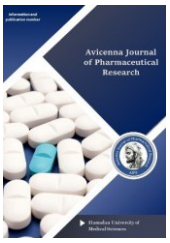
AJPR
Avicenna Journal of Pharmaceutical Research
Avicenna J Pharma Res. 2025 ;7(1): 50-60
DOI: 10.53208/ajpr.7.1.50
http://ajpr.umsha.ac.ir



Original Article

Assessment of the Pharmacist Workforce Supply and Estimated Staffing Requirements in Iran: A National Cross-Sectional Study

Marzieh Vanaee[1], Mojdeh Mohammadi[2], Ali Akbar Fazaeli[3], Maryam Rangchian[4*]

1. Faculty of Pharmacy, Hamadan University of Medical Sciences, Hamadan, Iran
2. Department of Pharmacology and Toxicology, Faculty of Pharmacy, Hamadan University of Medical Sciences, Hamadan, Iran
3. Department of Health Management and Economics, Faculty of Public Health, Tehran University of Medical Sciences
4. Department of Clinical Pharmacy, Faculty of Pharmacy, Hamadan University of Medical Sciences, Hamadan, Iran

Article history:
Received: May 31, 2026
Revised: June 20, 2026
Accepted: June 20, 2026
Published: June 29, 2026

***Corresponding author:**
Maryam Rangchian, Department of Clinical Pharmacy, Faculty of Pharmacy, Hamadan University of Medical Sciences, Hamadan, Iran
Email: m.rangchian@umsha.ac.ir

Abstract

Background: The supply of human resources is one of the most important issues in health systems. Policymakers need current data to plan future actions. This study aimed to calculate the number of occupied and unfilled job positions in different fields of pharmacy in Iran during 2020–2021 (20 March 2020 to 19 March 2021).

Methods: Occupied posts in community pharmacies, hospitals, distributing companies, Drug and Poison Information Centers, addiction treatment centers, medicine importer firms, and medicine exporter companies were obtained from the Iranian Food and Drug Administration. Pharmaceutical industry data came from direct company correspondence. Vacancies (unfilled positions) for areas with defined standards were calculated accordingly; others were queried from relevant organizations. For community pharmacies, vacancies were estimated under two scenarios: 4 and 8 working hours per pharmacist per day.

Results: A total of 22,834 pharmacists were active in relevant careers. The ratio of general pharmacists to population was 0.76 per 2,000. Their major areas of activity included community pharmacies, the regulatory section, pharmaceutical and supplement manufacturing, pharmaceutical distribution, and hospitals. The national share of women in employment was 44.72%. The number of vacancies for the above-mentioned scenarios was 6,612 and 2,723, respectively.

Conclusion: Although some vacancies were identified in the present study, if influencing factors remain unchanged, the labor market for general pharmacists is likely to become saturated. Currently, pharmacists' capabilities are minimally utilized in Iran. Pharmacists' services in community pharmacies are very limited; the pharmaceutical industry is concentrated on generic production, and research and development activities are mainly limited to formulation changes. If Iran's health sector policymakers do not address this issue at the right time, both pharmacists and society will suffer.

Keywords: Health Workforce Planning, Iran, Labor Market, Pharmacist Supply, Staffing Requirements, Workforce Demand

© 2025 The Author(s); Published by Hamadan University of Medical Sciences. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

[Downloaded from ajpr.umsha.ac.ir on 2026-11-23]

[DOI: 10.53208/ajpr.7.1.50]

Introduction

Providing the needed workforce is one of the most important global issues in all health systems [1]. Every group of health practitioners plays a special role in the health field, which leads to the provision of the goods or services required to maintain, improve, and restore the community's health.

Pharmaceutical services and preparations are among the most important health products. Access to high-quality medicines that are responsibly and efficiently produced, distributed, and consumed is a vital component of public health. Pharmacists play irreplaceable roles in this regard. For instance, hospital pharmacists not only collaborate with physicians and nurses to provide the best medication management and health outcomes for patients, but also participate in the purchase, control, storage, preparation, distribution of medicines and medical products, and budgeting of health-related goods [2, 3]. One of the relatively new concepts in the field of pharmacy is the community pharmacist, which reinforces pharmacists' role in controlling chronic diseases and providing better outpatient care [4]. When it comes to pharmaceutical manufacturing, pharmacists can manage many parts of the company, such as the research and development departments, production lines, and quality control units, which encompass a variety of activities from proposing new formulations to conducting clinical trials of new medicines and testing their efficiency, safety, and sometimes sales and marketing management [2, 5].

Considering the aforementioned facts, pharmacists are of undeniable worth in the health system, and access to a sufficient number of pharmacists is important. Therefore, it is necessary for health system policymakers to know the number of occupied positions and vacancies for pharmacists. Occupied positions are the jobs currently filled by workers, while vacancies are the open jobs.

Reasons for the lack of specialized labor may differ from country to country and career to career. To understand the fluctuations of the workforce, two factors, supply and demand, must be considered; however, demand-related data are usually less available [6]. Demand for the pharmacist workforce is affected by the quality and quantity of the products and services provided by pharmacists, as well as the extent of substitution of pharmacists by applying technologies or other practitioners [7]. The most common factors increasing demand for the pharmacist workforce include: the level of implementation of clinical governance and the improvement of the quality of pharmaceutical care, number of prescriptions, treatment complexity, temporary or permanent erosion of workforce, the trend of medicine use and its market growth, pharmacy working hours, number of newly established pharmacies, having access to health care and insurance coverage for prescription medicines, and finally the expansion of the activities and role of pharmacists [1, 8]. The most common factors for reducing vacancies for the pharmacist workforce are expanding the role of pharmacy technicians, technology utilization, and increasing the number of pharmacy technicians and pharmacy graduates [9].

Context of Iran

In Iran, job opportunities available for pharmacists include community pharmacies, hospitals, regulatory agencies, pharmaceutical distributing firms, Drug and Poison Information Centers, addiction treatment centers, medicine importer firms, medicine exporter companies, and factories producing products related to the pharmaceutical area, including pharmaceutical raw or finished products, supplements, and cosmetics. According to Iranian law, general pharmacists cannot be employed as faculty members of universities; the minimum degree for this field is a PhD.

Quantitatively speaking, there are specified standards for the number of pharmacists required in hospitals, community pharmacies, pharmaceutical manufacturing, and distribution. In hospitals, one pharmacist is needed for every 100 beds [10]. There is also legislation regarding the employment of an extra pharmacist in pharmacies with more than a certain number of prescriptions. However, these laws have not been implemented so far [10].

For the export, import, or distribution of medicines in Iran, at least one pharmacist must hold the firm's technical responsibility [11-13].

In the case of pharmaceutical manufacturers, only pharmacists are eligible to take charge of the technical responsibility and the quality control unit.

[Downloaded from ajpr.umsha.ac.ir on 2026-11-23]

[DOI: 10.53208/ajpr.7.1.50]

Although PharmD graduates can also work in some other positions in these companies, these positions are not legally restricted to the holders of this degree. In other words, at least two pharmacists must be employed in every company manufacturing pharmaceutical products [12]. In companies producing cosmetic products, the technical manager can be a pharmacist; however, it is not mandatory [14].

At most, every pharmacist is allowed to work 12 hours a day [10].

Considering these issues and existing concerns about saturation of pharmacists' job opportunities in the near future, the present study aimed to provide policymakers with statistics on job opportunities available for PharmD graduates in Iran in 2020.

Methods

Calculating the Number of Pharmacists Working in Various Fields, in the 1399 Iranian Year (20 March 2020 to 19 March 2021)

Data on the number of pharmacists working in community pharmacies, hospitals, distributing companies, DPICs (drug and poison information centers), addiction treatment centers, medicine importer firms, and medicine exporter companies were obtained through correspondence with the Iranian Food and Drug Administration Organization and the Iranian Pharmacists Association. Since accurate data regarding the pharmaceutical factories were not available from the mentioned sources, they were obtained through direct correspondence with each company.

The number of occupied positions was also examined by gender; it was reported in two ways: 1) the share of women among pharmacists working in the five main areas, and 2) the share of women among all employed pharmacists across all fields.

Calculating the Number of Job Vacancies Available for General Pharmacists, in the 1399 Iranian Year (20 March 2020 to 19 March 2021)

It must be explained that wherever the term "vacancy" has been used in this article it means a position that is required by existing legal or organizational standards but is not currently occupied.

The number of job vacancies in various fields of general pharmacists' activities was calculated based on two approaches, depending on whether a specific standard has been set for that field. For areas with a specific standard, this number was obtained by calculating the difference between the number of required pharmacists based on the relevant standards and the number of pharmacists who were working in those areas (i.e., the number of occupied positions). For settings without a specific standard, the health service needs model was used; the number of general pharmacists was obtained through inquiries from the human resource management units of the relevant institutions. For pharmaceutical and supplement factories, the number of vacancies was directly obtained through inquiries from the human resource management units of the factories. In the case of hospitals, under Iranian legislation, the total number of positions is defined based on the number of beds. Therefore, the total number of positions was equal to the sum of the numbers obtained through multiplying the number of hospitals in each category by the number of positions that was legally determined for that category. Data on the number of occupied positions in hospitals and the determined standard for each category were received from the relevant regulatory organizations. Subsequently, the number of vacancies for hospitals was calculated by subtracting the number of occupied positions from the total number of positions. The number of vacancies available in community pharmacies was calculated with three scenarios, assuming that each pharmacist in this field works 4, 8, or 12 hours a day in community pharmacies.

The Number of General Pharmacists Who Graduated During 2020–2021 (20 March 2020 to 19 March 2021)

Statistics on the number of PharmD holders who graduated during 2020–2021 (20 March 2020 to 19 March 2021) were obtained from the Educational Services Center of the Ministry of Health. Figure 1 shows the flow diagram of data sources and calculation pathway.

Results

In this section, first, the findings on the distribution of pharmacists by field, province, and gender are

[Downloaded from ajpr.umsha.ac.ir on 2026-11-23]

[DOI: 10.53208/ajpr.7.1.50]

reported. Subsequently, the status quo of the pharmacist workforce supply and demand equilibrium, and the total occupied job opportunities and vacancies are addressed.

Distribution of Pharmacists in Various Related Occupations

Table 1 shows the number of occupied positions, the share of each gender in them, and the number of vacancies in each area of the careers related to general pharmacy. As seen in the table, the largest share of employed general pharmacists belonged to the community pharmacies; the numbers of part-time, daily full-time, and 24/7 pharmacies were 182, 9209, and 785, respectively. Regarding the number of occupied positions, regulatory agencies ranked second, with 1437 positions. However, when it came to the job vacancies, hospitals were the first or second area, depending on the condition assumed for community pharmacies; if one assumes that each pharmacist is willing to work the minimum work hours (4 hours a day), the community pharmacy field has the highest number of vacancies. However, with the assumption of the maximum legally allowed work hours (12 hours a day), hospitals rank first.

Table 1. Pharmacists' employment status by field of work and gender.

Field	Occupied positions (N)	Share of total employed pharmacists (%)	Male (%)	Female (%)	Vacancies (N)
Community pharmacies	17991	78.7	49.8	50.2	5216[a] 1327[b]
Regulatory agencies	1437	6.29	51.9	48.1	–[c]
Pharmaceutical and supplement factories	1006	4.40	58	42	155
Drug distribution firms	887	3.88	58	42	0[d]
Health centers	421	1.84	31.4	68.6	–[c]
Hospitals	358	1.56	48.7	51.3	1241
Cosmetic products factories	187	0.81	51	49	0
DPICs	167	0.73	19	81	–[c]
Pharmaceutical importing companies	164	0.71	60	40	0[d]
Pharmaceutical exporting companies	68	0.29	79	21	0[d]
Raw material factories	74	0.32	80	20	–[c]
Pharmaceutical packaging items factories	32	0.14	53	47	–[c]
Milk powder factories	23	0.10	61	39	–[c]
Addiction treatment centers	19	0.08	73	27	–[c]
Total	22561		55.28	44.72[e]	6,612[a] 2,723[b]

[a]: For each pharmacist, 4 h of work per day.
[b]: For each pharmacist, 8 h of work per day.
[c]: There is no determined standard for this area.
[d]: The amount of need is calculated based on minimum existing standards.
[e]: The share of women among all employed pharmacists across all fields.

In terms of the gender composition, except for health centers, DPICs, pharmaceutical importing and exporting companies, raw material and milk powder factories, and addiction treatment centers, the proportions of male and female pharmacists were close; among these institutions, the share of women was higher in health centers and DPICs.

Pharmacist-to-Population Ratio

Based on the data, the total ratio of pharmacists to population in Iran was 0.76 per 2000. The ratio was

[Downloaded from ajpr.umsha.ac.ir on 2026-11-23]
[DOI: 10.53208/ajpr.7.1.50]

also calculated for each province. Since segregated data were not available for some areas of pharmacists' activity, only the five major areas (community pharmacies, distributing firms, manufacturing firms, regulatory agencies, and hospitals) were taken into account in this part of the study (Table 2). Tehran, the capital city of Iran, was the only province with a ratio higher than the national average. The lowest proportion belonged to Hormozgan, Iran. Another remarkable finding in this table is the high share of community pharmacies among the five main areas of PharmD positions in Iran.

Table 2. Pharmacist-to-Population Ratio for 5 Main Areas

Province	Population (million)	Number of pharmacists per 1000 persons					
		Community Pharmacy	Distributing firms	Industry	Regulatory agencies	Hospital	Sum of 5 areas
Alborz	2.709	0.274	0.017	0.041	0.017	0.008	0.356
Ardabil	1.270	0.211	0.015	0	0.016	0.007	0.249
Bushehr	1.167	0.155	0.014	0	0.016	0.003	0.189
Chaharmahal Bakhtiari	0.951	0.139	0.011	0.0042	0.019	0.010	0.185
East Azerbaijan	3.908	0.153	0.009	0.006	0.005	0.003	0.181
Fars	4.851	0.202	0.008	0.0020	0.005	0.002	0.219
Gilan	2.533	0.249	0.011	0.004	0.009	0.004	0.278
Golestan	1.87	0.184	0.015	0.008	0.011	0.004	0.224
Hamedan	1.734	0.199	0.013	0.006	0.013	0.005	0.235
Hormozgan	1.774	0.068	0.014	0.009	0.010	0.003	0.105
Ilam	0.583	0.189	0.022	0	0.029	0.005	0.245
Isfahan	5.123	0.260	0.008	0.012	0.006	0.003	0.288
Kerman	3.165	0.095	0.008	0	0.006	0.002	0.111
Kermanshah	1.950	0.153	0.016	0.003	0.010	0.005	0.188
Khorasan Razavi	6.434	0.232	0.006	0.007	0.005	0.003	0.251
Khuzestan	4.707	0.237	0.007	0	0.007	0.002	0.253
Kohkiluyeh-Boyer Ahmad	0.711	0.150	0.017	0	0.019	0.007	0.193
Kordistan	1.606	0.127	0.015	0	0.014	0.004	0.161
Lorestan	1.758	0.176	0.015	0.010	0.013	0.004	0.219
Markazi	1.430	0.184	0.013	0.019	0.013	0.006	0.236
Mazandaran	3.284.	0.250	0.008	0.001	0.006	0.002	0.268
North Khorasan	0.919	0.150	0.012	0	0.019	0.005	0.187
Qazvin	1.270	0.272	0.020	0.011	0.016	0.009	0.329
Qom	1.294	0.176	0.022	0.013	0.017	0.009	0.238
Semnan	0.703	0.179	0.034	0.011	0.036	0.009	0.271
Sistan-Baluchestan	2.773	0.110	0.006	0	0.006	0.001	0.124
Southern Khorasan	0.767	0.136	0.018	0	0.020	0.005	0.179
Tehran	13.267	0.368	0.009	0.043	0.057	0.006	0.483
Western Azerbaijan	3.268	0.195	0.008	0.001	0.006	0.002	0.213
Yazd	1.134	0.232	0.027	0.011	0.024	0.008	0.303

[Downloaded from ajpr.umsha.ac.ir on 2026-11-23]

[DOI: 10.53208/ajpr.7.1.50]

Zanjan	1.055	0.230	0.025	0.016	0.017	0.006	0.295

Speaking about various areas individually, the ratio of pharmacists per 1000 population in the field of community pharmacy varied from 0.068 to 0.368. In the distribution firms, this ratio ranged from 0.006 to 0.034. In the case of pharmaceutical finished product manufacturers, the proportion of pharmacists to population was equal to zero in Khuzestan, Kerman, Sistan-Baluchestan, Ardabil, Kurdistan, Bushehr, North and South Khorasan, Ilam, and Kohkiluyeh-BoyerAhmad; there were no pharmaceutical factories in these provinces at the time of the study. The highest ratios in this area were observed for Tehran and Alborz. Turning to the regulatory organizations and hospitals, the highest proportion belonged to Tehran and Chaharmahal Bakhtiari, respectively.

HDI and Pharmacists' Employment

Figure 1 demonstrates the number of pharmacists per 1000 population in each province versus the HDI index. As the chart shows, although many provinces possessed a similar condition regarding the HDI index, the pharmacist-to-population ratio varied from 0.10 to 0.48 among them.

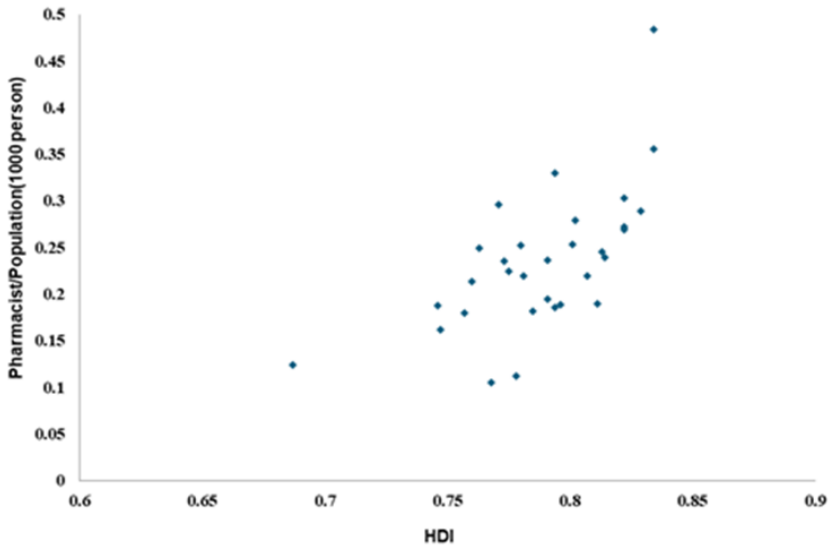


Figure 1. Flow Diagram of Data Sources and Calculation Pathway

The number of female pharmacists in each province and their share in various fields have been summarized in Table 3. In total, 10,699 women were working in the 5 main areas at the time of the study, while the corresponding number for male pharmacists was 10977. In other words, the proportion of women in the five main areas (49.4%) was approximately equal to that of men (50.6%). It is worth noting that the share of women among all employed pharmacists across all fields was 44.72% (Table 1).

Table 3. Female pharmacists' share in 5 main career fields in each province.

Province	Women's share (%)					Total number of pharmacists working in 5 main areas
	pharmacy	Industry	Distribution firms	Hospital	Regulatory agencies	
Alborz	55.45	29.09	31.11	61.90	46.67	964
Ardabil	30.22	NA*	31.58	44.44	47.62	317
Bushehr	43.6	NA	52.94	50	47.37	221
Chaharmahal Bakhtiari	55.30	25	54.54	60	52.63	176

[Downloaded from ajpr.umsha.ac.ir on 2026-11-23]

[DOI: 10.53208/ajpr.7.1.50]

East Azarbaijan	61.73	48	44.44	50	47.83	710
Esfahan	48.87	45.16	30.77	43.75	45.16	1480
Fars	56.03	50	35.13	54.54	42.86	1064
Gilan	59.90	36.36	44.83	54.54	50	706
Golestan	41.57	43.75	46.43	55.55	45.45	419
Hamedan	52.76	36.36	34.78	44.44	52.17	408
Hormozgan	55.37	41.18	48	50	55.55	187
Ilam	39.09	NA	46.15	66.67	47.06	143
Kerman	38.74	NA	41.67	55.55	38.89	353
Kermanshah	51.68	40	40.62	45.45	47.62	367
Khorasan Razavi	40.82	34.88	40.54	44.44	55.17	1619
Khuzestan	51.65	NA	46.87	40	43.75	1193
Kohkiluyeh-Boyer Ahmad	58.88	NA	58.33	60	57.14	138
kordestan	51.96	NA	45.83	37.5	47.83	259
Lorestan	48.87	33.33	51.85	37.5	45.83	386
Markazi	59.32	42.86	52.63	44.44	50	47.83
Mazandaran	44.89	50	44.44	44.44	47.62	883
North Khorasan	32.60	NA	45.45	60	55.56	172
Qazvin	50.29	42.86	46.15	58.33	47.62	419
Qom	45.17	47.06	48.28	41.67	52.17	309
Semnan	38.10	37.5	37.5	57.14	50	191
Sistan Baluchestan	36.39	NA	41.18	40	64.70	344
Southern Khorasan	35.58	NA	42.86	50	56.25	138
Tehran	55.34	45.53	37.10	60	47.56	6418
Western Azerbaijan	46.62	33.33	39.29	37.5	50	698
Yazd	38.78	33.33	48.39	40	46.43	344
Zanjan	34.98	23.53	48.15	42.86	50	312
Median	48.87	33.33	44.83	50	47.62	353
Minimum	30.22	0	30.77	37.5	38.89	138
Maximum	61.73	50	66.67	66.67	64.7	6418

*: Not applicable (There were no related factories in the province.)

Figure 2 illustrates the proportion of female pharmacists in 5 main career fields, by province. This share varied between 50.4% and 38.46%. The three highest ratios belonged to East Azarbaijan, Kohgiluyeh and Boyer-Ahmad, and Gilan, Iran, respectively. Ardabil, Zanjan, and North Khorasan, Iran are set at the last three ranks.

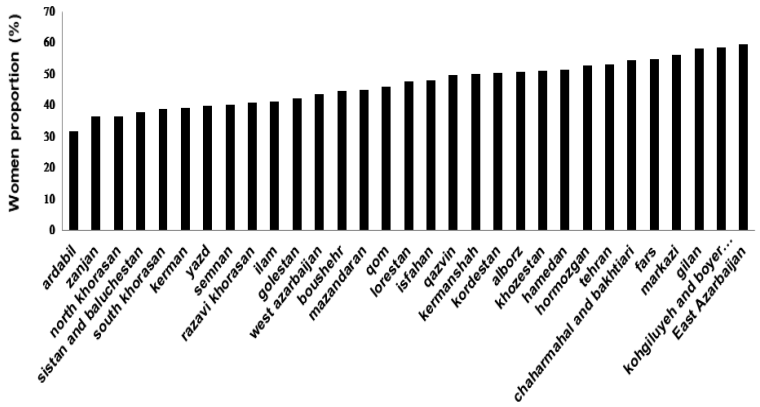


Figure 2. Female pharmacists' share by province

[Downloaded from ajpr.umsha.ac.ir on 2026-11-23]

[DOI: 10.53208/ajpr.7.1.50]

The Total Number of Occupied and Vacant Job Opportunities

Based on the achieved data, at the time of the study, 22,834 pharmacists were working in Iran. The number of related vacancies in the studied year was 6,612 or 2,723, depending on the assumption about the average working hours for every pharmacist in community pharmacies. Considering that the number of graduates by the end of that year was 1023, a shortage of 5589 or 1700 pharmacists could be considered, at minimum. It must be noted that to achieve the exact number of the shortage, various variables must be taken into account in calculations; one of the most important variables is the rate of immigration of pharmacists. An article published in 2015, in Persian, reported that Iran's pharmacists' immigration rate rose from 7.1% in 2006 to 13.8% in 2015 [15].

Discussion

In this article, the number of job opportunities for general pharmacists and their distribution by gender and province were examined in Iran During 2020–2021 (20 March 2020 to 19 March 2021).

In the present study, the highest share of the occupied job opportunities was observed for the community pharmacy field (78.8%). In Nigeria and Saudi Arabia, in 2018, this ratio was reported to be equal to 42% and 34.51%, respectively [16, 17]. In 2016, its worldwide value was 55%, in Europe it was more than 60%, and in the USA, it was less than 40% [18]. In 2006, the related literature mentioned 70, 44, and 84.75 percent for Australia, the United Kingdom, and Turkey, respectively [8]. In some countries, people holding a diploma or bachelor's degree in pharmacy work in this position. However, in Iran, PharmD and PhD are the only academic degrees available in the field of pharmacy. It might be worthwhile for local experts and decision makers to scrutinize this situation, of course, with a comprehensive view, considering all aspects of the issue. The number of vacancies available in this field was 5216 and 1327, with scenarios assuming that each pharmacist works 4 or 8 hours a day in the community pharmacies. If 12 hours a day is assumed, a surplus of general pharmacists would result. However, this scenario is far from reality, because most pharmacists do not work 12 hours a day.

In terms of hospitals, this study revealed that 358 pharmacists were working in this field, accounting for 1.56% of the total general pharmacists in the country. In comparison with other countries, this ratio is low; it was 11% in Nigeria in 2018 [16], 15% in 2012 in the Philippines [19], and 3.58% and 15% in 2006 in Iraq and Australia [8], respectively. In 2016, the values of 18%, 9%, and 10% were reported worldwide, in Europe and the USA, in order [18].

Turning to the pharmaceutical industry, the findings showed that 4.4% of the pharmacist workforce in the country was working in this area. In 2016, this proportion was reported as 10% worldwide, 5% in Africa, and 30% in Asia [18]. According to these numbers, it seems that the participation and role of pharmacists in the Iranian pharmaceutical industry should be strengthened. One of the influencing issues might be the existing disagreements regarding the optimum level of pharmacists' education to play an impactful role in this area, which should be addressed as soon as possible; some believe that PharmD is adequate, while others think that the minimum appropriate education is a PhD in pharmaceutics.

The regulatory section was another domain of pharmacists' activity, which accounted for 6.29% of pharmacists working in Iran. In 2018 in Saudi Arabia, 17.32% of pharmacists worked in civilian government institutions [17], and in 2016, 5% worked in this field worldwide [18]. It seems to the authors that assessing whether the number of pharmacists for this section in a country is sufficient should take several issues into account, such as the structure of the regulatory section of the health system, extent and frequency of required regulatory activities (such as inspections) as well as methods and tools being used to conduct them.

When it came to the distributing firms, results showed that 887 pharmacists were working in this area. No related statistics were found in the studies addressing other countries. Although only 3.88% of the pharmacists in Iran were working in this section, considering the number of companies in each province, it can be said that they can provide good coverage in the current situation.

[Downloaded from ajpr.umsha.ac.ir on 2026-11-23]

[DOI: 10.53208/ajpr.7.1.50]

As the last area of PharmD graduates' occupation in Iran, health centers will be addressed in this part of the discussion. Based on the obtained data, 421 pharmacists were working in these centers. It is predicted that this number will diminish in the future because of the new policy of these centers regarding the assignment of related pharmaceutical affairs to private pharmacies. No data were found on this field in other countries.

Regarding gender distribution, in the DPICs and health centers, the proportion of female pharmacists was higher than that of males. In total, the share of the two genders in the relevant jobs was 55.28% male versus 44.72% female. The proportion of female pharmacists in the world's pharmaceutical industry in 2016 was 65%, and this ratio is still increasing. This ratio was equal to 15.13%, 28.27%, and 7% in Singapore in 2006 [8], Saudi Arabia in 2018 [17], and the Philippines in 2012 [19], respectively. The observed differences regarding gender distribution may stem from several issues; personal interests may be one of them; a study conducted in 2019 in Hamadan, Iran, revealed that female pharmacy students are less interested in working in the pharmaceutical industry or importing firms [20].

When it came to the geographical comparison of the pharmacists-to-population ratio, although its value was close in most provinces, there were considerable differences between its minimum and maximum values in all occupational fields. In addition, the results showed remarkable differences regarding the Tehran situation in comparison with other provinces. For instance, in this province, the pharmacist-to-population ratio in community pharmacy, industry, and regulatory domains is considerably higher than in other provinces. This province contains Tehran, the administrative, political, and economic capital city of Iran, which is preferred by many businesses because of its higher economic prosperity and the concentration of national administrative and decision-making organizations. In some fields, the observed discrepancies are unavoidable due to limitations, such as the lack of natural resources. However, in some areas, this is not the case, and differences can be mitigated.

Finally, the study's strengths and limitations are addressed. In summary, this study provides a comprehensive, scenario-based calculation of Iran's pharmacy workforce that balances methodological rigor with practical policy relevance. The multi-sector coverage, triangulation of the data sources, and estimation with various probable scenarios represent key strengths that enhance the utility of these findings for health workforce planning. However, the results should be interpreted with caution, due to the probable influences of the study limitations. First, the subjective nature of the vacancy self-reports, the lack of consideration of the qualitative aspects of pharmacists' practice, and the potential effects of the cross-sectional design, especially in the COVID-19 pandemic context, should be considered. Data about unemployed pharmacists were not accessible; therefore, it was not possible to consider this variable in calculations. In addition, regarding statistics, such as the population of the provinces or the data received from the Iranian Food and Drug Administratio and the Iranian Pharmaceutical Association, in some cases there was no way to access their raw data. Therefore, it was not possible for the research team to assess the accuracy of their statistics.

Conclusion

The present study evaluated the occupied job opportunities and vacancies for PharmD holders during 2020–2021 (20 March 2020 to 19 March 2021) in Iran. This study revealed that, in comparison with other countries, the share of pharmacists in community pharmacies and the regulatory sector is not low. However, a deficiency was observed in the pharmaceutical industry and hospitals. In hospitals, some potential explanations include inadequate awareness of the benefits of pharmacists' services in these settings, hospital budget limitations, and a lack of attention to preventive approaches to reduce the consequences of medication problems and errors. In addition, some pharmacists' services that are required in hospitals fall within the realm of clinical pharmacists. Therefore, they are not considered a job opportunity for the PharmD workforce. In the industry, some parts of the present situation may be caused by the concentration on generic production

[Downloaded from ajpr.umsha.ac.ir on 2026-11-23]

[DOI: 10.53208/ajpr.7.1.50]

and insufficient attention and investment in research and development, which in turn reduces the opportunities for utilizing pharmacists' capabilities. A variety of factors intervene in this issue, and further research is needed to identify them and the intensity of their effects. All in all, at the time of the study, there was a shortage of pharmacists in the country. However, the observed staffing requirements and annual graduation levels suggest a potential risk of future workforce surplus under unchanged conditions. Therefore, for appropriate planning of pharmacist human resources, further studies using dynamic workforce projection models considering various interfering variables, such as annual number of pharmacy school admissions, number of graduates, retirements, immigration, new pharmacy establishment, population growth, changing employment laws, changes in pharmacists' roles in various professional areas, growth of the pharmaceutical industry, technology and automation, and changes in the payment systems, seem of undeniable value.

Acknowledgments

This research was extracted from the first author's PharmD dissertation (project number: 9812209805). We would like to thank the Research Deputy of XXXXX University of Medical Sciences.

Authors' Contribution

MV: Data gathering, Manuscript drafting; MM: Conceptualization; AF: Conceptualization; MR: Study design, Data analysis, Conceptualization, Manuscript drafting and revision.

The final manuscript is confirmed by all authors.

Conflict of Interest

The author(s) declare(s) that they have no conflict of interest.

Ethical Issues

The study proposal, including the methods, was approved by the Ethics Committee of Hamadan University of Medical Sciences (ID: IR.UMSHA.REC.1398.1112).

Funding/Support

This research was supported by the Research Deputy of Hamadan University of Medical Sciences as a PharmD dissertation (project number: 9812209805).

References

1. Hawthorne N, Anderson C. The global pharmacy workforce: A systematic review of the literature. Hum Resour Health. 2009;7:48. [DOI: 10.1186/1478-4491-7-48]
2. Kalman SH, Schlegel JF. Standards of practice for the profession of pharmacy. Am Pharm. 1979;19(3):21-33. [DOI: 10.1016/s0160-3450(15)32774-4]
3. van Grootheest AC, de Jong-van den Berg LT. The role of hospital and community pharmacists in pharmacovigilance. Res Social Adm Pharm. 2005;1(1):126-33. [DOI: 10.1016/j.sapharm.2004.12.009] [PMID]
4. Blenkinsopp A, Bond CM. The potential and pitfalls of medicine management: What have we learned so far? Dis Manage Health Outcomes. 2008;16(2):79-86. [DOI: 10.2165/00115677-200816020-00002]
5. Cato A, Cloutier G, Hull H, Johnston JA, Collins GE. Innovative roles for pharmacists in industrial clinical research. Clin Res Pract Drug Regul Aff. 1986;4(2):85-100. [DOI: 10.3109/10601338609051230]
6. Knapp KK, Livesey JC. The Aggregate Demand Index: Measuring the balance between pharmacist supply and demand, 1999-2001. J Am Pharm Assoc (1996). 2002;42(3):391-8. [DOI: 10.1331/108658002763316806] [PMID]
7. Mott DA, Doucette WR, Gaither CA, Kreling DH, Pedersen CA, Schommer JC. Pharmacist participation in the workforce: 1990, 2000, and 2004. J Am Pharm Assoc (2003). 2006;46(3):322-30. [DOI: 10.1331/154434506777069589] [PMID]
8. Chan XH, Wuliji T. Global pharmacy workforce and migration report: A call for action. International Pharmaceutical Federation (FIP). 2006. [Link]
9. Gall D, Bates I, Bruno A. FIP global pharmacy workforce report. International Pharmaceutical Federation (FIP). 2012. [Link]
10. Iran Food and Drug Administration. Regulations for the establishment and management of pharmacies. 2021. [Link]
11. Iran Food and Drug Administration. Rules for issuing production licenses for the export of chemical drugs and biological products. 2024. [Link]
12. Iran Food and Drug Administration. Rules for issuing licenses for technical officials of pharmaceutical companies. 2024. [Link]
13. Iran Food and Drug Administration. Rules for the establishment and operation of distributing companies. 2016. [Link]

[Downloaded from ajpr.umsha.ac.ir on 2026-11-23]

[DOI: 10.53208/ajpr.7.1.50]

14. Iran Food and Drug Administration. Food, beverage, cosmetics and hygiene law. 2026. [Link]
15. Akbari Javar H, Khalaj A, Banay Razi S. Immigration of pharmacists from Iran to abroad. Iran J Cult Health Promot. 2018;2(2):232-47 (Persian). [Link]
16. Ekpenyong A, Udoh A, Kpokiri E, Bates I. An analysis of pharmacy workforce capacity in Nigeria. J Pharm Policy Pract. 2018;11:20. [DOI: 10.1186/s40545-018-0147-9] [PMID] [PMCID]
17. AlRuthia Y, Alsenaidy MA, Alrabiah HK, AlMuhaisen A, Alshehri MJ. The status of licensed pharmacy workforce in Saudi Arabia: A 2030 economic vision perspective. Hum Resour Health. 2018;16(1):28. [DOI: 10.1186/s12960-018-0294-8] [PMID] [PMCID]
18. Bates I, John C, Bruno A, Fu P, Aliabadi S. An analysis of the global pharmacy workforce capacity. Hum Resour Health. 2016;14(1):61. [DOI: 10.1186/s12960-016-0158-z] [PMID] [PMCID]
19. Loquias MM, Robles YR. Issues and concerns on utilization of the pharmacy workforce in the Philippines. J Asian Assoc Sch Pharm. 2012;1:86-96. [Link]
20. Rangchian M, Nezami S, Jafari Seresht D, Larki-Harchegani A. Pharmacy students' level of financial literacy and its differences among students with various career intentions. Curr Pharm Teach Learn. 2020;12(6):671-9. [DOI: 10.1016/j.cptl.2019.10.008] [PMID]

[Downloaded from ajpr.umsha.ac.ir on 2026-11-23]

[DOI: 10.53208/ajpr.7.1.50]