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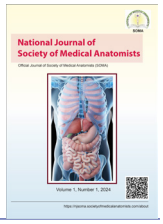

Self-Directed Learning as a Method for Teaching Gross Anatomy of Kidney among MBBS Students in a Medical College of Kolkata: An Interventional Comparative Study

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ABSTRACT

Objectives: This study aimed to compare the learning outcomes after exposure to scaffolded SDL, as well as traditional demonstration/ prosection method; and to evaluate effectiveness of self-directed learning (SDL) in teaching Anatomy of kidney, an important viscus, among first-year MBBS students. **Material and Methods:** This interventional comparative study was carried out at the Department of Anatomy of a government medical college, Kolkata. Hundred first-year MBBS students were included in the study, they were divided into two groups of fifty students in each group. Students of one group were taught the viscus kidney by traditional method of teaching by demonstration/ prosection, and the students of the other group had a scaffolded self-directed learning session on the same topic. Pre and post-test questionnaire were administered to evaluate learning outcomes of both methods. The results were compared. **Results:** It was observed that mean pretest score before traditional teaching was 4.32 (S.D. 1.68), whereas mean post-test score was 7.72 (S.D. 1.58). P value is less than 0.0001. The mean pre-test score before SDL was 4.74 (S.D. 1.88), whereas mean post-test score was 8.08 (S.D. 1.16). P value is less than 0.0001. It was found that the mean post-test scores after exposure to SDL was slightly greater than the mean post-test score after exposure to traditional teaching method, but difference was not significant. **Conclusion**: Both traditional teaching by dissection/ prosection and scaffolded self-directed learning methods were found to be comparably good for learning Anatomy of an important viscus, viz. kidney. In this era of reduced number of teachers of Anatomy and increased number of students, SDL can be a choice for teaching-learning some portion of Anatomy, like few viscera. Further research with larger sample sizes can throw more light into the matter.

Introduction

Anatomy has been the cornerstone of medical education for centuries.[1] It is viewed as the "first link in a long chain of events that teach new skills and competencies to tomorrow's physicians".[2] The undergraduate curriculum in India has undergone paradigm shift in the last few academic years. In the present competency-based medical education (CBME), there are guidelines for teaching and learning methods so that Indian medical graduates can be lifelong learners. The curriculum has been restructured from discipline-based to competency-driven. The new CBME by National Medical Council of India aims to be more learner-centric, patient-centric, and outcome-oriented.[3] Faculty and medical students are equally challenged by the implementation of CBME, because of major restructuring of the traditional pedagogic approaches.[4] Onus of learning lies on the students. Teachers are supposed to be the facilitators of their learning, who can impart knowledge and lead them to broaden their horizons, but they must eventually embark on their own.

Medical students need to be lifelong learners. So, acquiring competencies by medical students through self-directed learning (SDL) can be in focus. Self-directed learning, or SDL is defined by adult education expert Malcolm Knowles as the process by which the students themselves take the initiative to diagnose their learning needs, formulate their learning goals, identify resources for learning, and evaluate their learning outcomes.[5]

The system of medical education in India is sceptical in adapting such methods of andragogy. But since the implementation of Competency Based Medical Education (CBME) by the NMC, SDL is receiving attention, even dedicated time has been allotted to SDL in CBME curriculum in each specialty. Despite all reservations, the implementation of SDL has become mandatory.[6] SDL plays a crucial role in inducing the habit of reading and learning in medical graduates. It also develops all of the domains of learning: cognitive, psychomotor, and affective. Scaffolded SDL can successfully inculcate the habit of SDL in the young medical students, who are supposed to be life-long learners in their professional career.[7]

The number of teachers and teaching time for Anatomy is reduced, but students have increased manyfold. So, teachers must deliver new curriculums to an expanding student population through a more learner centred approach.[8] Since the concept of SDL is comparatively new in India, not much

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studies are there to compare the effectiveness of SDL with those of traditional teaching methods.This study aimed to evaluate the effectiveness of scaffolded self-directed learning (SDL) in teaching Anatomy of kidney, an important viscus, among first year MBBS students. The objectives are to evaluate learning outcomes after exposure to scaffolded SDL, as well as traditional demonstration/ prosection method by pre-test and post-test scores; and to compare the effectiveness of self-directed learning (SDL) with traditional method of teaching by prosection in learning viscus of kidney among first year MBBS students by comparing the post-test scores of both the methods.

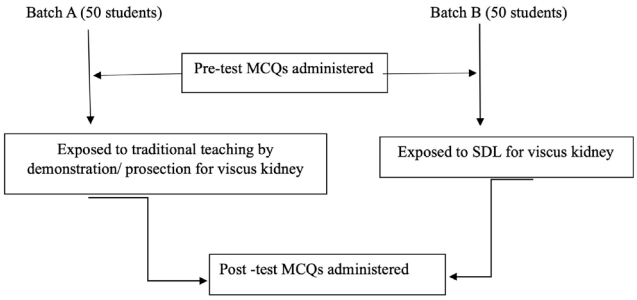
Material and Methods

This interventional comparative study was carried out at the department of Anatomy of a government medical college, Kolkata from January 2024 to June 2024. The study was conducted after obtaining institutional ethics committee clearance.

Hundred first-year MBBS students were included in the study (Flowchart 1). They consented to participate in the study. The students were divided into two batches (Batch A and B, according to their roll numbers) of fifty students in each group. Students of Batch A were taught the viscus kidney by traditional method of teaching by demonstration/ prosection for one and a half hour. Pre and post-test questionnaire were administered to evaluate learning outcomes of traditional teaching methods. The questionnaire consisted of ten multiple-choice questions, carrying one mark each, total ten marks. The questionnaire was validated by two subject-experts in Anatomy and two members of Medical Education unit of the medical college.

Students of Batch B had a scaffolded self-directed learning session on the same topic, viz. viscus kidney, for one and a half hours. Students were instructed to bring their textbooks, reference materials, and laptops with internet connections to encourage them to do computer-assisted learning. You-tube videos links were provided, with LCD screens, so that they could learn from the video. The students were helped by two faculty members to select their study materials, remain focussed and manage their time The pre-test and post-test questionnaire were given just before and after the SDL sessions to evaluate learning outcomes. The results were compared. Data were collected manually. Data analysis was done statistically with the help of Prism software. Paired t test was done to compare the means of the scores. $P < 0.05$ was considered statistically significant.

Flowchart 1



Result

In this study, it was observed that mean pretest score before traditional teaching of gross Anatomy of kidney was 4.32 (SD 1.68), whereas mean post-test score was 7.72 (SD 1.58). P value is less than 0.0001 (Table 1). By conventional criteria, this difference is considered to be extremely statistically significant.

The mean pre-test score before SDL was 4.74 (SD 1.88), whereas mean post-test score was 8.08 (SD. 1.16). P value is less than 0.0001 (Table 2). By conventional criteria, this difference is considered to be extremely statistically significant.

It was found that mean post-test score after exposure to traditional teaching methods is 7.72 (SD 1.58), and mean post-test scores after exposure to SDL was 8.08 (SD 1.16). P value equals to 0.2411. This value is not statistically significant.

Discussion

In the present study, it was observed that mean pretest score before traditional teaching was 4.32 (SD 1.68), whereas mean post-test score was 7.72 (SD 1.58). P value is less than 0.0001 [Figure 1]. This is considered to be extremely statistically significant. Therefore, it may be assumed that the students' knowledge improved significantly after exposure to traditional teaching of anatomy of kidney by prosection/ demonstration methods. In congruence with Older, it can be said that the dissected cadaver remains the most powerful means of learning, it has survived the test of time.[9]

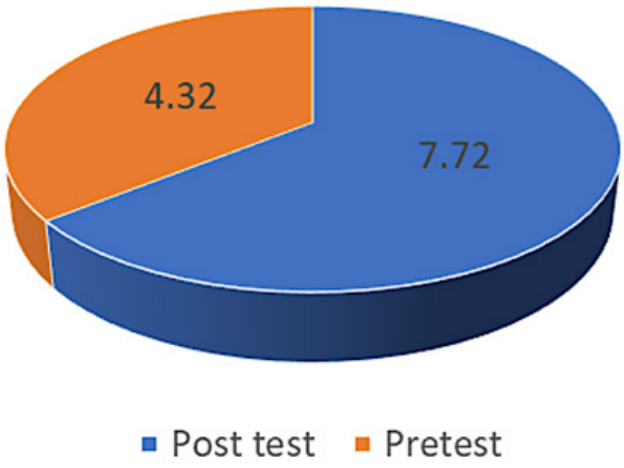


Fig. 1: Mean pretest and post-test scores for traditional teaching of kidney

The mean pre-test score before SDL was 4.74 (SD 1.88), and mean post-test score was 8.08 (SD 1.16). P value is less than 0.0001 [Fig 2]. The mean pre-test score before SDL was 4.74 (SD 1.88), and mean post-test score was 8.08 (SD 1.16). P value is less than 0.0001 [Fig 2]. This is considered to be extremely statistically significant. The observation suggests

Table 1: Pre-test and post-test data for traditional teaching of kidney

Group	Traditional Teaching Post-test	Traditional Teaching Pre-test
Mean	7.72	4.32
SD	1.58	1.68
SEM	0.22	0.24
Number of participants	50	50
P value < 0.0001		

Table 2: Pre-test and post-test data for SDL of kidney

Group	SDL Post-test	SDL Pre-test
Mean	8.08	4.74
SD	1.16	1.88
SEM	0.16	0.27
Number of participants	50	50
P value < 0.0001		

that SDL of gross anatomy of viscera improves learning outcome significantly. Researches in medical education are there reporting improvement in the all the learning domains after exposure to SDL.[10, 11]

In the present study, it was observed that the mean post-test score after exposure to traditional teaching methods was 7.72 (SD 1.58), and mean post-test scores after exposure to SDL was 8.08 (SD 1.16). P value equals to 0.2411 [Fig 3]. It is not considered to be statistically significant.

It is evident from the observations of present study that both the methods of teaching anatomy of kidney were very effective to improve learning outcome amongst the first-year MBBS students. The mean post-test score after SDL session was slightly better than the mean post-test score after traditional teaching method by dissection/ prosection (8.08 > 7.72), but the difference between the two methods was not significant. Literature is there, expressing similar views. Student performance scores were found to be statistically equivalent when comparing traditional teaching/dissection to other laboratory methods.[12]

SDL can succeed when the teachers evolve as facilitators, and help the novice students to understand the process of SDL well.13 The efficiency of self-directed learning is not same for all students, so teacher-assisted scaffolded learning is required to facilitate the process of SDL.[14] The limitation of the study is the small sample size, in one phase of MBBS. A larger sample size across phases would be more conclusive.

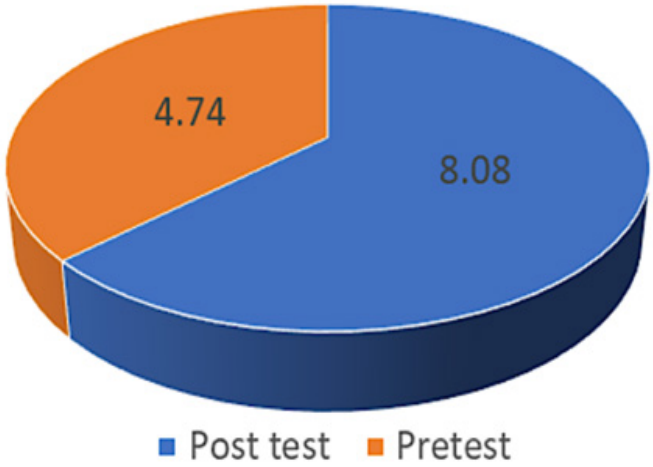


Fig. 2: Mean pretest and post-test scores for SDL of kidney

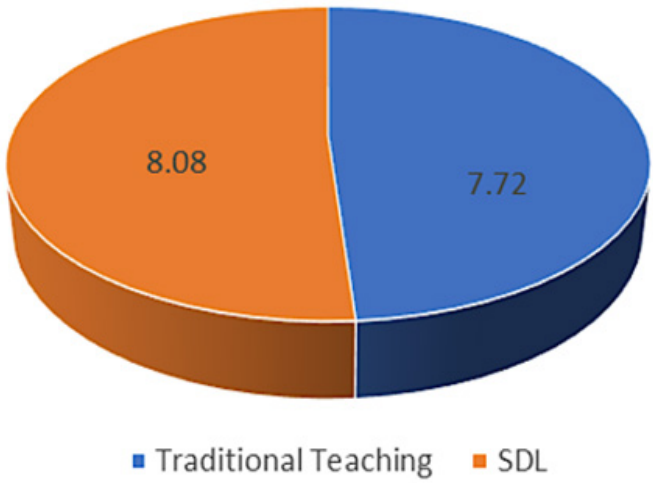


Fig. 3: Mean post-test scores of traditional teaching versus SDL for kidney

Conclusion

In the present study, the mean post test score after a session of scaffolded SDL under supervision of teachers for Anatomy of kidney showed a significant improvement on pretest score. It was also observed that traditional teaching method by demonstration/ prosection in learning Anatomy of kidney yielded a mean post test score that was significantly better than the pretest score. It can be thus concluded that both the methods were good for learning gross anatomy of an important viscus, viz. kidney. Also, the mean post-test scores for both the methods were not significantly different, so the methods were comparable. In this era of reduced number of teachers of Anatomy and increased number of students, SDL can be choice for teaching-learning some portion of anatomy, like few viscera. More researches with larger sample sizes can throw more light into the matter.

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