

Report

Growth Trends in Physician Specialists Supply in Iran; 1979 – 2013

Nasser Simforoosh MD¹, Seyed Amir Mohsen Ziaee MD^{1,2}, Shima Tabatabai PhD³

Abstract

Over the past 35 years Iran had significant quantitative progress in postgraduate medical education; and growth in specialist's physician workforce supply.

Health and medical education policy makers have struggled with many issues related to physician supply, such as determining the sufficient number of physicians workforce and the appropriate number to train; establishing new medical schools; the diversity of specialty programs; efforts to increase the supply of physicians in specialty level in remote and rural areas; and the growing number of female physicians and its impact on health services. After establishment of MoHME in Iran, expansion of medical specialty education was a priority. Since then, great advances have been made in training of new specialty programs. Despite of these brilliant advances during the last decades in Iran, there has been no integrated and comprehensive documentation of previous and current growth trend, yet.

To understand where Iranian physician supply and specialty training is headed, we examined the Iranian medical specialist's trends from 1979 to 2013 in a national study by support of Iranian academy of medicine. This paper documents the growth trend of medical specialist's workforce over the past 35 years.

Examining the health manpower growth trends allow health and medical education policy makers to plan innovative strategies for the purposeful expansion of postgraduate medical education to ensure that in future there would be sufficient physicians supply, with the right skills, in the right places in response to population demands.

Keywords: Health manpower, specialty training, trends,

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Introduction

Medical education especially specialty training and physician supply are important elements in designing an efficient system that provides the highest quality of care. In Iran, over the period 1978 to 2013, the number of medical schools have increased from 11 to 54, and the number of specialty programs have grown from 18 to 28. Physician supply has been growing during this period. In 1979, there were 15411 specialist physicians in Iran; however in 2013 this figure had increased to more than 65000.¹

In 1984 and in response to the concerns about the supply of physicians, the integration of health care and medical education was occurred and a new unified ministry of health and medical education (MoHME) was established.

The MoHME concluded that the nation faced a potentially serious shortage and recommended that it expands the number of medical school positions and raises the number of medical school graduates severely. When MoHME established in 1985, there were 20028 active medical specialists in Iran.¹ Concerns about shortage escalated with expert opinions in the early 1990s sug-

gesting that the expansion of medical education especially medical and surgical specialists is needed.^{2,3}

According to government goal and policies in health system, during the last decades expansion of PGME was a priority to improve the public health and social accountability.

The goals of MoHME were to:

1. Address shortages of physicians especially in specialty and subspecialty level
2. Enhance the availability of medical and health care services, in rural and urban areas;
3. Be self-sufficient in providing medical specialists manpower for serving people;
4. Approve new specialties and subspecialties as well as increase of the annual admission number in existing fields; and
5. Emphasize on integral role of female training including in undergraduate and postgraduate level of medical education to bring community oriented medicine compatible with patients desire and right to select a same gender physician

Method

The present study was a comprehensive national Study for analyzing Iranian clinical postgraduate medical education progresses over the last 35 years. We used quantitative methods to create summaries of historical medical specialists and subspecialists growth trend after Iran revolution. Data about the overall registered Iranian medical specialists and subspecialists were obtained from the department of Information and Statistics of Medical Council of Islamic republic of Iran. The data of admitted/gradu-

Authors' affiliations:¹Shahid Labbafinejad Medical Center, Urology Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran, ²Deputy Minister of Education, Iran Ministry of Health and Medical Education, ³School of medical education, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Corresponding author and reprints: Shima Tabatabai PhD, School of Medical Education, Shahid Beheshti University of Medical Sciences, Tehran, Iran. E-mail: shtabatabai@yahoo.com.

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ated residents were obtained from the Secretariat of the Council on Medical Education and Specialty Training as well as the Department of Exam evaluation of Ministry of Health. The number of specialists from (1978 – 1979) till (2012 – 2013) by gender were extracted from paper base records, based on the available information from MoHME and Medical Council of Islamic republic of Iran. Then the information were entered into structured databases and analyzed.

Results

The current physician workforce has the responsibility of providing care for over 75 million Iranians. In the light of continued population growth and an increased focus on the quality of care across the nation, an adequate supply of physicians is required to ensure the healthcare system continues to function.

Statistics and information which show quantitative development of Iran medical specialty education have been depicted in the shape of graphs and tables.

Our analysis revealed that there are five major growth trends of medical specialist's manpower in Iran.

These growth trends are very important to consider in projecting the future of the healthcare landscape:

1. Medical Specialists overall Supply Growth

The number of physicians in Iran has grown significantly over the last decades. The proportion of specialists manpower trained in Iran's medical universities has risen sharply. The graph shows that, specialty education has experience a sharp quantitative growth over the last 2 decades.

The number of active medical specialists increased from approximately 15000 in 1979, to 20000 in 1985, to nearly 30000 in 1993 and to more than 64500 in 2012, (Figure1).

2. Female Medical Specialists growth trends

The female to male ratio of the physician entering the specialty training programs can be helpful in projecting future physician growth trends. Over the past 35 years, there has been a remarkable increase in female workforce physician.

The number of female specialists increased from 1988 active specialists' physicians in 1979 to 20177 in the beginning of 2013, 914 percentage increase (compared with 230.8 % increase for men), (Table1).

Over this period the percentage of active specialist's physicians who were female increased from 13 percent to 31 percent.

The number of female medical students has increased considerably over this time period, and they now make up more than half of all medical students. The number of female specialists will continue to grow, since women made up 55 percent of specialty residents in post graduate medical programs in the 2013 academic year. This trend is expected to contribute to the rise in female specialists, as they qualify and move into postgraduate training and employment.

Although the impact of having more women in medicine has not been determined completely, a number of studies and reports suggest that female physicians practice differently than their male counterparts' do.⁴

Female physicians have different specialty selection preferences and working patterns than men. These differences will affect how the physician workforce evolves in the next ten to twenty years.

3. Specialties progression –Medical and surgical specialty disciplines
Figure 2 shows the growth of physician workforce in each specialty discipline in Iran since 1979. Increases have been somewhat uneven across specialties during this period (Figure 2).

Over the period of 1979 – 2013, the absolute number of medical specialists' manpower has 332 % increases (Table 2).

These data indicate relatively little change between 1979 and 1982(+11.85%), followed by significant growth in overall trainee numbers since 1992 to 2002 (+83.81%). In 2013 there were 66591 active medical specialists in Iran. During the period of 1992-2013, number of Iranian medical specialists' manpower has 136.68 percentage increases, while most of the increase occurring since 2002 (Table 2).

4. Ratio of overall medical specialists to population

Our results confirm that, growth trends of the Iran medical specialists to the population were significant. As detailed below, since 1979 to 2013, physician growth has outpaced growth in the population such that there are almost twice as many physicians per 100,000.

In 1979 the ratio of specialist physicians per 100,000 Iranian population was only 41.65 ,while in 2013 the ratio of medical specialist per 100,000 population was 88.55 . The ration of Iranian medical specialists per 100,000 population nearly doubled over the past 35 years (Table3).

Iran medical specialists supply grew by more than 51180 physicians between 1979 and 2013. However, despite the sharp growth in supply, there is a little indication of a good distribution of physician supply across the country and underserved areas.

Some recent reports of MoHME are conducted to study the bal-

Table 1. Number , Percent and **Percentage change** of specialists by Sex, in IRAN

| Year | Total specialists | Male | | Female | |
|--------------------------|-------------------|----------------|---------|--------------|---------|
| | | Number | Percent | Number | Percent |
| 1979 | 15411 | 13423 | 87% | 1988 | 13% |
| 2012 | 64581 | 44402 | 69% | 20177 | 31 % |
| Percentage change | | +230.8% | | +914% | |

Table 2. absolute percentage changes

| Year | Total number of specialists | % Absolute increase | % Increase | % Absolute increase |
|------|-----------------------------|---------------------|---------------------------|----------------------|
| 1979 | 15411 | | | |
| 1982 | 17237 | 11.85 % | | |
| 1992 | 28136 | 63.23 % | | |
| 2002 | 51717 | 83.81 % | 1992 – 2013 = 136.68 % | 1979 – 2013= 332.1 % |
| 2013 | 66591 | 27 % | | |

Table 3. % Increase per 100,000 population

| Year | Specialists per 100,000 population | % Increase per 100,000 population |
|------|------------------------------------|-----------------------------------|
| 1979 | 41.65 | |
| 2013 | 88.55 | 112.61 % |

Table 4. Percentage changes of specialty-to-population growth in each discipline

| Specialty | Iran in 2012: Population = 75,180,000 – Iran Population in 1979 = 36975000 | | Percentage increase | | |
|-----------------------|--|------|--|--|----------------------------------|
| | Absolute number of Physician | Rank | Physician per 100,000 Population In 2012 | Physician per 100,000 Population in 1979 | Per 100,000 Population 1979–2012 |
| Gynecology | 7923 | 1 | 10.54 | 5.08 | 107.48% |
| Pediatrics | 7734 | 2 | 10.28 | 5.68 | 81 |
| General surgery | 6246 | 3 | 8.32 | 6.97 | 19.51 |
| Internal Medicine | 6235 | 4 | 8.29 | 4.31 | 92.34 |
| Anesthesiology | 5378 | 5 | 7.15 | 1.44 | 396.53 |
| pathology | 5350 | 6 | 7.11 | 1.97 | 268.39 |
| Radiology | 3941 | 7 | 5.24 | 2.53 | 107.11 |
| Ophthalmology | 2758 | 8 | 3.66 | 2.27 | 61.23 |
| Orthopedic | 2720 | 9 | 3.62 | 1.51 | 139.74 |
| E.N.T | 2592 | 10 | 3.44 | 2.29 | 50.22 |
| Psychiatry | 2438 | 11 | 3.24 | 0.92 | 252.17 |
| Cardiology | 2275 | 12 | 3.02 | 0.87 | 247.13 |
| Dermatology | 1824 | 13 | 2.42 | 1.04 | 132.69 |
| Urology | 1637 | 14 | 2.17 | 0.82 | 146.63 |
| Infectious Disease | 1301 | 15 | 1.73 | 0.54 | 220 |
| Neurosurgery | 1065 | 16 | 1.416 | 0.61 | 132.69 |
| Neurology | 915 | 17 | 1.217 | 0.46 | 165.22 |
| Physical Medicine | 410 | 18 | 0.54 | 0.13 | 315.38 |
| Radiotherapy | 374 | 19 | 0.49 | 0.2 | 150 |
| Forensic medicine | 318 | 20 | 0.42 | 0.05 | 740 |
| Social medicine | 313 | 21 | 0.416 | 0.11 | 272.7 |
| Emergency medicine | 302 | 22 | 0.401 | 0.02 | 1900 |
| Nuclear medicine | 280 | 23 | 0.37 | 0.09 | 311 |
| Occupational Medicine | 210 | 24 | 0.28 | 0.06 | 366 |
| Sports Medicine | 40 | 25 | 0.053 | 0.02 | 150 |
| Aerospace Medicine | 2 | 26 | 0.002 | 0 | |

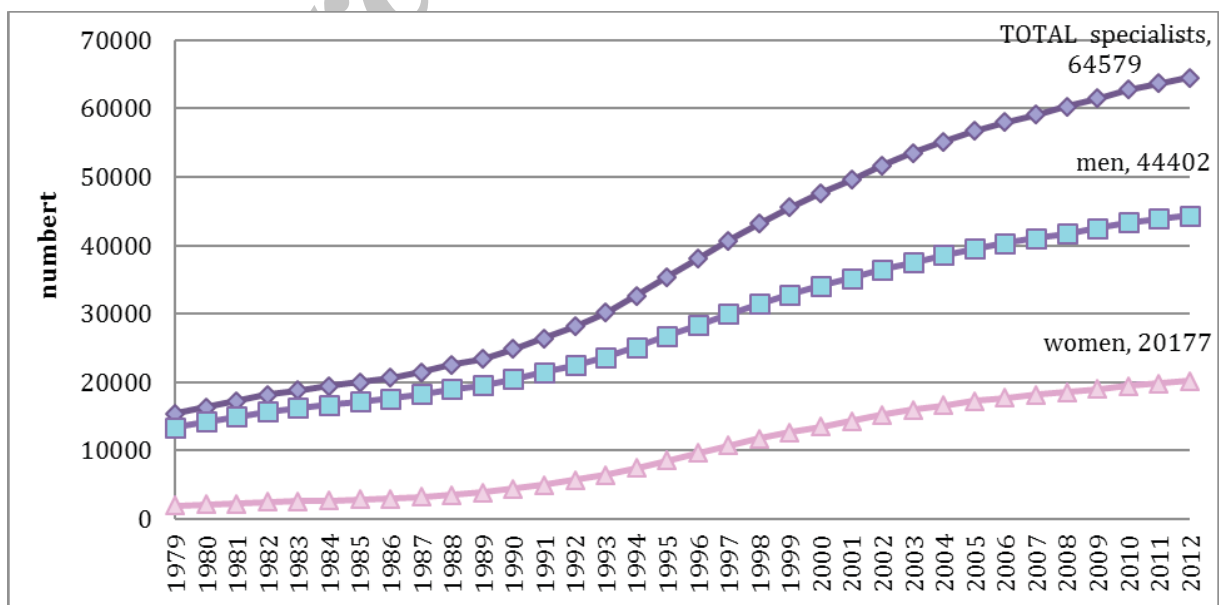


Figure 1. Specialists manpower growth trends in Iran since 1979

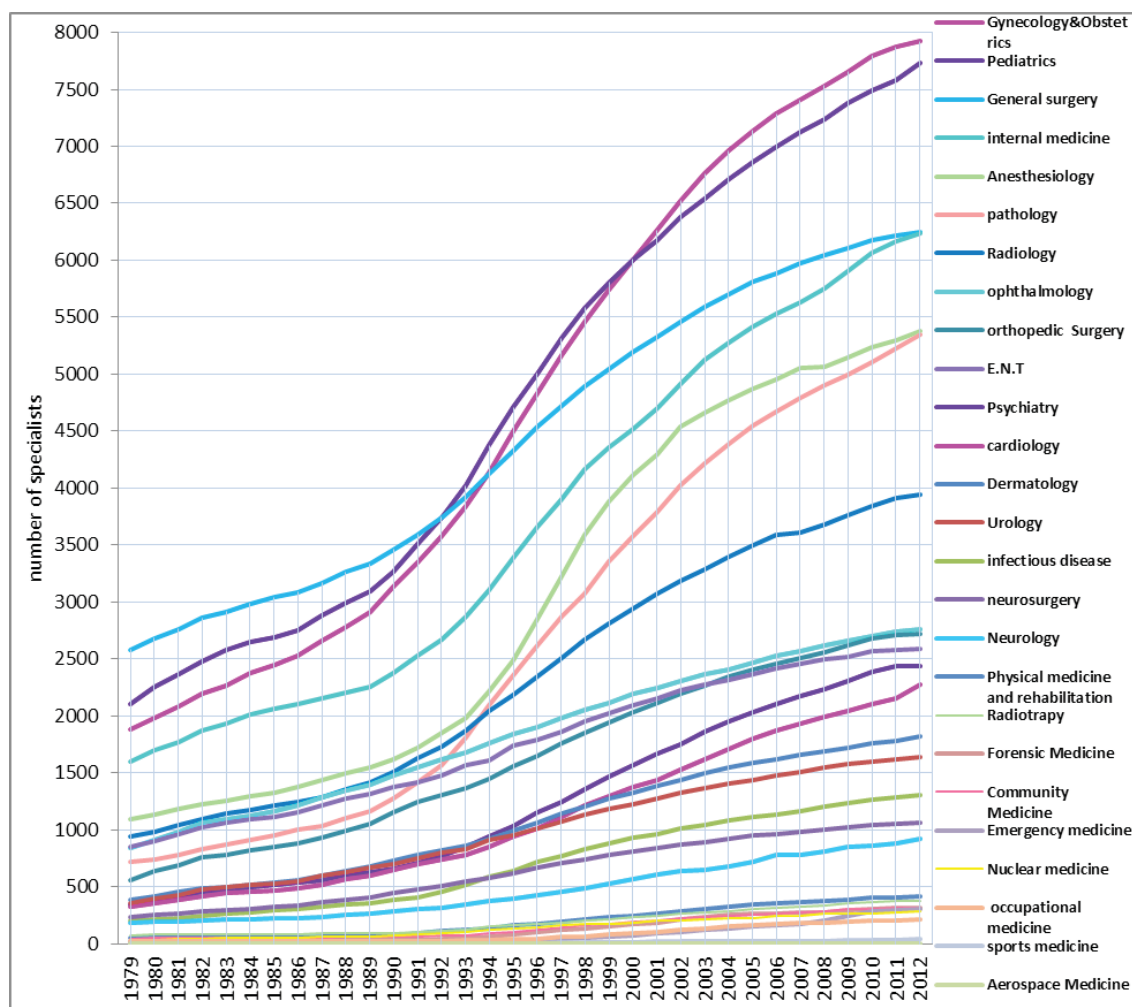


Figure 2. Physician manpower growth trends in each specialty discipline(1979-2012)

ance physician's distribution, but the results suggest that the nation may be facing misdistribution of physicians. The misdistribution of physicians is an important health policy issue.

5. Specialty-to-population growth in each discipline

Specialty-to-population growth trends over the past 35 years in Iran, shows that specialty training is variability in the rate of expansion within the different disciplines. Considering expected population aging and growth trends as well as expected health insurance expansion and economic growth, it is vital that health care and medical education policy makers be aware in meeting population special demands to deliver optimal specialty care.

Gynecologists, general pediatrics, general internal medicine, and general surgeons comprise the majority of the specialist's physician in Iran.

To better understand trends in the medical specialist's workforce, we have calculated the percentage changes of specialty-to-population growth in each discipline (Table 4).

The physician-to-population ratio among all medical specialties has increased consistently for at least the past three decades.

The growing rate of some is higher than the total overall physician growth rate. Almost all the medical specialties grew at a rate above 50% per 100,000 population 1979 – 2012.

The top five specialties in growth rate included: emergency medicine 1900 %, Forensic medicine 740% , Anesthesiology

396%, physical medicine and rehabilitation 315%, as well as occupational medicine 366% .

In addition, the number of physicians in internal medicine grew by 92.34% over this period.

The highest percentage increase in emergency medicine physicians per 100000 population, reflects that there was not any specialist in this field in 1979 in Iran. Emergency medicine as a specialty discipline has been offered in 2001 and after 1 decade more than 300 specialists have been trained in this specialty discipline.

The bottom five specialties percentage changes per 100000 populations from 1979 to 2012 were: General surgery 19.51%, ophthalmology 61%, E.N.T 50.22%, pediatrics 81%, and Internal medicine 92%.

A shortage of general surgery doctors is generally recognized.¹Some of specialties doubled or even tripled their number of trainees, and all clinical patient-care specialties have had some growth. Five new training programs were introduced after 2002 that did not exist two decades earlier. The largest absolute increases in trainee numbers were in emergency medicine (increase of 1900) and forensic medicine (increase of 740).

Discussion

Nested within a 40-year trend of specialty-to-population growth outpacing that of primary care (family medicine, and general in-

ternal medicine) is variability in the rate of expansion within the different primary care disciplines.⁵

The aging population, and declining medical student interest in primary care,⁶ portends a likely crisis for the adult care workforce to provide accessible, and comprehensive care to that in need.

Insurance expansion under the Affordable Care Act will cover several million more people, many with pent-up demands for care, and living in underserved areas. Today, with increasing part-time work, and career shifts away from full-time direct patient care, medical specialty supply and demand projections are more complex than ever.⁷

Important characteristic of the medical workforce is geographic distribution. To date, studies that have examined the relationship between physician supply number and population health outcome have found a positive association.⁸ Adversely, the limited number of studies have found diminishing returns of improved health with higher levels of physicians per people. These types of researches are methodologically challenging.

Some studies offer that accelerating demand for flexible, part-time posts raising the prospect that more doctors may be required to provide care in future years.⁹

Policy efforts directed toward appropriate medical specialists manpower production and further characterization of the unique contributions of the specialties to the delivery of optimal care, could help improvement in access to specialty health care for millions of patients.⁷

Future scenarios for the medical specialist's workforce

The number and composition of the medical specialist's workforce is likely to have a substantial impact on the way health care is delivered over the next 20 years.

Growing numbers of residents-in-training are expected to increase demand for a finite number of positions at specialty level, while many doctors may work beyond retirement age, further reducing the number of available specialty posts.

Our findings show the growth trends in medical specialists workforce may facilitate planning for future of specialty and subspecialty education in Iran. Examining the workforce growth trends over the last three decades could allow health and medical education policy makers to forecast the future health and educational needs.¹⁰

The recent trend in medical specialist supply in the Iran shows significant growth over the general population rate. Growth trends of specialists physician supply have a direct impact on the future of country's medical education and healthcare services. Planning for future physician supply will need to understand this trend and recognize the growing portion of female physicians.

From the information above, a key point to have a purposeful growth of specialist physician workforce in future is to trend analysis of the expansion of the physician workforce over the last 35 years.

A full understanding of recent trends and current challenges facing the medical specialist workforce reveal some general workforce trends. First, the number of medical specialists in Iran continues to grow in both absolute and per-capita numbers.

The second notable trend was the continued growth in the number of female medical students. In 2013, 31 percent of all Iranian medical specialists were female. The number of women in medical specialties are expected to accelerate between 2013 and 2023. Some study shows that female physicians tend to work fewer

hours.¹¹

Accompanying the growth of female physicians is the fact that a larger proportion of physicians are getting older and nearing retirement (75 years old), and we must estimate the number physicians who will reach retirement age.

Another important characteristic of the medical specialist's workforce is its geographic mal-distribution.

Other general trends that affecting the health system and post graduate medical education in Iran are demographic changes; epidemiologic transition; physician work patterns changes, changes in patients' expectations of health services.¹² Decision-makers should consider the various trends that affect education.

With these trends in mind, it will be interesting to see how the Iran's health and medical education system will plan to make significant changes in the distribution of physicians especially in specialist level across the country.

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Conflict of interest: *There is no conflict*

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