

EFFECTIVENESS OF ACTIVE TEACHING METHODS FOR THE RESIDENTS OF PHYSICAL MEDICINE AND REHABILITATION

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ABSTRACT

BACKGROUND

Lecture is the most common teaching aid not only for medical undergraduates, but also specialty residents. There are many disadvantages for this type of teaching. Active teaching methods include didactic lectures followed by interactive sessions, problem-based teaching and hands on demonstration apart from the traditional didactic lecture. The aim of this project was to compare the effectiveness of active teaching method over the didactic lecture to the first year residents of Physical Medicine and Rehabilitation.

MATERIALS AND METHODS

Settings- Physical Medicine and Rehabilitation Department among first year residents.

Study Design- Educational intervention. Didactic lecture followed by active teaching method.

Statistical Analysis- Analysed using SPSS-16 package software.

Initially, the first year students were subjected to a pretest, which consists of ten single responses multiple choice questions regarding - "The Carpel Tunnel Syndrome." This is followed by didactic lecture about the above topic. After this lecture, a post test was conducted with identical questions as the pretest. Then, an interactive session and hands on demonstration of confirming the carpel tunnel syndrome by nerve conduction studies were given. Following this, the same post test was then repeated.

RESULTS

The arithmetic mean value of pretest score was 3.5, which improved to 8.33 after the lecture session. After the live demonstration of nerve conduction studies, the mean value further increased to 9.8333. The 'p' value of the paired t-test after the lecture session was 0.000113, which is significant. The 'p' value after the live demonstration session was 0.008612, which is also significant.

CONCLUSION

The active teaching learning method is found to be more effective than the didactic lecture. Immediate and short-term gains are seen with such programmes.

KEYWORDS

Active Teaching Method, Didactic Lecture, Residents, Rehabilitation Medicine.

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BACKGROUND

A lecture (French 'lecture', meaning 'reading') is an oral presentation intended to present information or teaches people about a particular subject.¹ It is for an audience, especially one of students in a university. Lectures are probably the best teaching method in many circumstances and for many students, especially for communicating conceptual knowledge and where there is a significant knowledge gap between lecturer and audience.² The lectures are most suitable for teaching information, even though it does not promote thought or inspiring changes in

attitudes.³ This method of teaching is followed in many medical colleges of India. The lecturer who delivers has control over the flow of information and is able to provide students with precise, up-to-date information. A good lecture should have proper introduction, well-planned body and consolidating conclusion. A 20-minute lecture was found equal to the classic 50-minute lecture in terms of information retained by residents.⁴ There should be break in the middle for enhancing learning and non threatening questions for increasing the curiosity. Sequencing should be from simple to complex, familiar to unfamiliar and basics to advanced. While concluding, key points, review objectives and the references should be mentioned.

Advantages of lecture are- Large amount of topics can be covered in a single class period, excludes the use of lab or equipments, learning material is not needed, etc. Disadvantages are it is a passive method, doesn't engage every learning style, compromises critical thinking skills, teacher bias, precludes discussion, minimal student feedback, etc.

Active learning is "a method of learning in which students are actively or experientially involved in the learning process and where there are different levels of active learning depending on student involvement" (Weltman p. 8).⁵ There have been many articles published in the education literature on the merits of active learning. There is evidence that active learning and student-centered approaches to teaching work better than more passive approaches.⁶

Bonwell and Eison (1991) suggest that active learning provides the following benefits- Students are more involved than in passive listening; students are engaged in activities such as reading, discussing and writing; students' motivation is increased; students can receive immediate feedback; and students may engage in higher order thinking such as analysis, synthesis and evaluation.⁷

Demonstration involves showing by reason or proof, explaining or making clear by use of examples or experiments.⁸ Demonstrations often occur when students have a hard time connecting theories to actual practice or when students are unable to understand application of theories. Demonstrations can be used to enhance lectures and to offer effective hands-on, inquiry-based learning opportunities in classes or labs. It can be used in classes of all sizes in multiple grade and subject areas.⁹ Demonstrations are most commonly used in science and technology courses.

When using the demonstration model in the classroom, the teacher or some other expert on the topic being taught, performs the tasks step-by-step so that the learner will eventually be able to complete the same task independently.⁹ This method shows that students will be more active and will easily understand material presented in a learning process. The disadvantages of demonstration are-time consuming, requires instruments, capability of students maybe different may limit large participation, etc.

Thus, the effectiveness of didactic lectures in student learning can be increased by including various teaching learning methods involving the students in the learning

process. By incorporating active teaching-learning methods, the facilitator can improve the learning process among rehabilitation residents. This will enhance the receptivity and learning process of the learner resident.

One among the commonly encountered clinical scenarios in the Department of Physical Medicine and Rehabilitation is the carpal tunnel syndrome (median neuropathy at the wrist). Hence, this topic was taken to demonstrate the comparison of teaching the concerned topic with didactic lecture versus incorporating active teaching-learning methods to prove the effectiveness of the active teaching method versus lecture alone.

AIMS AND OBJECTIVES

To demonstrate the comparison of teaching the topic - carpal tunnel syndrome with didactic lecture alone versus active teaching-learning methods (didactic lecture, interactive sessions, problem-based teaching with hands on demonstration including the use of nerve conduction machine) to the first year residents of Physical Medicine and Rehabilitation thus to determine the effectiveness of this active-teaching method.

MATERIALS AND METHODS

Settings- Physical Medicine and Rehabilitation, Department among first year residents.

Study Design- Educational intervention. Didactic lecture followed by active teaching.

Inclusion Criteria

1. The six first year residents of Physical Medicine and Rehabilitation.
2. Patients with features of CTS who gave valid consent.

Exclusion Criteria

1. Any resident not willing to participate in the study.
2. Second and final year residents.

Study Tools- Semi-structured questionnaire.

Statistical Analysis- By using, SPSS-16 Software.

Methods

At the beginning of the class, consent from the residents was taken. They were given a pre-lecture test regarding - "The Carpal Tunnel Syndrome." The pre-lecture test consisted of ten single responses multiple choice questions (1 mark each) comprising of anatomy of carpal tunnel, clinical features, diagnosis (including nerve conduction studies) and management of this syndrome. The didactic lecture about the subject was then commenced with a listing of the specific learning objectives for the session. The topic was covered with the help of a PowerPoint presentation displayed through a LCD projector. The blackboard was also utilised as and when required. After the didactic lecture, the post-lecture test was administered with identical questions as the pretest.

Then, the residents was given active learning methods, which included problem-based learning, interactive session

and finally the hands on demonstration of how to confirm the diagnosis of carpal tunnel syndrome by using nerve conduction studies on patients who had given valid consent to participate in this study. After this session, the same post test was administered. The pre, post-lecture test and post hands on demonstration tests responses was evaluated using the above-mentioned questionnaire.

OBSERVATIONS

Before the lecture on the subject (carpal tunnel syndrome), a pretest evaluation was performed, which showed marks of 2, 3, 3, 4, 4 and 5. After the lecture, the score was increased to 7, 8, 9, 10, 7 and 9, respectively. After the live demonstration and training of nerve conduction studies in carpal tunnel syndrome, the score was further increased to 9, 10, 10, 10, 10 and 10 (Figure 1).

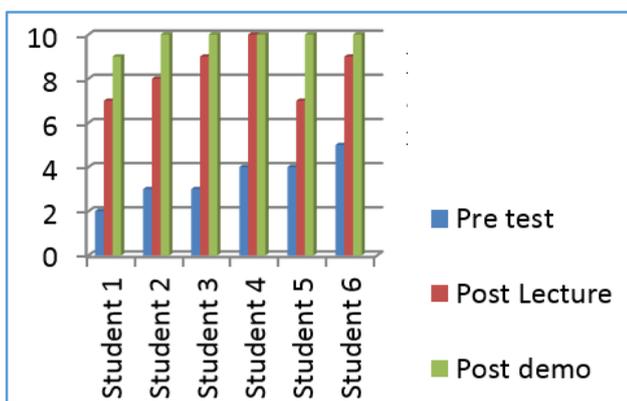


Figure 1. Pre, Post Lecture and Post Demo Marks

Data Analysis

The arithmetic mean and paired t-test of the pre-lecture, post-lecture and post-demonstration test scores were calculated. The arithmetic mean value of pretest score was 3.5, which improved to 8.33 after the lecture session. After the live demonstration of nerve conduction studies, the mean value further increased to 9.8333.

The 'p' value of the paired t-test after the lecture session was 0.000113, which is significant (below 0.05). The 'p' value after the live demonstration session was 0.008612, which is also significant (below 0.05).

DISCUSSION

"If you tell me, I will listen. If you show me, I will see. But, if you let me experience, I will learn." These are the words of Chinese philosopher Lao-Tse (5th century B.C.). This clearly shows that the idea of active learning has been there since long ago. John Dewey an American philosopher and educational reformer believed that progressive education is essentially a view of education that emphasises the need to learn by doing. Dewey believed that human beings learn through a 'hands on' approach. This places Dewey in the educational philosophy of pragmatism.¹⁰

However, the didactic lectures seem the principle mode of teaching aid used in the medical colleges all over India. It is more passive in nature and less effective as a teaching tool when compared with active learning methods. There

have been many articles published in the education literature on the merits of active learning including a review article on active learning in science education with an emphasis on the teaching.¹¹

The ability to perform high quality electrodiagnostic studies is a critical skill for the practicing physiatrist. Electrodiagnosis is an important and helpful extension of the physical examination and can detect minor abnormalities when physical examination cannot.¹²

This education intervention showed the advantages of active learning over the traditional didactic lecture. Therefore, we should start modifying our teaching using the active learning methods that match the needs of our students.

CONCLUSION

The present study demonstrates that there are short-term gains in students' knowledge of nerve conduction studies from didactic lectures and live demonstration. Their performance in class tests based on the material covered in the lecture and live demonstration showed a significant positive correlation.

1. Incorporating various teaching-learning methods to impart knowledge.
2. In Physical Medicine and Rehabilitation, nerve conduction studies is a must to know area. Students should have a clinical diagnosis; know to conduct nerve conduction studies and interpretation, this will give precise and accurate clinical diagnosis to plan rehabilitation goals.
3. By administering hands on demonstration by faculty, students will get a first-hand experience about the proper technique of conducting a nerve conduction studies.

RECOMMENDATIONS

The active teaching-learning method is found to be more useful than the didactic lecture alone for teaching residents. So, this learning method could be adopted in medical colleges for teaching undergraduates and residents.

LIMITATIONS

1. Small sample size.
2. Only one topic could be covered.
3. Test was conducted immediately after the teaching-learning method.
4. Longer impact is yet to be searched out.

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