



## Emigration Pattern among Medical and Non-medical Iranian Elite and Its Associated Factors: A Review of Literature

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### Abstract

**Background:** The phenomenon of elite migration from developing countries to developed countries has various causes. This study aims to review the causes of the emigration of medical and non-medical Iranian elites and the associated factors.

**Materials and Methods:** In this review, online databases (Medline, Scopus, Web of Science, ERIC, ProQuest, CIVILICA, and Google Scholar search engine) were searched in both English and Persian up to March 2023, using combinations of keywords (e.g., medical students, non-medical students, brain drain, developed country, migration, elite, developing country), and their Persian equivalents.

**Results:** The tendency to emigrate among non-medical students was 56%. Men, people aged 31-40, graduate students, married people, those dissatisfied with income, and individuals of high socio-economic status had a higher tendency to emigrate. The tendency to emigrate had an inverse correlation with the four dimensions of origin and destination conditions (economic, political, social, and cultural). The most important factors affecting the migration of non-medical students were cultural, economic, occupational, and socio-political factors ( $p < 0.05$ ). The tendency to emigrate among medical students was  $6.13 \pm 2.82$  out of 10. There was a significant relationship between willingness to emigrate and variables of gender, pre-university study region, parental academic degree, having a relative/friend abroad, foreign trip experience, foreign language skills, number of published articles, and Iran's National Elite Foundation membership ( $p < 0.05$ ). The most important factors affecting the emigration of specialists and medical sciences students were economic, structural, occupational, personal, and socio-political factors.

**Conclusion:** The tendency to emigrate among elites is high. The strategies for maintaining the elite and specialists should focus on economic factors and employment opportunities related to the field of study and supporting the continuation of education.

**Key Words:** Brain drain, Elite, Iran, Migration, Students, Specialists.

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## 1- INTRODUCTION

Human capitals are among the primary factors in the growth and development of countries, and their lack in developing countries delays growth and development (1). Today, it is acknowledged that human capacities are the basic factor of sustainable development in any country, and education is fundamental to creating these capacities. Trained and skilled people are vital to overcoming the problems, especially in developing countries. A cause of human capital loss in developing countries is the emigration of elites to developed countries. Emigration of trained people with high education can be detrimental to developing countries because they carry out occupations that are vital to the development, including fundamental research and innovation, transferring these activities into practice, and creating capacity for others by training other key professionals such as teachers, physicians and scientists (2).

The term “elite migration” (brain drain) was first used to describe the migration of English engineers and scientists to the United States in a report by the Royal Society of London in 1963 (3). Brain drain is a form of elite migration that highlights the repulsive or driving factors of the social environment in the source society (4). The migration of human capital is an important issue in underdeveloped, developing, and even some industrialized and advanced countries today (5).

The strategic document on the affairs of elites (approved by the 248th meeting of the Supreme Council of Cultural Revolution of Iran in October 2013) defines the elite as an outstanding and efficient person with a significant impact on the creation and expansion of science, technology, art, literature, culture, and management of the country within the framework of Islamic values whose activities are based on intelligence, creativity, motivation, and inherent

capabilities on the one hand and expertise, expertise and acquired capabilities on the other hand and contribute to the progress and advancement of the country (6). According to the statistics provided by the vice president of cultural affairs and planning of the National Elite Foundation in October 2012, 30% of Science Olympiad medalists and 25% of national exam winners migrated abroad during 2012-2016 (7). Brain drain has grown significantly in recent years. According to Iran’s immigration yearbook, the number of Iranian students abroad per year has increased from 19,000 in 2003 to 56,000 in 2018 (8). Some studies show that in health and medical sciences, the level of desire of physicians and nurses to migrate is considerable, and about half of the medical doctors have a desire to emigrate (9).

The migration of physicians in Iran is a long-standing phenomenon, but its recent trend and acceleration have become concerning (10). Human capital, especially high-skilled individuals and specialists, plays an undeniable role in the economic, social, and cultural development of a society and is considered by the World Bank as one of the sources of the wealth of countries (11). The emigration of elites from developing countries undermines the scientific production and economic foundation of the source countries and decreases the efficiency of physical capital, leading to lower creativity and innovation and the society moving towards sustainable poverty (12). The United Nations has defined brain drain as the movement of a single strain of highly specialized people from developing countries to developed countries, which only benefits developed countries (13).

A study on the reasons for the migration of specialized forces from universities introduced economic, social, and political factors as the most influential factors (14). Researchers have introduced a wide range of variables as effective factors in elite

migration, including social, cultural, and economic factors and issues in the professional, administrative, and educational systems and globalization (15, 16). The departure of elites and specialists from the country (medical or non-medical) is a social phenomenon that is the product of economic, cultural, social, and political factors of the Iranian society and damages economic, political, and social growth and development. According to the statistics, five million dollars of the country's capital is lost every year for each elite leaving the country. It is, therefore, necessary to identify the motivations of the elites leaving the country and the associated factors (17). Determining and investigating these factors can help the country's macro policies (18).

The present study aimed to combine the results of various research and individual and scattered studies and integrate their findings for scientific and practical use in line with the research program by reviewing the causes of the emigration of the medical and non-medical Iranian elite and the associated factors.

## 2- MATERIALS AND METHODS

### 2-1. Data sources

A systemic search of electronic databases, including Medline (via PubMed), Scopus, Web of Science, ERIC, ProQuest Dissertations, CIVILICA, and Google Scholar search engine, was performed with no time limit up to March 10, 2023. The following keywords were used alone or in combination: "Medical students, Non-medical students, Brain drain, Developed country, Migration, Elite, Abroad, Developing country", and their Persian equivalents. The studies were written in English or Persian. The search was done independently and in duplication by two reviewers, and any disagreement between the reviews was resolved by the supervisor.

### 2-2. Inclusion criteria

Inclusion criteria were all qualitative and survey (observational) data, and theses in English or Persian.

### 2-3. Study selection

A database search was done for suitable studies, abstracts of the studies were screened for identification of eligible studies, full-text articles were obtained and assessed, and a final list of eligible studies was made. This process was done independently and in duplication by two reviewers, and any disagreement was resolved by a third reviewer. References were organized and managed using EndNote software (version X8).

### 2-4. Exclusion criteria

Letters, commentaries, expert opinions, reviews and systematic reviews, theoretical and unstructured reviews, case reports, and protocols did not meet the mentioned eligibility criteria and were excluded.

### 2-5. Data items

A data collection form was designed and piloted by two independent authors. The data collected from the selected studies included authors' names, study type (quantitative or qualitative), publication date, study period, target population, settings, sample size, and main findings.

### 2-6. Ethics

Approval by the research ethics committee was not necessary as the study analyzed only publicly available articles.

## 3-RESULTS

Finally, 18 related studies (non-medical research=12, medical research=6), including one qualitative studies, one mixed method, and 16 surveys, were selected. The main characteristics of the selected studies are summarized in **Table 1** and the following:

### 3-1. Non-medical elites

1. A study was conducted with secondary analysis as part of the plan for measuring tendencies, behavior, and awareness of public university students extracted in 2001 with a sample of 1522 people from Iranian universities (under the Ministry of Science, Research and Technology). The results showed that 59% of the students had a moderate tendency, and 17% had a high tendency to migrate abroad. The two variables of adherence to the national society and religiosity as deterrent factors and a critical attitude toward the current and future conditions of the society as an encouraging factor in migration tendency were statistically significant ( $p < 0.05$ ). The tendency to emigrate was higher in men than in women and in people of higher socio-economic status (19).

2. A descriptive-analytical study investigated the economic factors affecting the desire to emigrate among students of electrical and computer majors at Tehran and Sharif Industrial Universities in 2002. The results showed that, according to the students' opinion, economic factors were more important than scientific-educational, social-cultural, and political factors (20).

3. A descriptive and analytical study at the Tehran University investigated factors affecting the tendency of Iranian scientific elites to emigrate in 2005-2006. The results showed that the primary factors in the emigration of Iranian scientific elites were the internal conditions governing Iranian society. The contrasting favorable social perception of the prevailing conditions in advanced countries was an effective factor in the desire of scientific elites to immigrate to such countries (6).

4. A descriptive-analytical study in 2012 investigated the tendency of the members of the National Elite Foundation of Mazandaran Province to emigrate and the associated causes and social factors. The results showed that more than half of the

elites (54%) desired to stay in Iran, and 25.4% were willing to migrate. The tendency for the migration of scientific elites was associated with the conditions and performance of social factors inside and outside the country. The low attractiveness of the country of origin and the high attractiveness of the destination country were the reasons for the elites to migrate. Also, employment opportunities were the primary attraction for emigration, and the two factors of unfavorable conditions for continuing education and research and insufficient appreciation of the scientific elite were the primary repulsive factors (21).

5. A cross-sectional study aimed to assess the educational, social, and cultural factors affecting the immigration of students at the Tehran University in 2012. The results showed that the tendency to immigrate had a significant correlation with the variables of social-cultural alienation and age and a significant negative correlation with educational satisfaction. Men had a significantly higher tendency than women and undergraduate students had a lower tendency to immigration than graduates. There was no significant difference between socio-economic classes and the tendency of students toward immigration (22).

6. A descriptive-analytical study was conducted on the factors related to the tendency of educated girls to migrate abroad among students referred to the immigration agencies in Shiraz in 2012. The results found several driving factors with a meaningful effect on the migration of female students abroad, including unemployment, low income, a lack of suitable jobs for the field of study, inadequate job opportunities, low job security, insufficient facilities, economic crises, lack of scientific, research, and laboratory facilities, lack of expert professors, disregard to the demands of educated people and their scientific value,

the restriction of women in choosing specific fields of study, and the restriction of individual freedom. Also, the attraction to migration was affected by factors such as job distribution based on people's skills, appropriate income, favorable economic order and stability, fair distribution of wealth, higher academic level, valuing innovation, better material facilities and services, welfare, and equal rights of men and women (23).

**7.** A descriptive-analytical study examined the social factors affecting the phenomenon of elite migration in graduate students of technical fields who immigrated to America (the University of Minnesota,  $n=100$ ), and graduate students of technical fields in Tehran, Amir Kabir, and Sharif Industrial Universities ( $n=150$ ) in 2012-2014. The results showed no significant relationship between social class and immigration. There was a negative relationship between the Iranian lifestyle and immigration and a direct relationship between Iran's social structure and elite immigration (24).

**8.** A descriptive-analytical study based on structural equations was conducted to provide a structural model of factors affecting the migration tendency among elite students of Semnan University in 2016-2017. The results found seven main factors influencing elite students' tendency to migrate, with scientific, educational, and psychological factors having the highest average effect. The results also showed that various factors such as social, political, cultural, economic, organizational, psychological, and educational factors should be considered in relation to each other and simultaneously regarding the migration phenomenon of elite students (25).

**9.** A descriptive-analytical study was conducted in governmental and non-governmental universities of Tehran in 2017-2018 on the factors influencing the

tendency of elites to migrate to developed countries. The results showed that the tendency of elites to migrate to developed countries was high in 56% and moderate in 29% of students. The groups with a higher tendency included male students, people aged 31 to 40 years, Ph.D. students, married elites, people with high work experience, and elites who were dissatisfied with their income. Also, the economic, political, social, and cultural dimensions of the source society conditions were evaluated as low by the elites, and in contrast, those of the destination society (developed countries) were evaluated as high. It means that the tendency of elites to migrate had an inverse correlation with the four dimensions of origin and destination conditions. The most effective factors in migration were the cultural, economic, and social conditions of the origin society ( $p<0.05$ ) (26).

**10.** A mixed-method (qualitative-quantitative) study was conducted to investigate socio-economic factors affecting the elites' tendency to migrate abroad. The qualitative part of the semi-structured interview involved 22 elites covered by the National Elite Foundation in 2018. The results of the qualitative part showed that the main factors were problems in scientific/research, socio-cultural, economic, managerial, planning, legal, communication, and technology infrastructures. The results of the quantitative part with a sample size of 200 showed that social and scientific factors (push factors) at the origin and scientific, social, and intervening factors at the destination (pull factors) affected the elites' tendency to migrate abroad (27).

**11.** A descriptive-analytical study was conducted to investigate the influencing factors in the tendency to migrate abroad among graduate students of Azad University of Science and Research in Tehran in 2019. The results showed that

47.5% of the students had a very high tendency to emigrate. The regression analysis showed that repulsive factors (internal) with a beta coefficient of 0.329%, attractive factors (external) with a beta coefficient of 0.271%, and individual factors with a coefficient of 0.249% were predictive of students for migration. Also, political and social factors had the greatest influence on the desire of elites to migrate abroad (28).

**12.** A descriptive-analytical study was conducted to identify the factors affecting the migration of graduate students of Kashan University in 2019. The results showed that among the measured indicators, the index of social order and legalism had the highest load (regression weight=0.98), followed by social and cultural factors (regression weight=0.96), and political and economic indicators jointly (weight regression=0.88). Scientific/educational/research indicators, physical environment, and migration intention were ranked next (29).

### **3-2. Medical elites**

**1.** A descriptive-analytical study investigated the willingness of physicians to immigrate and the associated factors in 2005. The results showed that the primary underlying factors of the willingness to emigrate among medical doctors were the low income of medical professions, high costs, inflation, social discrimination, a lack of career advancement, and a lack of comfort facilities. Iranian medical doctors declared the possibility of their migration on a scale of 0 to 100 at an average of 30.85 and cited financial problems, family issues, and problems in the destination countries as the main obstacles in their migration path (9).

**2.** A descriptive-analytical study in Iran University of Medical Sciences aimed to identify the most important factors that motivate students to migrate abroad in 2009. The results showed that the primary

factors from the students' point of view were economic factors, followed by administrative, educational, professional, social, and cultural factors and globalization (30).

**3.** A descriptive-analytical study aimed to investigate the social and cultural factors affecting the migration of Iranian students to Hungary (Pate University of Medical Sciences) in 2011. The results showed that the social attraction of the destination country and cultural repulsion of the origin were effective in the migration of Iranian students. The effect of social repulsion from the origin country and cultural attraction of the destination on this phenomenon was not confirmed (31).

**4.** A descriptive-analytical study investigated the migration status of pharmacy graduates abroad. The results showed that the migration of pharmacists increased significantly from 7.1% in 2006 to 13.8% in 2015. The rate of emigration of pharmacists (about 14%) was much higher than the average emigration of Iranians (about 2%), Iranian educated people (about 8%), and the average worldwide emigration (about 2.8%). The results also showed that a substantial factor affecting migration among domestic pharmacists was the economic situation of the country. Pharmaceutical graduates abroad cited continuing their education and then finding a job position and higher income as their primary reasons for emigrating. Also, Canada ranked first among the countries to which pharmacists emigrate, followed by Germany, the USA, Australia, England, France, and Sweden. Job security, higher income, the possibility of continuing education more easily, and better amenities appear as the factors influencing the migration of pharmacists (32).

**5.** A qualitative study aimed to evaluate the factors affecting the migration of specialist human resources in Iran's

healthcare system in 2015-2016. A total of 24 interviews with eight females and 16 males were carried out in Iran, Australia, the USA, Belgium, Canada, Italy, and The Netherlands. The results classified factors affecting the migration of specialists into five main themes: structural, occupational, personal, socio-political, and economic factors. These themes consisted of 12 categories and 50 subcategories. The most important factors affecting the migration of the studied population were structural issues, occupational problems, and personal concerns. In other words, the primary reasons for the migration were rooted in structural, occupational, personal, socio-political, and economic factors. Structural issues, occupational problems, and personal concerns were the most frequent drivers for migration (33).

6. A cross-sectional study was performed on 472 medical students of the Tehran University of Medical Sciences to investigate the tendency to migrate and the associated factors in 2019. The results showed that the tendency to migrate was  $6.13 \pm 2.82$  out of 10. There was no significant relationship between age, marital status, medical education phase, and the tendency to migrate ( $p > 0.05$ ). However, there was a significant relationship between willingness to migrate with variables of gender, pre-university study region, father's and mother's academic degree, having a relative/friend abroad, foreign trip experience, foreign language skills, number of published articles, and Iran's National Elite Foundation membership ( $p < 0.05$ ) (34).

#### 4- DISCUSSION

The present study aimed to review the causes of emigration among medical and non-medical Iranian elites and the associated factors. The results showed that the tendency to migrate among non-medical students was 56%, and the

associated factors were primarily cultural, economic, occupational, and socio-political. The tendency to emigrate among medical students was  $6.13 \pm 2.82$  out of 10, and the associated factors were primarily economic, structural, occupational, personal, and socio-political.

One of the essential and valuable resources of every country is the talented, skilled, and educated human resources. Policymakers try to cultivate, use, and preserve this valuable capital by applying various methods. The migration of human resources from the cycle of society is called the migration of elites or brain drain and may cause substantial damage to that society. In Iran, the issue of elite migration has raised great concerns. This phenomenon is often interpreted as evidence of the lack of a positive elitist culture, the inefficiency of the bureaucratic system, and even a cause of backwardness. On the other hand, some consider the current level of elite migration as normal, mostly consisting of those who have no desire to work and serve society within the framework of the system's political and cultural values. In some cases, they see the immigration of elites not as a problem and have demanded that policymakers send elites to other countries to study and learn techniques (35-38). However, these analyses do not consider the lack of an official, accurate, and documented evaluation and etiology of this phenomenon, leading to numerous questions yet to be answered (39).

The elites are those who have exceptional characteristics and excellent talents and capabilities in their field of work or activities (40). Due to their role, status, and special ability, they have a superior position to the average members of society and are considered privileged. Official and unofficial statistics regarding the extent and scope of the brain drain phenomenon in Iran indicate that the current outflow of specialized human resources with high

capital is a political, economic, and social problem, raising concerns and worries in the country (41). This issue, however, is not an emerging phenomenon in today's societies and can be investigated from various aspects due to its development in recent decades (26). However, it is clear and worthy of consideration that the departure of academics (brain drain) has grown significantly in recent years. According to the statistics of Iran's immigration yearbook, the number of Iranian students abroad reached 56 thousand in 2018 from 19 thousand in 2003 (42). In the health sector, the rate of migration of doctors and nurses is remarkable, and the evidence shows that about half of the physicians are willing to migrate (9). Another study shows that the migration of pharmacists has grown from 7.1% in 2006 to 13.8% in 2015 (32). Findings also show that medical professionals who intend to emigrate do so in the early years after graduation (43).

The migration of physicians in Iran is a long-standing phenomenon, but its recent trend and acceleration are concerning (9, 10). Some researchers mention the loss of quality human resources, waste of educational resources, challenges for the health system, lagging behind in international competition, and intensifying feelings of hopelessness and despair as the consequences of elite migration. The same researchers, however, have acknowledged that the migration of specialists can also create opportunities for the origin society because some of the migrated elites facilitate the transfer of knowledge to the country and increase its literacy level (44).

Migration is a multidimensional phenomenon with various causes (9, 42-46). One of the main reasons for elite migration is economic issues. Studies have identified several economic reasons for elite migration (9, 44, 47, 48), including the disproportion of wages with the inflation rate and living costs, the low

value of the Iranian Rial compared to other currencies (e.g., the dollar and the euro), economic instability, and the lack of hope for the country's economic future (44). In the present study, economic factors had the largest influence on elite migration, even though material causes are not the only factors of migration, as many hidden causes exist (49). Social reasons also play an effective role in the migration of specialists. Studies have shown that the impact of social factors might be even stronger than economic factors. Reasons such as the need for social security, higher quality of life, and more social security and freedoms, social discrimination, disregard for the social dignity of elites, lack of meritocracy in appointments, and the unaccountability of some country officials have been proposed in several studies (9, 44, 50).

Employment-related reasons also affect migration. Scarce job opportunities inside the country, not valuing innovation and initiative, uncertainty about the future of the job, and a lack of a clear path for job promotion have been identified among these reasons. Some studies show that the lack of attention to the elites in the administration of universities and society and the perception of lacking influence in society are among the reasons for the migration of the elites (44, 50, 51).

One study showed that factors such as unemployment, inadequate income, inappropriate jobs for the field of study, scarce job opportunities, lack of job security, lack of welfare facilities, economic crises, lack of scientific, research, and laboratory facilities, the lack of expert professors, disregard of the demands of educated people and their academic respect, the lack of success in higher education levels, the limitation of women in choosing specific fields of study, and the limitation of individual freedom have a meaningful driving effect in the migration of female students abroad.



Also, job distribution based on people's skills, appropriateness of income, economic order and stability, fair distribution of wealth, higher academic level, valuing innovation, better material facilities and services and welfare for life, and equal rights of men and women were the tensile factors mentioned by students (24). Lack of attention to research and injustice in the educational system based on various quotas, especially in postgraduate education, are other reasons for the migration of medical and non-medical science specialists (44).

Based on the results of the present study, the tendency to migrate is higher among men than women, and men evaluated the importance of economic factors as higher. The issue of earning a living, which is primarily the responsibility of men in Iran's society, may be effective in creating these differences.

Older and married students evaluated social factors as more important. Factors such as the feeling of belonging to the family, more extensive social communication, and better knowledge about the social conditions of the society and other countries can be effective in this attitude. Alaaldini et al. reported that age and gender (higher in men) have a significant direct relationship with the tendency to migrate and an inverse relationship with marriage (9).

A qualitative study was conducted with structured interviews with experts and those familiar with the issue of elite immigration who were members of the Education and Ethics Department of the Academy of Medical Sciences in 2022. The analysis of data led to the extraction of three main categories: causes of elite migration (repulsive factors of origin countries and attractive factors of the destination); consequences of elite migration (threats and opportunities); and solutions to elite migration (accurate understanding of the problem, correction

the system of fostering and supporting the elites, establishing and strengthening the innovation system, reforming the administrative system and meritocracy, improving the status and maintaining the dignity of the elite human resources, and the commitment of the country's policymakers). In other words, the elites have tended to migrate due to repulsion from the origin country and attractions in the destination countries (44).

Specialized human resources are essential to the economic, social, and cultural development of any society. Therefore, measures and mechanisms are needed to preserve these capitals, including attention to the dignity of the elites in the society. The expertise and scientific experience of individuals should be valued first and foremost regardless of personal and factional taste to leave the field open for the growth of all people. The migration of elites leads to people with lower expertise taking on specialized jobs (52).

Universities can increase the capabilities of students to work in the domestic labor market by providing educational courses that suit the needs of society (53). Strengthening the connection between the industry and the university (54), reasonable investment in the creation of science and technology parks (52), and focusing on entrepreneurship and financial support for graduates can contribute to the permanence of the country's elite and expert workforce.

**Table-1:** General characteristics of included studies (n=18).

Authors, publication date, References	Study period	Study type	Target population	Settings	Sample size	Main findings
Javaheri et al., 2015, 19	1989-2013	secondary analysis	university students	Governmental non-medical Universities, n=20	1522	59% of the students had a moderate tendency and 17% had a high tendency to migrate abroad.
Ebrahimi, 2002, 20	2001	descriptive-analytical study	electrical and computer students, graduate and undergraduate	Tehran and Sharif Industrial Universities	203	According to the students' opinion, economic factors were more important than scientific-educational, social-cultural factors, political have more priority in this field.
Ershad et al., 2007, 21	2007	descriptive and analytical study	graduate students	Tehran University	380	The most important factors influencing the emigration of elites were the internal conditions governing the Iranian society.
Janalizadeh et al., 2014, 22	2012	descriptive-analytical study	scientific elites	National Elite Foundation of Mazandaran province	32	54% of the elites desired to stay in Iran, and 25.4% were willing to migrate.
Hakimzadeh et al., 2023, 23	2011-2012	cross-sectional study	graduate and undergraduate students	Tehran University (Technical College)	415	The tendency to immigrate had a significant correlation with the variables of social-cultural alienation and age and a significant negative correlation with educational satisfaction.
Hatami et al., 2012, 24	2012	descriptive-analytical study	female students	The immigration agencies in Shiraz	120	The most important factors influencing the emigration of girl students were unemployment, low income, inadequate job opportunities, low job security, insufficient facilities, economic crises, lack of scientific, research, and laboratory facilities, etc.
Javadzadeh et al., 2015, 25	2012-2014	descriptive-analytical study	graduate students of technical fields	Iran, USA	the University of Minnesota, n= 100, Amir Kabir, and Sharif universities=150	There was a negative relationship between the Iranian lifestyle and immigration and a direct relationship between Iran's social structure and elite immigration.
Kiani et al., 2019, 26	2016-2017	descriptive-analytical study	university students	Semnan University	114	The results found seven main factors influencing elite students' tendency to migrate, with scientific, educational, and psychological factors having the highest average effect.
Hosseini et al., 2020, 27	2017-2018	descriptive-analytical study	university students	Governmental and non-governmental universities of Tehran	405	The tendency of elites to migrate to developed countries was high in 56% and moderate in 29% of students.

Bozorgzad et al., 2020, 28	2018	mixed-method (qualitative-quantitative) study	scientific elites	The National Elite Foundation	qualitative=22, quantitative=200	The social and scientific factors (push factors) at the origin and scientific, social, and intervening factors at the destination (pull factors) affected the elites' tendency to migrate abroad.
Firozysoreh et al., 2020, 29	2019	descriptive-analytical study	graduate students	Azad University of Science and Research in Tehran	300	The results showed that 47.5% of the students had a very high tendency to emigrate.
Heidary Soureshjani et al., 2022, 30	2019	descriptive-analytical study	graduate students	Kashan University	150	The index of social order and legalism had the highest load, followed by social and cultural factors and political and economic indicators jointly.
Ala Aldini et al., 2006, 31	2005	descriptive-analytical study	physicians	Iranian Medical System Organization	2789	The results showed that the primary underlying factors of the willingness to emigrate among medical doctors were the low income of medical professions, high costs, inflation, social discrimination, a lack of career advancement, and a lack of comfort facilities.
Nouri Hekmat et al., 2009, 32	2009	descriptive-analytical study	graduate students	Iran University of Medical Sciences	397	The primary factors from the students' point of view were economic factors, followed by administrative, educational, professional, social, and cultural factors and globalization.
Raheshkhoo et al., 2012, 33	2011	descriptive-analytical study	Iranian students	Hungary (Pate University of Medical Sciences	55	The social attraction of the destination country and cultural repulsion of the origin were effective in the migration of Iranian students.
Akbari jor et al., 2018, 34	2006-2015	descriptive-analytical study	pharmacy students	Iran	374	The migration of pharmacists increased significantly from 7.1% in 2006 to 13.8% in 2015.
Asadi et al., 2018, 35	2015-2016	qualitative study	Iranian healthcare professionals	Iran, Australia, the USA, Belgium, Canada, Italy, and The Netherlands	24	The results classified factors affecting the migration of specialists into five main themes: structural, occupational, personal, socio-political, and economic factors.
Taherahmadi et al., 2023, 36	2019	cross-sectional study	Medical students	Tehran University of Medical Sciences	472	The tendency to migrate was $6.13 \pm 2.82$ out of 10. Females, elites, and those with higher socioeconomic state, previous exposure to foreign countries, the ability to speak foreign languages, and research activity are more likely to migrate.

## 5- CONCLUSION

The tendency of non-medical science elites to migrate to developed countries was 56%. Men, people aged 31 to 40 years, PhD students; married elites, people with high work experience, elites dissatisfied with income, and people with high socio-economic status had a higher desire to migrate to developed countries. The results also showed that the tendency of elites to migrate has an inverse correlation with the four dimensions of origin and destination conditions (economic, political, social, and cultural). The most effective factors in migration were the cultural, economic, and social conditions of the origin society in the third order. Employment opportunities were the most important attraction for emigration, and the two factors of unfavorable conditions for continuing education and research and insufficient appreciation of the scientific elite were the most important repulsive factors.

The tendency to emigrate among medical students was  $6.13 \pm 2.82$  out of 10. There was a significant relationship between willingness to migrate with variables of gender, pre-university study region, parental academic degree, having a relative/friend abroad, foreign trip experience, foreign language skills, number of published articles, and Iran's National Elite Foundation membership ( $p < 0.05$ ). The most important factors affecting the migration of specialists and medical sciences students were economic, structural, occupational, personal, and socio-political factors.

In general, Iran is facing a growing trend in the phenomenon of migration and brain drain among medical and non-medical elites. Experienced researchers and specialists are creative and productive resources for promoting health, production, and technology in society. In Iran, migration causes are mainly the repulsive factors from the inside rather

than the attraction of the outside. Therefore, by providing solutions to economic, political, social, and cultural issues, elite forces can be retained and benefited from their knowledge and specialty.

## 6- AUTHORS' CONTRIBUTIONS

Study conception or design: HD, and MG; Data analyzing and draft manuscript preparation: MS, AY, and HD; Critical revision of the paper: MG; Supervision of the research: HD and MG; Final approval of the version to be published: HD, MS, AY, and MG.

**7- CONFLICT OF INTEREST:** None.

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