

RESEARCH ARTICLE

A cross-sectional survey on awareness of applied clinical physiology concepts among medical interns in a southern tertiary care institution

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ABSTRACT

Background: In India, the preclinical subjects - anatomy, physiology and biochemistry are taught during the 1st year of medical curriculum, as per the norms of Medical Council of India. Physiology is one of the preclinical subjects that form the basis for core knowledge in medical field to improve and deliver the better health care. **Aims and Objectives:** The aim and objective are to study the awareness of applied clinical physiology concepts among medical interns in a southern tertiary care center. **Materials and Methods:** A cross-sectional study was conducted using a pre-validated questionnaire on interns in a southern-based medical institution. All the principles of bioethics were adhered throughout the study period. The obtained data were analyzed and expressed in frequency and percentage. **Results:** This study showed that the study participants were not able to give the correct responses to the questions describing the different domains of applied clinical physiology concepts, and the percentage was found to be low (<50%). Majority of the study participants gave the positive opinion that physiology is one of the basic preclinical subjects, which helps in better understanding of other disciplines in medical field. It was also noted that majority of study participants were willing to update their knowledge in physiology through various teaching and learning programs. **Conclusion:** This study showed that there was a poor knowledge but with positive attitude toward the applied clinical physiology concepts among medical interns in a southern tertiary care center.

KEY WORDS: Physiology; Medical, Interns; Applied Clinical Principles; Basic Sciences

INTRODUCTION

Physiology is one of the basic preclinical subjects which is taught in 1st year medical academic curriculum, as per the norms of the Medical Council of India (MCI). Knowledge of basic sciences in medical field is important in clinical practice to deliver the better medical health care.^[1] Basic preclinical subjects form the sound foundation to become a good clinician.^[2]

There is a need to teach the basic science principles with clinical orientation and clinical-based problem-solving exercises in the undergraduate curriculum so that it will provide better implications of basic sciences from bench to bedside in future.^[3,4]

It has been found that the retention of concepts of basic sciences on long-term basis is very poor. The literature established that the retention of principles of basic sciences on long-term basis is only two-third to three-fourth after 1 year and still it is <50% from the next year.^[5,6] Pre-clinical sciences in medical education help in the development of clinical reasoning skills and form the part of evidence-based medicine.^[7] Knowledge and integration of basic pre-clinical sciences during the later part of life are beneficial in delivering the effective health care.^[8-12] Hence, there is a need to assess the awareness of

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principles of basic sciences continuously so that necessary steps can be taken in appropriate time to enhance the long-term retention of memory and its applications in clinical practice to deliver the medical health care effectively to the humankind. The objective of this research work was to study the awareness of applied clinical physiology concepts among medical interns in a southern tertiary care center.

MATERIALS AND METHODS

This was a cross-sectional study done in a southern teaching tertiary care center involving medical interns as study participants. The research proposal was approved by the Institutional Human Ethics Committee, and all the principles of bioethics were adhered while conducting the study. After obtaining prior written informed consent, the participants were recruited into the study and were provided with pre-validated structured questionnaire forms defining the different domains of principles of applied clinical physiology. Confidentiality about the details of study participants was strictly maintained.

A total of 83 questionnaire forms were provided to the medical interns and were asked to return the forms after filling them. Among 83, 11 forms were not considered for final data analysis, as 4 medical interns did not provide consent for the study and other 7 with incomplete forms. Finally, 72 questionnaire forms were analyzed which formed the sample size of the study.

The data collected from the questionnaire forms were recorded and summarized in frequency and percentages with the help of Microsoft office Excel 2007 software tool.

RESULTS

The total sample size of the study was 72. The questions describing the different domains on “applied clinical physiology concepts” and the correct/wrong responses marked by the medical interns were depicted in the form of frequency and percentages [Table 1]. It is shown in pie diagram about the opinion of medical interns regarding the physiology subject which helps in better understanding of clinical principles involved in health care [Figure 1]. The percentage of medical interns willing to update their knowledge in physiology subject through various teaching and learning programs is shown in Figure 2. The type of

program they would like to have for updating their knowledge in physiology subject was depicted in percentages [Figure 3].

DISCUSSION

This study was a cross-sectional in design, conducted on the medical interns through prevalidated questionnaire forms. Descriptive statistics were used for representing the data recorded from the returned complete questionnaire forms from the study participants. Our study results found that knowledge about “applied clinical physiology concepts covering different domains like basic physiology concepts, physiopathological concepts, medical conditions with physiological concepts and clinico-physiological concepts” among medical interns was found to be <50% [Table 1]. In our study, the medical interns were of optimistic in character with a positive attitude toward the physiology subject [Figures 1-3]. The study participants had good opinion and interested to update their knowledge in physiology subject periodically. The study results highlighted that more than three-fourth of the study participants were willing to learn or update the clinical applications of physiology subject in their professional practice through various teaching and learning strategies.

In our study, the target population were medical interns, and their responses to the questions defining various domains of clinical physiology principles were poor and were found to be <50% [Table 1]. As per the MCI norms, the gap between the study of physiology subject and internship is around 3½ years. It is also clearly evident from the literature that the retention of knowledge gained from the preclinical subjects is poor on long-term basis. It has also been found that the retention of preclinical sciences knowledge varies around two-third to three-fourth at 1 year and still poor on subsequent years.^[5,6] Our study results are in consistent with the study quoted and done by Custers.^[5] In our study, the average correct responses describing various domains of clinical physiology principles fall <40%. Hence, in our study, the retention of applied clinical physiology principles among medical interns found to be <50%. This could be due to the long gap between the study of physiology subject and internship program as per the MCI norms. There are many methods as described in the literature, for imparting the subject concepts more effectively, so that it can last for longer time. It is important to consider the teaching and learning preference of students to deliver

Table 1: Knowledge about “applied clinical physiology concepts” among medical interns in a southern tertiary care centre

Different domains of applied clinical physiology	Correct answer Frequency (%)	Wrong answer Frequency (%)
Basic physiology concepts	26.50 (36.80)	45.50 (63.20)
Physiopathological concepts	21.14 (29.36)	50.86 (70.64)
Medical conditions with physiological concepts	27.17 (37.73)	44.83 (62.27)
Clinico-physiological concepts	23.14 (32.14)	48.86 (67.86)

Data of frequency and percentages are represented in mean; n=72

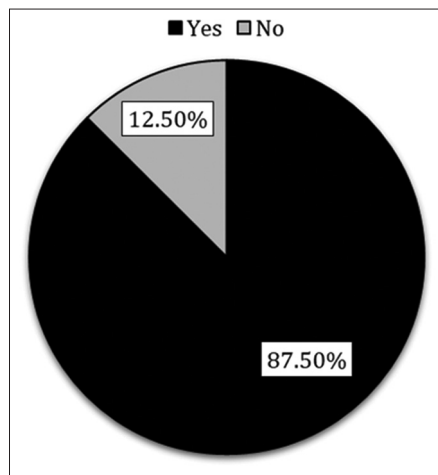


Figure 1: Pie diagram depicting the opinion to the question “Physiology helps in better understanding the concepts in various medical disciplines” among medical interns in a southern tertiary care center. Data are represented as percentage; $n = 72$

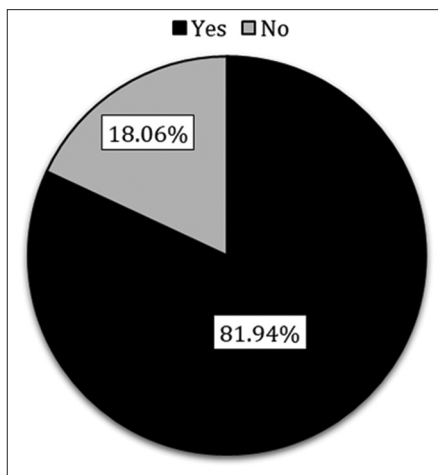


Figure 2: Pie diagram depicting the medical interns “Willing to have Symposia/Seminars/CME/Workshop/Conference/Other teaching and learning methods on applied clinical Physiology concepts” to improve knowledge and skills at clinical levels. Data are represented as percentage; $n=72$

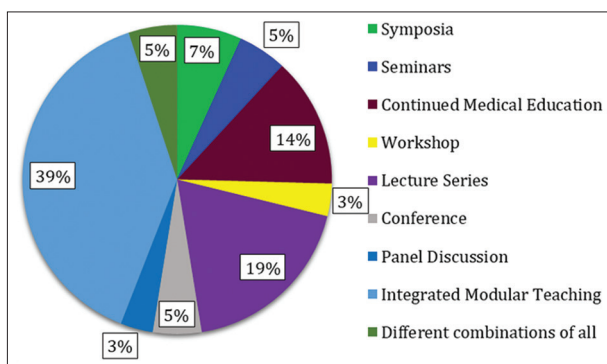


Figure 3: Pie diagram depicting the opinion on “various learning educational strategies to be adopted” to acquire the knowledge of applied clinical physiology concepts among medical interns in a southern tertiary care center. Data are represented as percentage; $n=72$

the subject concepts more impressive and clearly for better outcomes in future.^[13] There should be adaptation of effective teaching and learning programs for students from time to time by the facilitators/mentors to keep their knowledge not only updated but also retained for longer period with enthusiasm for active learning throughout the professional life.^[14] A review by Srivastava *et al.* emphasized that the missing gaps in teaching and learning process can be found through the classroom-based formative assessments, which can be corrected and adopted at appropriate time by the educators as well as policy makers for better outcomes in future.^[15] Again, various e-learning platforms can be adopted for continuous learning during the professional period to keep oneself updated.^[16] In our study, the positive and optimistic feedback given by the study participants highlights the importance of clinical physiology principles in professional practice [Figures 1-3]. The knowledge gained from the preclinical subjects is very essential, to have better clinical reasoning skills during the entire professional period of practice. The link between the preclinical subjects and good reasoning clinical skills was evident from the various studies conducted globally.^[1,3,4,7] A study was carried by Rudland and Rennie^[1] at Dundee Medical school (UK) to determine the importance of basic sciences in clinical practice. The above-said study was a questionnaire-based survey, showing that the integration of important clinically orientated problem-based learning during undergraduate courses will help efficiently for good clinical practice. Another study, done by VanGessel *et al.*,^[3] also reported that teaching of basic pre-clinical sciences with clinical scenarios will help in practicing better evidence-based medicine in future. Wallach *et al.*^[4] done a study at the University of South Florida College of Medicine, to evaluate the importance of basic sciences in clinical medicine in which a 3-week course entitled “The Profession of Medicine: An Integrated Approach to Basic Principles” was given to all study participants, and its results confirmed that basic sciences play very important role in making the clinical diagnosis and treatment. The above study also emphasized that learning and recapitulating the principles of basic sciences are crucial in clinical practice throughout the entire medical profession. Another study, done by Grande *et al.*,^[7] showed that principles of basic sciences help and support in the critical analysis of medical interventions, critical analysis of surgical interventions, analysis of processes to improve medical health care, and development of clinical reasoning skills.

In our study, the questions describing the various domains of clinical Physiology principles were prepared in consultation with the subject experts and were prevalidated. Hence, the questions in our study seem to be balanced, and the obtained results were in comparison to the previous quoted studies in the literature.^[5,6] However, our study results were limited to the single medical institution located in the Southern part of India. Further, larger studies involving many medical institutions in India are required for generalizability of the data.

CONCLUSION

This study concluded that medical interns had poor retention but with positive attitude toward the applied clinical Physiology concepts in a southern tertiary care center and hospital.

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