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The future of medical students; perspectives and expectations: a cross-sectional study in Mashhad University of Medical Sciences

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Abstract

Background: Health decision makers should be able to predict attitudes of medical students and factors influencing their tendency to allocate enough resources and university vacancy. These attitudes may not be always congruent with the actual and prominent health needs of society. The purpose of this study was to delineate medical students' career prospects and general expectations.

Methods: This cross-sectional study was conducted on 200 medical students who were selected through a multi-stage sampling method from all educational stages (basic science, physiopathology, clinical clerkship, internship) studying at Mashhad University of Medical Sciences in 2016-2017. The first five priorities for work after graduation and first five priorities for residency were studied and the Priority-Percentage Index (PPI), which considers the percentage and a reverse scoring for the priority of selecting an item, was calculated.

Results: Principally, "pursuing one of the medical specialties" was the most desired career choice (3.73 PPI) followed by "employment in private practice" (2.08 PPI) regardless of gender, native status, and stage of education. Although the most preferred specialties were ophthalmology (1.99 PPI), cardiology (1.66 PPI) and radiology (1.44 PPI), the trend of interest varied by educational stage.

Conclusion: Income and reputation have a significant influence on medical students' attitude toward specialties. Therefore, it is crucial that policy-makers note preferences in specialties and consider the society's demand in the field of healthcare.

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Introduction

Career expectations are a main concern of all medical students.^{1,2} Related to this, governments sometimes face difficulty in providing appropriate community health due to a lack of skilled specialists. Therefore, it is important to consider strategies in order to discover medical students' enthusiasms and preconceptions to predict future workforce numbers from the early time of medical students' training across the 6 to 7 years it takes them to enter the workforce.³ Moreover, it is essential for officials to predict the ratio of males and females in particular specialties for comparing these results with the general medical demand

to allocate enough resources and university vacancies on this basis. For instance, the study of Gadanya and Ismail found high demand in instrument-oriented specialties in males, and relation-oriented specialties in females.⁴ In another study, worldwide decreasing interest in the field of psychiatry was of considerable concern.⁵

Therefore, it is crucial to predict the attitudes of medical students and the factors influencing their preferences such as workplace environment and income potential as well as flexibility in time management.⁶ This may also help to attract incoming students towards a certain needed specialties.³

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In many countries, medical students tend to work as specialists instead of as general practitioners (GPs), which leads to a decrease in the proportion of primary care physicians.^{3,4,7-9} The most in-demand speciality varies by country and time period; for example, reports from Germany, Scotland, Jordan, and a follow-up study in Nigeria revealed that two of the most preferred specialities were surgery and paediatrics.^{4,5,7,10,11} Furthermore, the percentage of medical students who chose obstetrics, gynaecology, and internal medicine was remarkable.^{4,7,11} Reputation, prestige, and income seem to play an active role in career expectations among medical students. Therefore, in some studies, a speciality such as psychiatry was not cited as a first choice although it has highly desirable aspects such as proper working hours and good work-life balance.^{8,11} The speciality preferences also differs by gender; a study in Jordan showed that male students preferred surgery, while female students chose gynaecology and obstetrics.^{4,11}

As mentioned before, medical students' plans for their future career specialties can shape health system efficiency. In addition, health decision makers should guide the health system efficiently. Various specialty quotas along with gender, and being native has not been adequately studied in Iran. The purpose of this study was to delineate medical students' career prospects and general expectations based on the aforementioned factors.

Materials and Methods

This cross-sectional study was conducted with 200 medical students from all educational stages studying at Mashhad University of Medical Sciences (MUMS) from September 2016 to March 2017. This sample size was calculated based on a previously published study using the "qualitative estimation of the proportion of a population" formula where $P=0.71$, $d=0.071$, $\alpha=0.05$, $\beta=0.8$ and considering a 20% dropout rate.¹² The students were selected using a stratified clustered sampling method. Each stage (e.g., basic science, physiopathology, clinical clerkship, internship) was considered as a different stratum; within each stratum, two or three classes (based on stage) were considered to be clusters. All students in each class were surveyed until the designated sample size for that stratum was filled. Participants were fully informed of the research purpose and filled out a self-administered checklist in the presence of the researcher in order to clarify possible misunderstanding of the questions. As stated above, inclusion criteria were being a current medical student at any educational stage at MUMS and willingness to participate in the study. There were no exclusion criteria. The checklist had two main domains: "What are your first five priorities for work after graduation?" and "If you decide to continue studying after graduation, what are your first five priorities for residency?" The first question had four items: governmental job, administrative and research job, academic job/continuing education, and

private practice which included 12 options. The second question had listed the 24 available specialties in Iran, including neurosurgery, neurology, thoracic surgery, cardiology, ophthalmology, obstetrics and gynecology, dermatology, pediatrics, otorhinolaryngology, psychiatry, anesthesiology, orthopedics, internal medicine, infectious diseases and tropical medicine, general surgery, emergency medicine, urology, pathology, community medicine, occupational medicine, radiology, radiotherapy and oncology, clinical nuclear medicine, and toxicology. We also asked about the respondents' stage of education, gender, native status (inhabitants of Mashhad), and quota entry status (free or other quota: e.g., students were admitted into the university with defined positions). The validity of this checklist was approved by a panel of experts and the reliability was shown by a Cronbach's alpha of 0.75.

To analyse the data, an index was developed by the researcher. In this index, points were assigned to the priorities of 1 to 5, respectively, where priority 1 was worth 5 points, successively decreasing so that priority 5 was worth 1 point. These points were multiplied by the percentage of students selecting that priority. Finally, these scores were summed to form the whole index score for that speciality/prospective career. We called this index the "PPI," or the Priority-Percentage Index. A simple example is calculated thus: a 0.5 PPI means that priority one (worth 5 points) was selected for a speciality by 10% of the participants or a priority five (worth 1 point) was selected by 50% of participants. Thus, the PPI can vary from 0 to 5. Microsoft Excel version 2016 was used for calculations.

Results

The response rate was 90.5%: 181 of 200 students returned the questionnaires. Half (50%, 91) of participants were female, and 30% (55) of respondents were not native (i.e. they were not citizens of Mashhad). Moreover, 80% (141) of the medical students had a free quota.

Among all options, "pursuing one of the medical specialties" was the most desirable career choice (3.73 PPI) regardless of gender, native status or quota status. The second most desirable was for "employment in a private practice" (2.08 PPI). However, "pursuing an academic position" was the second highest score (2.48 PPI) among the students who had other quotas. However, in the all other choices, "employment in private practice" was ranked as their second choice and "pursuing an academic position" as the third. Notably, "employment in the national health system as a doctor" was ranked as the fourthmost desirable option by total students. However, this statement had a different priority among male and in other quota students (Table 1).

As shown in Figure 1, the most preferred career across all stages was "pursuing one of the medical specialties," followed by "employment in private practice." Moreover,

Table 1. Career preference (Priority-Percentage Index)* based on gender, being native and quota

Prospective career	Male	Female	Native	Non-native	Free quota	Other quotas	Total
Contract to work in a clinic	0.32	0.68	0.43	0.71	0.49	0.42	0.49
Employment in the public sector as a doctor	0.47	1.08	0.71	1.05	0.85	0.74	0.77
Employment in non-governmental organization as a doctor	0.63	0.87	0.85	0.65	0.77	0.58	0.71
Employment in the national health system as a doctor	1.16	1.51	1.33	1.44	1.31	1.84	1.27
Employment in the field of medical research	1	1.35	1.25	1	1.09	1.79	1.12
Management jobs at the ministry of Health and Medical education	0.84	0.83	0.89	0.67	0.78	1.37	0.78
Pursuing in one of the medical specialties	3.68	4.09	3.75	4.18	3.95	3.74	3.73
Pursuing to obtain an academic position	1.79	1.65	1.85	1.64	1.59	2.48	1.66
Employment in a private practice	2.5	1.89	2.28	2.05	2.25	1.64	2.08
Collaborating with colleagues to establish a clinic	1.13	1.1	1.13	1.13	1.11	1.42	1.07
Having an interest in economic and commercial activities related to medicine	0.71	0.43	0.6	0.55	0.59	0.48	0.55
Having an interest in economic and commercial activities unrelated to medicine	0.31	0.22	0.27	0.29	0.26	0.11	0.25

*Priority-Percentage Index can vary between 0-5. Higher index (darker green cells) means that item had a higher priority among students and/or higher percentage of them selected that.

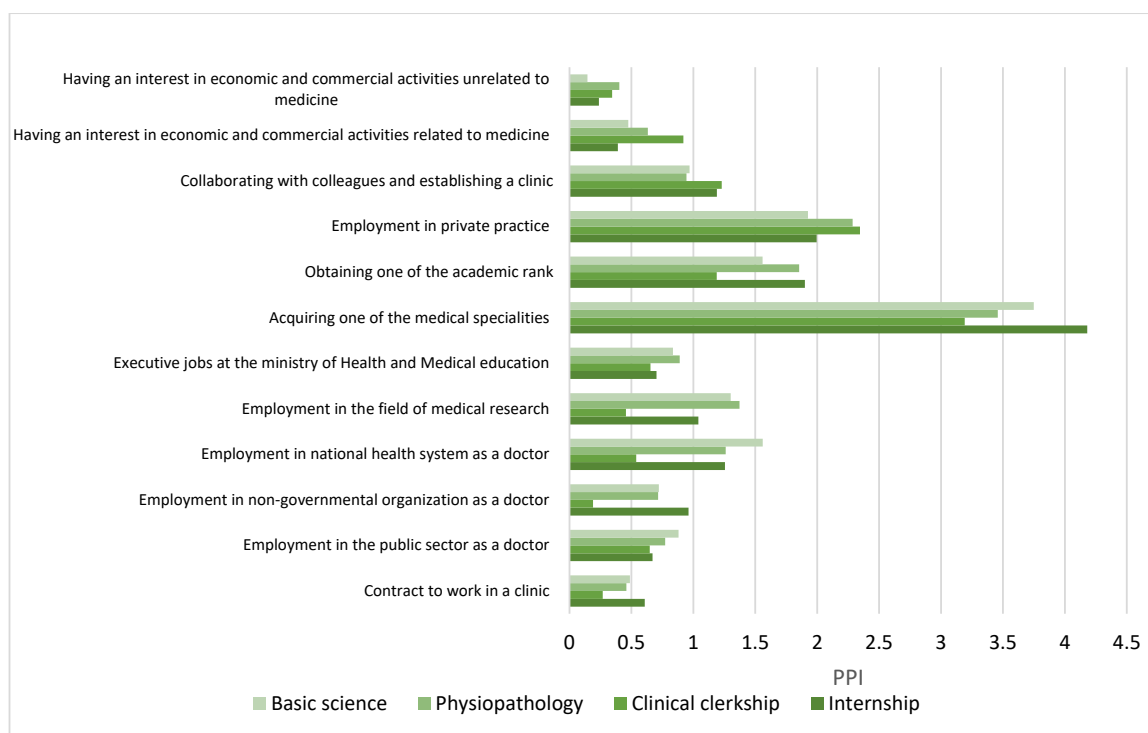


Figure 1. Career preference (Priority-Percentage Index) based on students' stages. Priority-Percentage Index can vary between 0-5. A higher index means that item had a higher priority among students and/or higher percentage of them selected that.

“pursuing an academic position” was the third preferred career among physiopathology, clinical clerkship, and internship students, while the thirdmost preferred career of basic science students was “employment in the national health system as a doctor.”

The most preferred speciality was ophthalmology (1.99 PPI), and the two other highly ranked specialities were cardiology (1.66 PPI) and radiology (1.44 PPI). Considerable differences were seen between male and female students in dermatology (preferred by female

Table 2. Preferred specialities (Priority-Percentage Index)* based on gender, being native and quota

Specialty	Male	Female	Native	Non-native	Free quota	Other quotas	Total
Anesthesiology	0	0.09	0.05	0.04	0.04	0.11	0.04
Cardiology	1.58	1.91	1.57	1.95	1.78	1.26	1.66
Clinical nuclear medicine	0.28	0.41	0.42	0.11	0.34	0.32	0.34
Community medicine	0.03	0.22	0.13	0.14	0.11	0.21	0.12
Dermatology	0.78	1.38	1.26	0.92	1.09	1.37	1.08
Emergency medicine	0.18	0.27	0.22	0.27	0.22	0.16	0.22
General surgery	0.85	0.87	0.78	0.96	0.84	1.05	0.81
Infectious diseases	0.09	0.26	0.11	0.33	0.16	0.05	0.17
Internal medicine	0.35	0.44	0.4	0.22	0.39	0.37	0.38
Neurology	1.27	0.69	0.87	1.22	1.05	0.32	0.91
Neurosurgery	1.17	0.78	0.91	1.07	1.02	0.58	0.91
Obstetrics and gynecology	0	0.83	0.46	0.6	0.43	1.27	0.5
Occupational medicine	0.04	0.12	0.12	0.02	0.09	0	0.08
Ophthalmology	2.34	1.82	2.07	2.13	2.14	2.05	1.99
Orthopedics	0.83	0.13	0.5	0.46	0.53	0.21	0.44
Otorhinolaryngology	0.65	0.41	0.46	0.64	0.44	1.32	0.5
Pathology	0.23	0.26	0.3	0.16	0.27	0.11	0.24
Pediatrics	0.73	0.9	0.72	1.06	0.78	0.79	0.77
Psychiatry	0.4	0.65	0.55	0.56	0.55	0.32	0.5
Radiology	1.46	1.5	1.76	0.97	1.5	1.74	1.44
Radiotherapy and oncology	0.49	0.47	0.6	0.31	0.5	0.58	0.45
Thoracic surgery	0.27	0.13	0.23	0.13	0.17	0.42	0.18
Toxicology	0.06	0.04	0.08	0	0.06	0	0.05
Urology	0.12	0.03	0.08	0.05	0.06	0.21	0.07

*Priority-Percentage Index can vary between 0-5. Higher index (darker green cells) means that item had a higher priority among students and/or higher percentage of them selected that.

students, with 1.38 PPI compared to 0.78 PPI in males) and neurology (preferred by male students, with 1.27 PPI compared to 0.69 PPI in females). Obstetrics and gynaecology and otorhinolaryngology in the “other quotas” category had higher scores compared to the “free quota” category (1.27 PPI compared to 0.43 PPI and 1.32 PPI compared to 0.44 PPI, respectively) (Table 2).

Figure 2 shows that the following specialities earned the highest scores among basic science students: cardiology (1.97 PPI), ophthalmology (1.90 PPI), and neurosurgery (1.36 PPI). In the physiopathology stage, ophthalmology (2.20 pp), cardiology (1.69 PPI), and neurosurgery (1.40 PPI) had the highest scores. In both clinical clerkship and internship educational stages, ophthalmology, radiology, and cardiology had the highest scores.

Discussion

This study reflects the opinion of MUMS' medical students about their career preferences and specialty intentions. The results of our study demonstrated that acquiring a medical speciality was the highest priority for both male and female students. In contrast, most medical students who participated in Gibis et al study in Germany preferred to have a contract to work in a clinic.⁷ This might be a result of the fact that a career as a GP

may not satisfy medical students' expectations regarding prestige or income, as other studies proved that the lower income associated with GPs is one of the reasons students are not interested in working as a GP.^{3,13-15} This may be also due to the fact that students do not feel ready to start their medical practice individually.^{16,17} Additionally, our results indicated that employment in the field of medical research is ranked amongst the lowest preferences, similar to previous research.⁵ Congruent with these findings, a recent study found that research misconduct in thesis work was 19% and 26% in undergraduate and postgraduate students, respectively.¹⁸ This suggests that research ethics is not well respected, and may affect choosing research as a job.

Ophthalmology was the most preferred speciality among the MUMS medical students, whereas general surgery or internal medicine had the highest rank in other studies^{3,5,7,10,11} and ophthalmology was one of the less preferred specialties.^{7,11} Working conditions associated with different specialties varies by country; for example, ophthalmology is highly preferred in Iran mainly due to the fact that this speciality provides a high income, prestige, and an acceptable work-life balance. Among all specialities, anesthesiology had the lowest score after toxicology, while it was ranked fourth in the study of Kiolbassa et al

in Germany.³ Anesthesiology is a speciality that is highly prone to malpractice and thereby lawsuits. This might be a reason that this speciality was not preferred by most medical students. It should be noted that anesthesiology has a high income and therefore income, *per se*, is not the primary or definitive determinant in choosing a speciality. In some societies, increased employment of nurse anesthetist experts instead of anesthesiologists was another negative factor in selecting this speciality.¹¹

Our data demonstrated that preferred specialities were mostly dependent on students' gender. Consistent with other studies, orthopaedics was chosen mostly by male participants, and obstetrics and gynaecology was only chosen by female participants.^{7,11,19} Apart from cultural, social and religious reasons, this might be a result of easiness of competition for its residency position for female students in Iran. Surprisingly, otorhinolaryngology was chosen highly by students of "other quotas" category, although both the students with "free quota" and the students of other studies were not interested in it.^{7,11}

Similarly, analyses showed that the preference of students differed based on their educational stage; neurosurgery was ranked third at the basic science and physiopathology level, but it was not preferred at two later stages. Previous studies also reported a decrease in the preference of students for surgery (or surgical specialities) throughout the time.^{4,9,11} On the other hand, radiology showed an increasing trend over the years of study. This result shows agreement with previous studies.^{4,20} This might stem from exceptional conditions such as increased income potential and flexible working hours.²¹ Moreover, students at the clinical clerkship and internship stages preferred pathology, which was consistent with the results of the study of Compton et al.²⁰ This is probably due to the hardships and stress of other clinical wards that students face throughout the medical education years.

This study is not without limitations. Although the response rate was acceptable and we do not assume any risk of bias, the results may be prone to imprecision. Due to the nature of cross-sectional design, the causality relationship cannot be considered. We recommend that a longitudinal study to be done to follow which speciality is chosen by medical students and what their perspectives might be after studying in that speciality. It should be also noted that due to dynamic nature of workplaces such studies should be repeated along time passes to monitor any possible changes in students attitudes. However, this was the first study of this kind (i.e., introducing a new index for measuring expectations) to evaluate differences in prospective career selection regarding medical stages and some other factors. We believe that not so many factors can influence motivation for selecting a future career especially in medicine, so these results can be generalized to at least type one medical faculty (if not all types) of Iran. However, due to socio-cultural variations around the country, similar studies with our design can be

of great interest and would obviously fill this knowledge gap.

Conclusion

Taken together, as in previous studies, income and speciality reputation have a significant influence on medical students' attitude toward specialities.^{9,17,22-24} Therefore, it is crucial that policy-makers note preferred specialities and consider society's demand and projected needs in the healthcare field. This should be noted in part to help the healthcare system reduce the income gap between different specialities to prevent pushing students into certain specialities. In this regard, it is possible to apply the policies of countries that have achieved health equity. For example, fair distribution of financial resources, as well as tax policies and development of national standards for maximum daily visits, can be beneficial.

Ethical approval

This study was approved by Ethics Committee of Mashhad University of Medical Sciences (MUMS-931562).

Competing interests

None to be declared.

Authors' Contributions

Study design: MKR and MY; Data gathering: MKR, ZZ and ZR; Data Analysis: MKR, ZZ and ZR; Drafting the manuscript: MKR, ZZ, ZR and MY. All authors reviewed and approved the final version of the manuscript

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