

# Assessment of awareness, perceptions, skills and motivation of undergraduate medical students 'research in physiology-a pilot study

## Abstract

**Background:** Training in research is gaining great importance at the undergraduate level. The subject of physiology forms the foundation of clinical subjects hence it becomes the fundamental constituent of medical curriculum. The evidence obtained from classroom assessment supports the effectiveness of computerized data recording systems in self-learning, motivation, improved performance, and skills development in undergraduate courses in a range of disciplines.

**Objectives:** Our assessment aimed to (a) evaluate students' awareness of research activities, (b) compare students' perceptions of their soft and research-specific skills competencies, and (c) determine students' motivation for research.

**Methods:** A pilot study was conducted using the questionnaire modified from (CETL-AURS) at Reading University having both closed ended and open ended questions completed by twenty, first and second year MBBS students session 2013-2014 of Shalamar Medical and Dental College, Lahore. It was a concurrent mixed study design. Internal consistency of items in the study questionnaire (Chronbachs' Alpha in range of 67 to 88) was determined using SPSS version 17. Descriptive statistics for quantitative data was used. Thematic analysis was done for qualitative data.

**Results:** Most of the students were moderately motivated to plan research projects. Male students appeared to be the more confident regarding their research skills competencies. Although all students recognized the role of research in medical practice, many were unaware of the medical research activities within their college. A common perception was that research should be done using Power Lab especially in respiratory and cardiovascular physiology.

**Conclusion:** This study will help in planning guided research projects by students. The use of Power Lab and Lab tutor software will enhance self directed learning and will thereby build better concepts in physiology for the student. Students will enjoy group learning and this will create an encouraging environment for instilling curiosity on the part of the student.

**Keywords:** research training, awareness, perception, motivation, undergraduate level physiology, power lab

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## Introduction

In a medical curriculum physiology is an vital component as it forms the base of clinical subjects. In order to apply knowledge of physiology in clinical practice, this subject has to be taught and learned productively. There is no single method of teaching that can ensure thorough understanding. It is important to explore the existing advances and practices in medical education.<sup>1</sup> It is assumed that learning is an active process of constructing knowledge, rather than a passive process of memorization. Instructional methods should inspire students by activating relevant prior knowledge related to the knowledge to be attained. Methods of instruction should provide a learning setting that resembles to a large extent the background in which the knowledge is to be applied in the future. In addition, the learning environment should supply learners with an opportunity to elaborate on their own knowledge.<sup>2</sup> Students gain hands on experience by Laboratory Based Learning (LBL) session, which is a part of physiology curriculum and they also understand

the concepts better through active mode of learning, enhancing student learning and performance.<sup>3,4</sup> Active learning, "learning by doing", improves student performance on examinations and enhances student preservation of course content. Active learning also provides inquiry-based, mutual and problem-solving activities that encourage curiosity, skepticism, objectivity, and the use of scientific reasoning.<sup>5</sup> In some countries teaching of various research methodologies e.g, epidemiology, biostatistics survey methods are adopted in the very first and second year of medical education.<sup>6</sup> Data recording devices play a major role in life sciences research and teaching. By these devices various animal physiological parameters such as temperature, blood pressure, electrical activity of heart (ECG) muscle activity (EMG) and brain activity (EEG) are analyzed. When physiology is taught by recording and analyzing these parameters the students not only learn about normal physiological functions of the body but these devices are also useful in understanding the changes that occur during disease.<sup>7</sup> Lab tutor software and accompanying PowerLab hardware is configured for use with step by step instructions designed to maximize

student productivity by applying independent learning techniques to a group of human and animal physiological experiments (Figure 1).



**Figure 1** Pulmonary function tests are being performed using power lab in physiology laboratory of Shalamar Medical and Dental College, Lahore.

### Objectives

- i. Evaluate students' awareness of research activities.
- ii. Compare students' perceptions of their soft and research-specific skills competencies.
- iii. Determine students' motivation for research.

### Subjects and methods

This pilot study design was a concurrent mixed method study. A total number of 20 students of first year and second year from first professional M.B.B.S session 2013-2014 equally divided in number and gender voluntarily participated in May 2014. The setting was department of physiology, Shalamar Medical and Dental College, Lahore. Anonymous questionnaire adapted from measures originally developed to assess research skills with Zoology and Ecology students by the Centre for Excellence in Teaching and Learning in Applied Undergraduate Research Skills (CETL-AURS)<sup>8</sup> at Reading University.<sup>9</sup> This questionnaire was chosen because there are no standardized tools to assess medical student engagement in research and we found the CETL-AURS measures, appropriate for the stated

objectives. For measuring internal consistency of items in study questionnaire Chronbachs' Alpha in range of .67 to .88 was determined using SPSS version 17. Descriptive statistics was used to measure items in questionnaire. Themes were generated for perceptions about research. For all purposes a p-value of <0.05 was considered as criteria of significance.

### Results

#### Questionnaire exploring awareness about research at shalamar medical and dental college

- Q1. Are you aware of ongoing research projects in your institution?
- Q2. What is your awareness about research papers published by clinical and basic sciences faculty?
- Q3. Are you aware that faculty members from department of physiology are involved in research projects?
- Q4. Are you aware of research posters and exhibitions within your college?
- Q5. Do you have any idea of issues faced in research area in the college?
- Q6. Are you aware of research seminars and conferences in your institution?
- Q7. Do you have any information about books, images and research designs produced by your college staff?
- Q8. Do you know about any research reports produced by the college?

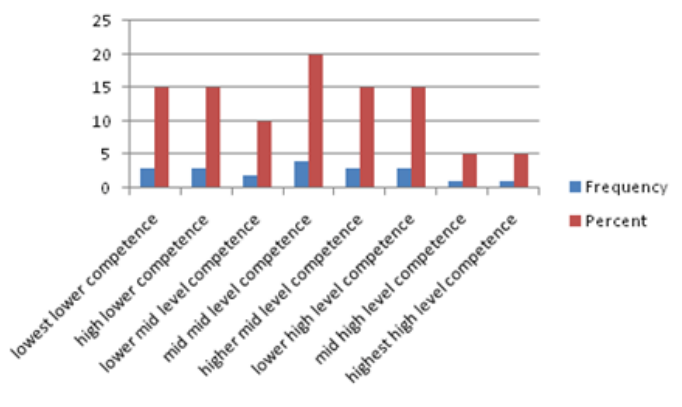
In (Table 1 & Table 2), 10 % excellent awareness is shown regarding awareness about involvement of faculty members from department of physiology in both male and female students. For response to open ended question 45% students were keen to do research using power lab, 10% were interested in research only and 45% were not interested. There is mid level competence in research skills as shown in Figure 2. The students' were placed in self-rated levels of motivation towards doing research into low, somewhat, moderate and high as revealed in Figure 3. No low motivation is shown by male students. The number of male students showing moderate and high motivation was more than female students.

**Table 1** Responses of students to questions about awareness in frequency and percentage

	Male					Female				
	Minimum Awareness n(%)	Fair Awareness n(%)	Good Awareness n(%)	Very good Awareness n(%)	Excellent Awareness n(%)	Minimum Awareness n(%)	Fair Awareness n(%)	Good Awareness n(%)	Very good Awareness n(%)	Excellent Awareness n(%)
Q1	3(15.0)	2(10.0)	3(15.0)	1(5.0)	1(5.0)	5(25.0)	3(15.0)	2(10.0)	0	0
Q2	2(10.0)	2(10.0)	3(15.0)	3(15.0)	0	5(25.0)	3(15.0)	2(10.0)	0	1(0.0)
Q3	2(10.0)	3(15.0)	2(15.0)	1(5.0)	2(10.0)	3(15.0)	1(5.0)	3(15.0)	1(5.0)	2(10.0)
Q4	3(15.0)	2(10.0)	3(15.0)	2(10.0)	0	5(25.0)	3(15.0)	1(5.0)	1(5.0)	0
Q5	3(15.0)	1(5.0)	3(15.0)	2(10.0)	1(5.0)	7(35.0)	0	2(10.0)	1(5.0)	0
Q6	3(15.0)	1(5.0)	4(20.0)	1(5.0)	1(5.0)	6(30.0)	2(10.0)	2(10.0)	0	0
Q7	3(15.0)	0	2(10.0)	5(25.0)	0	8(40.0)	1(5.0)	0(0.0)	1(5.0)	0
Q8	3(15.0)	0	4(20.0)	2(10.0)	1(5.0)	6(30.0)	1(5.0)	3(15.0)	0	0

**Table 2** Responses of students to open ended question

You areas of interest using power lab (open ended question)	Frequency	Percentage
<b>Written responses</b>		
Ø CVS and respiration using power lab in physiology practical classes	9	45
Ø I am interested in CVS physiology research without using power lab	2	10
Ø I am not interested in research	9	45
<b>Total</b>	<b>20</b>	<b>100</b>



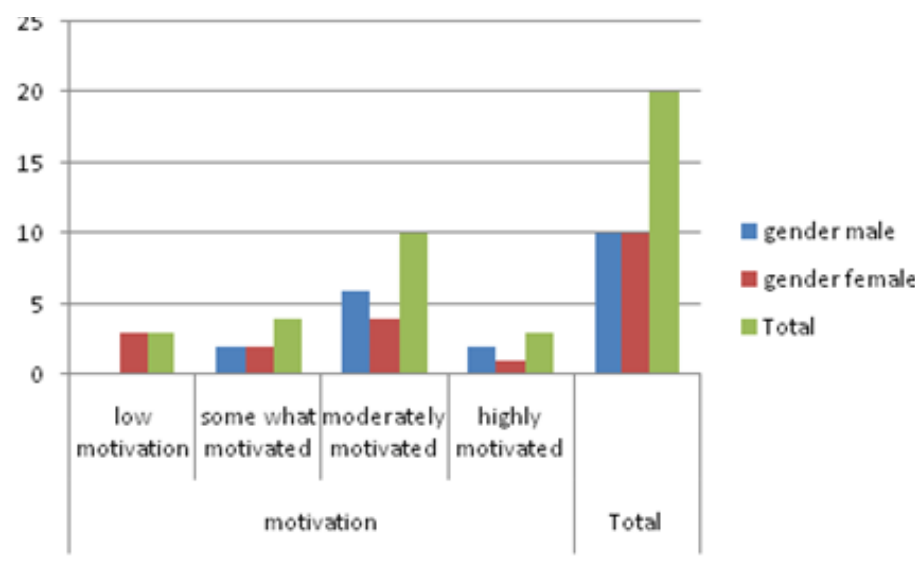
**Figure 2** Research skill competence of students in frequency and percentage.

Four themes were identified from perceptions of students about research as made known in Table 3.

- a) **Concepts in physiology:** 4 males and 3 female students were of the view that research helps in building better concepts in physiology.
- b) **Hobby to increase general knowledge:** 3 male and 2 female students thought of taking research as a hobby to increase their general knowledge.
- c) **Wait and see:** 2 female and only one male student's response was to wait and see though their interest in doing research existed.
- d) **No interest:** 2 male and 3 female students within a total of 20 showed no interest in research.

**Table 3** Perceptions about research. Supporting written examples from themes

Theme	Written examples
Concepts in physiology (n= 7, male 4, female 3)	'Research is the best way to understand the subject and build concepts, and makes us capable to produce new ways of learning' (2nd year male, age 20)
Hobby to increase general knowledge (n=5 , male 3 , female 2)	'I think doing research will keep you fresh, it can be taken as a hobby to increase your general knowledge' (2nd year female, age 20)
Wait and see (n= 3, male 1, female 2)	'I am interested in lab work. I am not confident whether I can review things myself. I have to wait and learn' (1st year male, age 19)
	'The studies are tough. I am studying all the time , I do not understand how I can cope. I am depressed and not interested' (1st year female age, 20)



**Figure 3** Research skill competences of students in frequency and percentage.

## Discussion

The subject of physiology has been considered as a pre-clinical subject generally. For integration in between the pre-clinical and clinical sciences it is imperative to provide students with both theoretical knowledge, as well as practical exposure to bridge this gap. Students with higher perceived research skills competency were more motivated to pursue research. Although all students recognized the role of research in medical practice, many were unaware of the medical research activities within their college. A common perception was that research should be done using Power Lab especially on respiratory and cardiovascular physiology. The students in their understanding of research appeared paying attention on testing different hypothesis, increasing of knowledge, data gathering and discovering new things.<sup>10</sup>

## Recommendations

Highly motivated and research-enabled students must be mentored by highly motivated staff. This study will help in planning guided research projects by students using Power Lab and Lab tutor software will enhance self directed learning for building better concepts in physiology.

## Acknowledgements

None.

## Conflict of interest

Author declares that there is no conflict of interest.

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