



Comparative Meta-analysis of Fifty-one Iranian Medical Universities Regarding Faculty Members Information

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ABSTRACT

Background: Faculty members are the key components of any medical university. The number, specialty, scientific rank, and H-index play a significant role in the general primacy of any university. This study compared 51 Iranian medical universities regarding faculty members in terms of total number of faculty members per medical university, ISI articles of each top faculty member, citations, average citations per paper of each, H-index, their scientific rank, and their specialty.

Methods: In this analytic-descriptive study conducted in 2018 in Yazd, Iran, the data were gleaned from 51 Iranian medical universities affiliated to the Iranian Ministry of Health, Treatment, and Medical Education using Electronic Scientific Measurement System and analyzed with SPSS₁₉ (SPSS Inc., Chicago, IL, USA) using descriptive statistics of frequency, range, mean, SD, and also correlations. Independent medical schools, medical research centers, and Islamic Azad University medical schools were excluded.

Results: Data analysis showed the maximum and minimum number of faculty members at each medical university, total number of ISI articles, total citations, citations per paper, H-index, scientific rank, and specialty of each top faculty member. There were statistically weak, moderate, and strong correlations between the five variables under study.

Conclusion: The findings of this study showed that there were 18972 medical faculty members teaching and researching in Iranian medical universities. Yet, there was an imbalance in the variables under study in different medical universities located in different parts of Iran. A more balanced distribution of faculty members and resources is required to improve medical education in all parts of Iran. The findings of the study may be added to the WHO database to be used by foreign students and scholars who want to study medicine or carry out research in Iranian medical universities.

Key Words: Medical university, Faculty member, H-index, Citation, Resources distribution

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Introduction

Medicine is an old science related to the protection and maintenance of health in the human community and saving lives. One of the first books on medicine, i.e., *Canon of Medicine*, was written by Avesina, a Persian physician and Neo-Platonist philosopher considered as a standard medical textbook used in Europe till the 17th century. Moosavi asserted that Avicenna was a Muslim scientist of the tenth and eleventh centuries who played an important role in the history of medicine in Iran and the world, so that the modern medicine is laid upon the infrastructure of his medicine.(1). He believes that from 11th to 17th centuries, the scholarly and academic endeavors of medicine round the globe were revolving round the hinge of Avesina medicine or were influenced by it tremendously. It is accepted that this science originated in ancient Persia and names like Avesina associated with traditional medicine is familiar to any scholar or clinician. A quick glance at the history of medicine, as practiced by trained professionals, elucidates how societies have undergone transformation in their attitude towards illness and disease from ancient times to the present. The pioneer medical traditions appeared in Babylon, China, Egypt, and India. Medical terms like medical diagnosis, prognosis, and medical ethics were developed in Greece. The Greeks also wrote the Hippocratic Oath in the 5th century BC. It is still taken by doctors nowadays. Moreover, Rogerius improved and then systematized surgical practices inherited from the ancient masters in the medieval age in his *The Practice of Surgery*. It was about 1220 that the established universities commenced systematic training of physicians in Italy. This was further accomplished when during the Renaissance, anatomy was perceived better and the microscope was invented, followed by the presentation of the germ theory of the disease in the 19th century that ultimately resulted in some cures for many maladies. As of necessity, the army physicians improved the approaches to trauma treatment and surgery. The Islamic states acquired primacy in medical science since its traditional physicians

made significant contributions to the field of medicine and worked on improving disciplines such as anatomy, surgery, physiology, pharmacy, pharmacology, ophthalmology, and pharmaceuticals. The Arabs developed these further as they were influenced by ancient Indian, Greek, Roman, and Byzantine medical practices. Public health measures were developed especially in the 19th century. Subsequently, the extensive growth of cities necessitated the systematic sanitary measures and advanced research centers opened in the early 20th century which were usually affiliated to important hospitals. Then, the widespread use of antibiotics emerged in mid-20th century. Briefly, these developments in addition to progress in genetics, chemistry, laboratory medicine, and radiography predisposed to today's modern medicine which was highly professionalized in the 20th century. Sarton asserts that Galen and Hippocrates were pioneer authorities (2). Hill states that some scattered old literature refer to the presence of higher education systems and centers in the ancient Persia (3) while Safa says that the deported Greek scholars and physicians were researching medicine and mathematics in old Iran during the Sassanid kings (4). Moreover, according to Meri, the Gondishapoor College was a famous center during the Sassanid dynasty which was active in medicine leading to the establishment of Beit-al-Hekmah in Baghdad in the following years (5). Parallel to the rest of the world, 51 governmental Iranian medical universities have been established in 31 provinces along with dozens of medical research centers and also tens of medical schools in Islamic Azad University in all parts of Iran. Faculty members are the key components of any medical university. The number, specialty, scientific rank, and H-index play a significant role in the general primacy and universal ranking of any university.

Medical education has faced many challenges over the past years. According to Raymond et al., some trends have been added to these challenges such as initial interventions to shorten education at medical schools, and containment of new



pedagogic content into medical school curricula (6), and implementation of various other curricular reforms (7). Current and projected shortages of neurologists also highlight the need to recruit more students into the specialty (8).

Other scholars (9, 10, 11) have elucidated health education as an important factor in promoting client satisfaction, active independence, and contribution to healthcare programs. They have also referred to promoting healthy behaviors predisposing to helpful consequences such as improved quality of life and enhanced mental condition through diminishing disease sequelae and attenuating anxiety. In addition, Rankin & Stallings (12) and Glanz et al. (13) categorize access to complete information about their own health, disease, and even treatment as one of the most important rights of clients. That is why Close (14) and Zwanikken et al. (15) assert that depriving clients of such education and training is unethical.

This study compared Iranian medical universities regarding total number of faculty members and the top faculty member of each medical university in terms of number of ISI articles, total citations, H-index, citations per paper, scientific rank, and specialty.

Materials and Methods

In this descriptive-analytic meta-analysis, the Electronic Scientific Measurement System affiliated to the Ministry of Health, Treatment, and Medical Education available at www.research.ac.ir was used for data collection (16). This database provides us with information on 51 medical universities, 19 independent medical schools, and 835 medical research centers and covers 18972 registered medical faculty members. It provides the data on Iranian medical universities separately in 31 Iranian provinces so that if you click on the map of the intended province on the map of Iran given in the home page, you will have the medical universities of that province. Also, any faculty member can type in their forename and surname in the command line of the home page and the system quickly presents their data including rank in the university, name, affiliated university or center,

specialty, scientific rank, number of ISI papers, citations, H-index, and citations per paper. The faculty members can fill in the boxes in the home page and click to be added to the database. These universities have different schools like school of medicine, school of dentistry, school of pharmacy, school of nursing and midwifery, paramedical school, school of health, school of well-being and rehabilitative sciences, school of nutrition, school of clinical psychology, etc. This database excludes the medical and allied health schools in the Islamic Azad University as they are not affiliated to the Ministry of Health, Treatment, and Medical Education. Using the mentioned system, the raw data of each medical university, total number of faculty members of each, the top faculty member of each along with his/her number of ISI papers, total number of citations, citations per paper, H-index, scientific rank, and specialty were extracted by the researcher manually. The raw data on 51 medical universities including total number of faculty members of each, the top faculty member of each along with his/her number of ISI papers, total number of citations, citations per paper, H-index, scientific rank, and specialty were tabulated, and rank-ordered. The culled data were analyzed with SPSS19 using descriptive statistics of frequency, range, mean, SD, and also correlation and rank order.

The Scientific Measurement System of the Iranian Ministry of Health, Treatment, and Medical Education (www.research.ac.ir) is an open access network database that allows the use of its data freely provided proper reference citation is mentioned. This paper entailed no human or animal subjects; so, there were no ethical concerns.

Results

The gleaned data are presented in Table 1.

The primary data in Table 1 were imported to SPSS19 and analyzed using descriptive statistics of frequency, range, mean, SD, and also rank order and correlations. The findings were tabulated in Table 2 and Table 3.

This study also investigated the correlations between the five variables under study among the



Iranian medical universities. The findings are displayed in Table 3.

As can be observed, there was a statistically strong correlation between total number of articles and H-index of each faculty member ($r = 0.833$, P -value = 0.01), between total number of articles of each top faculty member and their total number of citations ($r = 0.802$, P -value = 0.01), and between total number of citations and H-index of each top faculty member ($r = 0.877$, P -value = 0.01). There was also a moderately strong correlation between scientific rank of each top faculty member and

their H-index ($r = 0.517$, P -value = 0.01), between total number of citations and citations per paper ($r = 0.468$, P -value = 0.01), between citation per paper and H-index ($r = 0.437$, P -value = 0.01), and between scientific rank and total number of citations ($r = 0.400$, P -value = 0.01). Finally, there was a weak correlation between total number of articles of each top faculty member and their scientific rank ($r = 0.322$, P -value = 0.05), and between scientific rank and citations per paper of each top faculty member ($r = 0.350$, P -value = 0.05).

Table 1. Comparison of information on top faculty members of 51 Iranian medical universities

| No. | University name | No. of faculty members | Top faculty member's articles | Citations | Greatest H-index | Citations per paper | Scientific rank | Specialty |
|-----|--|------------------------|-------------------------------|-----------|------------------|---------------------|---------------------|---|
| 1 | Tehran University of Medical Sciences | 1914 | 492 | 22460 | 60 | 45.65 | Top Full professor | Clinical subspecialty of adults' gastroenterology and liver |
| 2 | Shahid Beheshti University of Medical Sciences | 1503 | 917 | 14145 | 56 | 15.43 | Full professor | Clinical subspecialty in adult endocrinology and metabolism |
| 3 | Mashhad University of Medical Sciences | 917 | 240 | 5733 | 42 | 23.89 | Full professor | PhD in pharmacology |
| 4 | Shiraz University of Medical Sciences | 912 | 229 | 2888 | 29 | 12.61 | Full professor | PhD in immunology |
| 5 | Isfahan University of Medical Sciences | 900 | 467 | 7243 | 43 | 15.51 | Full professor | Pediatrics |
| 6 | Tabriz University of Medical Sciences | 876 | 206 | 4291 | 38 | 20.83 | Full professor | PhD in pharmaceuticals |
| 7 | Iran University of Medical Sciences | 864 | 142 | 2973 | 27 | 20.94 | Associate professor | PhD in infectious diseases |



| No. | University name | No. of faculty members | Top faculty member's articles | Citations | Greatest H-index | Citations per paper | Scientific rank | Specialty |
|-----|---|------------------------|-------------------------------|-----------|------------------|---------------------|---------------------|----------------------------------|
| 8 | Jondishapoor University of Medical Sciences | 661 | 166 | 1317 | 16 | 7.93 | Full professor | Pediatrics |
| 9 | Kerman University of Medical Sciences | 484 | 61 | 2293 | 21 | 37.59 | Top Full professor | Endodontics |
| 10 | Hamedan University of Medical Sciences | 450 | 32 | 625 | 16 | 19.53 | Associate professor | PhD in pharmaceutical chemistry |
| 11 | Mazandaran University of Medical Sciences | 416 | 165 | 2687 | 31 | 16.28 | Full professor | PhD in Pharmacological chemistry |
| 12 | Kermanshah University of Medical Sciences | 414 | 112 | 1189 | 20 | 10.62 | Full professor | PhD in biochemistry |
| 13 | Yazd University of Medical Sciences | 385 | 68 | 597 | 13 | 8.78 | Full professor | Obstetrics |
| 14 | Urmia University of Medical Sciences | 365 | 64 | 3244 | 29 | 50.69 | Full professor | PhD in clinical biochemistry |
| 15 | Zanjan University of Medical Sciences | 354 | 83 | 1932 | 19 | 23.28 | Full professor | PhD in pharmaceuticals |
| 16 | Zahedan University of Medical Sciences | 326 | 195 | 2718 | 24 | 13.94 | Full professor | PhD in clinical biochemistry |
| 17 | Qazvin University of Medical Sciences | 293 | 61 | 1369 | 18 | 22.44 | Full professor | PhD in pharmacology |
| 18 | Hormozgan University of Medical Sciences | 287 | 32 | 388 | 10 | 12.13 | Associate professor | PhD in genetics |



| No. | University name | No. of faculty members | Top faculty member's articles | Citations | Greatest H-index | Citations per paper | Scientific rank | Specialty |
|-----|--|------------------------|-------------------------------|-----------|------------------|---------------------|---------------------|---|
| 19 | Baqiatallah University of Medical Sciences | 257 | 515 | 4659 | 31 | 9.05 | Full professor | Clinical subspecialty of adults' gastroenterology and liver |
| 20 | Arak University of Medical Sciences | 255 | 51 | 815 | 18 | 15.98 | Assistant professor | PhD in environmental health |
| 21 | Lorestan University of Medical Sciences | 254 | 93 | 817 | 19 | 8.78 | Full professor | PhD in microbiology |
| 22 | Kurdistan University of Medical Sciences | 251 | 104 | 584 | 15 | 5.62 | Full professor | MSc in environmental health |
| 23 | Share Kord University of Medical Sciences | 238 | 344 | 7142 | 52 | 20.76 | Full professor | PhD in pharmacology |
| 24 | Ardebil University of Medical Sciences | 237 | 39 | 850 | 15 | 21.79 | Full professor | Clinical subspecialty of adults' gastroenterology and liver |
| 25 | Birjand University of Medical Sciences | 220 | 60 | 573 | 15 | 9.55 | Associate professor | PhD in clinical toxicology |
| 26 | Kashan University of Medical Sciences | 211 | 136 | 864 | 18 | 6.35 | Associate professor | PhD in nutrition |
| 27 | Bushehr University of Medical Sciences | 207 | 140 | 1134 | 18 | 8.10 | Full professor | Clinical subspecialty of adults' gastroenterology and liver |
| 28 | Semnan University of Medical Sciences | 205 | 114 | 1311 | 23 | 11.50 | Full professor | PhD in physiology |
| 29 | Qom University of Medical Sciences | 196 | 91 | 732 | 11 | 8.04 | Instructor | MSc in nursing |
| 30 | Rafsanjan University of Medical | 188 | 126 | 1152 | 19 | 9.14 | Assistant professor | PhD in immunology |



| No. | University name | No. of faculty members | Top faculty member's articles | Citations | Greatest H-index | Citations per paper | Scientific rank | Specialty |
|-----|--|------------------------|-------------------------------|-----------|------------------|---------------------|---------------------|-----------------------------------|
| | Sciences | | | | | | | |
| 31 | Yasooj University of Medical Sciences | 176 | 8 | 345 | 8 | 43.13 | Assistant professor | PhD in clinical psychology |
| 32 | Alborz University of Medical Sciences | 163 | 267 | 2022 | 19 | 7.57 | Assistant professor | PhD in epidemiology |
| 33 | Sabzevar University of Medical Sciences | 162 | 29 | 234 | 9 | 8.07 | Associate professor | PhD in physiology |
| 34 | University of Well-being and Rehabilitative Sciences | 161 | 239 | 4474 | 35 | 18.72 | Full professor | PhD in genetics |
| 35 | Ilam University of Medical Sciences | 149 | 119 | 783 | 16 | 6.58 | Full professor | PhD in epidemiology |
| 36 | Zabol University of Medical Sciences | 138 | 32 | 216 | 9 | 6.75 | Associate professor | PhD in pharmacological toxicology |
| 37 | Khorasan-e Shomli University of Medical Sciences | 138 | 22 | 165 | 8 | 7.50 | Associate professor | PhD in immunology |
| 38 | Shahed University of Medical Sciences | 135 | 143 | 1462 | 21 | 10.22 | Full professor | PhD in physiology |
| 39 | Artesh University of Medical Sciences | 135 | 57 | 492 | 15 | 8.63 | Full professor | PhD in physiology |
| 40 | Jahrom University of Medical Sciences | 108 | 22 | 538 | 14 | 24.45 | Associate professor | PhD in physiology |
| 41 | Tarbiat Modarres University of Medical | 94 | 429 | 4902 | 33 | 11.43 | Assistant professor | PhD in hematology |



| No. | University name | No. of faculty members | Top faculty member's articles | Citations | Greatest H-index | Citations per paper | Scientific rank | Specialty |
|-----|---|------------------------|-------------------------------|-----------|------------------|---------------------|---------------------|---|
| | Sciences | | | | | | | |
| 42 | Gonabad University of Medical Sciences | 90 | 44 | 233 | 11 | 5.30 | Instructor | MSc in environmental health |
| 43 | Fasa University of Medical Sciences | 90 | 69 | 624 | 15 | 9.04 | Instructor | MSc in biostatistics |
| 44 | Dezfool University of Medical Sciences | 58 | 20 | 141 | 7 | 7.05 | Assistant professor | PhD in pharmacology |
| 45 | Bam University of Medical Sciences | 53 | 31 | 133 | 7 | 4.29 | Instructor | MSc in environmental health |
| 46 | Jiroft University of Medical Sciences | 50 | 6 | 57 | 5 | 9.50 | Assistant professor | PhD in clinical biochemistry |
| 47 | Torbat-e Heidarieh University of Medical Sciences | 47 | 52 | 314 | 9 | 6.04 | Assistant professor | PhD in physiology |
| 48 | Guilan University of Medical Sciences | 45 | 85 | 814 | 16 | 9.58 | Full professor | PhD in biologic products |
| 49 | Babol University of Medical Sciences | 37 | 123 | 835 | 16 | 6.79 | Full professor | PhD in pharmacology |
| 50 | Maraqeh University of Medical Sciences | 35 | 27 | 177 | 8 | 6.56 | Researcher | PhD in History of Medical Sciences |
| 51 | Golestan University of Medical Sciences | 29 | 93 | 1926 | 23 | 20.71 | Associate professor | Clinical subspecialty of adults' gastroenterology and liver |

| | N | Range | Minimum | Maximum | Mean ± SD |
|---------------------|----|-------|---------|---------|---------------------|
| Faculty Members | 51 | 1885 | 29 | 1914 | 335.9 ± 372.69 |
| Articles | 51 | 911 | 6 | 917 | 146.3 ± 166.97 |
| Citations | 51 | 22403 | 57 | 22460 | 2345.3 ± 3803.5 |
| Greatest H-index | 51 | 55 | 5 | 60 | 20.9 ± 12.66 |
| Citations Per Paper | 51 | 46.40 | 4.29 | 50.69 | 14.7 ± 10.50 |

Table 3. Correlations between the five variables under study

| | | Correlations | | | | |
|---------------------|---------------------|---------------|-----------------|------------------|---------------------|-----------|
| | | Articles | Scientific Rank | Greatest H-index | Citations Per Paper | Citations |
| Articles | Pearson Correlation | 1 | | | | |
| | Sig. (2-tailed) | | | | | |
| | N | 51 | | | | |
| Scientific Rank | Pearson Correlation | .322* | 1 | | | |
| | Sig. (2-tailed) | .021 | | | | |
| | N | 51 | 51 | | | |
| Greatest H-index | Pearson Correlation | .833** | .517** | 1 | | |
| | Sig. (2-tailed) | .000 | .000 | | | |
| | N | 51 | 51 | 51 | | |
| Citations Per Paper | Pearson Correlation | .112 | .350* | .437** | 1 | |
| | Sig. (2-tailed) | .435 | .012 | .001 | | |
| | N | 51 | 51 | 51 | 51 | |
| Citations | Pearson Correlation | .802** | .400** | .877** | .468** | 1 |
| | Sig. (2-tailed) | .000 | .004 | .000 | .001 | |
| | N | 51 | 51 | 51 | 51 | 51 |

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Discussion

This study was the first one in its own type. This was because the Electronic Scientific Measurement System (www.research.a.c.ir) is a new database and no study like the present one has been carried out on the topic previously. Hence, the researcher could not compare and contrast his own findings with previous ones. In this study, seven variables including total number of faculty members per medical university, the scientific rank of top faculty members of 51 Iranian medical universities, their specialties, total number of ISI articles of each top faculty member, total number of citations of each, H-index of each, and citations per paper of each were compared. The results showed that the maximum number of faculty members was 1914 that belonged to Tehran University of Medical Sciences while the minimum number was 35 belonging to Maraqeh

University of Medical Sciences. Also, the maximum number of articles of the top faculty members of each university was 917 that belonged to the top faculty member of Shahid Beheshti University of Medical Sciences while the minimum number of articles was 6 belonging to the top faculty member of Jiroft University of Medical Sciences. Moreover, the maximum number of citations of the top faculty members was 22460 that belonged to the top faculty member at Tehran University of Medical sciences while the minimum number of citations was 57 belonging to Jiroft University of Medical Sciences. Additionally, the maximum H-index was 60 which belonged to the top faculty member at Tehran University of Medical Sciences whereas the minimum H-index was 5 owned by the top faculty member at Jiroft University of Medical Sciences. Furthermore, the maximum number of citations per paper was 50.69 for the top faculty member at



Urmia University of Medical Sciences while the minimum number of citations per paper was 4.29 belonging to the top faculty member at Bam University of Medical Sciences. Finally, the maximum scientific rank of the top faculty members was senior full professor belonging to two faculty members at Kerman University of Medical Sciences and Tehran University of Medical Sciences whereas the minimum scientific rank was instructor owned by the top faculty member at Bam University of Medical Sciences.

Our findings demonstrated that the Iranian medical universities affiliated to Ministry of Health, Treatment, and Medical Education were not uniform in the seven variables under study. This indicates that manpower and resources are not evenly distributed among the 31 provinces in Iran. This situation asks the authorities of the less-privileged medical universities to make their best effort to absorb the required resources, manpower, equipment, and faculty members to develop their related medical university.

This study excluded the medical and allied health schools in the Iranian Islamic Azad University as they are not affiliated to the Ministry of Health, Treatment, and Medical Education. It also excluded Iranian medical research centers and independent medical schools. Also, it covered just the faculty members that had registered in the Scientific Measurement System.

Conclusion

The findings of this study showed that there were a total of 18972 medical faculty members teaching and researching in Iranian medical universities excluding the independent medical

schools, medical research centers, and medical universities not affiliated to the Iranian Ministry of Health, Treatment, and Medical Education in the Islamic Azad University. This study presented some useful, information on top medical faculty members in Iranian medical universities in terms of total number of ISI articles, total citations of each, average citations per paper of each, H-index, scientific rank, and specialty. Yet, there was an imbalance in the variables under study in different medical universities located in different parts of Iran. A more balanced distribution of faculty members and resources is required to improve medical education in all parts of Iran. Our findings may be added to WHO data base to be used by foreign students or professors who are interested in studying or teaching in Iranian medical Universities.

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Conflicts of Interests

The authors declare that there is no financial support or relationships that may pose conflict of interest.

Author's Contributions

Barzegar, K designed research; Barzegar, K and Barzegar, S conducted research; Barzegar, K analyzed data; and Barzegar, K wrote the paper. Barzegar, K had primary responsibility for final content. All authors read and approved the final manuscript.

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