & further proving that both teaching methodologies were comparable. **Conclusion:** It is concluded that guided and minimally guided teaching strategies are equally effective in small group anatomy classes.

Key words: Guided Teaching, Minimally Guided Teaching, OSPE, Anatomy, Small Group, Academic Performance.

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INTRODUCTION

Anatomy is one of the fundamental parts of the medical curriculum. Teaching human anatomy is becoming steadily more challenging due to the drastic changes of teaching methodologies, new pedagogical challenges in the medical curricula, composed with a paucity of empirically integration and evidence-based instructional practices in the field of anatomy and medical education.^{1,2} There are wide range of approaches & strategies of teaching anatomy such as Large Group Format (LGF), Small Group Discussions (SGD) Task-Based, Team-Based, Practical

classes & dissections.³ The use of cadaver is another important fact that has been championed by most of the professionals & students as a key tool for understanding structures and variations of human anatomy. However, dissection has almost always been tried to be replaced with other tools such as videos, animated clips, images simulation and computer generated images, peer learning and examination etc in many universities and medical schools in the world.⁴ There has been particular interest in strategies that are visual and/or facilitate the development of 'other' important aspects of medical student learning;

such as spatial and dimensional awareness, communication, interaction and empathy.⁵ For the purpose of learning and retaining, the emphasis has always been on the development of practical anatomical knowledge, as well as its underlying science and its application onward.⁶

The new debate now a days is that whether the students should be guided thoroughly in learning anatomy or there should be minimum guidance directly or indirectly and they should be encouraged to do Direct Self Learning (DSL) or Self Direct Learning (SDL) using different learning tools in learning anatomy in small group format.^{7,8} The term Guided teaching (GT) refers to a careful planning, direct supervision, evolving assessment and focused intervention by a trained instructor / facilitator using the process of inquiry process which will lead to a gradual improvement and motivation of students toward the independent learning process.⁹ GT eventual goal is to develop independent focused learners who know how to broad their knowledge and expertise through a skilled targeted use of a variety of information sources utilized in different areas and circumstances. Guided-inquiry requires students to find out things for themselves.^{10,11} There have been suggestions that novice learners (e.g, 1st year MBBS students) must be provided with proper direct instructional guidance on the concepts of a topic and practicals or procedures required by a specific subject and must not be left to do discovery of those concepts and procedures by themselves.

Direct instructional guidance is defined as providing required information which can fully explain the concepts and procedures that students are required to learning.¹¹ Literatures state a global concern for the heavy emphasis on the memorization of the facts with very little emphasis on problem solving or self-directed study skills that are essential for the practical application of that gained knowledge.^{10,12} Self-directed & direct self learning are teaching-learning methods that are specifically designed to emphasize & focus on student-centered learning.^{10,13,14,15} However, these teaching learning strategies are considered as minimally guided teaching & learning

methodologies (MGT&L) and learning process.^{12,16} It is considered that minimally guided instruction appears to proceed with lack of reference to the attributes of working memory, long-term memory, or the complex relations between them. So it is not as effective as it should be.¹⁷ It is claimed by the researchers that even for students with considerable prior knowledge; strong guidance while learning is most often needed and is found to be effective.^{18,19,20}

Considering the above mentioned facts which support both strategies from different prospective and the new trends in medical education this study was carried out in (PMC) Peshawar medical college which was assessed through practical exam to find out whether guided or minimally guided teaching should be carried out in Anatomy dissection classes in order to get a better outcome and positive result in students' performance. Comparing the minimally guided and guided teaching and finding out the best method through assessing the students by practical exam will help us to select the most appropriate strategy of teaching Anatomy in small groups and dissection classes.

MATERIAL AND METHODS

A quantitative cross over randomized control trial study was carried out on Second year MBBS students to assess guided and minimally guided strategies of teaching as shown in Figure-1. This study was conducted in Peshawar medical college. The sampling technique used in this study was stratified random sampling. The four strata (groups) were made as per gender distribution and previous academic scores.

A total of 80 students were included in the study. The strata were made according to their previous academic scores as follows; Group I males: 50-75%, Group II: males >75%, Group III: females 50—75%, Group IV: females >75%. Data was collected from March to April 2016. The instrument used in this study was OSPE. OSPE validity and reliability has been confirmed by various studies and it is being used in most of the medical schools around the world as a best assessment tool for practical exams.²¹ The

total number of 20 Anatomy stations (10 pre-test OSPE and 10 post-test OSPE) was developed. The face and content validity of the OSPE stations was established through five experts. The content validity index (CVI) of 20-Stationed OSPE was found to be 0.08. The ethical and institutional approval was granted by ethical review board of KMU and PMC, respectively. The purpose of the study was explained to the students and informed consent was taken. The study was accomplished by assessing the second year MBBS students through pre and post-test OSPE stations. After dividing the students into groups through stratified sampling based on their previous academic performances & gender, the controlled group had their pre test and then were given 2 weeks time period to prepare the given topics and practice on their own using different tools of learning & after 2 weeks their post test was conducted, whereas the intervention group also went through a pre-test followed by direct guidance of the same topics by the facilitator/ teacher and after the same time period of 2 weeks and direct instruction by the teacher they went through the post test OSPE. The same Pre- test of OSPE was taken by both the groups at the start of the study whereas, at the end of the 2 weeks time post OSPE test of equal numbers and same difficulty level was taken by both the groups. Cross over for guided and minimally guided groups were done at the end.

Data was analyzed using SPSS 19. Paired t-test was carried out to compare means of pre and post- tests within the respective groups. And the independent sample t test was performed to compare the score of the post test OSPE of both controlled and intervention groups. The cutoff score of the OSPE was calculated through Modified Angoff's standard setting procedure.²²

RESULTS

This randomized controlled trial study was conducted on eighty students (n=80) of 2nd years MBBS at Peshawar Medical College. These 80 students were randomly divided into two groups. Both groups had equal number of students (40 in each group). Group I were taught through guided teaching (GT) and Group II were taught through minimally guided teaching (MGT) method. They were assessed through OSPEs. The statistical analysis was not significant with a P value of 0.315, which depicts that there was no remarkable difference between academic scores of both the groups taught by either guided or minimally guided teaching respectively. Hence deducing that minimally guided and guided teaching are equally good teaching and learning strategies in practical classes of anatomy. Further, paired sample t test was applied within respective groups to find out difference in academic performance between pre and post OSPE scores as shown in Table-I.

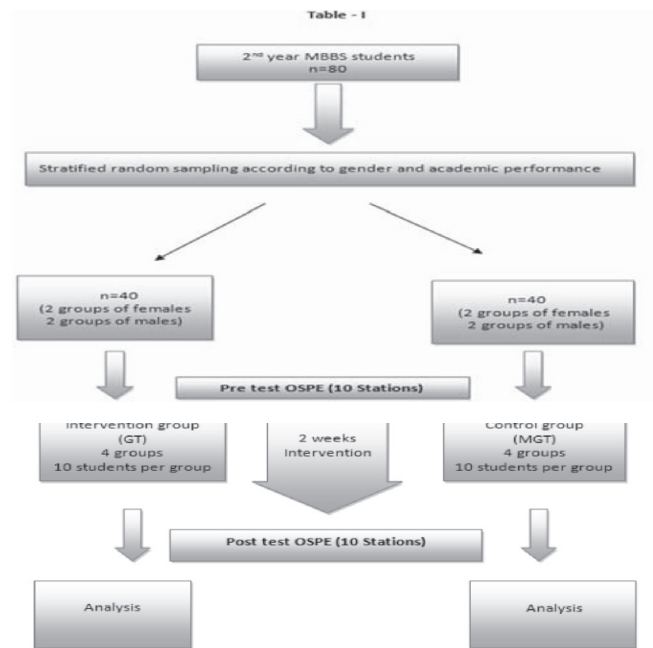


Figure-1. Plan of study

	Groups	N	Mean	±SD	P value
Control group (MGT)	Pre-test	40	9.113	3.37	0.031
	Post-test	40	13.038	3.17	
Intervention group (GT)	Pre-test	40	7.88	2.72	0.007
	Post-test	40	12.27	4.34	

Table-I. Paired sample statistics of control and intervention groups

DISCUSSION

This research provides quantitative data and reveals the essence of both guided and minimally guided teaching in effective learning of anatomy in small groups. The results of current study did not show any remarkable difference in terms of post OSPE scores of guided and minimally guided students, who were encouraged to do DSL or SDL by using different learning strategies such as e-learning, books, models etc. An insignificant p value of 0.315 was obtained on application of independent sample t test in both groups. However, improvement in academic scores in both control as well as intervention group was found from 9.13 to 13.03 in controlled group and from 7.88 to 12.27 in intervention group respectively, each of which gave a significant p value of 0.031, 0.007. In which the intervention group was highly significant. Thus, it is concluded that guided and minimally guided teaching strategies are equally good teaching and learning strategies. However many studies around the world support the influence of the teachers' expertise, knowledge and methods which is required for conceptual learning particularly in novice learners.²⁰

The study conducted by Luc Bude et al reflected a genuine effect of tutor guidance on students' performance with a significant result. It was stated in this study that the positive effect of guidance could lead to a more active learning, students' elaborations on critical points, stimulating the integration of the new acquired knowledge and perhaps decreasing the cognitive load and saving students' time on unnecessarily search.²³ Paul A. Kirschner et al in his study fully opposed the minimally guided methods of teaching such as inquiry based, PBL etc. According to their study they are all the failed methods of teaching strategies which are being by passed by teacher around the world since decades and by passage of time same strategies are repeated with new names.¹⁷ In a study conducted by Sweller et al it was found that noted that despite the alleged advantages of minimally guided opportunities which help students to derive meanings and concepts from learning materials, the free exploration of a highly complex environment can generate a heavy working memory load which

is detrimental to learning. And is particularly more important in the case of novice learners, who actually lack proper schemas to integrate the new information and concepts with the prior knowledge they are having.²⁴ Joel Michael in his study supported the minimally guided teaching and learning methods according to him active learning can come by student-centered approaches and it works better than more passive methods such as teacher-centered approaches.¹⁵ Our study is in agreement with the study done by Touvinen & Sweller in which it was found that in many instances, a more experienced learner can be benefitted equally from minimal and guidance instruction.²⁵ Our study is also supporting the study done by Glaser R & Y Engestrom, in which it was found that self learning comes only if the prior knowledge exists and are given by experts.^{26,27,28}

Guided and minimally guided teaching methods are already implemented in Peshawar Medical College. However, which one to consider the most suitable depends on the topic and subject matter, whether fully a new concept or already familiar to students. Although, minimally guided teaching methods are gaining an important status in medical education and it is highly suggested by researches as optimum method of teaching and learning.

LIMITATIONS

There has been few limitation in the current study of which , analyzing only anatomy small topics which are done in discussion was important, as all parts and anatomy allied has not been evaluated, meantime, it was only done on 2nd year students, and should have also be done and a very novice learners who are 1st year students. However, through this study we can do further vast researchers on a large scale.

CONCLUSION

It is concluded that guided and minimally guided teaching strategies are both effective in small group anatomy classes. Although, minimally guided teaching methods are gaining an important status in medical education and it is highly suggested by researches as optimum method of teaching and learning. Therefore, both

strategies can be used for teaching anatomy.

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The best HIJAB is in the Eyes of the beholder.

– Benazir Bhutto –

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Brekhna Jamil	BJ helped in generation of idea, designed study and edited all drafts of paper.	
2	Shamilah Hafizi	SH helped in collection of data, edited all draft papers including final draft.	