

ORIGINAL ARTICLE

PERCEPTIONS OF UNDERGRADUATE MEDICAL STUDENTS TOWARDS THE SUBJECT OF PHYSIOLOGY AND LEVEL OF INTEGRATION WITH CLINICAL SUBJECTS

Zaima Ali, Qamar Shakoor, Shaheena Naz, Attiqa Khalid, Sadia Nazir, Shakila Zaman*

Department of Physiology, Lahore Medical & Dental College, *Lahore School of Public Health, Lahore, Pakistan

Background: Students' perception of a subject has a very important role in the learning process. Integration of basic medical subjects with clinical sciences generates more interest and enables the students to apply their knowledge clinically. This study aimed to ascertain the medical students' perception towards physiology as a subject and as a career choice. It also aimed to elucidate students' perception about level of integration of physiology with clinical and basic subjects. **Methods:** This was a descriptive study. Students of first till final year participated in the survey by filling a 16 items questionnaire and the responses were graded on a 5 point Likert scale. **Results:** Physiology was considered an important subject of medical education by all students. Forty-four percent first year students agreed to take up physiology as a future career and the response changed to 24% in the final year students. Majority (78%) of the students were in agreement that integration of physiology with clinical subjects would be fruitful and 71% agreed that it should be integrated in the first year. **Conclusion:** Instead of teaching physiology as an individual discipline it should be integrated with clinical sciences. This study enlightens importance of integrated medical education.

Keywords: Perceptions, Integration, Physiology, Curriculum, Medical Education, Undergraduate,

Pak J Physiol 2016;12(2):43-6

INTRODUCTION

Human physiology is science of normal functions of body systems. Its knowledge enables a medical student to understand how the genes regulate the functions at molecular levels and how beautifully the different systems work together to maintain nearly constant internal body environment which helps the body to respond to physical activity and to the environmental conditions.¹ Modern technologies and advanced research in molecular biology have resulted in explosion of knowledge and it is challenging for educators to facilitate the students to understand the physiological principles rather than focusing on content of the subject. Understanding the principles will help the medical students to apply their knowledge to solve the clinical problems.^{2,3} Role of physiology in developing the clear clinical concepts of medical students cannot be ignored. Moreover, addition of clinical information will motivate and urge the students to learn more about the physiology for better understanding.⁴

Perception of an individual inadvertently influences the learning process.⁵ Student's perception of the subject thus has an important impact on passing their exams as well as their selection of the subjects as career specialty. It is important to change the perception of pre-clinical students that the basic sciences are just stepping stones to the clinical courses ahead and can rather be considered as future career.⁶ A number of studies pointed lack of interest in the basic sciences to choose them as career.⁷⁻¹⁰ The objective of this study was to ascertain the medical students' perception towards physiology as a subject and as a career choice. It also

aimed to elucidate students' perception about level of integration of physiology with clinical and basic subjects.

SUBJECTS AND METHODS

A descriptive cross-sectional study was conducted in the Department of Physiology, Lahore Medical & Dental College, Lahore, among students from all five years of MBBS course (first year to final year). The study was approved by the Ethical Review Board of the Institution. Out of total 510 participants present on the day of survey 109 students were from first year and 117, 110, 111, and 63 students belonged to second, third, fourth and final years respectively. Students who were absent were excluded. The objectives of the study were explained to students with assurance of their anonymity and secrecy.

Data collection was done through a 16 item questionnaire.^{1,11,12} The reliability and consistency of the questionnaire was checked by Cronbach's Alpha which gave a value of 0.7. All responses were graded on a 5 point Likert scale ranging from 5=strongly agree to 1=strongly disagree. After initial analysis percentages of those who strongly agreed and agreed were merged into one category 'Yes' while those who disagreed and strongly disagreed in 'No'. Data were entered and analysed using SPSS-20. Kruskal Wallis test was applied to find differences between all classes, Mann Whitney U test for differences between two classes, and $p < 0.05$ was considered statistically significant.

The questionnaire was designed to evaluate student's perception of:

- 1) Status of physiology as a subject of medical education (Question 1–8)
- 2) Physiology as a choice for their future career (Question 9–11)
- 3) Integration of physiology with clinical subjects (Question 12–15)
- 4) Integration of physiology with other basic medical sciences (Anatomy & Biochemistry) (Question 16)

RESULTS

Out of the total participants 38% were male and 62% were female. Only positive responses are tabulated, the neutral frequencies and percentages are not shown.

Physiology was considered as an important subject of medical sciences by 98% of the students. None of the students in 4th and final year were in disagreement with the statement that studying physiology is imperative for better understanding of clinical subjects in contrast to 3% in first two years. Sixty-six percent of the students in 1st and 2nd year found the content of the subject overburdening as compared to 41% in clinical years. Although most of the students were in agreement that physiology as a subject becomes more interesting when related with clinical knowledge

but an increase in percentage was seen from 1st year (91%) to 5th year (97%). There were no significant difference in percentages between the classes with respect to the responses for question No. 5 and question No. 8.

Physiology was considered as a good choice for future career by 44% of the students in 1st year and a decline was seen with just 24% in the 5th year. Sixty-four percent of the 1st year students agreed with the statement that physiology as a career will provide an opportunity to progress in the field of research as compared to 43% in 5th year while 28% in 1st year and 37% in 5th year remained neutral. Major share of percentage of all classes (86%) were in agreement that knowledge of physiology is helpful in solution of clinical problems. The response to Q. 13 was not different between the classes with 78% in agreement to the statement that it will be more fruitful to integrate physiology with other clinical specialties while 71% students were of the view that physiology should be integrated with clinical subjects during 1st year. Similarly 65% were in agreement with Q. 16, while 27% remained neutral.

Table-1: Responses of students to individual questions [n (%)]

Q. No.	Questions	First Year		Second Year		Third Year		Fourth Year		Final Year	
		YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
1	Physiology is an important subject of medical science	107 (98)	0 (0)	113 (97)	3 (3)	106(96)	2 (2)	110(99)	0 (0)	62 (98)	0 (0)
2	Studying physiology is imperative for better understanding of clinical subjects	99 (91)	3 (3)	105 (90)	3 (3)	104(95)	6 (6)	105 (95)	0 (0)	61 (97)	0 (0)
3	Content of the subject is over burdening	72 (66)	10 (9)	78 (67)	11 (9)	43(39)	30 (27)	50 (45)	23 (21)	21 (33)	21 (33)
4	Physiology as a subject becomes more interesting when related with clinical knowledge	99 (91)	3 (3)	105 (90)	3 (3)	104(95)	1 (1)	105 (94)	0 (0)	61 (97)	0 (0)
5	Medical students can understand clinical sciences without learning physiology	7 (6)	89 (82)	10 (9)	96 (82)	8(7)	94 (85)	14 (12)	87 (78)	9 (14)	54 (86)
6	Physiology can be studied without the help of facilitator	25 (23)	61 (56)	36 (31)	48 (41)	34(31)	56 (51)	36 (32)	53 (48)	15 (24)	26 (41)
7	To comprehend physiology is a difficult task	52 (48)	23 (21)	50 (43)	34 (29)	14(16)	61 (56)	33 (30)	35 (32)	8 (13)	32 (51)
8	Medical practice does not need much input from physiology.	7 (6)	82 (75)	8 (7)	91 (78)	28(26)	82 (75)	19 (17)	71 (64)	5 (8)	50 (79)
9	Physiology would be a good choice for my future career	48 (44)	30 (28)	32 (27)	43 (37)	36(33)	25 (23)	33 (30)	18 (16)	15 (24)	21 (33)
10	Being a physiologist will be equally good as being a clinician	44 (40)	30 (28)	33 (28)	41 (35)	42(38)	23 (21)	43 (39)	25 (23)	16 (25)	23 (37)
11	Physiology as a career will provide an opportunity to progress in the field of research	70 (64)	8 (7)	60 (50)	19 (16)	59(54)	11 (10)	65 (59)	10 (9)	27 (43)	13 (20)
12	Knowledge of Physiology helps in solution of clinical cases	94 (86)	7 (6)	101 (86)	16 (14)	99(90)	3 (3)	91 (82)	0 (0)	53 (84)	2 (3)
13	It will be more fruitful to integrate physiology with other clinical specialties	89 (82)	5 (5)	82 (70)	6 (5)	90(82)	3 (3)	86 (78)	2 (2)	51 (81)	7 (11)
14	Physiology should be integrated with clinical subjects during first year	76 (70)	12 (11)	78 (67)	15 (13)	75(68)	7 (6)	85 (77)	6 (5)	49 (78)	6 (10)
15	Integration with clinical subjects will enhance the importance of physiology	85 (78)	6 (6)	92 (79)	5 (4)	90(82)	3 (3)	92 (83)	1 (1)	50 (79)	2 (3)
16	Integration with other basic subject (anatomy & biochemistry) is more important	62 (57)	11 (10)	85 (73)	7 (6)	71(65)	10 (9)	76 (68)	7 (6)	40 (64)	4 (6)

Statistically significant differences were found in the median scores of 1st and 5th year ($p < 0.05$) with regard to question 2, 3, 9, 11 (Table-2).

Table-2: Comparison of median scores of 1st and 5th year for question No. 2, 3, 9, 11

Q No.		First year Median score (IQR)	Final Year Median score (IQR)	<i>p</i>
2	Studying physiology is imperative for better understanding of clinical subjects	4 (1)	5 (1)	0.00
3	Content of the subject is over burdening	2 (2)	3 (2)	0.00
9	Physiology would be a good choice for my future career	3 (2)	3 (1)	0.04
11	Physiology as a career will provide an opportunity to progress in the field of research	4 (1)	3 (1)	0.00

DISCUSSION

Basic sciences form the foundation of consistent medical practice, hence it is required that students should have sound knowledge of the subjects.¹³ A number of innovative changes have been incorporated into medical education with emphasis on student centred integrated teaching and learning.¹⁴ In view of the constructivism theory, knowledge is constructed on the basis of learners' perception and experience.¹⁵ Learning process is affected by the interplay of personal, environmental and behavioural factors and an individual's perception is one of the important personal factor.¹⁶

In our study physiology was perceived as an important subject of medical sciences by all students with a significant increase in percentage of respondents in agreement in the clinical years. The change in response can be attributed to a greater clinical exposure.¹¹ Content of the subject was found to be overburdening by the 1st year students while 5th year did not find it so.

Interestingly, 44% students in 1st year and 24% in 5th year were in agreement to take up physiology as a career in contrast to the results by Joan Bryant¹¹ where 25% positive response was noted in 1st and 5th year. Our results reflect the trend among young medical students all over the world as reported by a number of researchers who have reported a decline in preference of basic sciences as future career.^{7-10,12} Lack of research resources and opportunities, inadequate jobs, and poor role models were cited as main factors for this lower preference.¹¹ Regarding the statement, 'knowledge of physiology helps in solution of clinical cases' our results were in accordance with Gupta *et al*¹⁶ and Tufts *et al*¹⁷ who reported that 85.7% of the students considered physiology as an important subject to understand clinical cases.

Integrated medical education has been accepted and applied by a number of universities all over the world in contrast to only a few in Pakistan. A number of studies have highlighted that the basic science knowledge acquired in clinical context is better understood and well applied by the students.^{17,18} A survey by physiology educators reported that medical students facilitated by integrated medical education can better integrate and apply the basic concepts to clinical scenarios.¹⁹ Seventy-eight percent of students in our study agreed that physiology should be integrated with clinical subjects while 71% were of the view that integration should be done in 1st year. In contrast to these results, Tufts *et al* emphasized that basic sciences and concepts are essential and starting straightaway with clinical subjects would deteriorate the quality of doctors.¹⁹

CONCLUSION

Importance of physiology as a basic subject of medical education and application of its core concepts in clinical years was well appreciated by the students especially the final year students. After clinical rotations students were even more aware of the fact that studying physiology is imperative for better understanding of clinical cases. Better resources and role models may generate interest and motivate the students to opt basic sciences as future career. Integrated teaching will improve learning of the subject by creating a positive attitude and better understanding of physiology. Students' perception is most relative and could be a valuable guide in designing the curriculum.

REFERENCES

1. Gaikwad RB, Waghmare VKR, Gaikwad NB, Hawaldar. Physiology as a subject and career option in a view of medical students. *Int J Pharm Biomed Res* 2011;2(4):269-71.
2. Michael J, Modell H, McFarland J, Cliff W. The "core principles" of physiology: what should students understand? *Adv Physiol Educ* 2009;33(1):10-16.
3. Ferguson MJ, Bargh JA. How social perception can automatically influence behavior. *Trends Cogn Sci* 2004;8(1):33-9.
4. Ebomoyi ML, Agoreyo FD. Preclinical students' perceptions of their courses and preclinical specialty choice. *J Med Biomed Res* 2007;6(1):47-58.
5. Kim KJ, Park JH, Lee YH, Choi K. What is different about medical students interested in non-clinical careers? *BMC Med Educ* 2013;13:81.
6. Yamazaki Y, Uka T, Shimizu H, Miyahira A, Sakai T, Marui E. Japanese medical students' interest in basic sciences: a questionnaire survey of a medical school in Japan. *Tohoku J Exp Med* 2013;229(2):129-36.
7. Kumar A, Mitra K, Nagarajan S, Poudel B. Factors Influencing Medical Students' Choice of Future Specialization in Medical Sciences: A Cross-Sectional Questionnaire Survey from Medical Schools in China, Malaysia and Regions of South Asian Association for Regional Cooperation. *N Am J Med Sci* 2014;6(3):119-25.
8. Alawad AA, Khan WS, Abdelrazig YM, Elzain YI, Khalil HO, Ahmed OB, *et al*. Factors considered by undergraduate

- medical students when selecting specialty of their future careers 2015; Pan Afr Med J 2015;20:102.
9. She L, Wu B, Xu L, Wu J, Zhang P, Li E.. Determinants of career aspirations of medical students in southern China BMC Medical Education 2008;8:59.
 10. Bryant J, Sen R, Sood SK. Undergraduate medical students' perceptions and opinions towards the subject of Physiology. Int J Biomed Adv Res 2014;5(12):605-8.
 11. Anand MK, Raibagkar CJ, Ghediya SV, Singh P. Anatomy as a subject and career option in view of medical students in India. J Anat Soc India 2004;53(1):10-4.
 12. Rehman R, Afzal K, Kamran A. Students opinion about usefulness of interactive lectures in conventional and hybrid curriculum. Pak J Physiol 2013;9(1):7-10.
 13. Okeke TC, Anyaehie BUS, Ugwu EO, Agu PU, Orizu I, Adiri C, *et al.* An Audit of Medical Students' Performance in 2nd MBBS Physiology Examination in a Medical School in Nigeria: A 7-Year Review. Am J Clin Med Res 2013;1(2):28-31.
 14. Mann KV. Theoretical perspectives in medical education: past experience and future possibilities. Med Educ 2011;45(1):60-8.
 15. Kaufman DM, Mann KV. Teaching and learning in medical education; how theory can inform practice. In: Swanwick T (Ed). Understanding medical education. Evidence, theory and practice. 1st ed. West Sussex: Wiley-Blackwell; 2010.p. 16-36.
 16. Gupta S, Gupta AK, Verma M, Kaur H, Kaur A, Singh K. The attitudes and perceptions of medical students towards basic science subjects during their clinical years: A cross-sectional survey. J Appl Basic Med Res 2014;4(1):16-9.
 17. Tufts MA, Higgins-Opitz SB. What makes the learning of physiology in a PBL medical curriculum challenging? Student perceptions. Adv Physiol Educ 2009;33(3):187-95.
 18. Atukorala KR, Atapattu P. Pre clinical-Basic Sciences teaching curriculum of a medical school in a developing country —Are we doing it right? J Bangladesh Soc Physiol 2014;9(2): 98-104.
 19. Tufts MA, Higgins-Opitz SB. Medical physiology education in South Africa: what are the educators' perspectives? Afr J Health Prof Educ 2012;4(1):15-21.

Address for Correspondence:

Dr Zaima Ali, Assistant Professor, Department of Physiology, Lahore Medical & Dental College, University of Health sciences, Lahore.

Email: zaima.ali@hotmail.com

Received: 22 Feb 2016

Revised: 3 Jun 2016

Accepted: 12 Jun 2016