Gender Gap and Inequality in Health Professionals' Income in Iran

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ÖZET

İran sağlık çalışanlarında cinsiyet farkı ve eşitsizliği

Amaç: Gelir eşitsizliği tüm dünyada artmaktadır. Bu çalışmanın amacı Gini katsayısı yardımıyla 2012 yılında İran'daki sağlık çalışanları arasındaki gelir eşitsizliğini incelemektir. Cinsiyete gore gelir farkı ve belirleyicileri de ayrıca çalışılmıştır.

Gereç ve Yöntem: Eğilim skorlama yöntemini kullanarak erkek ve kadın çalışanlar arasındaki gelir farkını araştırdık. En küçük sıradan kareler regresyon testi ile sağlık çalışanlarının gelirini etkileyen değişkenler çalışıldı.

Bulgular: Gini katsayısı ile sağlık çalışanlarının geliri 0.428 olarak saptandı. Karışık değişkenlerin ayarlanması sonrasında erkek ve kadın gelirleri arasında anlamlı fark saptandı.

Sonuç: Sağlık çalışanlarının özel sector ve cinsiyete gore gelir farklarında anlamlı fark bulundu. Sağlık çalışanları arasındaki bu gelir farkına yönelik hükümetlerin yeni politikalar üretmesi gerektiği sonucuna varıldı.

Anahtar kelimeler: Cinsiyet ayrımı, gelir eşitsizliği, sağlık çalışanları, İran

ABSTRACT

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Objective: The income inequality has increased significantly throughout the world. The aim of current study was to examine income inequality using Gini Coefficient among health professionals in Iran in 2012. Also, gender income gap and its determinant were assessed in this study.

Material and methods: Using propensity scoring method, we examined the existence of income gap between male and female physicians. At the end OLS regression was estimated to find variables effect health professional income.

Results: The results of the study showed that Gini coefficient for health professional income was 0.428. A significant difference was found between male and female income after adjustment of confounder variables.

Conclusion: There are differences in income by the type of the work of professionals, working in private sector and sex. It is suggested that the government make policies to reducing the income gap between health professionals.

Key words: Gender gap, income inequality, health professionals, Iran

INTRODUCTION

While a large number of studies focused on income inequality in different countries and its

consequences, there are few studies which have assessed the income inequality in job groups (1). Health professionals are such of these job groups. In this study, health professionals include physicians, dentists, pharmacists, nursing and midwifery specialists. Differences in distribution of income of the employees who are working together in an organization have many negative consequences. Inequality decreases the motivation of the personnel and deviate them from working under the goals of organization (2). The income

inequality will break down the social capital and increases depression and suicide as well (3). The final aim of health sector is the promotion of the populations' health status so health sector is sub-grouped as social and welfare service. If the health facilities and health professionals have not enough motivation to serve the society, the health sector cannot work efficiently and the best outcome could not be received (4).

Income inequalities between health professionals are including many aspects such as different works, male and female, public and private earnings, and urban and rural regions. Gender income inequality will lead to exit women from health labor market and wasting the governmental education costs. It will lead to shortage of female workers especially in rural areas (5). Inequality between public and private sector leads to transition of health staffs from one sector to another. For example studies in Japan have shown that the number of staffs in private sector will increase, because the income in this sector is higher than public one (6,7). The more unequal distribution of income for health staffs will lead to more informal payments. By comparison himself with a higher wage employee, the person will justify his excuses about informal receives (8,9). Therefore, in this study, we aimed to analyze the income distribution of health staffs for Iran in 2012. In this study we answered these questions: first, how is the distribution of health staff income in Iran? Second, what variables make differences in the income of health professionals? Third, is there any inequality in the income distribution between gender groups?

MATERIAL AND METHODS

This was an analytical and cross sectional study. 246 data of health sector professionals (physicians, dentists, pharmacists and nursing and midwifery experts) were extracted from Iranian household income and expenditures data 2012, which is gathered by Iranian statistical center (ISC) yearly. These data were gathered by clustered random sampling method by ISC. Because of using all available data, no sample size calculation was used. Also, the data analysis was done by STATA 11 software.

Calculating income distribution

For calculating income inequality in health staff, we

used Lorenz curve and Gini Coefficient. Geometrically, the Gini Coefficient equals to the twice space between the Lorenz curve and the equal line. The Gini indicator is shown as blew:

$$G = \frac{1}{2\mu N^2} \sum_{i=1}^{N} \sum_{j=1}^{N} |y_i - y_j|$$

In this model, G is the GINI coefficient, μ is the mean level of income, N is the sample size and yi is ith sample size unit.

Also:

$$L(u) = \frac{1}{\mu} \int_{f(y) \leq u} y dF(y) \qquad 0 \leq u \leq 1$$

Represents the Lorenz curve which L has the range of [0,1] and is an increasing convex function. F(y) is the cumulative income distribution function and μ is the mean of the income.

Calculating gender inequality in health staff income

A propensity scoring matching estimator was used for examining the existence of income inequality for gender groups. This estimator matches the two groups and deletes confounding variables. In this study, propensity score is the probability of being male or female conditional on the covariates. The idea is to compare the income of individuals who based on observables have a similar propensity score, but one of them is male and another is female.

For comparing two groups with propensity scoring method, first a Logit or Probit model with the dependent variable of sex must be utilized. In this model, all of the variables which seem to be confounder in difference of income between men and women are used as explanatory variable. If there is a significant relationship between an explanatory variable and dependent variable, the explanatory variable is confounder. After that, with propensity scoring estimator, the scores of the overall confounders for each individual will be calculated and the two groups of men and women will be matched by these scores. By using nearest neighborhood matching

and Radius method the income of two groups will be compared to each other. The null hypothesis of these tests indicates that two groups have similar income. So if the t-statistics of the tests become more than 1.96, the two groups are not similar and the null hypothesis will be rejected in 5% significance level.

Factors determining income differences

Using an ordinary least square model, the predictors of income for health professionals was estimated. The model used in this study has shown below:

$$Y_i = \beta_1 + \beta_2 sex_i + \beta_3 age_i + \beta_4 urb_i + \beta_5 work_i + \beta_6 pub_i$$

Where sex is the dummy variable of being male or not, age is the age of the health worker, urb is the dummy variable for living in urban regions, work is the vector for dummy variables of the specialty of the professional, contains 1.Physicians, 2.dentists, 3.phramasists and 4nurses. Pub is the vector of dummy variable of the type of the work. Contain: 1: If the health professional work in his office, 2: if he works for the public system, 3: if working for private system and 4: for working in cooperative system.

If each explanatory variable have significant relationship with income, they are influencing factors which causes income inequality for health professionals.

RESULTS

Results of income distribution of professionals and descriptive statistics

The Gini Coefficient for health professionals was 0.42876669. It was very high for health professional and indicated that the income is distributed unequally between health professionals. Figure 1 shows the Lorenz
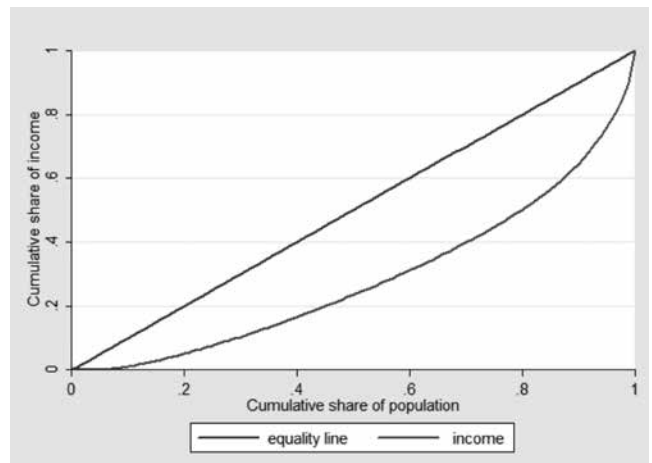

Figure 1: Inequality in health profesionlas income

curve for the income of professionals.

In this figure, X-axis is the cumulative % of population from lowest to highest income and Y-axis is the cumulative % of income earned. As the income line is closer to equality line, it means that income is distributed more equally. As shown in the figure, the area between the equality line and income line is big and there is a large inequality in income between health professionals.

In Table 1, some descriptive statistics of study are shown. % 41.7 of the sample were male, %84 live in urban region, %65 were married and %68 work in public sector. In addition, the average age of the sample was 37.61 (SD: 11.027).

Gender inequality using propensity scoring

The results of Logit regression method for confounder variables is presented in Table 2. As shown, the age, marriage status and the work sector have significant relationship with the sex. So these variables are confounder. No significant relationship was found for living in urban region, so this variable must be eliminated from matching method.

Table 1: Descriptive statistics

	Percentage	S.E	Lower limit	Upper limit
Male	0.4796	0.0321192	0.418	0.544
Urban region	0.8414	0.023334	0.795	0.887
Married	0.65714	0.030387	0.5972	0.7169
divorced	0.0081	0.0057	-0.0031	0.0195
widow	0.204	0.0090	0.00257	0.03823
Public employee	0.682	0.0297	0.624	0.741
Private employee	0.1747	0.0242	0.127	0.222
Cooperative employee	0.0813	0.0174	0.046	0.115

Table 2: The results of confounding variables with sex

	Coefficient	S.E	p-value
Age	0.0841	0.0186	0.000
Urban region	-0.1263	0.416	0.761
Work sector (public)	-0.1605	0.406	0.693
Private	-0.5545	0.559	0.321
Cooperative	1.7850	0.932	0.055
Family worker	-1.4114	1.470	0.337
Marriage status:			
divorce or widow	-2.1912	1.279	0.087
Single	-0.9181	0.358	0.011
Constant variable	-2.7951	0.777	0.000

Table 3: Number of observations for each block

Blocks	Male	Female	Total
0	1	1	2
0.1	18	2	20
0.15	9	10	19
0.2	51	12	63
0.4	29	27	56
0.6	17	47	64
0.8	3	19	22
Total	128	118	246

As indicated later, first the confounder variables must be identified. For this purpose a logit regression was estimated with explanatory variables which seem to be confounder. The dependent variable of the model is being man or woman. Age, living in urban areas, type of the work and marriage status were the variables which

seem to be confounder.

Table 3 shows the number of each observation in each block. Propensity scoring method, divides the calculated scores in to 7 blocks. This number of blocks ensures that the mean propensity score is not different for male and female in each block.

Table 4 shows the results of comparing the income of the two groups with nearest neighborhood and radius methods. As shown in the table the t-statistics of these two tests are more than 1.96 and this indicates that the two groups are not equal and the null hypothesis of having similar income groups is rejected in 5% level. It can be indicated that, there is gap in the earnings of male and female professionals even if the confounding variables effects are deleted. So there is gender inequality in the earnings of professionals in Iran.

Results of factors determining income differences

Table 5 shows the results of factors which effects income of professionals. We estimate the model using OLS method. The type of the work has significant relationship with income. This means that, for each work, the professionals earn different money and there is income gap between different jobs. No relationship was found between age and income. It indicates that, the

Table 4: The results of comparing male and female incomes with nearest neighborhood and radius methods

Method	Treatments	Controls	Statistics	S.E*	t-stat
Nearest neighborhood	118	67	2.29×10^7	5.69×10^7	2.481
Radius	115	128	2.1×10^7	4.73×10^7	2.254

*Standard error

Table 5: Results of OLS regression with dependent variable of income

Variables	Coefficient	S.E	T	p-value
Age	1760446	1006204	1.75	0.082
Dummy variables: Type of Work 1.Being dentist	-697.64	3.79×10^7	-1.72	0.087
2.Being pharmacist	-129.6	2.91×10^7	-4.13	0
3.Being nurse	-665.54	2.44×10^7	-2.55	0.011
Work sector? 1.Own work	-151.2	8.6×10^7	-1.63	0.106
2.Public system	9.77×10^7	1.05×10^8	0.93	0.352
3.Private system	1.89×10^8	8.78×10^8	2.16	0.032
4.Cooperative system	1.08×10^8	9.26×10^7	1.17	0.243
Being male	6.87×10^7	2.49×10^7	2.76	0.006
Living in urban region	2.13×10^7	2.58×10^7	0.83	0.41
Constant variable	5.38×10^7	4.45×10^7	1.21	0.228

income of the professional is not dependent on the age. Working in private system has a positive relationship with income. It means that, professionals working in private sector earn more money than other ones. Being male also has positive relationship with income. This confirms the results for gender gap analysis which indicated that there is gender gap in income of professionals. No significant relationship was found between living in urban regions and income, so no inequality was found between earnings of professionals in urban and rural regions.

DISCUSSION

Gini Coefficient is an indicator to show the distribution of income between people. Gini coefficient varies between 0 (complete equality) and 1 (complete inequality). As the UNDP report, the Gini Coefficient in income of all population of Iran in 2013 was 0.383, while the Gini coefficient for health staff in this study was 0.4287 and was more than the overall Gini (10). An important note is that the income distribution for similar working types must be more equal because similar earnings but the distribution of between health professionals is more unequal than overall country (11). It may lead to decrease the motivation of professionals with lower income (12). Dieleman et al. in Vietnam concluded that the income has a large effect on the motivation of health staff in rural areas (13). Also income distribution is one of the most important policies for increasing motivations in health sector reform (14). Our study showed that the income distribution of health professionals have a huge gap between male and female. The male income is higher than women and it is one of the concerns of health system. Exit of female workers from health labor market is one of the consequences of the gender gap in income (15). A study conducted by Sasso et al. in New York State in 2008 demonstrated that newly male trained physicians earn more money than women. They concluded that the gender gap is not explained with work hours, specialty choice, practice setting or other characteristics (16). Jagsi et al was studied the differences of income in physician researchers in United States in 2012. After adjustment of specialty, research time, leadership positions, academic rank, publications, they found that male workers earn more than female ones in the United States (17). Weeks et al also found that there is gap in sex and Race in the earnings of primary care physicians in the United States (18). Wallace et al demonstrated that income disparities decreased during the 10 year in the United States with 1% rate annually (19). Cashin et al. have been showed the inequality of income leaded to gender gap in Central Asia (20).

In the regression model, we tried to find that the determinant factors of income differences among health professionals in Iran. The sector of the work was one of these variables. We found that the health professionals working in private sector earn more money than other ones. It may lead to shifting physicians from public to private sector. Studies showed that, financial concerns are the most important factors which effect shifting the health staff from public sector to private and led to shortage of skilled labor force in public sector (21). In a study done by Leigh et al in the United States, authors found that wages for internal medicine, surgery, and pediatric subspecialties, and other specialties were higher than primary care specialties after adjustment by age, sex, race and region (22). Similar results were found by Bodenheimer et al (23). We did not find a significant relationship between living in urban regions and income. This means that, no differences were found in the income of urban and rural health staffs. In a study done by William et al in the United States the income of physicians in urban and rural regions was adjusted by work effort, practice characteristics and physician characteristics. In this study, the authors found that physicians living in rural areas are made less than urban regions (24). Studies in the United States showed that the disparity in income in urban and rural income leaded to shortage of physicians in rural areas (25-27). In the regression model a significant relationship was found between sex and physician income which confirmed the results of propensity scoring method which has discussed later.

In this study, for the first time we calculated the Gini Coefficient of professionals physician income in Iran. In addition we used a new method for survey the professionals' income gender gap in Iran. We found the confounder variables and adjusted income for male and female with them. Our study implies that there is gender gap in professionals' income in Iran. In addition we found that there is a gap in professionals' income by type of the work and working sector (public, private). For policy decisions it is very important to notice on the income distribution of health professionals.

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