

A Scoping Review of the Reasons and Strategies to Manage Health Workforce Migration in Iran

Zahra Arabbadvi¹, Sara Mehrabi², Faezeh Nazari Robati³, Mohammad Sadeghi⁴, Zahra Askari⁵, Zohreh Khoshnood⁶, Azam Bazrafshan^{7*}, Reza Malekpour Afshar⁸, Ali Akbar Haghdooost⁹

¹Ali Ibn Abi Taleb Hospital, Rafsanjan University of Medical Sciences, Rafsanjan, Iran

²Student Research Committee, Razi Faculty of Nursing and Midwifery, Kerman University of Medical Sciences, Kerman, Iran

³Afzalipour Hospital, Kerman University of Medical Sciences, Kerman, Iran

⁴Department of Anesthesiology, Sirjan School of Medical Sciences, Sirjan, Iran

⁵Department of Medical Emergencies, Sirjan School of Medical Sciences, Sirjan, Iran

⁶Nursing Research Center, Kerman University of Medical Sciences, Kerman, Iran

⁷HIV/STI Surveillance Research Center, World Health Organization Collaborating Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran

⁸National Agency for Strategic Research in Medical Sciences Education, Tehran, Iran

⁹HIV/STI Surveillance Research Center, World Health Organization Collaborating Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran

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***Corresponding author:**

HIV/STI Surveillance Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran.

Email: bazrafshan.a.83@gmail.com

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Abstract

Background: Health workforce migration (HWM) is a long-standing and increasing phenomenon in low and middle-income countries. If adequately managed, mobility and migration of health workforce from these countries facing health worker shortages can strengthen their health systems and widen equities.

Objectives: This scoping review aimed to understand the reasons for and approaches to managing HWM in Iran which could have potential applications in other contexts.

Methods: The inclusion criteria of this scoping review consisted of studies reporting HWM in Iran. In November 2023, PubMed, the Web of Science, Scopus, SID, and Magiran were searched. Searches were limited to Persian and English reports published without a time limitation. We followed the PRISMA protocol for scoping reviews. Data were extracted and charted.

Results: Searches identified 5,661 articles. A total of 40 original articles met the inclusion criteria and were included after the screening. Overarching themes related to the review questions were: (1) Reasons for health workforce mobility and migration (three themes including *Governance*, Social domain, and Social scope), and (2) strategies to address HWM at the national level (three themes including *Governance-structural strategies*, *Educational and academic strategies*, *Individual-social strategies*).

Conclusion: HWM is a complex and multifaceted phenomenon often driven by a range of push and pull factors at the individual, institutional, community, and policy levels. This research can serve as a foundation for future work aiming to implement interventions to minimize the negative consequences of HWM and promote workforce sustainability in Iran or other developing countries.

Keywords: Health Workforce, Migration, Brain Drain, Iran

Background

Brain drain or elite migration is one of the most severe human capital challenges in the world. Indeed, it is the transfer of human resources where the country of origin needs the knowledge and expertise of its elites, but they prefer permanent or semi-permanent migration to

other countries (1). Immigrants make up one-seventh of the world's population (2). The migration of people from developing to developed countries is a typical and ongoing process, and many experts and intellectuals decide to leave their countries if they recognize that the country of origin cannot pave the way for actualizing

their talents (3). Elite and efficient human resources play a vital role in various national fields and are considered one of the most critical assets of any country or organization (4). Elite migration causes severe damage to the country and leads to a shortage of professionals in different fields. It also disrupts the meritocratic system managing of the country of origin. Moreover, host countries exploit the academic and occupational competencies of elites migrating to these countries (3).

Human resources are the most critical input of the healthcare system and play a vital role in providing healthcare services. However, less attention has been paid to the importance of human resources in the healthcare sector of developing countries (4). Health workforce migration (HWM) from countries affects the health and welfare of the community as well as restricts residents' equal access to healthcare services. According to the World Health Organization (WHO, 2006), there was a shortage of 3.4 million healthcare workers, and it is estimated that this shortage will reach 18 million people by 2030 (5). HWM restricts the access to and quality of healthcare services. Moreover, the diminished number of healthcare staff, especially in rural areas, leads to a disruption in service provision and delivery, more dissatisfaction, the resignation of other staff, increase in the waiting time of patients, elevated treatment costs, and loss of active population (4).

Evidence suggests that Iran is among the countries with a high level of HWM. A report released by the World Health Organization (WHO) in 2017 revealed that Iran is ranked seventh in the world in terms of the number of immigrant doctors. Many immigrants are specialists and graduates of various fields of medical sciences, including general practitioners, holders of specialized and sub-specialized degrees, dentists, pharmacists, and other professionals with doctorate degrees in related sciences. According to the assessment of the Iran Medical Council (IRIMC), every year, about 400 general practitioners and 300 to 350 specialists migrate from Iran (5, 6).

Variables such as political defects, payment differences, inadequate research facilities, family issues, children's education, and work-related rewards are among the possible factors that can encourage students from third-world countries to leave their homelands (7). In general, the deterrents of the country of origin include economic-occupational, cultural-social, political-religious, educational-academic, and personal factors that cause the medical community to be dissatisfied with the government, while attractive factors such as legality and regulations, the sense of security, welfare, and material facilities, as well as job and

educational opportunities in the destination country would motivate many medical specialists to migrate to the destination country (2).

The Global Commission on International Migration (GCIM) reported the effects of migration on development. It recommended that the analysis of international migration should be an integral part of national, regional, and global strategies for economic growth in developing and developed countries. According to the GCIM report, the immigration of elites can be an opportunity to create and use their potential to the maximum (8). Since efficient and elite human resources play the most crucial role in the developing any country by employing their tactfulness and resource management, their optimal management is considered very important. Due to their potential, elites have an undeniable role in changing the structure of systems, driving changes, and developing the community. Thus, there is a need for a paradigm shift from traditional human management to new management with a focus on elites (4). New management practices involve identifying, attracting and guiding, training, employing, supporting, honoring, modeling, and maintaining human capital (9, 10). Given the growing rate of elite migration and the significance of human capital management, the present study sought to examine the reasons and strategies affecting the management of HWM in Iran using a scoping review methodology.

Objectives

This scoping review aimed to understand the reasons for and approaches to managing HWM in Iran which could have potential applications in other contexts.

Methods

This study partially followed the preferred reporting items for systematic reviews and meta-analyses for scoping reviews (PRISMA-ScR) (Supplementary Material). The manuscript was not previously registered in databases such as PROSPERO.

A. Search strategy

The studies were collected through a comprehensive search of the electronic national and international databases, including the Scientific Information Database (SID), Magiran, PubMed, the Web of Sciences, and Scopus. The manuscripts were collected if published before November 2023. A range of keywords were adopted, including "elite migration," "migration," "immigration," "brain drain," and "Iran," to encompass as many articles as possible in the review.

B. Eligibility Criteria

No eligibility restrictions were adopted for the methodology or design of the studies. The only inclusion criteria were related to the topic that had to be on the HWM and Iran. We ensured that only original and peer-reviewed articles were included excluding letters to the editor, conference papers, proceedings, or abstracts, while other manuscript typologies were included.

C. Data Sources, Studies Sections, and Data Extraction

Two investigators independently reviewed the results retrieved from electronic databases and performed the screening. The first step of the screening was the removal of duplicate screenings, which were conducted by title, abstract, and full text. Next, in the second step, the references of the included studies were manually screened to include the review of other studies on this topic. Finally, the main results were summarized in a table. It included information related to the year of publication, journal, study methodology, and the main findings. The results were analyzed and discussed thematically. MAX-QDA was used for the analysis.

Results

A total of 5661 articles (Pub Med: 507, Web of Science: 4002, Scopus: 101, SID and Magiran: 1051) were searched and extracted from scientific databases. After removing duplicates and irrelevant articles, 40 full-text articles were used in the final analyses. The screening process is presented in (Figure 1).

Characteristics of included studies

The studies used in this article were from 1998 to 2024. The number of studies from 2005 to 2024 was 40 articles and the number of descriptive articles was 14 (6, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22); the number of qualitative articles was 10 (4, 5, 8, 23, 24, 25, 26, 27, 28, 29); the number of cross-sectional articles was 3 (1, 30, 31); the number of case study articles was 1 (32); the number of analytical articles was 2 (2, 33); the number of review articles was 1 (34); the number of qualitative-quantitative articles was 2 (35, 36); the number of qualitative-descriptive articles was 1 (3); the number of survey articles was 3 (37, 38, 39); the number of experimental articles was 2 (10, 40); and the number of articles qualitative and meta-analysis was 1 (7) (Figure 2) (Table 1).

The subgroups investigated in the studies included elites (7, 10, 20, 24, 21, 14, 13, 31, 38) nurses, doctors (3, 29, 26), medical students (16, 34), immigrant women (1) (Sample search strategy can be seen in appendix) (Table 2).

Influential factors in elite migration

Factors affecting stimulation of the migration of elites included the Governance, Social Domain and

Social scope, each of which had sub-sets that we have discussed below.

Governance

A review of the selected articles revealed that one of the factors that provoked elite immigration was governance.

Governance involves selection, meritocracy, the rule of law, as well as internal and international relations. Selection and meritocracy are affected by rent-seeking (7), lack of support for and employment of elites, absence of permission to recruit elites (3), lack of context for standard services (11), and absence of meritocracy (10). Moreover, the issues affecting the rule of law include the dominance of political groups over universities (7), weak and unfair laws (3), as well as government monopolies and sanctions (33). Further, the issues related to national and international relations include weak educational research communication and the lack of communication between industry and academic research centers (33).

Social Domain

The most important factors linked to the social domain included the scientific issues faced by the Elites Foundation, as well as educational infrastructure, and economic and welfare problems. The scientific problems faced by the Elite Foundation include lack of performance evaluation, inadequate inter-departmental coordination (23), while educational infrastructure problems such as extended academic program (24), poor scientific guidance (4), failure to foster creativity and thinking (24), and economic and welfare problems including job dissatisfaction, unemployment of graduates with academic education (24), lack of job opportunities in some industrial fields (2), inadequate income (35), low level of economic openness and freedom (25), and lack of financial stability and transparency (30).

Social scope

The social factors affecting elite migration include workplace issues, motivation and vision for the future, and social security. Workplace issues include high-risk workplaces, high workloads (5), and counterproductive workplaces (18). Motivation and vision for the future involve the lack of confidence in the future (3), reduced social dignity and respect for scientists (7), failure to create a happy and dynamic environment for elites (4), and lack of effective programs to motivate and encourage elites (19). Moreover, social security issues include political/social instability (37) and lack of social freedom (4) (Figure 3).

Human capital and elite migration management strategies

The strategies of human capital management and elite migration included *Governance-structural strategies*, *Educational and academic strategies*, and *Individual-social strategies*, which we have discussed below.

Governance-structural strategies: Previous studies have proposed various strategies for human capital and elite migration management, including reducing bureaucracy, establishing rule-based governance, creating efficient jobs, and reducing intermediation.

Bureaucracy can be reduced by reforming administrative structures, procedures, scientific and executive centers (37), resource management (26), the institutionalization of the participatory management system (17), reducing paperwork in scientific institutions (10), eliminating complex administrative bureaucracy, and guaranteeing contracts (33).

Further, establishing rule-based governance involves adopting stable anti-corruption policies (10), judicial security, and fighting corruption (23). Creating efficient jobs and reducing intermediation requires government support for entrepreneurship (33), improving job security (35), creating a match between the labor market and academic programs (17), increasing job opportunities (12), and enhancing satisfaction (33).

Educational and academic strategies: Previous studies have proposed the most important educational and academic strategies: reforming the educational system's infrastructure, rebuilding university support services, providing financial support, attracting investment, and improving technology. The educational system's infrastructure involves training the future workforce, strengthening the scientific infrastructure (10), and improving the scientific-educational quality (7). In addition, rebuilding university support services includes the execution of support plans (26), establishing student organizations (36), and establishing the department of knowledge translation (24). Financial support involves increasing the research budget (24), providing economic support for elites (31), and providing scholarships to pave the way for the elites' return. In addition, attracting investment includes:

- developing the relationship between industry and universities (10),
- developing the relationship between national and international universities (18),
- creating a dynamic relationship with the community (34),
- establishing cooperation among virtual colleges,
- strengthening e-learning centers at universities (20), and

- taking advantage of the scientific and professional competencies of immigrants (12).

Finally, promoting technology involves improving scientific research competencies (20) and developing research projects using artificial intelligence plus electronic services (34).

Individual-social strategies: The most critical social-individual strategies reported in previous studies included establishing security and emotional support, creating motivation and a sense of belonging to the country, and building trust. Establishing security involves respecting and tolerating dissenting opinions (17), political stability, and non-violence (27). Emotional support involves strengthening ties and strong connections with family and community (40). Further, creating motivation and a sense of belonging to the country involves creating motivation to stay (32), providing facilities for elites (36), and civic participation of elites (30). Finally, building trust encompasses emphasizing property rights (40), applying Iranian material and spiritual power (17), providing adequate information to the public (13), as well as transparency and accountability (36) (Figure 4).

Discussion

One of the most critical issues in Iran is the emigration of intellectual capital and elite migration since expert and efficient human resources are considered the principal components of development in any country. In recent years, the rate of emigration of specialists (also called brain drain) has been growing. This issue is not only specific to developing countries, but more importantly the factors contributing to this phenomenon and how to cope with them should be addressed. According to the present study's findings, more attention should be paid to elite migration as a growing phenomenon to reduce the damage and losses caused by elite migration. Accordingly, a review of the articles published in this field shows that it is necessary to focus on the issues of governance and social and individual problems as factors contributing to elite migration.

Overarching themes related to the review questions were: (1) Reasons for health workforce mobility and migration (3 themes) list items here, and (2) strategies to address HWM at the national level (3 themes) list items here.

Elite migration can be partly attributed to governance issues, including selection and meritocracy, the rule of law, and national and international relations, each with 4, 5, and 3 subcategories, respectively. Similarly, Bang and Mitra reported that the

marginalization of educated and elite people, non-interference of skills and competence in recruiting, tense political atmosphere, and unequal promotion opportunities were critical reasons for brain drain (21).

The data in the present study indicated that social factors such as the Elite Foundation's scientific problems, educational infrastructure, and economic and welfare issues could account for elite migration, each with 3, 2, and 6 subcategories, respectively. A study by Ribeiro et al. in Portugal showed the leading causes of migration were searching for better employment opportunities and obtaining professional development opportunities (32).

The results of the current study indicated that social factors play a significant role in elite migration. These factors include workplace issues, motivation and vision for the future, and social security, each with 4, 3, and 2 subcategories, respectively. In a similar vein, Bange and Mitra reported that the lack of freedom of speech and social security were some reasons for elite migration (21). A review of the investigated articles demonstrated that the focus on governance-structural, educational-academic, and individual-social issues could contribute to formulating human capital and elite migration management strategies.

Accordingly, some governance-structural strategies can mitigate elite migration trends by reducing bureaucracy, creating rule-based governance, creating efficient jobs, and reducing intermediation, each with 6, 2, and 5 subcategories, respectively. A study by Bang and Mitra in the USA also found that political stability, the form of investment, and the quality of the bureaucracy significantly affect the flow of immigration in the USA (21).

The present study observed that educational and academic strategies, including reforming the infrastructure of the educational system, the reconstruction of academic support services, financial support, investment attraction, and technology promotion, could reduce elite migration, each with 5, 3, 3, 3, and 2 subcategories, respectively. Further, a study by Murakami in Japan showed that the availability of an excellent research environment, development of science and technology, abundant funding, high-quality facilities, diversity of human resources, the existence of an opportunity for free discussion, and reduced responsibility for doing various tasks were some factors affecting immigrants' decision to return to the homeland (22).

Crucially, our research underscores the importance of individual-social strategies in mitigating brain drain. These strategies, which involve ensuring security, providing emotional support, fostering motivation and

a sense of belonging, and building trust. Notably, Bang and Mitra's research supports our findings, emphasizing the effectiveness of strategies such as respecting elites' opinions, providing a platform for political expression, protecting property rights, and promoting transparency in reducing elite migration (21).

There was no access to the non-Farsi and non-English papers. One of the weaknesses of the current study was being non-experimental, but its strength its proximity the real situations of society. Note that one of the best and most efficient methods to understand the influential factors on immigration and the strategies to maintain a society is the health care system.

Previous studies have indicated that various factors, including economic, social, cultural, political, and educational issues, can contribute to elite migration.

Conclusion

The present study explored the factors of human capital management strategies and the main factors affecting the tendency of elites to migrate abroad. Thus, Iranian officials need to pay more attention to elite migration and use the Iranians' intellectual and economic competencies abroad to a greater extent. These goals can be achieved if the whole system tries to develop a road map by establishing effective communication with university graduates as well as resolving the problems and issues reported in this study. Further, regarding the current policies governing the country, relevant authorities should reform the repulsive and restrictive policies as well as strengthen the government's approach to the maximum use of elite human resources. Considering the vital role of human resources in countries' health systems, managers should be aware that healthcare staff can play an influential role in promoting community health. Therefore, adopting effective policies, improving communication with experts worldwide, and managing capable immigrants can mitigate the burden of such problems in the country as well as improve the quality of life and work of capable community members. Meanwhile, there is a need for deep and comprehensive field studies on the factors contributing to or hindering brain drain. One of the limitations of the present study was the lack of access to articles in languages other than Persian and English due to the unavailability of language experts. Hence, future review studies need to address elite migration in articles published in different languages.

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Table 1. Characteristics of included studies

Author	Year	Study Typology	Main Objective
Taherahmadi et al. (1)	2023	Cross-Sectional	This study was designed and conducted to investigate the tendency to migrate and the factors affecting it among medical students of the Tehran University of Medical Sciences, Tehran, Iran, in 2019
Diba et al. (2)	2021	Analytical	Prospective analysis of the reverse migration of academic elites
Vadadher et al. (3)	2020	Qualitative-descriptive	Explaining the tendency to migrate abroad among medical community
Vahiddastjerdi et al. (4)	2021	Qualitative	Identifying the challenges and strategic priorities of health elites.
Asadi et al. (5)	2016	Qualitative	Evaluating the factors affecting the migration of specialist human resources in Iran's healthcare system.
Alaaddini et al. (6)	2006	Descriptive	Examining the factors of doctors' migration and the factors related to it
Zakersalehi (7)	2008	Qualitative and meta-analysis	Workforce maintenance based on the theory of attraction and repulsion
Khosravi et al. (8)	2011	Qualitative	There is no need for elites to reside in national borders. Still, it is possible to provide institutional grounds for knowledge to move quickly across borders through elites and to increase their productivity in the network. In the world of knowledge, the national society will also get its share.
Nazemi et al. (9)	2012	Descriptive	Consequences of rethinking in elite concept
Shahabadi et al. (10)	2017	Experimental	Investigating the effect of economic freedom on the migration of elites from other countries Chosen is developing 77G to the United States of America from 1997 to 2009.
Biglari et al. (11)	2021	Descriptive	Rethinking brain drain in Iran
Mosavirad et al. (33)	2016	Analytical	Analyzing various scenarios and their effect on the rate of migration
Cheraghi et al. (23)	2018	Qualitative	The existence of a permanent mechanism based on their demands, expectations, and problems seems necessary to improve the education system.
Ghaneirad (24)	2005	Qualitative	Unbalanced development of higher education
Shoogi et al. (35)	2020	Quantitative and Qualitative	The relationship between the brand attractiveness of Iranian employers and the reduction of elites' inclination for immigration.

Ahadi et al. (40)	2020	Experimental	Investigating the non-linear effects of oil rent on brain drain in OPEC oil exporting countries in the period of 2000-2016
Hajian et al. (25)	2023	Qualitative	Exploring the migration motivations of Iranian dentists who have moved to Canada.
Salehi et al. (30)	2023	Cross-Sectional	Assessing the relationships between migration intention, workload, and a healthy work environment for nurses.
Alamooti (18)	2005	Descriptive	Globalization and migration of elites
Heidari et al. (19)	2017	Descriptive	Examining the relationship between brain migration and the productivity of all economic factors and its effect on the growth of different sectors as well as social welfare
Javadzade (37)	2016	Survey	The social causes of the migration of Iranian elites to American universities
Bolandhemmatan et al. (26)	2016	Qualitative	Why the elite refrain from immigration
Razavi (17)	2006	Descriptive	Presenting a two-way model of migration of scientific elites
Shahabadi et al. (12)	2014	Descriptive	Identifying factors affecting brain drain from Iran to Europe
Bozorgzad et al. (36)	2020	Qualitative and Quantitative	Investigating socio-economic factors affecting the degree of tendency among elites to emigrate abroad
Afyooni et al. (27)	2020	Qualitative	Analysis of women's lived experience of immigration
Noori et al. (31)	2010	Cross-Sectional	Knowing the most important factors encouraging graduates to migrate abroad
Shojaeimotlagh et al. (28)	2018	Qualitative	Identifying the psychological factors that persuade Iranian nurses to migrate, suggesting necessary measures.
Yazdani et al. (34)	2019	Review	Examining the role of brilliant talents and elites in achieving scientific authority and proposing a model for the maximum participation of elites in achieving scientific authority
Fallahi et. al. (21)	2009	Descriptive	Appropriate strategies to reduce elite immigration
Hakimzade et al. (13)	2014	Descriptive	Investigating the impact of educational, social, and cultural factors on the desire of elites to migrate
Bang et al. (21).	2011	Descriptive	Bange and Mitra reported that the lack of freedom of speech and social security were some reasons for elite migration and in the USA also showed that political stability, the form of investment, and the quality of the bureaucracy significantly affect the flow of immigration in the USA, and supports our findings, emphasizing the effectiveness of strategies such as respecting elites' opinions, providing a platform for political expression, protecting property rights, and promoting transparency in reducing elite migration.
Ribeiro (32)	2014	Case study	Ribeiro et al. in Portugal showed the leading causes of migration were searching for better employment opportunities and obtaining professional development opportunities
Murakami (22)	2010	Descriptive	Murakami in Japan found that the availability of an excellent research environment, development of science and technology, abundant funding, high-quality facilities, diversity of human resources, the existence of an opportunity for free discussion, and reduced responsibility for doing various tasks were some factors affecting immigrants' decision to return to the homeland
Eissazade et al. (14)	2021	Descriptive	Exploring the extent and the reasons for migration among psychiatric trainees and early career psychiatrists in Iran.
Jahanian et al. (29)	2022	Qualitative	Investigating the possible causes behind the significant growth of the number of Iranians in Portugal.

Kazemi et al. (15)	2018	Descriptive	Inspecting the reasons why Iranian students choose to immigrate to Malaysia.
Chalbi et al. (16)	2005	Descriptive	Explaining the sociological factors of the phenomenon of labor displacement and the factors affecting it
Tavakol et al. (38)	2016	Survey	Analyzing immigration of elites
Froutan et al. (39)	2018	Survey	the results of this study accord with the pull-push theory of Lee (1966) and provide further evidence to support the United Nations' (2002) studies, suggesting that the tendency of young people towards international migration is mainly associated with more and better occupational and educational opportunities.

Table 2. Sample search strategy appendix

Search number query sort by filters search details results			
11 "(((("Brain Drain"[Mesh]) OR (Migrat*[Title/Abstract] OR "brain drain"[Title/Abstract] OR immigrat*[Title/Abstract] OR emigrat*[Title/Abstract])) AND (((("Health Workforce"[Mesh]) OR "Health Personnel"[Mesh]) OR "General Practitioners"[Mesh]) OR "Dentists"[Mesh]) OR "Pharmacists"[Mesh]) OR (profession* OR practic* OR pharmac* OR dent* OR dotor OR graduat*)) AND ("Iran"[Mesh] OR (iran[Title/Abstract]))" Publication Date from 1000/1/1 - 2023/11/29 "(((("Brain Drain"[MeSH Terms] OR ("migrat*[Title/Abstract] OR "Brain Drain"[Title/Abstract] OR "immigrat*[Title/Abstract] OR "emigrat*[Title/Abstract] AND ("Health Workforce"[MeSH Terms] OR "Health Personnel"[MeSH Terms] OR "General Practitioners"[MeSH Terms] OR "Dentists"[MeSH Terms] OR "Pharmacists"[MeSH Terms] OR ("profession*[All Fields] OR "practic*[All Fields] OR "pharmac*[All Fields] OR "dent*[All Fields] OR "dotor"[All Fields] OR "graduat*[All Fields])) AND ("Iran"[MeSH Terms] OR "Iran"[Title/Abstract])) AND (1000/1/1:2023/11/29[pdat]))" 119			
10 "(((("Brain Drain"[Mesh]) OR (Migrat*[Title/Abstract] OR "brain drain"[Title/Abstract] OR immigrat*[Title/Abstract] OR emigrat*[Title/Abstract])) AND (((("Health Workforce"[Mesh]) OR "Health Personnel"[Mesh]) OR "General Practitioners"[Mesh]) OR "Dentists"[Mesh]) OR "Pharmacists"[Mesh]) OR (profession* OR practic* OR pharmac* OR dent* OR dotor OR graduat*)) AND ("Iran"[Mesh] OR (iran[Title/Abstract]))" Publication Date "(((("Brain Drain"[MeSH Terms] OR ("migrat*[Title/Abstract] OR "Brain Drain"[Title/Abstract] OR "immigrat*[Title/Abstract] OR "emigrat*[Title/Abstract] AND ("Health Workforce"[MeSH Terms] OR "Health Personnel"[MeSH Terms] OR "General Practitioners"[MeSH Terms] OR "Dentists"[MeSH Terms] OR "Pharmacists"[MeSH Terms] OR ("profession*[All Fields] OR "practic*[All Fields] OR "pharmac*[All Fields] OR "dent*[All Fields] OR "dotor"[All Fields] OR "graduat*[All Fields])) AND ("Iran"[MeSH Terms] OR "Iran"[Title/Abstract]))" 128			
9 ("Iran"[Mesh]) OR (iran[Title/Abstract])" Publication Date "Iran"[MeSH Terms] OR "Iran"[Title/Abstract]" 72	756"	756"	
7 "(((("Health Workforce"[Mesh]) OR "Health Personnel"[Mesh]) OR "General Practitioners"[Mesh]) OR "Dentists"[Mesh]) OR "Pharmacists"[Mesh]) OR (profession* OR practic* OR pharmac* OR dent* OR dotor OR graduat*)" Publication Date "Health Workforce"[MeSH Terms] OR "Health Personnel"[MeSH Terms] OR "General Practitioners"[MeSH Terms] OR "Dentists"[MeSH Terms] OR "Pharmacists"[MeSH Terms] OR "profession*[All Fields] OR "practic*[All Fields] OR "pharmac*[All Fields] OR "dent*[All Fields] OR "dotor"[All Fields] OR "graduat*[All Fields]" 9	623	624	
6 profession* OR practic* OR pharmac* OR dent* OR dotor OR graduat* Publication Date "profession*[All Fields] OR "practic*[All Fields] OR "pharmac*[All Fields] OR "dent*[All Fields] OR "dotor"[All Fields] OR "graduat*[All Fields]" 9	294	295	
5 "(((("Health Workforce"[Mesh]) OR "Health Personnel"[Mesh]) OR "General Practitioners"[Mesh]) OR "Dentists"[Mesh]) OR "Pharmacists"[Mesh]" Most Recent "Health Workforce"[MeSH Terms] OR "Health Personnel"[MeSH Terms] OR "General Practitioners"[MeSH Terms] OR "Dentists"[MeSH Terms] OR "Pharmacists"[MeSH Terms]" 653	191"	191"	
4 "Brain Drain"[Mesh]) OR (Migrat*[Title/Abstract] OR "brain drain"[Title/Abstract] OR immigrat*[Title/Abstract] OR emigrat*[Title/Abstract])" Publication Date "Brain Drain"[MeSH Terms] OR "migrat*[Title/Abstract] OR "Brain Drain"[Title/Abstract] OR "immigrat*[Title/Abstract] OR "emigrat*[Title/Abstract]" 451	764"	764"	
2 "Migrat*[Title/Abstract] OR "brain drain"[Title/Abstract] OR immigrat*[Title/Abstract] OR emigrat*[Title/Abstract]" Publication Date "migrat*[Title/Abstract] OR "brain drain"[Title/Abstract] OR "immigrat*[Title/Abstract] OR "emigrat*[Title/Abstract]" 451	762"	762"	
1 "Brain Drain"[Mesh]" Most Recent "Brain Drain"[MeSH Terms]" 17			

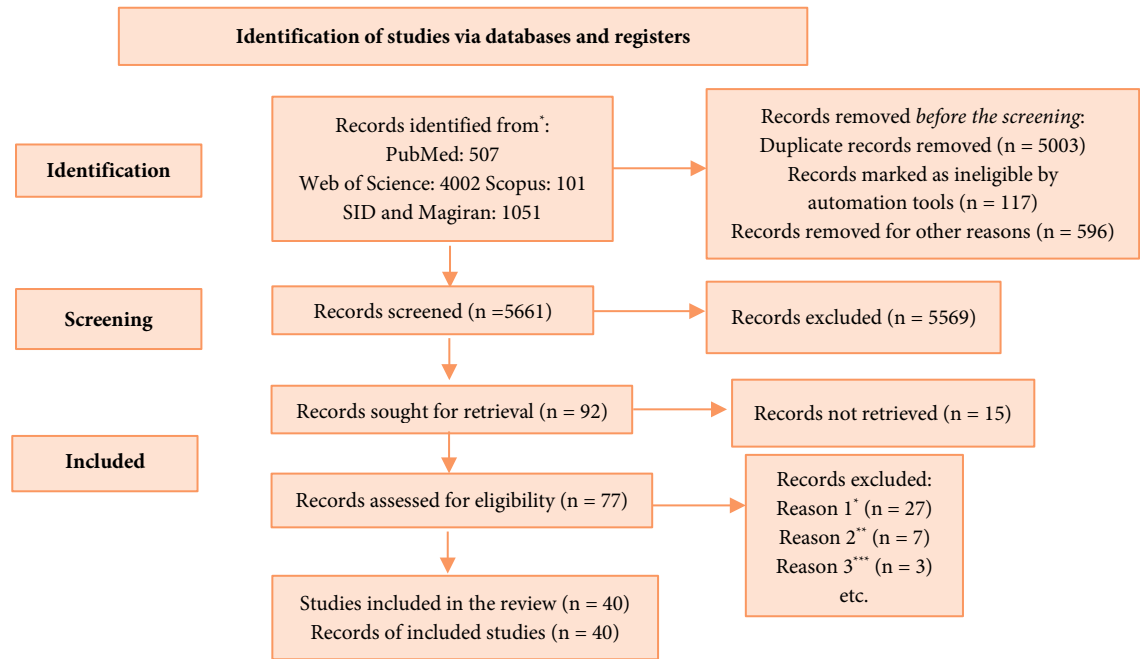


Figure 1. PRISMA 2020 flow diagram
*Failure to mention reasons for migration.
**Failure to mention solutions to tackle the issue of immigration at the national level.
***Lack of access to the full text of the article

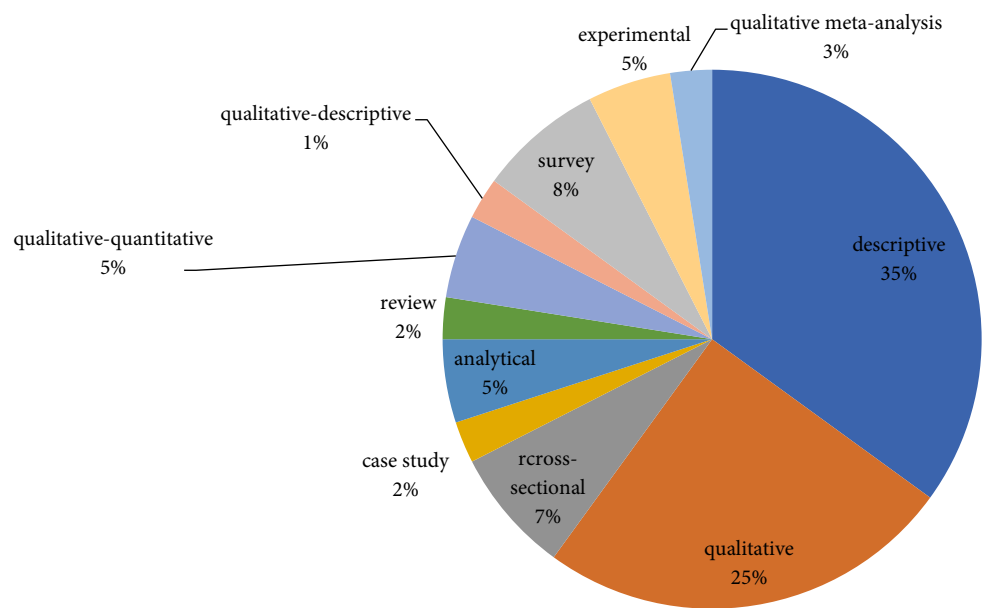


Figure 2. Frequency of included studies by type

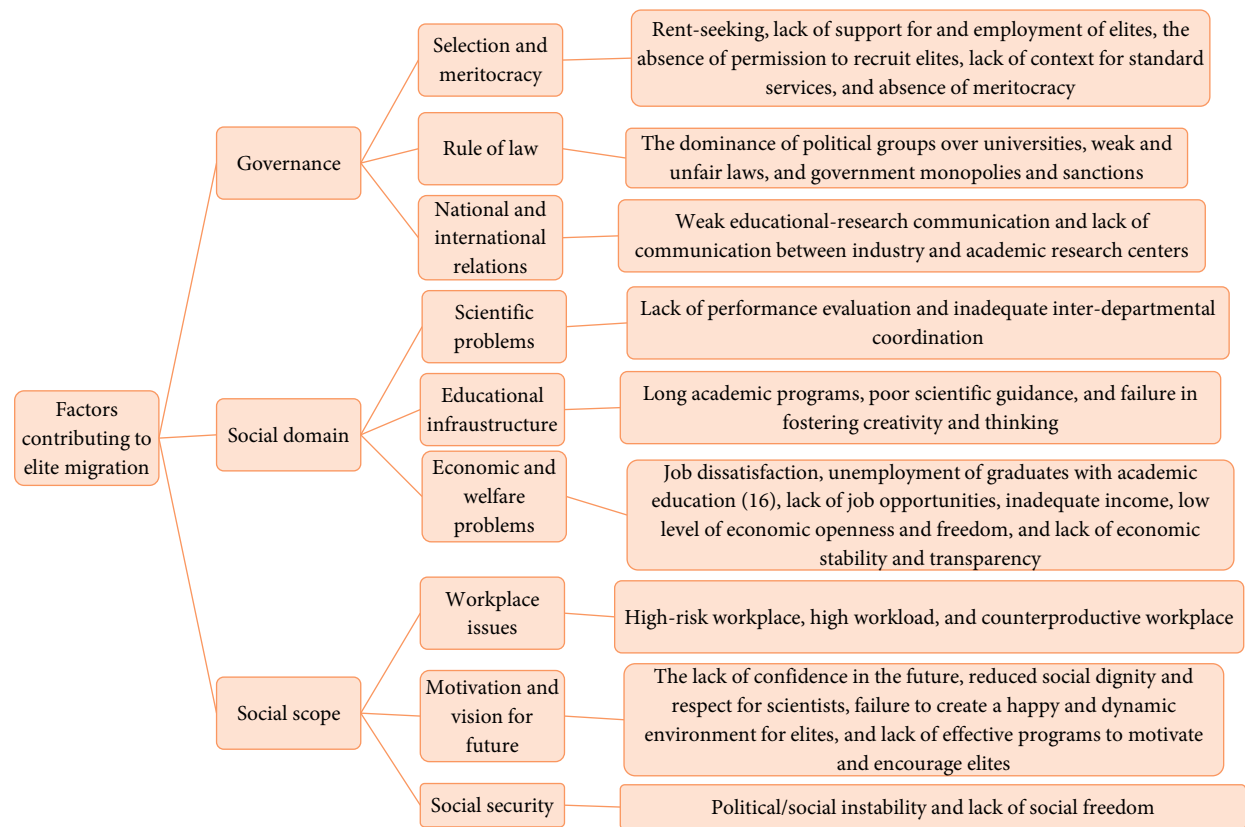


Figure 3. Influential factors in elite migration

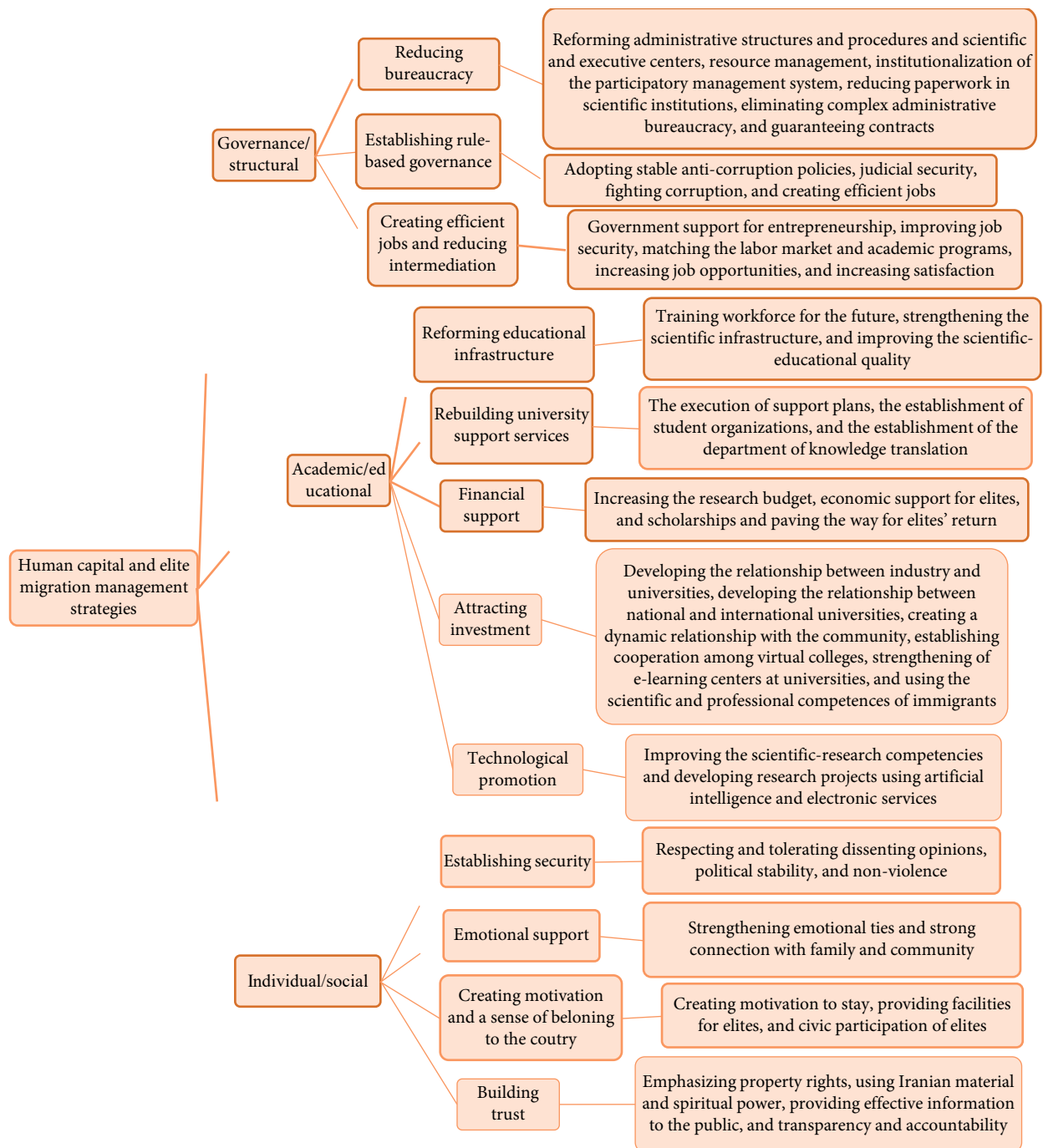


Figure 4. Human capital management and elite immigration strategies