

RESEARCH ARTICLE

Teaching and learning educational tool preferences among 1st year dental students in physiology: A cross-sectional questionnaire survey

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Received: August 22, 2018; **Accepted:** September 12, 2018

ABSTRACT

Background: Evaluation is an important process in teaching and learning strategies, which includes description, collection, and analysis of available tools for their effective outcome. Hence, it is important to understand and adopt the most preferred teaching and learning educational tool to deliver the knowledge efficiently and clearly to the target audience. **Aims and Objectives:** This study aims to collect and describe the feedback on teaching and learning educational tool preferences among the 1st year dental students in physiology. **Materials and Methods:** An observational cross-sectional study was done at a Southern single teaching tertiary care dental institution using prevalidated structured questionnaire on the 1st year dental students. The study proposal was approved by the Institutional Review Board and national as well as international guidelines on bioethics were followed throughout the study period. A total of 57 completed and returned questionnaire forms were taken for final data analysis and represented in descriptive statistics. **Results:** It was revealed that majority of study participants opined as “teaching and learning physiology by powerpoint slide and blackboard presentation” were the very good tools on five-point Likert scale (15.79%). It was also seen that majority of study participants would like to learn physiology through weekly class tests in the form of multiple choice questions (MCQs) (50.88%), case study (56.14%), small group discussions (36.84%), and in more relevance to both clinical and experimental aspects (71.93%). The study also showed that the most interesting topic in physiology was gastrointestinal system and most difficult topic to understand was cardiovascular system. **Conclusion:** The 1st year dental students prefer to learn physiology by powerpoint and blackboard presentations, case study, and small group discussions, weekly class tests in MCQs format and more relevance to clinical as well as experimental aspects, as the most effective teaching and learning educational tools.

KEY WORDS: Dental; Educational and Learning Tools; 1st Year; Teaching and Learning

INTRODUCTION

Physiology is an important branch of medical science, dealt in the 1st year medical, dental, and nursing undergraduate courses under the guidelines of Medical Council of India,

Dental Council of India, and Nursing Council of India, respectively. Physiology needs to be understood and studied in detail about the normal functioning of various important systems including cardiovascular, central nervous, autonomic, reproductive, endocrine, and gastrointestinal systems.

There is an indeed need to evaluate the students throughout the course with various teaching and learning methodologies available in the current era to impart the knowledge effectively and also to create the better teaching-learning environment in the classrooms.^[1,2] Evaluation is an organized process involving collection, analysis, and description of information to find out the extent of objectives to be achieved, so better decision regarding

Access this article online	
Website: www.njppp.com	Quick Response code 
DOI: 10.5455/njppp.2018.8.0827012092018	

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the best available methodologies will be implemented for better enhancement.^[3] In the current era, even though computer-based powerpoint slide presentation is extensively being used as teaching and learning methodologies, it has been controversial and debates about the benefit of it as an educational tool.^[4]

The feedback on various teaching-learning tools in students is important as teaching and assessment are the core integral elements of undergraduate training program.^[5] It has been established that the knowledge, perception, and memory among students to students and from place to place vary widely.^[6] There is a need to establish and describe the various teaching and learning methodologies to deliver the medical knowledge efficiently to the students with an overall goal to improve the better medical health care to patients.^[7]

MATERIALS AND METHODS

The research proposal was approved by the Institutional Research Committee and Institutional Human Ethics Committee. The research was carried adhering to the Good Clinical Practices and Indian Council of Medical Research (ICMR) ethical guidelines for biomedical research on human participants.

After obtaining prior written informed consent, the 1st year dental students were recruited into the study. This study was a cross-sectional survey conducted on the 1st year dental students from a Southern single teaching tertiary care center. Various teaching and learning tool preferences among the 1st year dental students in physiology were collected through structured questionnaire forms. The questionnaire forms were prepared by consulting the subject experts in this field. All the questions were close ended with multiple options and the participants were instructed to choose the best one among them, as per their most preference or choice. The questions were prevalidated in a small group of target population for its authenticity and validity. The confidentiality of each individual participant was maintained as per the national ICMR bioethics guidelines.

A total of 66 questionnaire forms were distributed to the 1st year dental students. However, six study participants did not provide the voluntary consent for participation into the study and three returned the incomplete questionnaire forms. Hence, in this study, a total of 57 1st year dental students, who returned the completed questionnaire forms and the data collected from the same were taken into account for final descriptive statistics, and hence, the sample size of the study was 57. The descriptive statistics were expressed in the form of percentages in pie and bar diagrams.

RESULTS

These study results were depicted in diagrams in the form of descriptive statistics [Figures 1-6]. The most liked topic in physiology among the 1st year dental students was shown in pie diagram [Figure 1] in the form of percentages. The

preferred method/mode of teaching and learning physiology by various strategies was categorized on five-point Likert scale ranging from very good, good, average, not useful, and useless [Figures 2 and 3]. In Figure 4, the preferences regarding, how weekly class tests to be conducted for the improvement of subject knowledge in physiology among the 1st year dental students was shown in percentages in pie diagram. The opinion of the 1st year dental students, in respect to teaching and learning physiology in the form of either clinical or experimental part or both was highlighted in the pie diagram [Figure 5]. The most difficult topic or system in physiology felt by the 1st year dental students was shown in percentage [Figure 6].

DISCUSSION

This was a cross-sectional study, with target population as the 1st year dental students from a Southern single teaching

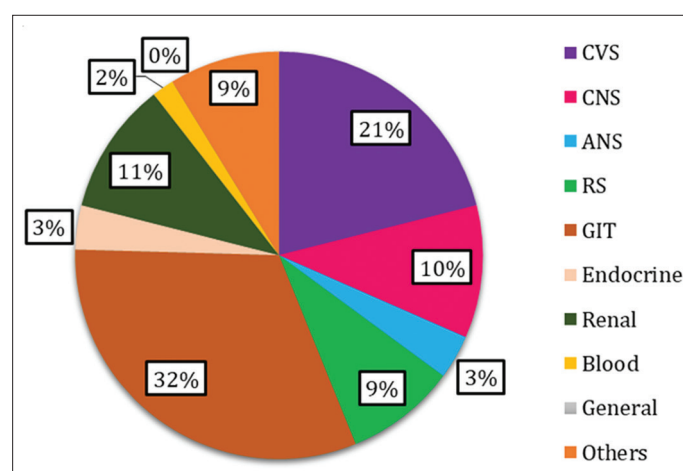


Figure 1: Pie diagram depicting the “most liked topic in physiology” among the 1st year dental students. Data are represented as percentages; $n = 57$; CVS: Cardiovascular system, CNS: Central nervous system, ANS: Autonomic nervous system, RS: Respiratory system, GIT: Gastrointestinal system

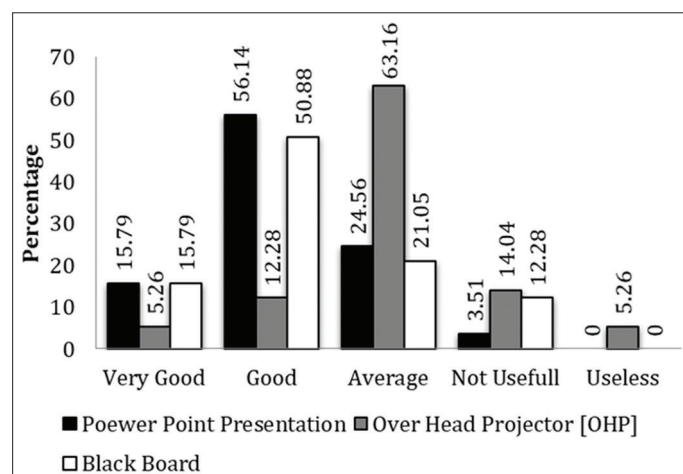


Figure 2: Bar diagram depicting the “opinion regarding teaching physiology” by different teaching and learning tools among the 1st year dental students. Data are represented as percentages; $n = 57$

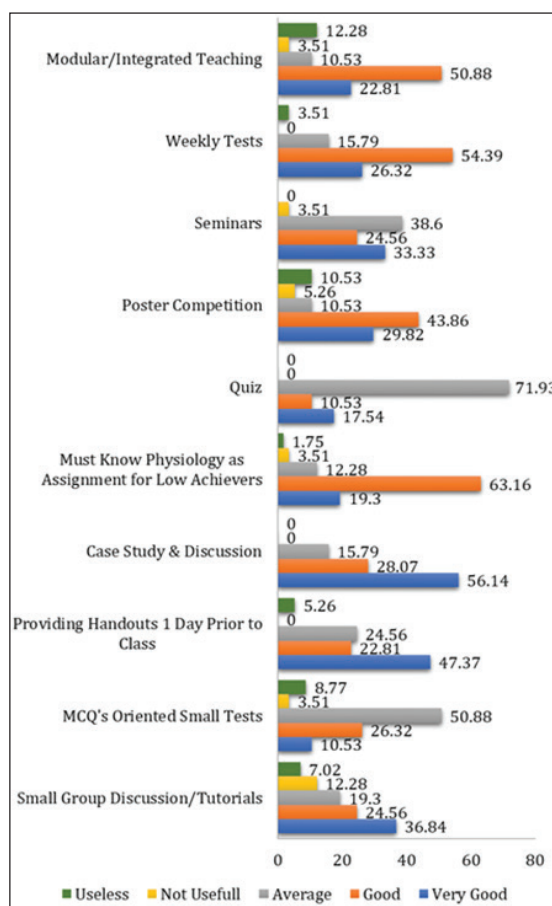


Figure 3: Bar diagram depicting the “opinion regarding learning physiology by different teaching and learning strategies” among the 1st year dental students. Data are represented as percentages; $n = 57$; MCQs: Multiple choice questions

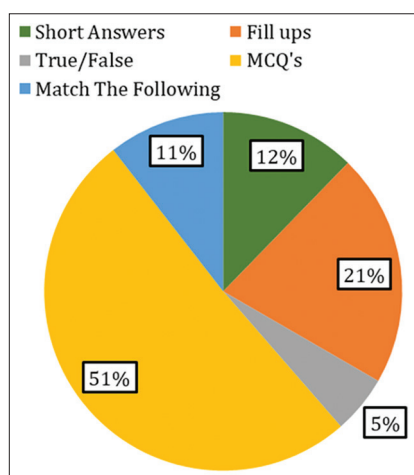


Figure 4: Pie diagram depicting the “opinion regarding how do you like the weekly tests?” among the 1st year dental students. Data are represented as percentages; $n = 57$; MCQs: Multiple choice questions

tertiary care dental institution. The objective of the study was to collect the feedback of study population in reference to their teaching and learning style preferences in physiology through prevalidated questionnaire forms. The findings of our study revealed that most liked topics or systems in physiology in descending order were gastrointestinal

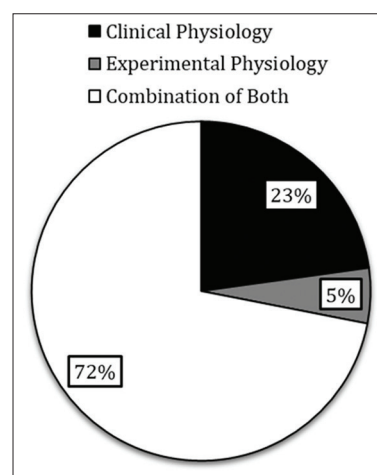


Figure 5: Pie diagram depicting the “opinion regarding how do you like physiology to be taught in more relevance to” among the 1st year dental students. Data are represented as percentages; $n = 57$

system, cardiovascular system, central nervous system, renal system, respiratory system, autonomic nervous system, and endocrinal system [Figure 1]. Our study data also revealed that majority of the 1st year dental students prefer to learn the physiology through powerpoint and blackboard presentations (with very good or good on five-point Likert scale [Figure 2]) and small group discussion/tutorials, studying the handouts

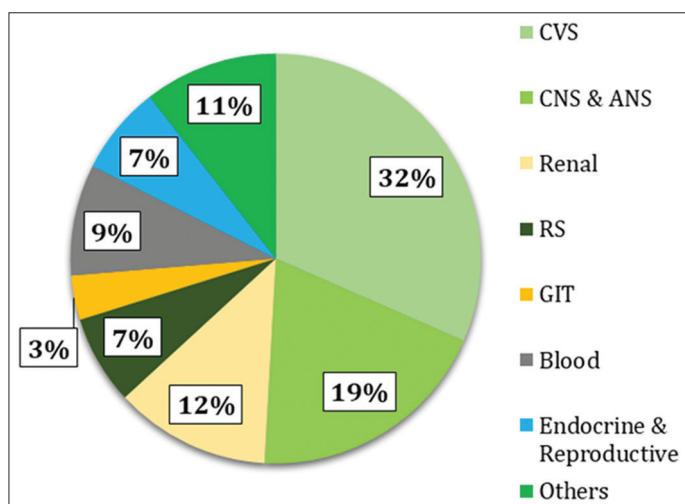


Figure 6: Pie diagram depicting the “most difficult system/topic to understand in physiology” among the 1st year dental students. Data are represented as percentages; $n = 57$; CVS: Cardiovascular system, CNS: Central nervous system, ANS: Autonomic nervous system, RS: Respiratory system, GIT: Gastrointestinal system

provided a day before the lecture classes, case studies, poster competition, weekly class tests, and integrated/modular teaching (with very good or good on five-point Likert scale [Figure 3]). The study findings also highlighted that the 1st year dental students prefer to have weekly class tests through multiple choice questions [Figure 4] and learn the physiology in more relevance to clinical as well as experimental aspects [Figure 5]. It was also seen that the most difficult system to understand was cardiovascular and least was gastrointestinal system [Figure 6].

In our study, the majority of study participants opined powerpoint as well as blackboard presentations as the most effective tools for learning physiology concepts [Figure 2]. Our study findings are in accordance with the previous study reported by the Thaker *et al.*^[8] However, our study findings are in contrast to the other reported studies in the literature. A cross-sectional study was carried by Hemalatha *et al.*^[9] reported that majority of study population preferred chalk and board as the method of teaching and learning physiology followed by combination of various methods. Another study done by Khane *et al.*^[10] to assess the teaching and learning methods in physiology at D. Y Patil Medical College, Kolhapur, Maharashtra (India), also highlighted that the most preferred teaching aid in physiology was blackboards, then followed by the overhead projector and powerpoint presentations. In our study, most of the study participants prefer to have modular or integrated teaching programs, weekly class tests, poster competitions, must know physiology as assignment for low achievers, case study discussions, providing topic handouts 1 day before the classes, and small group discussions in the form of tutorials as the most effective teaching and learning tools in understanding the physiology concepts [Figure 3]. Our study results are similar to the other studies, in respect

to learning physiology by small group discussions,^[10,11] case-based learning,^[12] and handouts for the classes.^[13,14] Another study reported by Thaker *et al.*^[8] to compare the efficacy of different teaching tools in the 1st year medical students on teaching activities at the Department of Physiology, Smt. NHL Municipal Medical College, Ahmedabad (India), showed that group discussion was the best among all modalities of teaching and learning methods. In our study, participants preferred to learn the physiology concepts more in relevance to both clinical and experimental physiology [Figure 5]. Other studies carried by Rajaratnam *et al.*^[15] to evaluate the teaching methods for lecture classes in physiology reported that majority of students prefer to learn the physiology by unimodal learning. Another study done by Lujan *et al.*^[16] to evaluate the attitude and perception of students toward teaching-learning methodology in physiology found that students preferred a single mode of information presentation (36.1%). Among that 36.1%, it was found that 5.4% preferred visual (learning from charts, diagrams, and graphs), 4.8% from auditory (learning by speech), and 7.8% as learning by reading and writing. Khane *et al.*^[10] study also highlighted that quiz program was one of the most preferred learning methods in physiology. However, in our study, majority of study participants felt learning physiology by quiz programs as the average method on five-point Likert scale. It is very important to take the feedback of professional students in respect to their most preferred teaching and learning styles as they differ from place to place and from time to time. Hence, it is important to understand and adopt the most preferred teaching and learning style as felt by the professional students to deliver the knowledge effectively from time to time. It is a debatable topic, one to say which is the most effective teaching and learning tool for imparting the subject knowledge to the professional students.^[4] In the current era, the technology is rapidly progressing, and hence, the preferences of teaching and learning styles also differ from time to time. Hence, it is important to have the feedback of students periodically and adopt the most preferred learning styles to deliver the subject concepts clearly and efficiently.

Confinement to the single center was the major limitation of our study. It had been tried to eliminate the various biases resulting from the questionnaire by prevalidating the questionnaire in a pilot study with modification of questions as per the advice of subject experts. However, further larger studies are required to explore and generalize the data to the globe.

CONCLUSION

Our study concluded that majority of the 1st year dental students prefer to learn the physiology, by powerpoint as well as blackboard presentation, case study, and small group discussion methods. It was also revealed that majority of the 1st year dental students prefer to have handouts of the

physiology topic 1 day before the class, willing to learn it in context to both the clinical and experimental physiology and prefer to have weekly class tests in the form of multiple choice questions as the most effective teaching and learning educational tools in physiology.

ACKNOWLEDGMENT

Authors thank the Chairman Dr. C. K. Velayuthan Nair and Director Dr. Rema V. Nair of Sree Mookambika Institutions, Kulasekharam, for their kind and valuable support throughout the study period.

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How to cite this article: Bai KM, Madhavrao C. Teaching and learning educational tool preferences among 1st year dental students in physiology: A cross-sectional questionnaire survey. *Natl J Physiol Pharm Pharmacol* 2018;8(11):1561-1565.

Source of Support: Nil, **Conflict of Interest:** None declared.