

Original Article

More Income for Male Physicians; Findings About Salary Differences Between Male and Female Iranian Physicians

Homaie Rad et al. More Salary for Male Physicians

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Background: In recent decades, the role of women in the organizations of developed and less developed countries has increased, but little is known about gender gap in salaries of Iranian physicians.

Aims: The aim of this study was to analyze the gender gap in the salary of physicians working in public health sector of Iran and its predicting factors in 2016.

Study design: This is a cross sectional study conducted on physicians' salary in Iran in 2016.

Methods: 30824 records about characteristics of study population were extracted from national human resources for health database. Nearest neighborhood matching technique was used to find adjusted differences of salary between male and female physicians. In addition, by using Oaxaca decomposition method, the reasons for the differences were found.

Results: The results showed that there was a difference of 117 dollars in monthly salaries of male and female physicians in favor of men. Differences in male and female salaries could be predicted by place of work and residency, type of specialty, type of employment and marital status.

Conclusion: Gender gap in physicians' salaries exists in public health sector of Iran. The payment methods of salaries for men and women should be revised in order to remove the inequalities.

Keywords: Gender salary gap, Salary, Physicians, Iran, Income distribution, Gender, Inequality, Gender pay gap

Introduction:

In recent decades, the role of women in the organizations of developed and less developed countries has increased. Access to family planning methods and contraceptives, as well as education and health services, and supports of governments have created conditions for women to enter labor market (1). In recent years, the number of female university students has increased significantly in Iran (2). In 2016, 33687 women were studying medicine, while the number of male medicine students was 22675. However, labor force participation rate of women is less than men in this country; it was 65.5% for men and only 12.3% for women in 2011(3). Gender pay gap (GPG) is one of the most important factors in a lower willingness of women to enter labor market.

Studies show that GPG leads to a decrease in productivity and efficacy. Moreover, emotional factors besides labor market may result in lower wages for jobs held primarily by women (2, 4). It is not an issue limited to a region or religion or culture; almost all over the world, women face it. For example, gender salary gap was 26.3% in Japan, 19.1% in United States and 15.3% in Germany in 2012(6). However, in some countries the gap is not considerable. For instance in 2012, it was 5.9% in Norway, 6.4% in Greece and 8.6% in Spain (5). Studies showed that GPG is often smaller among medical professionals and in public sector. However, studies in the United States showed that it was high between university physicians (7, 8). The results of another study showed that in USA, average earnings is lower for a higher percentage of female employees working in highly skilled occupations; also this is happen more strong in the jobs requiring lower education and experience (9).

In the Ministry of Health and Medical Education (MOHME) of Iran, there is no obvious difference defined between the salary of male and female physicians according to the law. The only very little difference is the monthly payment to married men as the heads of households (10). However, the actual situation of GPG among Iranian physicians is unknown. Because of the importance of this issue and lack of studies on the situation of gender salary gap in Iran's health sector, we analyzed gender salary gap among physicians in this country.

Materials and Methods:

Data:

MOHME records physicians' salary data, detailing their national code, payments, work experience, level of education, job position, marital status, and workplace and work province. We extracted all general physicians' and specialists' information from the MOHME's Deputy of Human Resource Management dataset in 2016. Because MOHME records include only the information of physicians working in public health sector; private physicians were not studied. After cleaning data and removing unrelated samples, 30824 records were entered the study. Ethical considerations of this study were approved by the Ethics Committee of Guilan University of Medical Sciences in 2016. Validity of data was confirmed using random selection of 310 samples; Validity of data was confirmed by contacting the studied physicians too. Acquiring inform consent was not applicable to this study.

Statistical analysis:

Nearest neighborhood matching technique was used to discover the differences in payments of male and female physicians in Iran. In this method, after matching variables of job position, education degree, workplace, work experience, type of employment, specialty, province of work and marital status, the GPG could be identified. In nearest neighborhood matching estimator, the average treatment effect (ATE) coefficient shows the absolute difference between men's and women's payment. In addition, two multivariate regressions were estimated to show the differences. The dependent variable of regressions were payments to physicians, and independent variables included all variables used in the nearest neighborhood method. In addition, GINI index was calculated for describing salary distributions between males and females separately. GINI index has a value between 0 and 1(11, 12, 13), which 0 shows completely equal distribution of salary and 1 shows completely unequal distribution. The index was calculated using CONINDEX package in STATA software v13.1 (StataCorp, Texas, USA). At the end, Oaxaca decomposition technique was used to show how proportions of the differences were related to physicians' occupational and individual characteristics, and how proportions came from latent reasons such as a systematic gender payment gap.

Suppose that y is salary of general physicians, two regression models for men and women can be designed as below:

$$y_i = \begin{cases} \beta^{males} x_i + \varepsilon_i^{males} & \text{if male} \\ \beta^{females} x_i + \varepsilon_i^{females} & \text{if female} \end{cases}$$

Where x_i is vector of dependent variables, including occupational and individual characteristics, β is the vector of coefficients of dependent variables. βx_i can be observed by dependent variables. ε_i is vector of residuals and includes those factors which cannot be observed by dependent variables.

The gap between payment of men and women can be determined as below:

$$\Delta y_i = \Delta x_i \beta + \Delta \beta x_i + \Delta \beta \Delta x_i$$

Where $\Delta \beta x_i$ is the gap derived from coefficients which could be predicted by study variables, $\Delta x_i \beta$ is the gap related to endowments, and $\Delta \beta \Delta x_i$ is the gap from interactions. For weighting the matrix of decomposition, Cotton Method and relative sample size of advantage group were used (14). All statistical analysis was conducted using STATA SE v 13.1 (StataCorp, Texas, USA).

Results:

Characteristics of study population:

Characteristics of studied physicians are presented in table no. 1. The sample consisted of 30824 physicians employed by MOHME. Of these, 16642 (53.9%) were men and 14182 (46.1%) were women. Unadjusted mean of

monthly salary was significantly higher for men (1047.42 US\$ for men and 766.61 US\$ for women (with a currency rate of 38140)) Larger percentage of women were single in comparison to men (31.34% vs 11.15%). Average work experience of men was 13.67 years that is significantly higher than the experience of women (9.66 years). The percentage of specialists (43.73%) and subspecialists (9.78%) were significantly higher among men, while the percentage of general physicians was higher among women (56.49%).

A larger percentage of men and women were specialized in family medicine, general physician, internal medicine and pediatricians, while most of gynecologists were female. Women were less likely to be academic staff than men (25.96 vs. 15.20). Permanent employment was the major type of employment among men (45.30%), while mandatory short term employment after graduation (mandatory employment) was the major type of employment for women (47.16%).

Gini indexes of salary distributions for men and women are presented in table no. 2. The Gini index, for men was 0.341 (± 0.001), while it was 0.293 (± 0.002) for women. So inequality in the distribution of salary among men is higher than women. The difference in Gini index between men and women was 0.047 that was statistically significant ($P < 0.001$).

Nearest neighborhood matching results:

After adjustment of marital status, type of employment, education, specialty, job position, workplace (hospital, university, health house, headquarter, research center), province of work and work experience, salary difference between men and women was 116.91 (± 9.02) US\$, which was statistically significant (table no. 3). Salary differences on the basis of specialty types are presented in table no. 3. No gender differences in the salary of gynecologists, otolaryngologists, anesthesiologists, dermatologists, pediatricians, infection diseases specialists, psychiatrists, neurologists, pathologists and hematologists were found. Gender differences in the salary of orthopedic surgeons were higher than other specialties (844.42 US\$). The salary of male emergency medicine physicians (386.85 US\$) and cardiologists (366.22 US\$) was much higher than female ones.

Gender related differences in salary of physicians working in different provinces are presented in figure no. 1. The province of Kohkiluyeh va Boyer-Ahmad had the largest adjusted gender difference in salary (147.37, SD: ± 33.09) and Golestan had the smallest (118.76, SD: 38.10). Khorasane Razavi had the highest average of unadjusted salary for both men and women. (1436 vs 1012 US\$), West Azerbaijan had the lowest unadjusted average of salary for men (749.86 US\$) and Ardebil had the lowest for women (597.79 US\$). As shown in the figure no. 1, heterogeneity of adjusted salary differences between physicians of different provinces is high.

Adjusted gender related differences in salaries for personnel with permanent contract was bigger than others (110.02 US\$, SD=17.50); adjusted salary difference between men and women with short term contract was 87.25 (± 13.99) US\$, for mandatory employment 64.72 (± 11.64), for physicians employed for family medicine plan 9.64 (± 3.51) US\$ and for others 16.68 (± 17.96) US\$. Moreover, adjusted salary difference between male and female specialists was 171.98 (± 20.63) US\$, which was higher than other medical professionals. Gender differences in salary of subspecialists was 105.21 (± 33.73) US\$ and for general physicians 57.35 (± 3.39) US\$ (Table no. 4).

Oaxaca decomposition estimations:

Table no. 5 shows the results of decomposing gender related differences in physicians' salary in Iran. According to this study, there was 30% GPG among physicians in this country. If studied women had the same work related characteristics as men, 21.21% of the gap could be removed. Type of employment (12.89%) and workplace (4.12%) had the greatest roles in making the gap, so if women had the same type of employment as men, more than one third of the difference in salaries could be removed. Moreover, education and work experience were the reasons of the gap too. (2.14% of salary difference was related to the level of education and 1.66% was related to work experience. Moreover, 7.14% of salary difference was related to interaction and efficiency and other factors (e.g. systematic gap and cultural factors) which could not be observed by predictors of the study.

Discussion:

In the present study, diversity in salaries of physicians employed by MOHME of Iran was analyzed. We used monthly payments of physicians in 2016; the data was collected from human resource management database of MOHME. After adjustment of some factors including marital status, work experience, type of workplace, province of work, types of employment and education degree, we found out that there was 116.91 US\$ salary difference between male and female physicians. Average salaries of women was 30% lower than men. Moreover, diversity can be seen in different provinces, specialties, types of employment and workplace and different education levels. This study, for the first time to our knowledge, by using a large dataset (which has been collected carefully throughout the country and showed the real salaries of physicians, not the revealed salary), analyzed gender related differences in the salary of Iranian physicians.

Gender gap pay can be seen all over the world. Ly et al. in 2016 studied the effects of gender and race differences in the salary of physicians in United States and indicated that white male physicians have higher income than blacks after adjustment of other factors. While no differences were found between white and black female physicians' salaries. However, differences were found in both male and female physicians' salary (15). In a study by Keshavarz et al, gender related difference in logarithm of hourly salary in urban population in Iran was -0; their study showed that women earn more than men. However, their sample was not adjusted by some important variables such as education degree, work experience and types of work (4). Using Panel Data of statistical center of Iran, Googerdchian et al found that there is a gender gap in wages of men and women in Iran. Some factors including labor participation and education level had the greatest share in making the gap (1). However another study found that wage differences are smaller among higher skilled groups such as physicians (16).

This study showed that despite lower salaries of women comparing to men, according to the results of GINI index, salary inequality among men was higher than women. This might arise from more diversity of specialty, education and workplace among men comparing to women. In addition, the patterns of gender differences among physicians were not the same in different provinces. Skilled medical workers such as physicians are less willing to work in less developed areas, unfavorable climate condition and some regions with specific cultures. For improving equality in access to health professionals in these regions, MOHME has set some incentives such as higher salaries for physicians working in such conditions. In some provinces such as South-Khorasan, Sistan va Baloochestan and Lorestan, the number of unbearable and less developed regions is more than other provinces, while in some provinces such as Kakhilooye va Boirahmad, Ardebil and Qom, cultural factors might affect salary differences. Male physicians have more potency to work in these regions; while female physicians tend to work in better weather and developed parts of provinces. Therefore, salary difference between men and women is higher in these provinces. Recently, lack of female physicians in less developed regions has become a major concern of MOHME (17).

Gender related differences in the salary of some types of specialties were higher than others. For example, in orthopedic surgery, emergency medicine and cardiology, gender differences were higher. Family physicians, social medicine specialists and pediatricians had the least GPG. Gender related difference in salary is related to the productivity of women at work too (1). In specialties which need more physical strength or capabilities (need for instances more night standbys and residency in hospitals and hand works) women's salary is less. On the other hand, orthopedic surgery and emergency medicine require less physical strength. Similar results were found in a study in United States; adjusted gender difference of salary in orthopedic surgeries was higher than other specialties and for family medicine, GPs and radiologists, it was lower than others (18). In another study in 1996, after adjustment, salary differences were higher among internal medicine and emergency medicine physicians (19). However, to our knowledge, no study has tested the relationship between difficulty of duties of different specialties and gender difference. Studies on academic specialties showed that gender difference in salary is related to the productivity. The authors calculated the productivity by the number of publications and grants (8). Different studies indicated that productivity of female physicians were lower than men in academic positions (7, 8, 20-22) Ness et al 2000 suggested that gender inequality is higher among well paid specialties (23).

Academic physicians and headquarters (who had managerial position or worked at headquarter departments of medical universities) had bigger gender differences of salary in comparison to other personnel. Also, temporary employed personnel had larger gender difference comparing to others. Several studies showed that there is a salary gap among academic physicians based on some variables such as work experience, type of specialty and clinical practice expertise in United States. (9, 15, 18, 21). More studies are needed to find out the reasons of GPG by place of work and type of employment. About one quarter of the salary difference between men and women in Iran could not be observed by factors used in this study. Some of these factors include cultural factors, household characteristics, responsibility of women for raising children, and financial dependence of women to their husbands (2, 4, 16, 24-29). However, because of unavailability of data, share of these variables in GPG cannot be observed easily.

This study had transparent results about gender differences in salaries of physicians in Iran. It used a large dataset and evaluated gender gap using an appropriate study design. However, limitations of study were inevitable. Firstly, we were not able to test the effects of regional variables including the level of development of each province, and cultural factors on gender differences of salary. Secondly, we analyzed gender pay inequality for physicians working in public sector. No data for private sector's physicians was available. In addition, we assume that payment of MOHME was the sole income source of studied physicians, while some physicians work in both public and private sectors.

Conclusion:

This study showed that there was a gap between male and female physicians' salary in Iran and this gap was bigger in orthopedic surgery, emergency medicine and cardiology specialties. A large part of the gap could not be observed

by the variables added in this study and may arise from cultural factors. Unified governance and comprehensive planning for health workforce should be implemented in order to decrease the salary gap between different job categories and also genders. Inequality in income is not a direct result of discrimination in pricing medical services on the basis of gender. It is mainly rooted in socio-cultural and economic structures that restrict the opportunities and participation of women in this labor market. Social changes are needed in order to provide equal chances for men and women. Since the law does not discriminate on the basis of gender in paying the salaries, further research is needed for investigating the reasons of the actual disparities.

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Conflicts of interest

No conflict of interest.

Ethical approval

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Table no. 1. Characteristics of studied population

	All (N=30824)	Men (N= 16642)	Women (N=14182)	P-value	test
Monthly salary, mean(SD)	917.04 (3.76)	1047.42(5.68)	766.61(4.38)	< 0.00	t-test
Work experience, mean(SD)	12.05 (7.97)	13.67 (8.00)	9.66 (7.30)	< 0.00	t-test
Education, NO (%)					
General physician	15,750 (51.10)	7,738 (46.50)	8,012 (56.49)	< 0.00	X ² test
Specialist	12,648 (41.03)	7,277 (43.73)	5,371 (37.87)		
Subspecialist	2,426 (7.87)	1627 (9.78)	799 (5.63)		
Marital status NO (%)				< 0.00	X ² test
Single	6,277 (20.43)	1852 (11.15)	4,425 (31.34)		
Married	24445 (79.54)	14,751 (88.85)	9694 (68.66)		
Physician specialty NO (%)					
Obstetrics/gynecology	1,119	34 (3.1)	1,085(96.9)		
Otolaryngologist	471	282(59.9)	189(40.1)		
Gastroenterologist	249	198(79.5)	51(20.5)		
Orthopedic surgery	473	448(94.8)	25(5.2)		
Urologists	299	263(88)	36(12)		
Anesthesiology	1,201	883(73.5)	318(26.5)		
Social medicine	158	61(38.6)	97(61.4)		
Family and GPs	14,689	7,324(49.9)	7,365(50.1)		
Dermatologist	449	305(67.9)	144(32.1)		
Pediatricians	1315	757(57.6)	558(42.4)	< 0.00	X ² test
Cardiologist	1,046	661(63.2)	385(36.8)		
Infection diseases	389	279(72.7)	110(28.3)		
Emergency medicine	387	252(66.1)	135(34.9)		
Psychiatrist	635	356(57.1)	279 (43.9)		
Radiologist	839	428(51)	411(49)		
Internal medicine	1,827	974(53.3)	853(46.7)		
Ophthalmologist	431	300(59.7)	131(30.3)		
Hematologist	176	139(89)	37(21)		
Surgery	775	607(88.3)	168(21.7)		
Neurologist	566	441(88)	125(22)		
Forensics and others	814	488(60)	326(40)		
Pathologist	462	235(50.8)	227(49.1)		
Job position NO (%)				< 0.00	X ² test
Academic staff	6476(21.01)	4321(25.96)	2155(15.20)		
Medical staff	24348(78.99)	12,321(74.04)	12,027(84.80)		
Types of employment					
Mandatory employment	9,557(31.01)	2,869 (17.24)	6,688 (47.16)		
short term employment	2,225 (7.22)	1,370 (8.23)	855 (6.03)	< 0.00	X ² test
permanent employment	13,964 (45.30)	9,641 (57.93)	4,323 (30.48)		
Family medicine plan	2,748 (8.92)	1,248 (7.50)	1,500 (10.58)		
others	2,330 (7.56)	1,514 (9.10)	816 (5.75)		

Table no. 2. Gini index of salaries for men and women

	All (N= 29364)	Men (N=15886)	Women (N= 13478)
Gini index (SD)	0.34 (0.00)	0.34 (0.00)	0.29 (0.00)
Differences (SD)	Diff =0.05, SD=0.00, P-value=0.00		

Uncorrected Proof

Table no. 3. Salary differences by type of specialty before and after adjustment of effective factors

Physician specialty (N)	USD (US\$)	ASD (US\$)	SD	P-value
All population (17,301)	278.06	116.91	9.03	< 0.00
Obstetrics/gynecology (679)	699.60	520.91	355.24	0.14
Otolaryngologist (298)	233.81	-45.57	87.13	0.60
Gastroenterologist (158)	277.04	241.67	135.18	0.07
Orthopedic surgery (275)	360.87	644.43	75.33	<0.00
Urologists (194)	325.61	209.65	117.07	0.07
Anesthesiology(827)	271.18	-62.40	69.89	0.37
Social medicine (109)	719.74	57.41	16.22	< 0.00
Family and GPs (8313)	125.47	57.92	3.36	< 0.00
Dermatologist (279)	223.34	61.93	94.37	0.51
Pediatricians (842)	201.43	22.87	54.10	0.67
Cardiologist (636)	657.51	366.23	77.02	< 0.00
Infection diseases (277)	253.11	-57.57	126.13	0.65
Emergency medicine (193)	451.00	386.86	78.00	< 0.00
Psychiatrist (399)	343.46	67.40	72.66	0.35
Radiologist (486)	269.11	170.65	87.04	0.05
Internal medicine (1136)	317.27	114.02	33.51	0.00
Ophthalmologist (246)	416.38	212.43	120.79	0.08
Hematologist (132)	-18.84	33.41	103.72	0.75
Surgery (495)	374.62	261.37	64.64	< 0.00
Neurologist (3610)	406.03	142.23	109.08	0.19
Forensics and others (659)	521.50	159.80	49.90	0.00
Pathologist (307)	104.97	52.06	91.01	0.57

USD= unadjusted gender differences, ASD= adjusted salary differences in US dollars, SD standard deviation

Table no. 4. Unadjusted (USD) and adjusted (ASD) salary differences between men and women by type of employment, level of education, Workplace and marital status

	USD(US\$)	ASD(US\$)	SD	P-value
Type of employment				
Mandatory employment	155.48	64.72	11.65	< 0.00
Short term employment	83.67	87.25	14.00	< 0.00
permanent employment	142.82	110.02	17.50	< 0.00
Family medicine plan	2.84	9.65	3.52	0.01
Others	-19.62	16.68	17.97	0.35
Education				
General physician	123.84	57.35	3.40	< 0.00
Specialist	320.82	171.99	20.63	< 0.00
Subspecialist	278.15	105.22	33.73	0.00
Workplace				
Hospital	172.74	106.42	10.37	< 0.00
Rural health house	65.96	40.31	5.47	< 0.00
University/ faculty	300.30	155.37	30.29	< 0.00
Headquarter	239.44	165.72	21.67	< 0.00
Clinic	135.13	98.77	20.83	< 0.00
Others	174.27	103.41	22.45	< 0.00
Urban Health house	99.75	53.20	6.63	< 0.00
Marital status				
Single	15.01	68.66	27.91	0.01
Married	266.54	123.57	10.50	< 0.00
USD= unadjusted salary differences, ASD= adjusted salary differences in US \$, SD standard deviation				

Table no. 5. Decomposing gender inequality in salaries of physicians in Iran

	Odds Ratio	Percentage	SD	P-value
Differences	1.30	30%	29.19	< 0.00
Due to endowments- explained				
Marriage	1.00	-0.13%	0.00	0.51
Work experience	1.02	1.66%	0.00	< 0.00
Workplace	1.04	4.12%	0.00	< 0.00
Province of work	0.99	-0.77%	0.00	< 0.00
Specialty	1.00	0.22%	0.00	0.58
Type of employment	1.13	12.89%	0.01	< 0.00
Education	1.02	2.14%	0.00	< 0.00
Total	1.21	21.21%	0.01	< 0.00
Due to coefficients-unexplained				
		Due to coefficients-unexplained		
Marriage	1.07	7.25%	0.02	< 0.00
Work experience	1.05	5.03%	0.01	< 0.00
Workplace	0.98	-1.83%	0.01	0.05
Province of work	1.11	11.26%	0.06	0.04
Specialty	0.95	-4.87%	0.02	0.03
Type of employment	0.97	-2.66%	0.01	0.03
Education	1.04	3.95%	0.02	0.02
constant	0.88	-11.54%	0.06	0.06
Total	1.05	4.76%	0.01	< 0.00
Due to Interaction- unexplained				
		Due to Interaction-unexplained		
Marriage	1.02	1.68%	0.00	< 0.00
Work experience	1.02	2.09%	0.00	< 0.00
Workplace	1.01	0.80%	0.00	0.00
Province of work	1.00	0.21%	0.00	0.19
Specialty	0.98	-1.69%	0.01	0.00
Type of employment	0.99	-1.21%	0.00	0.01
Education	1.01	0.54%	0.00	0.06
Total	1.02	2.38%	0.01	< 0.00

Figure no. 1. Adjusted and unadjusted gender related differences in salary of physicians by provinces of Iran (Ranked by level of development, lowest= Sisatan va Baloochestan, highest=Tehran) (US\$)

Uncorrected Proof

