Health Expenditure and Its Human Capital Determinants in Iran

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Abstract

Background: Human capital is an effective variable on the health condition of a society and its changing changes health expenditure as the proxy of health. This study aimed to investigate the relationship between human capital determinants and health expenditure.

Methods: An empirical model was used with 7 variables included gender parity (GPI) index, literacy rate, life expectancy at birth, GDP per capita, physician per capita, and hospital's bed as the independent variable and health expenditure as depended variable. After unit root test of data by using Zivot-Andrews method, the model was estimated by ordinary least square (OLS) method.

Result: GPI had the negative and significant impact on health expenditure. Literacy had the positive and significant impact on depended variable. In addition, GDP per capita and life expectancy had positive and significant on health expenditure. Hospital bed and physician per capita did not have the significant relationship with health expenditure. The value of R-squared and Durbin-Watson statistic were 0.99 and 1.95 respectively, which showed good model fit .

Conclusion: literacy rate and GPI index as the proxy of human capital had the different impact on health expenditure. The first had positive and the latter had negative. GDP per capita had the positive impact that showed health was a normal good.

Keywords: Health Expenditure; Human capital; Education

Introduction

Health is an asset and the evidence shows that the rich (developed) societies are healthier than poor ones. Healthcare expenditure is a variable, which depends on many socio-economic factors. In addition, it is a reflex of government policy in the health sector and condition of a society from the standpoint of health (1).

Human capital is an important factor that influences the health condition of a society. It can increase health expenditure or decrease it. Increas-

ing shows the more intention of people to their wellbeing by using more the health products. On the other hand, decreasing possibly indicates the enhance knowledge of people about healthy lifestyle and preventing from become sick. Many studies have investigated the impact of human capital on health expenditure. For example, one study has evaluated the relationship between health expenditure per capita and several socio-economic, demographic and lifestyle variables (2).

The other studies showed that effect of health expenditures on economic growth by including human capital such as life expectancy (3-7). One study evaluated an empirical model by including human capital and health expenditure that health facilities were developed human capital (8).

Education as the proxy of human capital has a dynamic and complicated relationship with several components of well-being, including health. For instance, education affects health in adulthood; life expectancy affects educational investment in childhood; the health and education of parents—particularly mothers—affects both outcomes in their children. These relations like the income play an important role in the developing countries (9,10).

Iran's society has faced with many changes during these years. The literacy rate, the life expectancy at birth, and so forth has changed, so healthcare expenditure has changed as a depended variable. For example, the life expectancy at birth has varied from 68.30 yr to 75.38 yr during 1995 to 2014 (11).

We aimed to investigate the effect of determinants of human capital on the health expenditure in Iran.

Materials and Methods

The standard to measure human capital stock was largely categorized into three parts: Output, Cost, and Income-based approach (12). This study used output method. In this method, education is the main proxy of human capital. Human capital is defined by generic knowledge and skill, not specific to a task or a company, usually accumulated through working experiences and education (13). Some economists have tried to measure the stock of human capital using "school enrollment rates" as a proxy of human capital (14,15).

The case study is Iran. The data was collected from word bank group data set (WDI 2016). An empirical model was used to investigate the variables. The model had 6 variables included health

expenditure per capita as the depended variable, GDP per capita, hospital's beds, physician per capita (per 1000 people), life expectancy at birth, literacy rate, and gender parity index (GPI) as independent variables. GPI index is a socio-economic index that is presented to measure the relative access to education of males and females. This index is provided by UNESCO. This index is the composition of School enrollment at primary and secondary level. The period of study was during 1995 to 2014. It meant that this study used the time series data to estimate and it didn't used the cross section data for model. The ordinary least square (OLS) was used to estimate the model. The model is as follows:

$$LHCE_t = GDPP_t + LR_t + HB_t + PSS_t + PP_t + LE_t + U_t$$

[1]

Where $LHCE_t$ is the logaritm of health expenditure per capita, $GDPP_t$ is gross domestic production per capita, LR_t is literacy rate, HB_t is hospital bed, PSS_t is the GPI index, PP_t is the physician per capita (per 1000 people), LE_t is life expectancy at birth, and U_t is error term.

Results

First, stationary of the variable should be checked to estimate the model. The result of unit root test is presented in Table 1. As can be seen from Table 1, the variables were stationary and the OLS method can be used to estimate the model. Zivot-Andrews test was used to test being stationary of variables because this test considers to the structural break.

As shown from Table 1, the variables were stationary. So, OLS method can be used to estimate the model. The result of estimation has been presented in Table 2.

The result showed that the model was good fitted because of R-squared and Durbin-Watson Statistic were 0.99 and 1.95 respectively.

Table 1: The result of Zivot-Andrews unit root test

Variable	t-test	P-value
LCHE	-5.64	0.000
GDPP	-4.48	0.000
LR	-5.50	0.001
HB	-6.46	0.000
PSS	-5.07	0.019
PP	-4.92	0.030
LE	-8.32	0.039

Table 2: The result of estimating the model

Variables	Coefficient	t-test	P-value
GDPP	0.0002	4.58	0.001
LR	0.0446	2.23	0.049
HB	-9.9187	-1.57	0.273
PSS	-4.4897	-2.33	0.042
PP	0.2061	0.27	0.789
LE	0.1818	1.84	0.098
C	-6.4078	-0.97	0.353
R-squared	0.99	Durbin-Watson	1.66
F-statistic	0.00		

Discussion

The trend of health expenditure per capita has been showed in Fig. 1 in terms of the constant US dollar based on 2011. The total trend (the black and direct line in the figure) of this variable shows that it was increasing during 1995 to 2014. However, the amount of expenditure has been decreased from 2011 to 2013 that mostly shows the impact of the sanctions on Iran. Although, the trend of health expenditure has been increasing during 1995 to 2014, the amount of expenditure is low compared with developed countries and some countries in EMRO area as illustrated in Fig. 2. In addition, the condition of health shows that the amount of expenditure should increase to meet goals in Iran. As can be seen from Fig. 2, health expenditure in Iran compared with other countries showed that Iran's expenditure is higher than Egypt. It is approximately as much as Turkey's expenditure. However, it is lower than other countries like Saudi Arabia, Qatar, and Kuwait (some EMRO countries), Germany, and United Kingdom (as developed countries with different financing system). Furthermore, Iran's Expenditure indicates there is a very different between health expenditure in Iran compared with countries like Germany and United Kingdom.
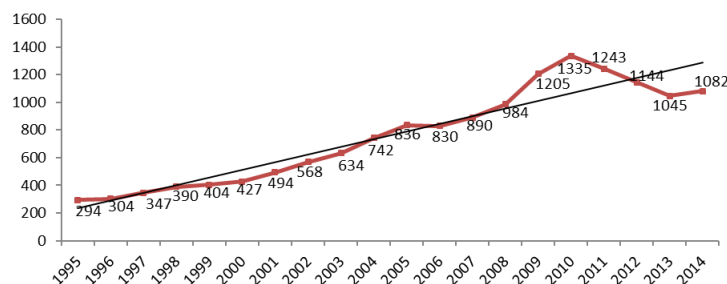

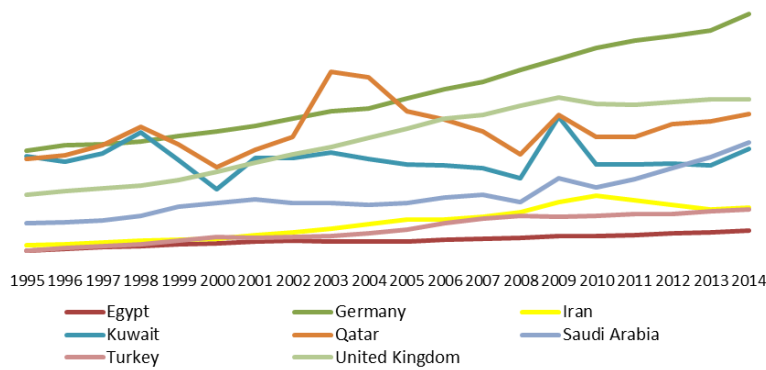**Fig. 1:** Health expenditure per capita (Constant 2011 $)

Fig. 2: Comparing health expenditure per capita in selective countries

According to Table 2, 4 variables included GDP per capita, literacy rate, GPI, and life expected at birth had the significant impact on health expenditure in Iran. The other variables consisted of the hospital's bed and physician per capita did not have the significant impact on health expenditure in Iran .

GDP per capita had the positive and significant impact on health expenditure. When GDP per capita changed 1 unit, health expenditure increased 0.0002 percent. It indicated that health, as a good in Iran's economy was not an inferior good during the period of study. Therefore, there are two implications from this positive relationship. First, as the income become more and more in Iran's society, the government should manage and direct the expenditure to strategic goals in health sector. Second, changing the health expenditure is parallel with the income and the government should predict the possible changes and consider them in its plans in the short run. The obtained result is accordance with some studies (2,9,16).

Literacy rate had positive and significant on health expenditure in Iran. It may indicate the importance of health has increased in Iran's social with increasing literacy rate, so health expenditure has increased. The result showed that when literacy rate changed 1 unit, health expenditure has been changed 0.0446 percent. The sign of literacy rate showed that the importance of healthy lifestyle is enhanced by increasing literacy rate and people have used more goods and ser-

vices in the health sector. The obtained result is accordance with other studies (2,9).

GPI index as a measure of the relative access to education of males and females had the negative and significant impact on health expenditure. According to the results, when GPI index varied 1 unit, health expenditure has been changed -4.4897. GPI index shows the access of female to education respect o males. In fact, equal access leads to have more educated females. Educated females can effect on health expenditure by proper taking care of children.

Life expectancy at birth had the positive and significant impact on health expenditure. This result was expected, because increasing age of a social increases health expenditure in that society. When life expectancy at birth has increased 1 unit, health expenditure has been varied 0.1818 percent.

Conclusion

This study has analyzed the determinants of healthcare expenditure from the standpoint of human capital from 1995–2014. Human capital that consider in this study by two variables including GPI index and literacy rate has different effect on health expenditure. GPI index showed negative affect on health expenditure that means policymakers can reduce expenditure by more access of females to education. Furthermore, the impact of literacy rate was the positive on expenditure that means policymakers should expect

increasing expenditure with enhance literacy rate and consider it in their plans. One limit of this study was the access to data specially detailed data. The paper proposes that the impact of human capital by using other approaches is investigated on health expenditure.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interest.

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