Achievements in Postgraduate Urologic Education in Iran: A Quantitative Study

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Purpose: The study focus is on the quantitative achievements in urology education and growth trends in urologic surgical workforce and fellowships by gender since 1979.

Materials and Methods: This comprehensive national quantitative study was performed in Iranian Academy of medical science. The first hand data gathered from The Iran Specialty Training Council of and also from Medical Council of Iran.

Results: Over the period 1979 to 2012, the numbers of resident's admission in urology/ fellowships have increased from 5 to 51 and from 0 to 24 respectively, and graduated urologists of national programs has grown from 5 (14%) in 1979 to 47 (100%) in 2012. Iranian urologists workforce haves increased from 315 in 1979 to 1637 in 2012. In 1979, there was 1 urologist for every 117,460 population, while in 2012 there was 1 urologist for every 46120 population. Iran Urologists to population rate is 1:46120. These statistics represents significant improvement from 34 years ago. Number of female urologists has progressively increased from 1 in 1979 (0%) to 110 (7%) in 2012. Urology fellowships are offered in 6 fields since 1994 in Iran. The number of trained fellowships grew sharply and reached to 221 in 2012.

Conclusion: The current urology training is successful to improve urology health care. Along with expansion of urology and fellowship training, the number of Iranian female urologists significantly increased. To our knowledge Iran had the greatest growth rate of female urologist training in the Middle East, and is comparable with those in the most progressed countries in the world.

Keywords: urology; education; iran; specialization; health planning; primary health care.

INTRODUCTION

There has been an increase in urologic surgical workforce in Iran over the last 34 years. After establishment of Ministry of Health and Medical Education (MOHME), based on health policies to improve health care, increasing the number of specialists and surgeons was a priority.[1]

In 1970s, there were a few Iranian urologists in main cities. Health care centers in small towns and rural areas were run by many non-Iranian urologist in part.[1] So, the shortage of physicians was a very serious issue, and that time only measure taken to solve this problem was hire foreign physicians,[2] (e.g. Indian urologists). Since 1979, great advances have been made in Clinical Postgraduate Medical Education.[3] Training competent urologic surgical specialist and subspecialist based on community health needs is one the priorities in the strategic plan provided by urology curriculum committee of medical education and specialty council of MOHME in 2007. Fellowship training has officially been initiated from the year 1992 following the assembly of the "council on medical education." At the present time, fellowships related to urology specialty are offered in 6 fields of study at more than 25 academic urology training program.

Monitoring the surgical health care workforce and analyzing the ratio of surgeon supply to population whether is growing and whether supply is adequate to meet future demand is important task of medical educators. Analysis of urologic education and urologist workforce growth trends is important in a country like Iran with diverse demographic characteristics and different health care needs. Population aging increases the demand of specialties for elderly care such as urology, while younger population increase demand for subspecialty treatment that serve special group of patients (children).

The aim of this study is to provide important information on quantitative achievements of urologic education and growth of urologic surgeons' workforce since 1979, which can be used by health policy makers.

MATERIALS AND METHODS

This comprehensive national quantitative study was performed in Iranian Academy of Medical Science. Data about the overall urologists were obtained from the Department of Information and Statistics of Medical Council of Iran and data of admitted/graduated residents were obtained from the Iranian Council in specialty and subspecialty training and the Department of Exam evaluation of Ministry of Health and Medical Education (MOHME). The data included information about number of registered residents and total urologists from (1978-1979) till (2011-201) by gender and trained fellowships in urologic subspecialty fields. First, the data were extracted from paper base records and entered into structured databases, and then data analyzed.

RESULTS

Our results confirm that, urologic education has experienced a sharp quantitative growth in Iran over the last 3 decades. There has been rise in the number of admitted residents in urology specialty from 5 in 1978-79 to 51 in 2011-12 (Figure 1). During 2012, 97 percent of admitted residents in urology specialty in Iran were men. One major expansion in urologic education in the last 3 decades has been spectacular increase in the number of residents. The number of female residents who participate in urologic surgery training programs is significantly improved over last years. Today 10 percent of urologic residents are women The number of urologists who are graduates of Iran's medical schools has increased from 5 in 1979 to 47 residents in 2012 (Figure 2). The proportion of urologic surgeons trained in Iran has risen sharply. In 1980, 86% of urologists were graduated from foreign medical universities, while by 2012, 100% of graduated urologists, have been trained in national universities.

At the end of training, graduated urologists attend in Iranian board of medical specialties examination. After board certification specialists could enter to academic positions in universities. To this date 60 board examinations have been held. The number of urologists who were successfully certified nationally was 4 in 1979, which was increase to 47 in 2012. There has been a significant increase in the supply of urologist relative to population growth in Iran. The number of urologists increased from 315 in 1979 to 350 in 1980 to 699 in 1990, to 1225 in 2000, and to 1637 in 2012 (Figure 3). The number of male urologists increased from 315 in 1979 to 1527 in 2012. In 1979 there was only 1 female urologist in Iran, while in 2012 there were 110 female urologists in Iran

(Figure 3).

In 2012, 93% of Iranian urologists were men, while 7% of them are women. We can see the same male: female ratios in England. According to Association of American Medical Colleges (AAMC) 2012 data, 94.2% of urologists in USA were men (Table 1). In 1979, there were only 315 urologists for 37 million of population in Iran. Most of the urologic surgeons in remote regions were not Iranian specialists. Shortage of urologists was a very serious issue in most of the Iran's provinces. At that time only solution was hiring foreign urologists from (India, Bangladesh, etc.). Since 1979, great advances have been made in Clinical Postgraduate Medical Education. The urologic training has experienced a steady quantitative growth. The number of residents entered to urology training increased in Iran. Urology continues to be attractive due to the serious need of the patients. In 2012, there were 1637 urologists for 75.5 million of population (Table 1). In 1979, there was 1 urologist for every 117,460 people in Iran and in 2012 there was 1 urologist for every 46,120 People in Iran. This ratio represents significant improvement from 34 years ago. In 2012 the ratio of urologic surgeons per 100,000 was 2.17. During the period of 1979-2012, number of Iranian urologic surgeons per 100,000 populations has 155.3% increases (Table 2). During 1981-2010 in USA, number of urologic surgeons per 100,000 populations decreased by 1.3 % (Table 2). The information presents in table 2 shows urologist supply increase in each decade in Iran vs. USA. This ratio represents significant improvement in Iran urology workforce supply over 3 decades.

Table 1. Number and percentage of urologists by sex in Iran versus USA and England.

		Male		Female	
	Total Urologists	Number	Percent	Number	Percent
USA *	9,824	9,257	94.2	567	5.8
Iran 2012	1,637	1,527	93	110	7
England 2012 **	875	814	93	61	7

*Source: Association of American Medical Colleges (AAMC) 2012 Physician Specialty Data Book.)
**Source: British association of Urological Surgeons) http://www.baus.org.uk/AboutBAUS/workforce.

Fellowships

Many urologists desire extra training in one particular aspect of the field. This means applying for post-residency fellowship training. Most fellowships are 1-2 year programs integrating both clinical and research experiences.[4] Fellowship training has officially been initiated from the year 1992. Fellowships placed more of an emphasis on, research, and scholarly work.[4] At the present time, fellowships related to urology specialty are offered in 6 fields of urology, including; pediatric urology, kidney transplantation, uro-oncology, endourology, female urology and reconstructive urology.

Table 3 shows the year each fellowship program has approved, duration of each field. These fellowships programs are growing in quantity and quality very quickly as a result of the large number of patients being referred. Two hundred eight urologists graduated from fellowship programs till 2012, and 94% of them are men. Table 3 shows the total trained fellowships number and number of women urolo-

Table 2. Sources of growth in urologic surgeons supply: Iran and USA 1979-2012.

Supply of urologic surgeons			Urologic surgeon per 100,000 population			
Period	Country	Urologists	Period			% Change
1980-81	Iran	350	IRAN	1979	0.85	+155.3
	USA	7423				
1990-91	Iran	759		2012	2.17	
	USA	8825				
2000-01	Iran	1179				
	USA	9649	*USA	1980	3.23	-1.3*
2010-11	Iran	1592				
2012	USA	9824		2010	3.18	
	Iran	1637				

*Urology Workforce Trends. Bulletin of the American college of surgeons, 2012.

gists graduated from each subspecialty field. We can see significant quantitative growth and expansion of fellowship training in the various subspecialty areas since last decade (Figure 4).

Endourology fellowships are currently very much in demand. Two areas of urology that motivated the urologists are renal transplantation and pediatric urology (Figure 4).

DISCUSSION

Adequacy of the Current Urology Workforce

There are a number of indicators of the adequacy of a surgical workforce. No single measure can provide a definitive assessment for urologic surgical supply. However we can use the most recommended benchmark to study whether urology workforce is adequately meeting current demand of population or if there is a significant shortfall or oversupply. One of The indicators chosen is surgeon/population ratio (SPR).[5] A USA submission to the 1988 Doherty enquiry suggested that the SPR for urology should be 1:65,000. This calculation was based on the British Association of Urological Surgeons recommendation that the SPR be 1:130,000 with two urologists per unit.

At that time the SPR for the USA was 1:40,000, for the England was 1:130,000 and for the Ireland was 1:170,000. There was no firm basis for this original prediction. In 1992 a Royal Australasian College of Surgeons (RACS) manpower study subsequently adapted this figure of 1:60,000 despite strong opposition from the USA. The USA suggest that the SPR for Australia should be in the range of 1:80,000 to 1:85,000. The fact that the current specialist SPR is slightly below this benchmark could be taken to indicate there is a shortage of urologists.[5] In 1994, there is a large range of urologist/pop-

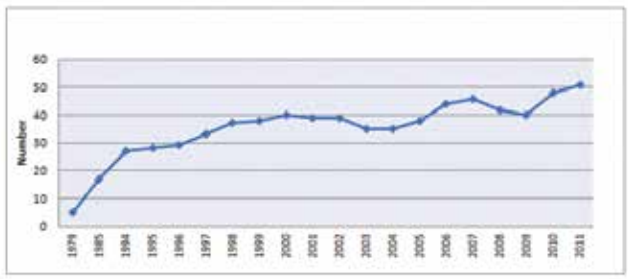

Figure 1. Urology admission growth trend in Iran since 1979.

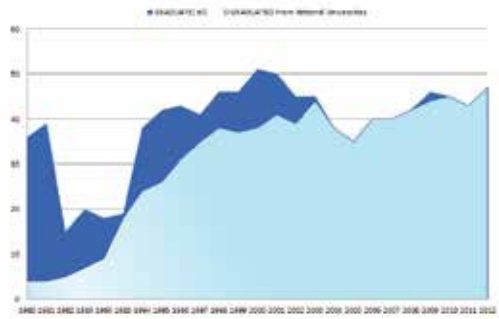

Figure 2. Comparing graduation trends in urology specialty since 1979.

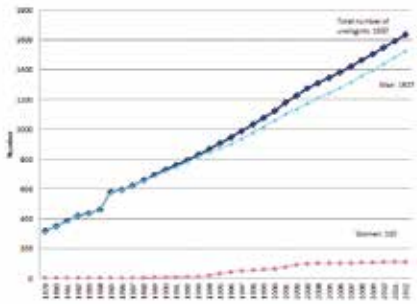

Figure 3. Urologists workforce growth trends in Iran since 1979.

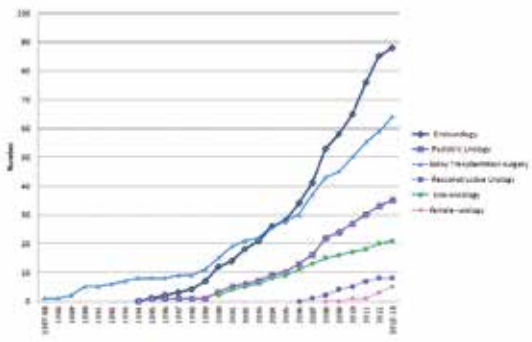

Figure 4. Growth trends in urologic subspecialty fellowship disciplines.

Table 3. Approval year and duration of each urologic fellowships and graduated numbers.

Fellowship discipline	Year program approved	Duration (months)	Total trained fellowships up to Dec. 2012	Female trained fellowships
Kidney Transplantation	1987 to 92 and 1997	12	85	3
Endourology *	1994	24	59	0
Pediatric Urology	1994	12	33	6
Uro-oncology	1999	12	20	0
Reconstructive Surgery	2007	18	8	0
Female -urology	2010	12	3	3
			Sum: 208	12 (6%)

* The Endourology-Laparoscopy Fellowship Program at Shahid Labbafinejad Medical Center includes 15 months of clinical training in laparoscopy and 9 months in endourology.

ulation ratios, ranging from 1:27,700 in USA to 1:214,300 in South Africa. Differences in health structures make international comparisons difficult, for example in the USA and Germany (SPR 1:30,800) urologists provide primary care that is as general practitioners in urology. This has resulted in reduced number of surgical operations per urologist.[5] In 2012, USA with a population of 313 million people, Urology SPR was 1:31000.[6] In 2012, England has 875 urologic surgeons, calculating for 63.7 million populations.[7] The England urology SPR was 1:72800. Europe is a large region and in 2012 has a population of approximately 730 million people, in these countries some 15,000 urologists have registered with national registration.[8] In 2012 Europe Urology SPR was 1:49000. In 2012, Iran has 1637 urologists for 75.5 million of population. Iran Urologic SPR was 1:46120. To our knowledge Iran had the greatest growth rate of urologic surgical workforce in the Middle East. Outstanding achievements of Iranian urologic education and current urology workforce, is comparable with those in the most progressed countries in this field. Iran has met the high standards for urologic surgeon per population in the world.

Urologic Surgical Supply and Health Outcome

Urologist can make a great impact on a patient's quality of life.[4] Research has shown an association between a higher density of urologists and lower mortality from prostate, bladder, and kidney cancer.[9]

Despite small number of urology-specific studies, consumers and payers are increasingly convinced that individual surgeon case volume is important. In addition to mortality, length of stay and complication, health service researchers are also exploring the relationship between volume and other outcomes. Literature suggests that low volume surgeons may tend to offer restricted options to the patient, expend more resources per case or have higher recurrence rates in oncology cases.[10]

Fellowship Training

Fellowship training is one of the most important contributors to progress in the field of urology. American Board of Urology supported the importance of fellowship training to the future of urology.[10] Fellowships enhance the overall quality of a training program and aid in faculty recruitment and retention. An example in Iran is the kidney transplantation. In 1979, there has been less than 100 kidney transplantation in Iran, while according to report in Middle East Society of Organ Transplantation (MESOT) congress 2011, the number of kidney transplantation was over 30,000 in Iran in 2011, which is number one in Middle Eastern countries.[11] Kidney transplantation department of Shahid Labbafinejad Medical

Table 4. Surgeon/population ratio for urology in 2012, ordered by surgeon/population ratio (SPR).

	Total Urologists	Population	Urologic SPR
USA	10,090 *	313 Million	1:31000
Iran	1637	75.5 Million	1:46120
European Union	15,000	730 Million	1:49000
England	875	63.7 Million	1:72800

*Source: American Urological Association.

Center with more than 3,500 Kidney transplantation was elected as one of the ten major kidney transplantation centers outside the US according to the statistics of clinical transplantation 2010 book.[12] Fellows in the endourology-laparoscopy fellowship program at Iranian Urology and Transplantation Center (IURTC) are actively involved in laparoscopic urologic surgery. Uro-laparoscopy is a minimally invasive option for urologic procedures and treatment of kidney disease. By the end of 2012, more than 5000 urologic laparoscopy procedures had been done in Iran.

Female Urologist Practice and Patient Satisfaction

Urology is a surgical subspecialty focusing on the urinary tract of men and women, as well as the reproductive system of men.[4] Women constitute a large portion of the patients seen by urologists and they have demand for same sex physician. Historically the specialty like urologic surgery has been a male dominated field. Most women interested in a surgical career may have some hesitation about selecting urology.[4] However, women entering urologic surgical specialty training have steadily increased in the last 3 decades. In USA since 1981, the number of female urologic surgeons has grown from 34 to 512.[13] In Iran the number of female physicians rose steadily, from 2 in 1980 to 110 in 2012. In Iran female physicians entering in urology have been increased since 1990 base in health policies that emphasize on integral role of female training in specialties to satisfy patients with accessing to same gender physician. During the period of 1992 to 2012 the supply of female urologists dramatically improved and grew by 10%. Several studies have investigated patients' preference for the gender of their doctor. The England national health system (NHS) has designed studies to examine the patient preference with urologic problems for gender of urologists. However, within these studies, the patients have predominantly been females. Women were more likely to prefer the same gender urologist than males.[14] The number of women in medicine continues to rise steadily. Despite this increase until recently women remained a small minority in urology and other surgical fields.[15] More women are becoming urologists, which parallels trends in other surgical subspecialties.[16] American Urologic Residency Strategic Planning Group Committee expressed a strong desire to keep urology more attractive to women and intensify efforts to recruit a large number of women and minorities into the specialty.[10]

CONCLUSION

Based on the available information, it is fair to conclude that Iran is one the most powerful countries in urologic surgical education and growth of urologic workforce. Growth trends suggest that the overall number of urologists in Iran is at the highest per capita since1979. Obviously, urologic educational models of the last decade will not match for another decade. Educational planners must consider urologic growth trends, evolution of urologic care, and population needs.

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CONFLICT OF INTEREST

None declared.

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