Case-based learning of Biochemistry to enhance diagnostic and clinical reasoning skills in interns – An experimental study

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Introduction

The principles of biochemistry are essential to understand cellular and tissue function, as well as the pathophysiology of disease. However, the clinical utility of biochemical principles is often obscure to clinical trainees. Exposing them to clinical scenario where we can imbibe the basic concepts of biochemistry provides an opportunity to illustrate how basic biomedical principles facilitate an understanding of the clinical presentation, the relevant pathophysiology, and the rationale for diagnostic and therapeutic strategies![1].

Several authors have thrown a light on the value of basic science in clinical diagnosis

and its usefulness in improving the residents' clinical reasoning and diagnostic skills. However, most of the studies have been done outside India and have used the case base learning during the preclinical course[1,2].

Through case discussion biochemical principles can easily be incorporated, with the potential to reinforce the concepts and to illustrate their application to clinical decision making. This approach maintains the effort to teach basic biomedical sciences in the context of clinical application across the medical curriculum[3,4]. Hence refreshing their basic science skills probably will improve their scientific reasoning and hence better management of patients. With this backdrop to check does reinforcing Biochemistry concepts through case-based learning during internship will really improves their diagnostic and clinical reasoning skills we compared the pre and post test scores of cases based MCQs in interns taught with case-based learning (CBL) methods between the study and the control group[4].

Materials and methods

An interventional study involving 40 interns of batch 2013-14 was conducted at Biochemistry department of Adichunchanagiri Institute of Medical Sciences. Sampling was done by using stratified sampling technique. Total participants were divided into two groups, 20 interns in the study group and 20 interns in control group. Informed consent from the study participants and Institutional ethical clearance was obtained. Pre-test was conducted for both study and control group. After that a Case based learning session was conducted for only the study group and followed by which post-test was conducted for both the groups. Pre and post test scores was compared to assess improvement in clinical reasoning and diagnostic skills. Post test scores was compared with the control group. The average 'gain' (posttest marks – pretest marks) in interns was calculated. The paired t test was used to look for differences in the mean test scores as well as the 'gain' scores. Unpaired t test was used to compare the post test scores of the two groups.

Results

The comparison of marks scored in pre and post test in the control group is shown in figure 1. Comparison of scores of study and the control group is shown in figure 2. The study

group (p=0.0001) showed significant improvement in percentage of marks scored in post test compared to the pre test. The improvement in the intervention group was highly significant (p=0.0001) compared to the control group.

Figure 1: Bar chart showing comparison of pre and post test scores in study group

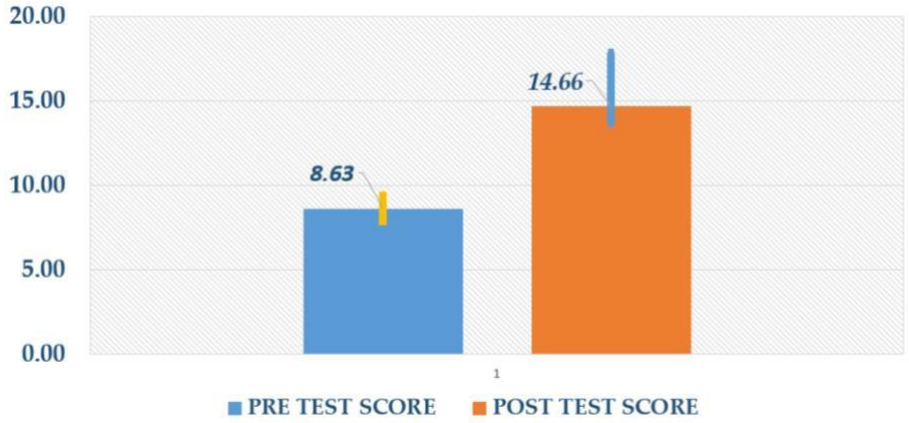
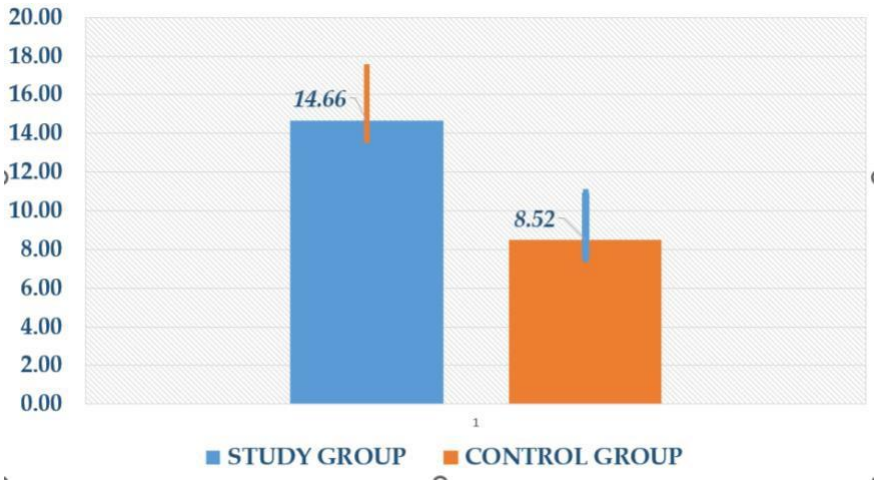


Figure 2: Bar chart showing comparison of scores between study and control group



Discussion

Student-centered education has recently gained importance in India, and the effectiveness of such method has also been tested. CBL appears to be a good method of teaching which can be made students–centric[2]. Our results were in accordance with few studies where medical education researches stated that with the usage of specific learning objects,

CBL could aid in effective evidence-based education system and sequentially evidence-based clinical practice [4-6].

During the study, when the response of majority of the interns related to their perception to CBL was evaluated it was observed that most of the interns alleged that it helped them in rising logical thinking, clinical reasoning and diagnostic interpretation[1,2].

Study by Nair et al.[7] concluded that CBL is effective for better understanding of biochemistry among medical students. Another study by Shigli K Nair et al.,[2] highlighted that CBL can be a good adjunct to traditional teaching method, and it proved to be effective in enhancing the knowledge and would facilitate learning at a higher level among dental interns. The results of the present study were reliable with those of Zhang et al.[8] who clinched that CBL is an effective method to clinical reasoning, diagnosis, and logic thinking. To conclude reinforcement of Biochemistry knowledge through case-based learning in interns resulted in improving scientific reasoning skills. This approach can be used to teach basic biomedical sciences in the context of clinical application across the medical curriculum thus helping them in improving their diagnostic skills and lateral thinking.

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