

## Comparing the Perspectives of Medical Graduates Concerning the Preference of Teaching Basic Science Lessons by Professors with MSc-PhD and MD-PhD Degrees

Manzume Shamsi Meymandi<sup>1</sup>, Maryam Okhovati<sup>2</sup>, Elham Sharifpoor<sup>3\*</sup>, Amir Abbas Shafeezadeh<sup>4</sup>, Shahriar Dabiri<sup>5</sup>

<sup>1</sup>Associate Professor, Department of Physiology and Pharmacology, Pathology and Stem Cells Research Center, Kerman University of Medical Sciences, Kerman, Iran.

<sup>2</sup>Associate Professor, Department of Medical Library & Information Sciences, Medical Informatics Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran.

<sup>3</sup>Ph.D Candidate, Department of Medical Library & Information Science, Student Research Committee, Kerman University of Medical Sciences, Kerman, Iran.

<sup>4</sup>MD, Department of Pathology, Pathology and Stem Cells Research Center, Kerman University of Medical Sciences, Kerman, Iran.

<sup>5</sup>Professor, Department of Pathology, Pathology and Stem Cells Research Center, Kerman University of Medical Sciences, Kerman, Iran.

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### \*Corresponding author:

Department of Medical Library & Information Science, Faculty of Management and Medical Information Sciences, Kerman University of Medical Sciences, Kerman, Iran.

Email: elham.sharifpoor@gmail.com

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### Abstract

**Background:** Given that basic medical science lessons constitute the fundamental part of the professional doctorate course, and among the numerous factors influencing education quality, the teacher is considered one of the most crucial facets of education quality.

**Objectives:** The present research was conducted to determine the perspectives of medical graduates regarding teaching basic science lessons by professors with MSc-PhD degrees compared to professors with MD-PhD degrees.

**Methods:** This descriptive-analytical and cross-sectional study was carried out on 200 general practitioners working on their plans in Kerman. Data were collected through a researcher-made questionnaire and finally analyzed using the paired t-test and its non-parametric equivalent (Wilcoxon test) by SPSS 22 software.

**Results:** The mean score of graduates concerning teaching basic sciences by professors with MD-PhD degrees was significantly higher than that of professors with MSc-PhD degrees ( $P = 0.01$ ); this score significantly increased with enhancing their work experience. In all basic science lessons, medical graduates mostly agreed to teach lessons by professors with MD-PhD degrees than professors with MSc-PhD degrees; however, the frequency of proponents of this issue was mostly different in histology (100%), physiology, anatomy, bacteriology (81%), and public health (99%) lessons, and the lowest disagreement was associated with biochemistry (53.5%) and parasitology (60%) lessons.

**Conclusion:** To reinforce and promote the education and learning level of medical students in the country and the health system, professors teaching basic sciences should have the required information and education regarding clinical applications of education, such as professors with MD-PhD degrees, and pay more attention to the clinical aspects in their teaching. It is suggested to hold postdoctoral programs or in-service training, workshops, etc. to achieve this goal.

**Keywords:** Perspectives of medical graduates, Basic sciences, Education, Professor, MD-PhD, Teaching

### Background

Nowadays, scientific advancement in various fields needs specialists who can operate in a multidisciplinary manner (1). The field of medicine is no exception to this. Because the medical education system is directly involved in society's health, constant, quantitative, and

qualitative evaluation of the educational factors engaged in the upbringing of specialists in this field is also necessary. Nowadays, there is a growing concern around the world that medical education is not going well at the general level (2-4) because the curriculum in many universities is mostly divided into two basic and clinical

parts. The vast difference between these two parts can result in a profound gap between the theoretical and clinical educational content.

On the other hand, usability thinking is based on the needs of society, and being appropriate to professional needs has also culminated in changes in the content of medical education courses in many universities worldwide during the recent few decades, and medical education has been suggested and implemented based on the needs of society and education based on professional requirements (5). In line with these developments, medical education has also been changed in many universities worldwide, and new methods have been innovated and developed to promote the motivation of learning and persistence of learning, increase the power of data analysis, enhance the power of clinical decision-making, identify and meet the needs of society, and create a learning context (6). In this regard, the Liaison Committee on Medical Education (LCME) and the Council on Graduate Medical Education, as the two main accreditation institutions in the United States that supervise medical education in this country, have stressed teaching as a necessary skill and activity (7).

Medical students in Iran are educated classically for seven years involving four levels of basic sciences, physiopathology, internship, and apprenticeship to achieve these goals and acquire adequate skills to work in this career (8), and each course is expected to be the prerequisite for the next course. Thus, the materials provided in each course should be effective in the next courses and, finally, in their professional performance (9). Multiple studies have indicated that the relationship between basic and clinical stages is weak and ambiguous (10, 11), so that in previous studies in Iran, the most and the least amount of achievement of the educational goals of the four courses were related to the internship and basic science courses, respectively (12).

Faculty members believe that the basic science course is also an opportunity to encourage medical students to continue their education in specialized fields of basic sciences. Using the information acquired in this course, a medical student should proceed to solve clinical problems and make clinical decisions (13). However, general practitioners in the clinical course do not have favorable performance in remembering the methods and applying various basic science learnings in the medical course. The inconsistency in providing lessons appropriately and timely makes this problem more complicated (14). Hence, the discrepancy between basic and clinical sciences has created many problems so that it first weakens the relationship between theoretical

and practical knowledge, and consequently, students often do not intend to learn a lot of information in detail (15). Medical students are willing to acquire basic sciences at the bedside as applied. Therefore, a large number of medical schools have recently revised the training of the pre-clinical course to improve the relationship between the clinical and basic sciences and increase the recall of the materials learned in basic sciences by linking them to the bedside (16). In other words, integrating basic and clinical sciences is performed as a solution in many countries (17).

On the other hand, communication skills, good-looking appearance and sense of humor concerning the students, teaching style and oratorical skill, scientific capability, patience, ethics, the art of expression and the ability to explain the lesson, the individual and behavioral traits, personality traits, scientific information, the ability for class management, mastery of the lesson's subject, self-confidence, and having an intimate relationship with the student are some of the most important priorities and factors influencing the medical students' positive attitudes toward teaching basic science lessons by professors (18, 19). Also, strictness and extreme control of professors in classes and exams, gender, or being aware of the sociopolitical situation have no effect or very little effect on their evaluation from students' perspectives (20).

Although numerous studies have been conducted on the factors influencing the evaluation of basic science professors, no study has investigated the perspectives of medical graduates regarding the degree types of basic science professors with a medical background (professors with MSc-PhD degrees versus professors with MD-PhD degrees) (21). This question has always been raised by many doctors can basic science professors have a mutual understanding of the requirements of medical students when they have not completed the basic medical science course? In other words, professors who have first obtained their degree in general medicine and then entered the Ph.D. course will provide the basic science materials more appropriate for clinical services whose ultimate goal is to train doctors (22).

Given that the basic medical science lessons underlie the professional doctorate course and the professor and his/her traits are among the most important factors influencing the quality of education, and because of the interaction of basic and clinical sciences emphasized by the Ministry of Health and Medical Education, assessing the perspectives of graduates who have recently entered the profession of medicine and not much time has passed since the completion of their formal education in higher education institutions, can be an effective step in

recognizing the factors affecting professors' teaching in the field of medicine in the country.

### Objectives

Hence, the present research was conducted to investigate the perspectives of general medicine graduates toward teaching basic science lessons by professors with MSc-PhD degrees compared to professors with a Ph.D. degree after obtaining a general doctorate. Identification and investigation of these factors can help in creating an efficient interaction between basic and clinical sciences in the country.

### Methods

This descriptive-analytical and cross-sectional study was carried out to evaluate the perspectives of medical graduates regarding teaching basic science lessons by professors with MSc-PhD degrees and professors with MD-PhD degrees in Kerman in 2020. The research population consisted of medical graduates of Kerman University of Medical Sciences, who were passing the plan for beneficiaries of the law on physicians' services in Kerman. Two hundred doctors entered the research by a census method (95%). Medical graduates in Iran are obliged to provide medical services for a maximum of two years in universities of medical sciences. The inclusion criteria included providing services as mentioned and the homogeneity of selected doctors and easier access to them. Their phone numbers and places of service were obtained from the Office of Manpower Planning (the Deputy of University Resources and Management Development) and Kerman Medical Council. The medical council of each city is an independent guild institution under the supervision of the medical council. In these offices, all information about working doctors is accessible. One of the important duties of this institution is the issuance of doctors' medical education numbers and work permits.

A senior trained medical student first explained to the doctors how to fill out the data collection form and the questionnaire. Also, the information regarding the type of educational degrees was provided by the mentioned student to the participants. Entering the study was optional; informed consent was obtained from the participants, and they were assured of keeping all information anonymous and confidential.

The research tool involved a data collection form and a researcher-made questionnaire. The first part was a questionnaire consisting of 18 questions in the three areas of content, communication, and teaching method that investigated the perspectives of medical graduates regarding teaching basic science lessons by professors who had completed master's and doctoral programs in basic sciences (MSc-PhD) compared to professors who

had completed a specialized doctorate program (MD-PhD) after a professional doctorate in medicine, pharmacy, and veterinary medicine courses. The scoring of this questionnaire was on a five-point Likert scale, including completely agree = 4, agree = 3, disagree = 2, completely disagree = 1, and no idea = zero.

In order to determine the questionnaire's content validity, the questions were provided to seven professors with medical education degrees and the faculty members of the medical school. In order to determine the reliability, the questionnaire was provided to 30 medical graduates, and the reliability was obtained at 84.9 based on Cronbach's alpha coefficient.

In the current research, frequency and percentage were used to describe qualitative data, and the median and the interquartile range were used to describe quantitative data. Paired t-test and Pearson's correlation coefficient were also used for numerical data analysis. In the case of non-normality of data distribution, the non-parametric Wilcoxon test was used to analyze the qualitative data, such as grade point average (GPA) and median. The data were finally analyzed by SPSS software version 22 (IBM Corporation, Armonk, NY). A  $P < 0.05$  was considered significant.

### Results

All medical graduates (n=200) completed the questionnaire, of whom 20% had work experience of less than one year, 44% less than six months, 26% 6-18 months, 10% more than 18 months, and most of them (63%) had a B GPA (Table 1).

**Table 1.** The participants' characteristics according to their grade point average and work experience

Variable	Level	Number (%)
Work experience (year)	Less than 1	40 (20.0)
	1-6	88 (44.0)
	6-18	52 (26.0)
	18-24	20 (10.0)
Grade point average	A	31 (15.5)
	B	126 (63.0)
	C	34 (17.5)
	D	9 (4.5)

Professors with MSc-PhD degrees gained the highest scores on the "emphasis on theoretical materials" item, and the participants believed that there was no appropriate relationship between the materials taught by these professors and their application at the bedside. The highest mean score of the respondents to the professors with MD-PhD degrees was related to the aspects of "the professor had more willingness to the clinical aspect in teaching," "the professor established an appropriate relationship between basic and clinical sciences", and "the

professor clarified well the relationship between basic and clinical sciences” (Table 2).

There was a significant difference between the perspective scores of those with A, B, and C GPAs and the teaching of professors with MD-PhD degrees compared to professors with MSc-PhD degrees ( $P = 0.001$ ), but the significance level was significant in those with D GPAs ( $P = 0.008$ ).

The median and interquartile range of the perspective scores of medical graduates on teaching basic science lessons by professors with MD-PhD and MSc-PhD

degrees was 54 (52-60) and 41 (39-43), respectively, and the Wilcoxon test indicated this difference to be significant ( $P = 0.001$ ). Moreover, the mean perspective score of medical graduates regarding teaching basic science lessons by MD-PhD professors ( $55.0 \pm 5.4$ ) was significantly higher than that of the MSc-PhD group ( $40.0 \pm 9.3$ ) ( $P < 0.001$ ). The results also showed that the perspective scores of medical graduates with any work experience regarding teaching basic science lessons by MD-PhD professors were significantly higher than that of the MSc-PhD group ( $P = 0.001$ ).

**Table 2.** Mean scores of medical graduates in each item regarding the teaching of professors with MSc-PhD and MD-PhD degrees

Aspects	MD-PhD Degree Mean (SD)	MSc-PhD Degree Mean (SD)
The professor used students' participation while teaching.	3.1(0)	2.4(0)
The rate of teaching materials was appropriate.	3.4(0)	2.0(0)
The professor emphasized the key points of the lesson.	3.4(0)	1.8(0)
The professor explained the contents comprehensibly.	3.5(0)	2.2(0)
The professor emphasized the applied and practical points of the lesson.	3.5(0)	1.8(0)
The professor was more inclined to teach toward the clinical aspect.	3.7(0)	1.6(0)
The professor made the student interested in the topic being taught.	3.3(0.1)	2.5(0.1)
The professor established an adequate relationship with the student.	3.2(0.1)	2.5(0.1)
The professor considered the student's satisfaction with teaching.	3.2(0)	2.5(0.1)
The professor used teaching aids well.	3.1(0.1)	2.5(0.1)
The professor emphasized theoretical materials.	1.2(0)	3.7(0)
Learning was higher in the professor's class.	3.4(0)	1.9(0)
The professor established an appropriate relationship between basic and clinical sciences.	3.7(0)	1.5(0)
The professor clarified the relationship between basic and clinical sciences well.	3.7(0)	1.3(0)
The professor created a good relationship between previous knowledge and new topics.	3.4(0)	2.4(0)
There was no appropriate relationship between teaching and its application in the hospital.	1.2(0)	3.6(0)
The professor performed an appropriate evaluation.	3.0(0.1)	2.3(0.1)
The professor reinforced investigative thinking in students.	2.6(0.1)	2.4(0.1)

As the participants' work experience increased, the perspective scores for MD-PhD professors increased, and for MSc-PhD professors decreased (Table 3).

Table 4 shows the results of the participants' willingness regarding the teaching of professors with MD-PhD and MSc-PhD degrees by lesson and denotes that medical graduates significantly agreed with the teaching of lessons by professors with MD-PhD degrees more than that by the MSc-PhD group so that the highest disagreement was observed in physiology, anatomy, and bacteriology lessons (81% MD-PhD and 19% MSc-PhD). In histology and immunology, the disagreement was also significantly different ( $P < 0.050$ ). There was no significant difference in biochemistry and parasitology lessons. In histology and public health, 99-100% agreed to teach professors with MD-PhD degrees. The participants' mean inclination to use professors with MD-PhD degrees (median = 54) was significantly higher ( $P < 0.001$ ) than the MSc-PhD group (median = 42).

## Discussion

The basic medical science lessons underlie the professional doctorate course, and the interaction between the two basic, and clinical science courses are greatly important. The results of the current research indicated that professors with MSc-PhD degrees emphasized more on theoretical materials, while no appropriate relationship was reported between the materials taught by them and their application at the bedside. Professors with MD-PhD degrees were more willing to use the clinical aspect of the materials and established an appropriate relationship between basic and clinical sciences. Teaching by professors with MD-PhD and MSc-PhD degrees indicated a significant difference regarding GPA and work experience. The inclination to teach by MD-PhD professors was significantly higher in all basic science lessons and no significant difference was observed only in biochemistry and parasitology lessons.

Efforts have been made in many countries to merge basic sciences and medical sciences, and programs have

also been developed to attract general doctoral graduates in MD-PhD courses as an effort to increase researchers in the medical field (23, 24). In countries such as Iran, the US, Canada, and England, candidates of these programs first complete their professional doctorate

courses after passing alternating courses in basic and clinical sciences. Then, in order to complete their education, they will enter Ph.D. courses and obtain their specialized doctorate degree.

**Table 3.** The perspective scores of the participants regarding teaching basic science lessons by professors with MD-PhD and MSc-PhD degrees according to their work experience

Work Experience (Month)	MD-PhD Degree		MSc-PhD Degree		P
	Mean (SD)	Median (Range)	Mean (SD)	Median (Range)	
Less than 1	48.7(0.4)	49 (48-50)	43.4(0.4)	43 (42-44)	0.001
1-6	54.0(0.4)	54 (54-55)	41.6(0.3)	41 (41-43)	
6-18	60.0(0.5)	60 (57-63)	39.2(0.5)	39 (36-42)	
18-24	63.4(0.3)	63 (62-64)	36.5(0.4)	36 (35-37)	

**Table 4.** The frequency of the participants' perspectives regarding the agreement to the teaching of professors with MD-PhD and MSc-PhD degrees based on the lesson type

Lesson Type	Type of Degree	
	MD-PhD	MSc-PhD
	N (%)	
Physiology*	162 (81.0)	38 (19.0)
Anatomy*	162 (81.0)	38 (19.0)
Biochemistry	107 (53.5)	93 (46.5)
Bacteriology*	162 (81.0)	38 (19.0)
Parasitology	120 (60.0)	80 (40.0)
Pathology*	200 (100)	0 (0)
Histology**	142 (71.0)	58 (29.0)
Immunology*	142 (71.0)	58 (29.0)
Public health**	198 (99.0)	2 (1.0)

\*P<0.050, \*\*P<0.001

These courses have greatly attracted the attention of governments in developed countries, and they are strongly supported (25).

Experts with MD-PhD degrees mostly work as faculty members in educational and research activities of educational and academic organizations. Thus, MD-PhD graduates who have completed both general doctorates and specialized doctorate courses are apparently more effective in nurturing and preparing medical students because they first teach them scientific thinking, which is a prerequisite for performing successful research, and then provide these concepts in an understandable and plain language for treating their patients (26). The professor and his/her traits are among the factors affecting the success of education. Thus, the current study assessed teaching basic science lessons by professors with MD-PhD and MSc-PhD degrees, and the results indicated that the perspective scores regarding professors with MD-PhD degrees ( $55.0 \pm 5.4$ ) were significantly higher than the MSc-PhD professors ( $40.0 \pm 9.3$ ). Masoumi et al. examined how to provide basic science lessons to achieve clinical goals, and the highest score was related to the relationships between final exam questions and comprehensive examination and lesson subjects, while the lowest score belonged to

applying basic science lessons at the bedside. Doctors showed a significant inclination to the importance of basic science courses being applied at the bedside (27). In the present research, also, the participants' perspectives were not consistent with teaching basic science lessons by professors with MSc-PhD degrees, and the score obtained by professors with MD-PhD degrees was higher than that obtained by professors with MSc-PhD degrees (the mean perspective score of doctors regarding teaching basic science lessons by professors with MD-PhD degrees was  $55.0 \pm 5.4$  and in the professors with MSc-PhD degrees group was  $40.0 \pm 9.3$ ).

Evaluating the teaching quality of basic medical science professors by medical graduates considering the method of obtaining specialty (MD-PhD versus MSc-PhD) was the focus of the current research because evaluating their performance after the course completion and its results can lead to improving the quality of education in a basic science course (28). Khadem Rezayian et al. stressed the recruitment of instructors with MD-PhD degrees in medical and dental schools (29), which was in line with the findings of the current study. In the study by Abedini Baltork et al., the professor's mastery of the subject was also proposed as

one of the ten factors affecting efficient teaching in medical education (30). The teacher's behavior as a function of his personality and his passion for the subject that develops during education is considered to be one of the effective indicators of teaching (31). Match and O'Brien concluded that if the feedback resulting from the students' evaluation results in terms of the professors' method of obtaining specialty accompanied consultation and appropriate policy-making, it would be effective in promoting the educational quality level (32).

One of the most effective and helpful components of the medical students' education is the faculty member professors, and their performance and behavior are reflected more than anything else in their teaching methods (17). Professors' method for gaining expertise in a basic science course is associated with their performance in the teaching-learning process (33).

The evaluation of the students' perspectives regarding the professors' specialty is one of the crucial components in educational activities and allows specifying the pros and cons of the education process according to its results so that by reinforcing the positive facets and eliminating the defects, appropriate steps are taken in transforming and modifying the workflow (33). The students' criticisms and perspectives are the main sources of evaluating the efficiency of the educational system, underlining the professor's effective role in the student's level of learning, along with teaching aids (34). Evaluating professors by students in terms of their specialty provides the officials of the educational system with beneficial results for substantial decision-making, such as diagnostic feedback to faculties regarding professors' performance, selection and election of prominent professors, and the use of the information obtained to guide students in choosing lessons with professors having scientific competence (28, 35-37).

Consistent with these results, this study obviously emphasized the main findings of Khadem Rezayian et al. (2016) on the recruitment of MD-PhD lecturers in medical and dental schools (27). Also, the professor's behavior, which is shaped during his/her education as a function stemming from his/her personality and the enthusiasm he/she shows for the lesson subject, is considered one of the effective teaching indices (29). Match et al. revealed that if the feedback resulting from the results of students' evaluation according to the professors' method for gaining specialty is accompanied by consultation and appropriate policy-making, it would be effective in promoting the educational quality level (28).

Because professors with MD-PhD degrees have completed the general doctorate basic medical science courses, they have a more mutual understanding of

medical students at this level compared to professors with MSc-PhD degrees. On the other hand, because of their acquaintance and personal perception of the clinical setting, they can be more successful in transferring the concepts of clinical lessons compared to the basic science professors and establish better interaction with their learners through mutual understanding.

Practical applications and clinical relationships of the topics provided in basic science education constantly attract the attention of medical students and educational programs (38). Previous studies have reported that lessons, such as physiology, bacteriology, anatomy, and pathology are most applicable in clinical settings, and clinical education is formed around these topics (39-41). In line with approving this important subject, the participants of the present study were also significantly more inclined to use professors with MD-PhD degrees in teaching pathology, public health, anatomy, and physiology lessons compared to professors with MSc-PhD degrees, which can result from more application of these lessons in the clinical courses (20).

### Conclusion

Medical graduates showed significantly more willingness for professors with MD-PhD degrees in teaching pathology, public health, anatomy, and physiology lessons compared to professors with MSc-PhD degrees. Therefore, in order to promote the education and learning level of medical students in the country and the health system, basic science professors should have the required information and education regarding the clinical applications of these lessons at the bedside (such as professors with MD-PhD degrees) and pay more attention to the clinical aspects in their teaching. It is suggested to hold postdoctoral programs or in-service training, etc., to achieve this important goal.

**Supplementary Material(s):** is available here [To read supplementary materials, please refer to the journal website and open [PDF/HTML](#)].

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