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Contents

Identifying the Causality Relationship between Health Expenditure and Economic Growth: An Application on E7 Countries

Hasan DİNÇER[1]
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ABSTRACT

This study aims to identify the causality relationship between health expenditure and economic growth in emerging economies. Within this framework, E7 countries are evaluated by using Pedroni panel cointegration method and Dumitrescu Hurlin panel causality analysis. For this purpose, annual data for the years between 1996 and 2016 is considered. As a result of Pedroni panel cointegration test, it is defined that there is a long run relationship between economic growth with total health expenditure and public health expenditure, but this relationship is not valid between private health care expenditure and economic growth. According to Dumitrescu Hurlin panel causality analysis results, it is concluded that there is not a causality relationship from the health expenditure to the economic growth. However, it is also determined that economic growth is the main cause of total, public and private health expenditure. Therefore, it is recommended that the role of private sector in health should be improved so that the health expenditure can have a positive contribution to the economic development of emerging countries.

Keywords: Health Expenditure, E7 Countries, Economic Growth, Pedroni Panel Cointegration Analysis, Dumitrescu Hurlin Panel Causality Analysis.

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INTRODUCTION

Economic growth is the most important purpose of the countries. The main reason of this issue is that it explains the development of these countries. In other words, when economic growth increases, it means that production of the goods and services in this country goes up as well (Barro, 1991). Another important point of economic growth is that it is a very significant indicator of the economy of the country on the eyes of foreign investors. Hence, foreign investors prefer to invest to the countries that have high economic growth. Because of this condition, countries aim to take many actions in order to provide economic growth (Acemoğlu and Restrepo, 2017; Lisowsky et. al., 2017).

Health expenditure is the factor that shows the life quality of people. Since the health is an essential issue in the lives of the people, any expenditure that contributes to people's health has a positive influence on the welfare (Grigoli and Kapsoli, 2018). Therefore, it is accepted as the important aspect which gives information about the development of a country. Due to this condition, each country in the world aims to increase health expenditure (Stubbs et. al., 2017; Yip et. al., 2017). Within this framework, some governments make public health expenditure whereas some other countries try to attract the attention of private investors.

The relationship between economic growth and health care expenditure is a much-discussed topic in the literature. Most of the authors argue that health expenditure has a contribution to the economic improvement (Piabuo and Tieguhong, 2017; Erçelik, 201; Naidu and Chand, 2013). On the other hand, some researchers also believe that the countries, which have high economic growth, make more health expenditure (Wang et. al., 2018; Khoshnevis Yazdi and Khanalizadeh, 2017). In addition to them, the bidirectional relationship between these two different variables is also underlined (Mukherjee, 2017; Khan et. al., 2016). Moreover, some researchers also emphasize the importance of public health expenditure on economic improvement of the countries (Ghanbari and Basakha, 2008; Odior, 2011). Thus, it can be said that the studies that focus on this topic are very important in economic development of the countries.

Emerging countries refer to the countries that have not been developed yet.

Nevertheless, it is thought that they have a potential to grow (Karwowski and Stockhammer, 2017). Due to this situation, these countries try to take some actions in order to achieve this objective. For example, these countries may provide some incentives to the foreign investors to attract their attention (Armanios et. al., 2017). Thus, it can be possible to have economic development by increasing investments and decreasing unemployment rate. Within this context, health expenditure also plays a key role for this purpose because when the health level of the people goes up, they can be more productive (Jakovljevic et. al., 2017).

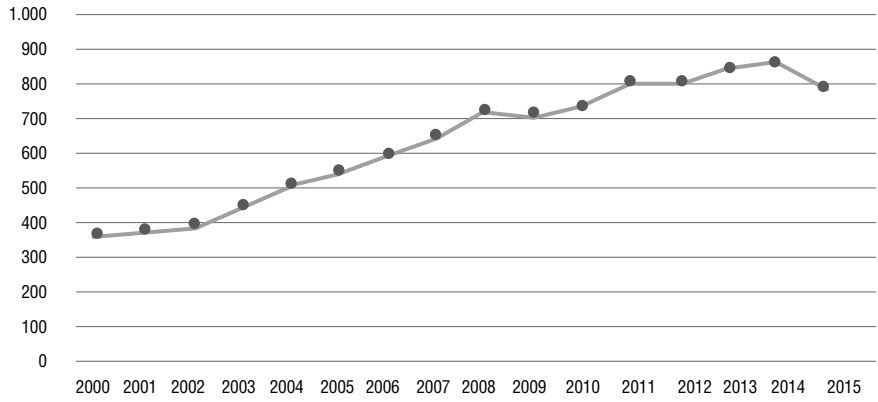
Parallel to the issues emphasized above, in this study, it is aimed to understand the causality relationship between economic growth and health expenditure. For this purpose, E7 countries are evaluated by using Pedroni panel cointegration method and Dumitrescu Hurlin panel causality analysis. In addition to these aspects, annual data for these variables between 1996 and 2016 is used. Also, in this process, the effects of public and private expenditure on economic development are taken into the consideration. As a result of this analysis, it can be possible to present recommendations that have a contribution to the development of emerging countries.

This study consists of 5 different sections. After the introduction part, some quantitative information about the health expenditure is given in the second part. In this section, the difference in health expenditure between different regions is shared. Moreover, the third part focuses on the details of similar studies in the literature. Therefore, it is aimed to identify the missing area in the literature related to this topic. Furthermore, in the fourth section, an application on E7 countries is given by using Pedroni panel cointegration method and Dumitrescu Hurlin panel causality analysis. Finally, recommendations are presented on the final part.

QUANTITATIVE INFORMATION ABOUT HEALTH EXPENDITURE

Health expenditure is accepted as a significant indicator of economic development. Hence, countries aim to increase the amount of this expenditure. Figure 1 illustrates the trends in current health expenditure in the world in the last decade.

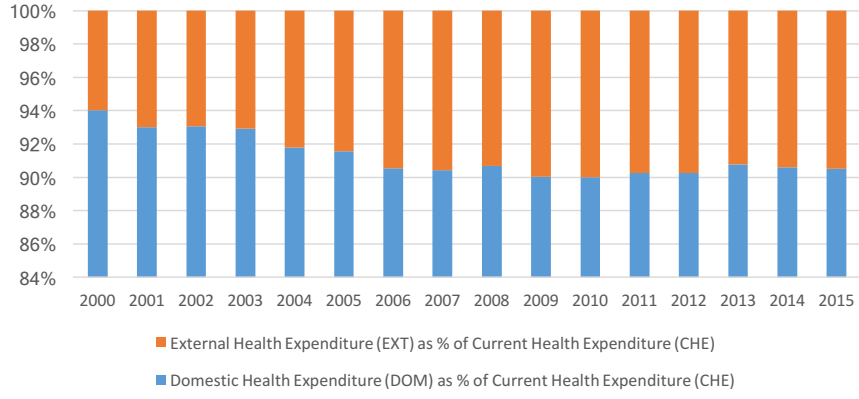
Figure 1: Current Health Expenditure per Capita in US$



Source: *World Health Organization (WHO)*

Figure 1 gives information that current health expenditure has an increasing trend in last 10 years. This situation shows that most of the countries all around the world give importance to the health expenditure. For example, while the average of current health expenditure per capita was 345$ in 2000, this amount jumped to the amount of 822$ in 2015. In addition to this aspect, Figure 2 shows the changes in the domestic and external health expenditure.

Figure 2: Domestic and External Health Expenditure as % of Current Health Expenditure

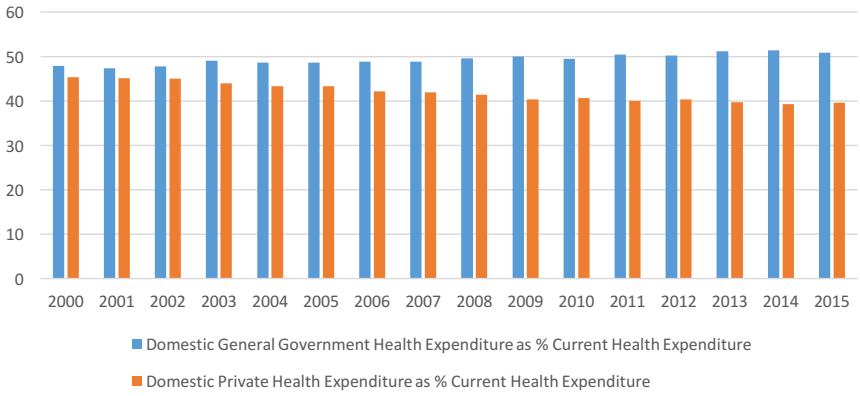


Source: *WHO*

Figure 2 states that there is not a significant change in the ratio of domestic

and external health expenditure. Another important point in this figure is that domestic health expenditure has a very high percentage in comparison with external health expenditure. Figure 3 demonstrates the percentage of government and private health expenditure in the last years.

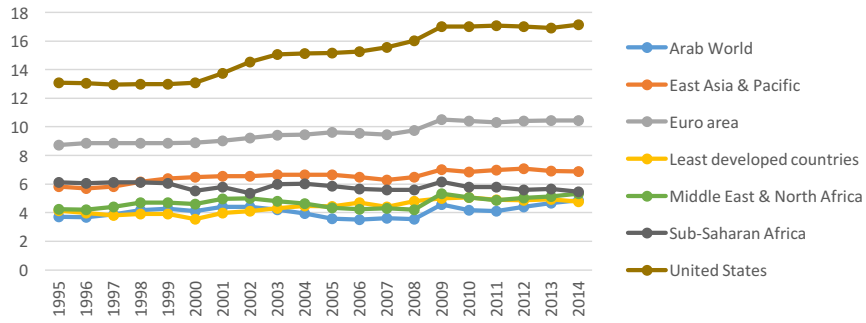
Figure 3: Government and Private Health Expenditure as % of Current Health Expenditure



Source: *WHO*

Figure 3 indicates that domestic government health expenditure is greater than domestic private health expenditure. In addition to this condition, it can also be seen that there is an increase in this difference especially in the last years. Figure 4 illustrates the total health expenditure for selected regions in the world as the percentage of GDP.

Figure 4: Total Health Expenditure of Selected Regions (% of GDP)



Source: *World Bank*

Figure 4 explains that the United States has the highest health expenditure ratio all around the world. Additionally, Euro area has also high percentage in comparison with other areas. On the other side, less developed countries and Africa have very low health expenditure percentage. While looking at this information, it can be understood that health expenditure percentage of GDP has a positive correlation with the income level of the countries.

LITERATURE REVIEW

The relationship between health expenditure and economic growth is evaluated by many different studies in the literature. Some selected studies are demonstrated in Table 1.

Table 1: Selected Studies in the Literature

Authors	Scope	Method	Result
Carrin and Politi (1996)	Least Developed Countries	Regression	The level of economic growth is an important indicator of health expenditure.
Leidl (1998)	European Countries	Granger Causality Analysis	Health care expenditure and economic growth affect each other significantly.
Scheffler (2004)	US	Descriptive Statistics	Health care expenditure leads to economic improvement.
Mojtahed and Javadipour (2004)	Developing Countries	Regression	It is concluded that health expenditure contributes to economic development.
Chang and Ying (2006)	15 OECD Countries	Descriptive Statistics	It is identified that there is a positive correlation between economic development and health care expenditure.
Ghanbari and Basakha (2008)	Iran	Regression	Government health expenditure in Iran positively affects economic improvement.
Haldar (2008)	India	Granger Causality Analysis	There is two-way causality relationship between economic growth and health care expenditure.
Bukenya (2009)	US	VAR Model	There is a positive relationship between health care expenditure and economic development.
Emadzadeh et. al. (2011)	Developing Countries	Regression	Health care has a positive effect on economic growth.
Balaji (2011)	India	Granger Causality Analysis	When there is an economic growth, the health care expenditure increases.

Wang (2011)	31 Different Countries	VECM Model	It is defined that health care expenditure has a positive influence on economic development.
Mehrara and Musai (2011)	Iran	Granger Causality Analysis	GDP growth is accepted as the significant cause of health expenditure.
Odior (2011)	Nigeria	Simulation Analysis	Public health expenditure leads to economic development.
Ogundipe and Lawal (2011)	Nigeria	Regression	Health care investment is the way of improving the economy.
Bakare and Olubokun (2011)	Nigeria	Regression	There is a positive relationship between health care expenditure and economic growth.
Luo (2011)	China	Data Envelopment Analysis	Public health expenditure has a positive influence on economic improvement.
Keehan et. al. (2012)	US	Descriptive Statistics	National health expenditure has a positive influence on economic growth.
Nasiru and Usman (2012)	Nigeria	ARDL	There is bidirectional relationship between health care and economic development.
Odubunmi et. al. (2012)	Nigeria	Johansen Cointegration Analysis	Health expenditure has a strong effect on economic improvement.
Cylus et. al. (2012)	24 European Countries	Descriptive Statistics	In case of economic recession, health care expenditure decreases.
Naidu and Chand (2013)	Pacific Island Countries	Regression	Health care expenditure is an important factor to have economic improvement.
Safdari et. al. (2013)	Iran	VAR	Health expenditure has a positive influence on economic growth.
Öztürk and Ada (2013)	European Countries	Johansen Cointegration Analysis	There is a bidirectional causality relationship between economic development of the countries and health expenditure.
Mehmood et. al. (2014)	26 Asian Countries	Granger Causality Analysis	There is a causality relationship from economic growth to the health expenditure.
Khan et. al. (2016)	SAARC Countries	Kao Panel Cointegration Analysis	There is two-way correlation between economic improvement and health expenditure.
Halıcı-Tülüce et. al. (2016)	44 Different Countries	GMM	There is a negative relationship between private health expenditure and economic growth.
Atılgan et. al. (2017)	Turkey	ARDL Method	Health care expenditure has a significant contribution to the economic growth.

De Mendonça and Baca (2017)	75 Developing Countries	Regression	Public health expenditure positively affects economic growth.
Aboubacar and Xu (2017)	African Countries	GMM	Health expenditure is accepted as the significant indicator of economic growth.
Mukherjee (2017)	India	VECM	It is concluded that health expenditure and economic growth affect each other
Khoshnevis Yazdi and Khanalizadeh (2017)	MENA Countries	ARDL	Economic growth causes higher health expenditure.
Piabuo and Tieguhong (2017)	African Countries	Regression	Any increase in health care expenditure has a positive influence on economic growth.
Wang and Lee (2018)	24 Different Countries	Regression	In case of increase in health care expenditure, economic growth will be affected positively.
Erçelik (2018)	Turkey	ARDL	There is a significant relationship between health expenditure and economic development.
Wang et. al. (2018)	22 Different Countries	VAR	When economic growth decreases, it has a negative effect on health expenditure.

Table 1 shows that most of the studies focus on the impact of health expenditure on economic growth. For example, Wang and Lee (2018) conducted a study to analyze this relationship in 24 different countries. By using regression analysis, it is determined that health care expenditure has a significant contribution to the economic growth. Moreover, Piabuo and Tieguhong (2017), Naidu and Chand (2013), Bakare and Olubokun (2011), Ogundipe and Lawal (2011), Emadzadeh et. al. (2011) and Mojtahed and Javadipour (2004) also reached the similar result by using the same methodology. Furthermore, Erçelik (2018) and Atılgan et. al. (2017) identified that health care expenditure has a positive influence on economic development with the help of ARDL methodology.

In addition to these studies, Bukenya (2009) tried to define the influence of health care expenditure on economic improvement of US. As a result of VAR analysis, it is concluded that health expenditure is accepted as the significant indicator of economic growth. Scheffler (2004) and Keehan et. al. (2012) also emphasized the same issue by using different methodology. Additionally, Wang (2011) focused on this relationship in 31 different countries. With the help of VECM, it is determined that health expenditure has a strong effect on economic improvement. Similarly, Chang and Ying (2006), Odubunmi et. al.

(2012), Safdari et. al. (2013) and Aboubacar and Xu (2017) also underlined the same situation for different countries, such as Iran and Nigeria.

By looking at Table 1, it can also be understood that some studies stated the opposite way of relationship between these variables. For instance, Wang et. al. (2018) aimed to identify this relationship in 22 different countries. By using VAR analysis, they determined that there is a causality relationship from economic growth to the health expenditure. Parallel to this study, Balaji (2011), Mehrara and Musai (2011) and Mehmood et. al. (2014) also reached this conclusion with the help of Granger causality analysis. Moreover, Carrin and Politi (1996), Cylus et. al. (2012) and Khoshnevis Yazdi and Khanalizadeh (2017) also identified that the level of economic growth is an important indicator of health expenditure.

Additionally, it is also seen that in some studies, mutual relationship between economic growth and health care expenditure is underlined. As an example, Mukherjee (2017) tried to define the relationship between these two variables in India. According to the VECM results, it is understood that there is a bidirectional causality relationship between economic development of the countries and health expenditure. Haldar (2008) also emphasized the similar aspect for the same country by using Granger causality analysis. Furthermore, Leidl (1998), Nasiru and Usman (2012), Öztürk and Ada (2013) and Khan et. al. (2016) are also other studies that showed the importance on two-way causality relationship between economic growth and health expenditure.

Moreover, it is also stated that some other studies made more specific analysis within this context. For instance, De Mendonça and Baca (2017) focused on 75 different developing economies by using regression analysis. They defined that public health expenditure positively affects economic growth. In addition to this study, Ghanbari and Basakha (2008), Odior (2011) and Luo (2011) also identified that public health expenditure has a positive influence on economic improvement. On the other hand, Halıcı-Tülüce et. al. (2016) conducted a study to evaluate the relationship between economic growth and health expenditure. With the help of GMM methodology, they concluded that there is a negative relationship between private health expenditure and economic growth.

While considering the studies emphasized in Table 1, it can be understood that the relationship between economic improvement and health care expenditure

attracted the attention of many different researchers. Owing to this aspect, many different studies were carried out for different countries. In addition to this condition, it can also be seen that different types of the methodology are also taken into the consideration, such as regression, VECM, Granger causality analysis and ARDL. Nevertheless, it is identified that there is a need for a new study in which the effects of public and private health expenditure on the economic growth are evaluated. Hence, making this kind of analysis with an original methodology makes a significant contribution to the literature.

AN EVALUATION ON E7 COUNTRIES

DATA AND SCOPE

In this study E7 countries are taken into the consideration. They are the biggest emerging economies, such as Brazil, China, India, Indonesia, Mexico, Russia, and Turkey. In the evaluation process, 3 different analyzes are performed to see the effect of total, public and private health expenditure on economic growth. The ratios of all health expenditures to the GDP are used. Moreover, with respect to the economic growth, annual GDP growth is considered. Annual data of these variables between the years 1996 and 2016 is used and this data is provided from the website of World Bank.

PEDRONI PANEL COINTEGRATION ANALYSIS

Cointegration analysis is used to understand whether there is a long-term relationship between the variables. In Pedroni panel cointegration analysis, there are 7 different tests which are Panel v-Statistic, Panel rho-Statistic, Panel PP-Statistic, Panel ADF-Statistic, Group rho-Statistic, Group PP-Statistic and Group ADF-Statistic. This methodology is suitable while making evaluation by using panel data. In this test, probability values of all these 7 tests are calculated. If the probability values of 4 or more tests are lower than 0.05, it means that there is cointegration between the variables. In other words, it can be said that these variables have long-run relationship (Pedroni, 2001; Pedroni, 1996).

DUMITRESCU HURLIN PANEL CAUSALITY ANALYSIS

Dumitrescu Hurlin panel causality analysis is the methodology which aims to understand the causal relationship between the variables. It is accepted as the advanced version of Granger causality analysis. In this approach, it is possible to evaluate by using panel data. The equation of Dumitrescu Hurlin panel causality analysis is shown below.

$$Y_{i,t} = a_i + \sum_{k=1}^{K} Y_i^k \, Y_{i,t-k} + \sum_{k=1}^{K} B_i^k \, X_{i,t-k} + \varepsilon_{i,t} \quad (1)$$

In this equation, X and Y represent the variables. Therefore, the aim of this methodology is to determine whether X is the main cause of Y. Furthermore, B is the coefficient of the variable and a is the constant term. Additionally, ϵ refers to the error term and K gives information about the optimal lag interval (Dumitrescu and Hurlin, 2012).

Dumitrescu Hurlin panel causality analysis is studied in many different studies. For example, Latif et. al. (2017), Paramati et. al. (2016) and Adalı and Yüksel (2017) focused on the causality relationship between foreign direct investment and economic growth. In addition to these studies, Dinçer et. al. (2017), Hasanov et. al. (2017) and Kahia et. al. (2017) evaluated the causality relationship between economic growth and energy consumption. Moreover, the relationship between financial development and economic growth is emphasized by using Dumitrescu Hurlin panel causality analysis in many different studies (Aydın and Malcıoğlu, 2016; Salahuddin and Alam, 2016; Abubakar et. al., 2015). Khan et. al. (2016), Tunalı (2018) and Amiri and Linden (2016) are the studies that used Dumitrescu Hurlin panel causality analysis in health sector.

ANALYSIS RESULTS FOR E7 ECONOMIES

In order to understand whether there is a long-term relationship between health expenditure and economic growth, panel cointegration model is used. Within this scope, firstly, panel unit root test is performed to see whether the variables are stationary or not. The details of Im, Pesaran and Shin panel unit root test are given on Table 2.

Table 2: Im, Pesaran and Shin Panel Unit Root Test Results

Variables	Level Value (probability)	First Difference (probability)
Total Health Expenditure	0.4241	0.0000
Public Health Expenditure	0.4574	0.0000
Private Health Expenditure	0.1933	0.0001
Economic Growth	0.0615	0.0000

Table 2 gives information that level probability values of all 4 variables are higher than 0.05. It shows that these variables have unit roots. Therefore, the first differences of these variables are taken into the consideration, and it is seen that all new probability values are less than 0.05. It is identified that all variables become stationary in their first differences. While considering these aspects, it is concluded that unit root test results satisfy the precondition of panel cointegration analysis. After stationary analysis, Pedroni panel cointegration test is performed to define the relationship between these variables. The details of this test are demonstrated on Table 3.

Table 3: Pedroni Panel Cointegration Test Results

Relationship Type	Test Name	Probability Values
The relationship between total health expenditure and economic growth	Panel v-Statistic	0.0365
	Panel rho-Statistic	0.0000
	Panel PP-Statistic	0.0000
	Panel ADF-Statistic	0.0000
	Group rho-Statistic	0.0021
	Group PP-Statistic	0.0000
	Group ADF-Statistic	0.0001
The relationship between public health expenditure and economic growth	Panel v-Statistic	0.4358
	Panel rho-Statistic	0.1878
	Panel PP-Statistic	0.0028
	Panel ADF-Statistic	0.0093
	Group rho-Statistic	0.6027
	Group PP-Statistic	0.0009
	Group ADF-Statistic	0.0167
The relationship between private health expenditure and economic growth	Panel v-Statistic	0.8921

	Panel rho-Statistic	0.8249
	Panel PP-Statistic	0.4104
	Panel ADF-Statistic	0.2178
	Group rho-Statistic	0.9666
	Group PP-Statistic	0.6936
	Group ADF-Statistic	0.1991

Table 3 gives information that with respect to the relationship between total health expenditure and economic growth, the probability values of all 7 different tests are lower than 0.05. Therefore, it is determined that the null hypothesis of "no cointegration" is rejected. In other words, it can be seen that there is a long-run relationship between total health expenditure and economic growth for these countries. Moreover, as for the relationship between public health expenditure and economic growth, it can be understood that the probability values of 4 different tests are lower than 0.05 whereas for other 3 tests, these values are greater than 0.05. Hence, it is concluded that there is a long-run relationship between public health expenditure and economic growth.

In addition to these issues, regarding the relationship between private health expenditure and economic growth, it can be seen that probability values of all 7 different tests are higher than 0.05. While considering these results, the null hypothesis cannot be rejected. Thus, it is identified that there is not a long-run relationship between private health care expenditure and economic growth. After making panel cointegration analysis, panel causality analysis is also performed by using Dumitrescu Hurlin methodology. The details of this analysis are explained in Table 4.

Table 4: Dumitrescu Hurlin Panel Causality Analysis Results

The Way of the Relationship	Lag	Probability Values	Results
Total Health Expenditure → Economic Growth	1	0.6304	Total health expenditure does not cause economic growth.
	2	0.9158	
	3	0.4429	
Economic Growth → Total Health Expenditure	1	0.0000	Economic growth is the main cause of total health care expenditure.
	2	0.0000	
	3	0.0000	

Public Health Expenditure → Economic Growth	1	0.7030	Public health expenditure does not cause economic growth.
	2	0.7910	
	3	0.6992	
Economic Growth → Public Health Expenditure	1	0.0543	Economic growth is the main cause of public health care expenditure.
	2	0.0000	
	3	0.0000	
Private Health Expenditure → Economic Growth	1	0.0003	Private health expenditure does not cause economic growth.
	2	0.2245	
	3	0.7190	
Economic Growth → Private Health Expenditure	1	0.0000	Economic growth is the main cause of private health care expenditure.
	2	0.0000	
	3	0.0223	

Table 4 explains that there is not a causality relationship from the total health expenditure to the economic growth. The main reason is that the probability values of all lags are greater than 0.05. This situation is also similar with respect to the relationship from public health expenditure to the economic growth. Hence, the null hypothesis of "no causality relationship" cannot be rejected. Furthermore, as for the causality relationship from private health expenditure to the economic growth, the probability value for lag 1 (0.0003) is lower than 0.05. In spite of this situation, it can also be seen that the probability values for other lags are greater than 0.05. Hence, it can be said that private health expenditure does not cause economic growth.

Additionally, regarding the relationship from economic growth to the total health expenditure, it is defined that probability values of all lags are lower than 0.05. This situation indicates that the null hypothesis of "no causality relationship" can be rejected. Similar to this issue, all probability values are also lower than 0.05 with respect to the relationship from economic growth to the public and private health expenditure. Therefore, it can be concluded that in addition to the causality relationship between economic growth and total health expenditure, it can also be said that economic growth leads to higher public and private health expenditure for E7 countries.

CONCLUSION

Health expenditure plays a key role in the economic improvement of emerging economies. When people in these countries become healthier, they

can be more productive. Hence, it is believed that health expenditure has a contributing effect for emerging countries to reach the developed status. Because of this situation, many emerging countries try to take some actions so as to increase health expenditure. The main purpose behind this issue is to increase investment and decrease unemployment rate so that it can be possible to have economic development.

In this study, it is aimed to evaluate the relationship between economic growth and health expenditure in emerging economies. Within this context, E7 countries are examined by using Pedroni panel cointegration method and Dumitrescu Hurlin panel causality analysis. For this purpose, annual data for the years between 1996 and 2016 is considered to reach this objective. Moreover, two different additional analyses are also performed in order to identify whether public and private health care expenditure has an influence on economic improvement of these countries.

In the first process of the analysis, Im, Pesaran and Shin panel unit root test is performed to understand whether the variables are stationary or not. It is understood that level probability values of all 4 variables are higher than 0.05 and these values for the first difference of these variables are lower than 0.05. Hence, it is defined that variables become stationary in their first difference. Hence, it can be understood that panel unit root test results satisfy the precondition of panel cointegration analysis.

After stationary analysis, Pedroni panel cointegration test is performed to identify the relationship between these variables. Firstly, it is determined that the null hypothesis of "no cointegration" is rejected with respect to the relationship between total health expenditure and economic growth. It can also be seen that there is a long-run relationship between public health expenditure and economic growth. On the other side, it is identified that there is not a long-run relationship between private health care expenditure and economic growth.

According to Dumitrescu Hurlin panel causality analysis, it is concluded that there is not a causality relationship from the total health expenditure to the economic growth. Similarly, a significant causality relationship cannot be found between economic growth and public and private health care expenditure. On the other hand, it is determined that economic growth is the

main reason of total health expenditure, public health expenditure and private health expenditure.

By considering these results, it can be stated that health expenditure does not have a contributing influence on economic development of emerging countries. Nevertheless, it is concluded that when economic growth of these emerging countries increases, they can give more importance to health care expenditure. This situation is also underlined in many different studies in the literature (Carrin and Politi, 1996; Cylus et. al., 2012; Khoshnevis Yazdi and Khanalizadeh, 2017).

In emerging economies, government health expenditure is greater than private health expenditure and this difference is growing especially in recent years. Therefore, according to these results, it can be recommended that the role of private sector in health should be increased. This study aims to make contribution to the literature by focusing on this important topic for emerging economies. However, it is thought that a new study that also covers developed economies is also very beneficial.

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The Correlation Analysis of Relative Values of DRGs and the National Health Public Health Service Tariffs in Turkey

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ABSTRACT

This study aims to analyze the correlation between the prices of public health service tariff (SUT) based on fee for service in Turkey with the DRGs which have being disseminated since 2009 in public hospitals in Turkey.

For this analysis, the inpatient patient data of Istanbul Haydarpaşa Numune Training and Research Hospital for 2015 were taken as basis and the 28,493 files that the hospital sent to Social Security Institution (SSI) and provisioned via SUT and the accrued amounts were obtained. Then the DRGs were obtained from the Ministry of Health's DRG application for the same cases. DRGs with fewer than 3 files were excluded from the calculation and 28,365 files were studied.

The correlation between the SUT prices of 28,365 files and the DRG's relative values of each file were calculated as 0.67 (medium related). The correlation between the average SUT prices of the 403 DRG groups corresponding to these files and the relative values were calculated as 0.79 (high correlation). When we investigate this relation based on the major diagnostic classification (MDC) of the DRGs, the relation between the file prices and the DRG relative values

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are calculated as very weak in 7 MDCs, weak in 9 MDCs, medium in 5 MDCs, high in 1 MDC. The relationship between average SUT prices of each DRG group and their relative values are also calculated as very weak in 1 MDC, weak in 4 MDCs, medium in 4 MDCs, high in 8 MDCs and very high in 5 MDCs.
The result of this analysis shows us the public healthcare service prices are medium and/or highly related with the relative values of DRGs applied in Turkey. Moreover, there are some issues to study on particularly DRGs of some MDCs which have weak and very weak relation with SUT prices (or vice versa).
Keywords: DRG, Diagnosis Related Groups, Correlation, Fee for Service, National Tariffs,

INTRODUCTION

As much as the service itself in the management of healthcare in the world, the payment models of health care are also important. The important stakeholders that make up the healthcare system are health service servers, people receiving services and repaid institutions. In Turkey, the reimbursement model and the person receiving the service are paid to the institution serving the appropriate by source according to the health assurance. Widely used and accepted payment models are as follows (Uzman, 2015):

1. Fixed budget-based payment
2. Pay per service
3. Pay per capita
4. Pay per diem
5. Pay per case

Among these models, the case-based payment model, which has been increasingly widespread in the last 30 years, is built on Diagnosis related groups-DRG. Originally reformed by Fetter and his friends at Yale University in the 1960s (Robert B. Fetter, n.d.) DRG, has emerged in other countries in this area. The world's leading countries in terms of DRG use are seen as Australia, Canada and Norway (Başara, 2015). The first purpose of the emergence of DRG is to measure the costs of hospitals ' services and to help increase their productivity with a performance-based approach (Robert B. Fetter, n.d.). However, the case-based grouping capacity of the services provided by the DRG, in a very short time with the attention of health repayment institutions,

a period of time after the DRG "pay per case" model was born (Narmanli et al., 2012) and is among the performance-based refund models in healthcare institutions (Lilford, Richard J, Brown, Celia A, & Nicholl, 2007). The case-by-case payment model, starting from the hospital patient's discharge, determination of the case group (DRG) based on the diagnosis by a grouper (Narmanli et al., 2012) and mentioned health service. According to the relevant DRG is based on the basis (AKYÜREK, 2012). DRG has a numerical value (relative value) that represents the size of the cost. In principle, the relative value of each DRG is expected to be determined periodically according to the average health service costs calculated throughout the country (Ayanoğlu, Beylik, & Orhan, 2014) (TÜKEL, 2010).

The payment to a case is not only the DRG that the case belongs to, it also depends on the case mix index, which shows how many health services the hospital offers (Turkish Republic Ministry of Health DGS Directory, 2014). As such DRG implementation, it offers a simple, flexible and traceable model according to the methods of pay per service, etc. for reimbursement agencies (Narmanli et al., 2012).

It is seen that countries that do not have DRG use DRG in numbers ranging from 600 to 1387 (K.Aksoy, 2017), they collect these groups under the Major Diagnostic Category (MDC), which varies between 20-40 (Güler, Şencan, Şeker, & Demir, 2013).

DRG APPLICATION IN TURKEY

The largest share of health assurance in Turkey belongs to the state-owned Social Security Institution (SGK). SGK has been actively implementing the pay-per-transaction model through the MEDULA system, which is a central provision system which is a central provision system implemented in 2007. The health process codes and all payment rules are updated annually in the pay-per-transaction model and are stated in the Health Service Tariff (SUT). Although a package-based structure is included in the SUT, especially for surgical procedures, these packages consist of a number of groupings made for easy operation of the pay-per-transaction model, rather than a case-based analysis, such as DRG. The Ministry of Health of the Republic of Turkey from 2009 to the global budget implementation, as well as payments made

to state hospitals, both SUT and DRG have begun to be referenced together. However, the SUT is a model that requires a process/package based and pre-service provision; DRG is based on the weight of the DRG group (relative value) and Case Mix index (VKI) which is based on the final discharge data set, which is confirmed after the patient is discharged (Hakan İstanbulluoğlu, Mahir Güleç, 2010). In addition, the functioning of the need of SUT and DRG and the different types of wages that they correspond to are a major risk for hospitals to be subjected to significant revenue losses during the transition from the pay per case model. Indeed, in 2009, the fees for the specified SUT have not been changed since then. In addition, these fees are determined and there is no average cost account across the country. On the other hand, the DRG used in Turkey has been transferred from the Australian model and a comprehensive cost study has not been made about how the relative values of 661 DRG correspond. For this purpose, although a project called "Infrastructure development project for strengthening and restructuring of health services financing structure" was conducted in cooperation with the Ministry of Health, SGK and Hacettepe University between the years 2005-2009, due to technical and practical difficulties in measuring the costs of health services, DRG's relative values have not been able to be determined (Yap & Yap, 2007).

As a result, what is used as a pay-per transaction model sin 2007, neither SUTs (SUT's; nor could we say that DRG) nor DRG were charged according to the National Health Service costs. This model became commonly used beginning in 2009.

In addition, if the same service is paid with the SUT and DRG the difference in the price varies, as a significant risk to the proliferation of DRG. However, there was no study of the differences between the SUT prices in Turkey and the DRG relative values or how the relationship was related.

It is known that the prices of the SUT and DRG relative values do not represent the exact same thing. SUT prices, not the cost of hospitals, it represents the amount (fee) payable by SGK in exchange for the service (Prof. Dr. M. Raşit TÜKEL, 2010). On the other hand, it is not entirely independent of the costs of the service with the current SUT prices; the amount to be paid to the hospital from the country is taken into consideration as the amounts of SUT. DRG Relative values must be calculated in principle based on local service,

consumables and device costs. However, there has been no comprehensive change in the relative values of DRG transferred from Australia, the relative values cannot be claimed to represent the costs in Turkey. In this case, the dispute between the DRG relative values in Turkey and the calculated case rates based on the SUT is a subject worth examining.

The aim of this study is to analyze the relationship between DRG relative values that correspond to the same cases as the service amounts accrued according to the price of the SUT in the pay for service model in Turkey.

The following sections of the article are defined as follows: Part 2 will mention the scope of our research and the methods implemented, and the results obtained are shared in section 3. In the last chapter, the results will be evaluated, and some suggestions are offered for further studies.

METHODS

The methods implemented in the study are given in order. It was evaluated under 4 main headings as data acquisition, pre-processing and data conversion, visualization and analytic, and correlation analysis.

DATA ACQUISITION

In the research, the SUT and DRG data of Haydarpaşa Numune Training and Research Hospital was obtained from the year 2015. The headings contained in the raw data set are respectively; the patient's service, DRG code, DRG description, relative value, SUT invoice price, hospitalization date, release date, diagnosis, type of admission, permission status, number of days of hospitalization, score, age, year of birth, branch, output shape, transaction codes are in the form.

DATA PREPROCESSING AND DATA CONVERSION

Data quality criteria were taken into consideration by examining the headings in the raw data set and data was passed through a pre-processing and data conversion. Data types (nominal, sequential, continuous, interval, etc.) of data obtained by the data quality criteria are considered to be incomplete, noisy or inconsistent. In addition, the number of cases with fewer than 3 DRG is considered to affect the average in the correlation analysis, the relevant

DRG is excluded from the study scope. As a result of these transactions, the number of files in raw data obtained from the hospital in 2015 28,493, the number of DRGs is 670, the total file amount is 41,175,821 TL. After the data cleaning process, the number of files after data cleanup is 28,365, the number of DRGs is 403, and the total file amount is 40,849,813 TL. Analysis studies were handled with data after data cleansing.

VISUALIZATION AND ANALYTICS

After data cleansing, the underlying data is visualized with the Business intelligence tool called Qlikview Personal EditionTM, and a summary table was created by editing the headings in the raw data set.

However, a summary table that creates work has created a good perspective for us to see all the data. The total number of files in the headers on the summary table, relative value, minimum amount of SUT (TL), maximum amount of SUT (TL), average amount of SUT (TL), total amount of SUT (TL), average amount/relative value, minimum hospitalization time (days), maximum hospitalization time (days), The average hospitalization time (days) is detailed and the information on the entire data set has been revealed in detail.

CORRELATION ANALYSIS

Based on the analysis screens developed with Qlikview, the correlation between the amounts in DRG files related to DRG relative values were calculated mainly on the basis of "amount per relative value on MDC and DRG." Correlation analysis for all DRG; both are made separately for each DRG and the correlation values were calculated.

Thus, MDCs that are more dissociated relative to the SUT amounts by their relative values of corresponding DRGs have also been identified. Also, as the correlation between the SUT amounts and the corresponding relative values of all the cases were calculated; the average SUT amount for each DRG was calculated instead of the direct file amounts and the correlation between these average amounts and the corresponding DRG relative values were also calculated. Thus, the effect on the correlation of different SUT amounts to the same DRG could be examined separately. Correlation coefficient strength was determined by referring to the following value range.

0.01 – 0.25 Very Weak Relationship
0.26 – 0.49 Weak Relationship
0.50 – 0.69 Medium relationship
0.70 – 0.89 High Relationship
0.90 – 1.0 Very High Relationship

RESULTS

In this study, the correlation analysis between DRG relative values and the corresponding SUT prices are based on the data of the Haydarpaşa Numune Training and Research Hospital, which is one of the high-end hospitals in Turkey with Case mix Index of 2015 Made. The resulting 28,493 files have been transformed into 28,365 files after the data cleanup phase.

Two different approaches are based on analyzing the relationship/ correlation between the DRG relative value of each file and the fee calculated according to SUT.

In the first analysis, correlation between the amounts of SUT and the relative value were analyzed. The correlation between DRG relative values and the amounts of SUT are found to be 0.67, corresponding to each of the 28,365 files in the data set. This value shows us that the correlation coefficient is "medium relationship" power.

In the second analysis, the 28,365 file corresponds to 403 different DRG, the average amount of SUT calculated and 403 DRG group's average SUT fee related to DRG's relative value of the correlation were investigated. As a result of this analysis, the correlation coefficient was calculated as 0.79. This value also shows us that the correlation is "high-relationship".

In comparison with the amounts of all the files and the average SUT amounts are relative values of the correlation layer of the number forces associated with the middle and the high relationship emergence of the distribution of the number of files in MDC groups, namely the strength of correlation coefficient. This leaves one wondering how it would affect the results. In this context, according to the correlation of MDC groups for each data set, the following table 1 has been compared with the analysis of the correlation analyses on MDC basis for both analyses.

Table 1: Comparison of correlation recent analyses on MDC basis

MDC Group	DRG Number	Number of files	1.Analysis Correlation Coefficient value	1.Analysis Correlation Coefficient power	2.Analysis Correlation Coefficient value	2.Analysis Correlation Coefficient power
MDC - 01 Nervous System Diseases	31	1462	0,08	Very Weak Relationship	0,22	Very Weak Relationship
MDC - 02 Eye diseases	19	5713	0,11	Very Weak Relationship	0,35	Weak Relationship
MDC - 03 ENT and Oral Diseases	23	1741	0,43	Weak Relationship	0,90	Çok High Relationship
MDC - 04 Respiratory System Diseases	24	3124	0,50	Medium relationship	0,36	Weak Relationship
MDC - 05 Circulatory System Diseases	22	311	0,21	Very Weak Relationship	0,75	High Relationship
MDC - 06 Digestive System Diseases	38	2326	0,64	Medium relationship	0,81	High Relationship
MDC - 07 Hepatobiliary System and Pancreas Diseases	22	1480	0,61	Medium relationship	0,84	High Relationship
MDC - 08 Musculoskeletal and Connective Tissue Diseases	57	2531	0,88	High Relationship	0,77	High Relationship
MDC - 09 Skin, Subcutaneous (Subcutaneous) Tissue and Breast Diseases	20	1375	0,18	Very Weak Relationship	0,54	Medium relationship
MDC - 10 Endocrine, Nutritional (Nutrition) and Metabolic Diseases	16	676	0,43	Weak Relationship	0,35	Weak Relationship
MDC - 11 Kidney and Urinary Tracts (Urinary Tract) Diseases	26	1966	0,30	Weak Relationship	0,75	High Relationship
MDC - 12 Male Reproductive Organs Diseases	12	490	0,42	Weak Relationship	0,71	High Relationship
MDC - 13 Female Reproductive Organs Diseases	12	1276	0,60	Medium relationship	0,97	Çok High Relationship

MDC - 14 Pregnancy, birth and puerperium	9	479	0,49	Weak Relationship	0,99	Çok High Relationship
MDC - 15 Newborn (and Other Neonates)	7	133	0,62	Medium relationship	0,89	High Relationship
MDC - 16 Blood and Blood-making Organs and Immune Diseases	9	753	0,22	Very Weak Relationship	0,36	Weak Relationship
MDC - 17 Neoplastic diseases (Hematological and solid neoplasms)	9	127	0,31	Weak Relationship	0,78	High Relationship
MDC - 18 Infectious and Parasitic Diseases	12	222	0,37	Weak Relationship	0,79	High Relationship
MDC - 19 Mental Health Disorders	9	399	0,30	Weak Relationship	0,58	Medium relationship
MDC-20 Alcohol / Drug Use and Alcohol / Drug-induced Organic Mental Health Disorders	1	3	-	Correlation Not analyzed.	-	Correlation Not analyzed.
MDC - 21 Injuries, Poisoning and Toxic Drug Effects	11	313	0,24	Very Weak Relationship	0,56	Medium relationship
MDC - 22 Skin Burn	8	2	It is excluded from the analysis due to the number of files.	-	It is excluded from the analysis due to the number of files.	-
MDC - 23 Factors Affecting Health and Other Types of Contacts Established by Health Services	13	1162	0,12	Very Weak Relationship	0,52	Medium relationship
Leading Major Diagnostic Classes	12	303	0,49	Weak Relationship	0,91	High Relationship

DISCUSSIONS

Based on all these results, the current relative values for the 403 DRG group can be said to be medium-high in relation to the prices of SUT. However, when we do the correlation analysis on MDC basis, the correlation between file

amounts and DRG relative values have been found to be very weak in 7 MDC, weak in 9 MDC, and 5 in MDC, and one in MDC. The correlation between average SUT amounts and relative values per DRG group was found to be very weak in 1 MDC, weak in 4 MDC, medium in 4 MDC, high in 8 MDC and 5 in MDC.

All these analyses are related to medium-high DRG relative values applied in Turkey with the prices of SUT; However, some arrangements can be made based on the relative values of DRG in the MDC groups which are particularly weak and very weak related, and/or the prices of the related SUT.

The most valuable information that our dissertation study will reveal for people who are deciding on DRG relative values is that the amount of the SUT in the data set/the relative Value section resulting from the data set average is too high or too low, the DRG's is determined. In this context, the data set we have, the average amount of SUT per DRG Group/relative value is sorted in ascending order. The following tables illustrate the DRG, which enters the lowest and highest level of 15% of the section result. In this way, decision makers can focus directly on these DRG and make appropriate changes in DRG relative values or in the amount of SUT or both, making the result of this section closer to the average of the data set (1,044 TL).

Table 2: The lowest value DRGs according to the average SUT Amount / Relative Value portion of the data set

MDC_Name	DRG	DRG_Name	Number of Files	Relative Value	Average SUT Amount	Average Amount / Relative Value
Leading Major Diagnostic Classes (MDC)	A41A	Intubation, under age 16, KK Found	3	21,85	1.043	48
MDC - 15 Newborn (and Other Neonates)	P66C	Newborn, Applied Weight 2000-2499 g, without a Major Operation Theater Operation, accompanied by a Different Problem	4	2,51	295	118
MDC - 17 Neoplastic diseases (Hematologic & solid neoplasms)	R61C	Lymphoma and Non-Acute Leukemia Within the Same Day	3	0,23	32	140

MDC - 11 Kidney and Urinary Tracts (Urinary Tract) Diseases	L67A	Kidney and Urinary Tract Diagnosis, Other, Catastrophic CK Found	4	3,36	588	175
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I68C	Spinal Diseases, Non-Surgical, In the Same Day	8	0,36	66	184
MDC - 01 Nervous System Diseases	B02B	Craniotomy, Severe / Moderate Degree KK Found	10	9,03	2.139	237
MDC - 07 Hepatobiliary System and Pancreas Diseases	H41B	ERCP, Complex Therapeutic Procedures, Catastrophic / Severe CR Non-existent	3	3,97	973	245
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I75B	Shoulder, Arm, Elbow, Knee, Leg or Foot Ankle Injuries, 64 Years Old or KK Found	10	0,88	218	248
MDC - 19 Mental Health Disorders	U66Z	Eating Disorders and Obsessive-Compulsive Disorders	11	5,22	1.332	255
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I67B	Septic Arthritis, Catastrophic / Severe CC Non-existent	5	1,55	411	265
MDC - 03 ENT & Oral Diseases	D62Z	Epistaxis (Nasal Bleeding)	4	0,46	126	273
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I08A	Hip and Femur Operations, Other, Catastrophic / Severe CK Found	4	8,13	2.374	292
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I77B	Pelvic Fractures, Catastrophic / Severe CC Non-existent	22	1,38	415	301
MDC - 19 Mental Health Disorders	U63A	Affective Disorder, Major, 69 Years Old, or Catastrophic / Severe CK Found	13	4,86	1.477	304
MDC - 16 Blood and Bloodmaking Organs and Immune Diseases	Q02A	Blood and Blood-making Organs, Operating Room Operations, Other, Catastrophic / Severe CK Found	3	6,39	2.056	322
MDC - 09 Skin, Subcutaneous (Subcutaneous) Tissue and Breast Diseases	J60A	Skin Ulcers	4	2,36	762	323

MDC - 07 Hepatobiliary System and Pancreas Diseases	H42A	ERCP, Other Therapeutic Procedures, Catastrophic / Severe CK Found	3	5,03	1.633	325
MDC - 11 Kidney and Urinary Tracts (Urinary Tract) Diseases	L60A	Kidney Failure, Catastrophic CK Found	4	4,18	1.382	331
MDC - 01 Nervous System Diseases	B02A	Craniotomy, Catastrophic CK Found	5	13,53	4.628	342
MDC - 23 Factors Affecting Health and Other Types of Contacts Established by Health Services	Z60A	Rehabilitation, Catastrophic / Severe CK Found	4	5,48	1.893	345
MDC - 21 Injuries, Poisoning and Toxic Drug Effects	X04B	Injuries, Lower Extremity, Sixty Years Old, KK None	4	1,14	397	348
MDC - 04 Respiratory System Diseases	E02C	Respiratory System, Operating Room Procedures, Other, Catastrophic / Severe CC Non-existent	4	1,47	519	353
MDC - 01 Nervous System Diseases	B66B	Neoplasm, Catastrophic / Severe KK None	11	1,79	638	356
MDC - 20 Alcohol / Drug Use and Alcohol / Drug-induced Organic Mental Health Disorders	V64Z	Dependence and Use Disorders, Other Medicines	3	0,93	355	382
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I76B	Musculoskeletal (Musculoskeletal) System, Other Diseases, 69 Years Old or KK Found	4	1,07	414	387
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I78A	Femur Neck Fractures, Catastrophic / Severe CK Found	3	1,91	741	388
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I65B	Soft Tissue, Malignities, Pathological Fractures Included, Catastrophic / Severe KK	4	1,84	722	392

MDC - 01 Nervous System Diseases	B79Z	Cranial Fractures	44	0,77	321	417
MDC - 19 Mental Health Disorders	U65Z	Anxiety Disorders	77	1,11	468	421
MDC - 09 Skin, Subcutaneous (Subcutaneous) Tissue and Breast Diseases	J14Z	Breast Reconstruction, Major	5	4,59	1.957	426
MDC - 09 Skin, Subcutaneous (Subcutaneous) Tissue and Breast Diseases	J67B	Skin Diseases, Minor, in the Same Day	11	0,21	92	440
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I01Z	Joint Operations, Lower Extremity, Major, Bilateral (Bilateral), or Multiple	7	13,57	6.078	448
MDC - 06 Digestive System Diseases	G02A	Thin and Small Bowel Procedures, Major Procedures, Catastrophic CT Findings	7	7,87	3.544	450
MDC - 15 Newborn (and Other Neonates)	P67B	Newborn, Applied Weight 2499 g, Without Major Operation Theater Procedure, Accompanied by One Major Problem	20	1,96	883	451
MDC - 04 Respiratory System Diseases	E70A	Whooping Cough and Acute Bronchiolitis, KK Found	12	0,99	454	459
MDC - 03 ENT & Oral Diseases	D67A	Dental and Oral Disorders, Except Shooting and Repair	67	0,85	396	465
MDC - 19 Mental Health Disorders	U63B	Affective Disorder, Major, Under 70 Years, Catastrophic / Severe KK None	171	3,08	1.439	467
MDC - 05 Circulatory System Diseases	F68Z	Congenital Heart Disease	3	0,96	452	471
MDC - 14 Pregnancy, birth and puerperium	O60B	Birth, Vaginal Delivery, Catastrophic / Severe CC Non-existent	11	1,10	526	478
MDC - 03 ENT and Oral Diseases	D66A	Ear, Nose, Throat and Mouth, Other Diagnoses, KK Found	5	0,97	468	483
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I05Z	Joint Replacement (Joint Replacement) and Joint Restart Operations	10	6,84	3.320	485
MDC - 05 Circulatory System Diseases	F13Z	Amputation, Circulatory System Caused, Upper Extremity and Thumb	8	2,47	1.202	487

MDC - 01 Nervous System Diseases	B02C	Craniotomy, KK	94	6,50	3.185	490
MDC - 19 Mental Health Disorders	U67Z	Personality Disorders and Acute Reactions	12	1,44	712	495
MDC - 16 Blood and Blood-making Organs and Immune Diseases	Q61A	Erythrocyte (Red Blood Cell) Diseases, Catastrophic CK Found	4	2,50	1.237	495
MDC - 14 Pregnancy, birth and puerperium	O66A	Referral, Antenatal and Other Obstetric Causes	115	0,62	308	497
MDC - 21 Injuries, Poisoning and Toxic Drug Effects	X02Z	Skin grafts and microvascular tissue transfer, aimed at hand injuries	15	1,51	755	500
MDC - 07 Hepatobiliary System and Pancreas Diseases	H62A	Pancreatic Diseases, Apart from Malignancy, Catastrophic / Severe CK Found	4	2,53	1.271	502
MDC - 14 Pregnancy, birth and puerperium	O01B	Birth, Caesarean section, Severe CK Found	7	2,44	1.274	522
MDC - 11 Kidney and Urinary Tracts (Urinary Tract) Diseases	L41Z	Cystourethroscopy in the same day	24	0,34	182	536
MDC - 14 Pregnancy, birth and puerperium	O60C	Birth, Vaginal Delivery, Unilateral, Uncomplicated, Other Discomfort	98	0,91	489	537
MDC - 03 ENT & Oral Diseases	D14Z	Diagnosis and Treatment of Oral and Salivary Glands	67	0,82	447	545
MDC - 03 ENT & Oral Diseases	D10Z	Nasal Diagnosis and Treatment Procedures	102	0,94	512	545
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I64B	Osteomyelitis, KK Non-existent	6	2,35	1.298	552
MDC - 02 Eye diseases	C02Z	Diagnosis and Treatment Procedures for Eye, Enucleation and Orbit	59	1,36	754	554
MDC - 11 Kidney and Urinary Tracts (Urinary Tract) Diseases	L09C	Kidney and Urinary Tract Diseases, Other Procedures, Catastrophic / Severe KK None	19	1,42	789	556

MDC - 08 Musculoskeletal and Connective Tissue Diseases	I69C	Bone Diseases and Specific Arthropathies, Over 75 Years Old, Catastrophic / Severe KK None	32	0,80	451	563
MDC - 14 Pregnancy, birth and puerperium	O61Z	Postpartum and Post-Late, Without Operation	3	0,57	322	564
MDC - 23 Factors Affecting Health and Other Types of Contacts Established by Health Services	Z64B	Other Factors Affecting Health Status, Within the Same Day	55	0,32	182	568
MDC - 04 Respiratory System Diseases	E63Z	Sleep apnea	1872	0,35	200	571

Table 3: The highest DRGs according to the average SUT Amount / Relative Value portion of the data set

MDC_Name	DRG	DRG_Name	Number of Files	Relative Value	Average SUT Amount	Average Amount / Relative Value
MDC - 06 Digestive System Diseases	G04B	Adheyolysis, Peritoneum, 49 Years Old or Catastrophic CK Found	27	1,93	3.410	1.767
MDC - 06 Digestive System Diseases	G70B	Digestive System, Other Diagnoses, KK None	155	0,42	743	1.769
MDC - 16 Blood and Blood-making Organs and Immune Diseases	Q62Z	Coagulation Disorders	55	1,48	2.621	1.771
MDC - 09 Skin, Subcutaneous (Subcutaneous) Tissue and Breast Diseases	J12C	Lower Extremity Procedures, Ulcer / Cellulite Findings, Catastrophic KK None, Skin Graft / Flap Repair No	4	2,37	4.205	1.774
MDC - 18 Infectious and Parasitic Diseases	T61B	Infections, Postoperative (After Surgical Procedure) and Posttraumatic (Post Traumatic), 55 Years Old or Catastrophic / Severe CC	14	1,00	1.775	1.775
MDC - 21 Injuries, Poisoning and Toxic Drug Effects	X62A	Poisoning / Toxic Effects, Medicines and Other Substances, 59 Years Old or KK Found	18	0,83	1.546	1.862

MDC - 12 Male Reproductive Organs Diseases	M64Z	Male Reproductive Organs, Other Diagnoses	19	0,31	579	1.868
MDC - 01 Nervous System Diseases	B63Z	Cerebral Function Disorders, Dementia and Other Chronic Disorders	14	2,01	3.795	1.888
MDC - 12 Male Reproductive Organs Diseases	M60A	Male Reproductive Organs, Malignancy, Catastrophic / Severe CK Found	1	2,10	3.969	1.890
MDC - 06 Digestive System Diseases	G64Z	Inflammatory Bowel Disease	38	0,95	1.808	1.903
MDC - 11 Kidney and Urinary Tracts (Urinary Tract) Diseases	L42Z	ESWL For Uriner Stones	3	0,50	977	1.954
MDC - 21 Injuries, Poisoning and Toxic Drug Effects	X63B	Sequelae, Caused Treatment, Catastrophic / Severe CK None	26	0,63	1.232	1.956
MDC - 02 Eye diseases	C61Z	Eye, Neurological and Vascular Diseases	88	0,63	1.245	1.977
MDC - 18 Infectious and Parasitic Diseases	T62A	Unknown Unknown Fire (FUO), KK Found	10	1,10	2.232	2.029
MDC - 07 Hepatobiliary System and Pancreas Diseases	H60B	Cirrhosis and Alcoholic Hepatitis, Severe CK Found	7	1,83	3.717	2.031
MDC - 05 Circulatory System Diseases	F67B	Hypertension, KK None	27	0,51	1.054	2.067
MDC - 23 Factors Affecting Health and Other Types of Contacts Established by Health Services	Z01B	Operational Procedures, For Diagnoses Made With Other Contacts Established With Health Units, Catastrophic / Severe CC Non-existent	179	0,78	1.635	2.096
MDC - 09 Skin, Subcutaneous (Subcutaneous) Tissue and Breast Diseases	J07B	Breast, Non-Malignant Events, Minor Procedures	115	0,67	1.416	2.113

MDC - 16 Blood and Blood-making Organs and Immune Diseases	Q01Z	splenectomy	6	3,14	6.700	2.134
MDC - 04 Respiratory System Diseases	E73C	Pleural effusion, Catastrophic / Severe CC Non-existent	20	0,89	1.981	2.226
MDC - 21 Injuries, Poisoning and Toxic Drug Effects	X07B	Injuries, Skin Grafting Practices, Without Hand, Without Microvascular Tissue Transfer, Catastrophic / Severe KK	12	1,37	3.071	2.241
MDC - 02 Eye diseases	C15B	Eye, Glaucoma and Complex Cataract Diagnosis and Treatment Procedures	184	0,48	1.082	2.254
MDC - 21 Injuries, Poisoning and Toxic Drug Effects	X60C	Injuries, Under 65	26	0,41	926	2.259
MDC - 17 Neoplastic diseases (Hematologic & solid neoplasms)	R04A	Neoplastic Diseases, Other, Accompanied by Other Operating Room Procedures, Catastrophic / Severe CK Found	3	2,48	5.796	2.337
MDC - 10 Endocrine, Nutritional (Nutrition) and Metabolic Diseases	K62C	Metabolic Diseases, Miscellaneous, Over 75 Years Old, Catastrophic / Severe KK None	59	0,56	1.328	2.371
MDC - 05 Circulatory System Diseases	F63B	Venous thrombosis, Catastrophic / Severe CC Non-existent	6	0,70	1.686	2.408
MDC - 01 Nervous System Diseases	B60B	Paraplegia / Quadriplegia, Identified, With or Without Operating Room Procedures, Catastrophic KK None	17	2,76	6.771	2.453
MDC - 11 Kidney and Urinary Tracts (Urinary Tract) Diseases	L65B	Kidney and Urinary Traktus Signs and Findings, Catastrophic / Severe KK None	51	0,57	1.404	2.463
MDC - 03 ENT and Oral Diseases	D61Z	Equilibrium Disorder	21	0,51	1.272	2.494

MDC - 08 Musculoskeletal and Connective Tissue Diseases	I73B	Post-Implant / Post protection Maintenance, Musculoskeletal (Musculoskeletal) System, 59 Years Old or Catastrophic / Severe CK Found	8	1,09	2.799	2.568
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I61Z	Femur, Distal Fractures	6	1,12	2.990	2.669
MDC - 05 Circulatory System Diseases	F71B	Major Non-Arrhythmia and Conduction Disorders, Catastrophic / Severe CC Non-existent	7	0,63	1.749	2.776
MDC - 01 Nervous System Diseases	B70B	Stroke, Severe CK Found	14	2,26	6.432	2.846
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I14Z	Stump Revision	5	1,42	4.078	2.872
MDC - 01 Nervous System Diseases	B71A	Cranial and Peripheral Nerve Diseases, KK Found	6	3,33	9.599	2.883
MDC - 05 Circulatory System Diseases	F73B	Syncope and Collapse, Catastrophic / Severe CC Non-existent	31	0,48	1.386	2.888
MDC - 01 Nervous System Diseases	B67B	Degenerative Nervous System Diseases, 59 Years Old, Catastrophic / Severe KK None	44	1,06	3.067	2.894
MDC - 18 Infectious and Parasitic Diseases	T61A	Infections, Postoperative (Post-Surgical) and Post Traumatic (Post Traumatic), 54 Years Old or Catastrophic / Severe CK	15	1,66	4.816	2.901
MDC - 01 Nervous System Diseases	B72B	Nervous System, Infection, Except Viral Meningitis, Catastrophic / Severe KK	28	1,72	4.990	2.901
MDC - 18 Infectious and Parasitic Diseases	T01C	Infectious and Parasitic Diseases, Operating Room, KK	21	1,45	4.315	2.976
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I68A	Spinal Diseases, Non-Surgical, CK Found	9	1,20	3.607	3.006

MDC - 06 Digestive System Diseases	G04C	Adheyzolysis, Peritoneal, Under 50 Years, Catastrophic KK None	10	0,77	2.444	3.174
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I66B	Inflammatory Musculoskeletal (Musculoskeletal) Diseases, Catastrophic / Severe CC Non-existent	40	0,60	1.964	3.273
MDC - 01 Nervous System Diseases	B70D	Stroke, Dead or Transferred Within 5 Days	7	0,57	1.887	3.310
MDC - 10 Endocrine, Nutritional (Nutrition) and Metabolic Diseases	K63Z	Metabolic Disease	15	0,60	1.993	3.322
MDC - 17 Neoplastic diseases (Hematologic & solid neoplasms)	R63Z	Chemotherapy	4	0,49	1.691	3.452
MDC - 10 Endocrine, Nutritional (Nutrition) and Metabolic Diseases	K04Z	Obesity, Major Operations	42	2,15	7.706	3.584
MDC - 18 Infectious and Parasitic Diseases	S65B	HIV - Associated Diseases, Severe CK Found	3	3,60	13.109	3.641
MDC - 01 Nervous System Diseases	B80Z	Head Injuries, Other	11	0,38	1.390	3.657
MDC - 02 Eye diseases	C03Z	Eye and Retina Diagnosis and Treatment Procedures	760	0,49	1.908	3.895
MDC - 23 Factors Affecting Health and Other Types of Contacts Established by Health Services	Z60C	Rehabilitation in the Same Day	5	0,18	783	4.352
MDC - 12 Male Reproductive Organs Diseases	M60B	Male Reproductive Organs, Malignancy, Catastrophic / Severe CK Found	5	0,64	2.848	4.450

MDC - 09 Skin, Subcutaneous (Subcutaneous) Tissue and Breast Diseases	J63Z	Breast, Non-Malignant Diseases	51	0,41	1.869	4.559
MDC - 01 Nervous System Diseases	B68B	Multiple Sclerosis (MS) and Cerebellar Ataxia, KK None	104	0,44	2.013	4.576
MDC - 02 Eye diseases	C62Z	Eye, Hifema and Medical Intervention Trauma	20	0,11	511	4.644
MDC - 04 Respiratory System Diseases	E71B	Respiratory System, Neoplasm, Severe / Moderate Severe CK Found	5	1,35	8.413	6.232
MDC - 10 Endocrine, Nutritional (Nutrition) and Metabolic Diseases	K09Z	Endocrine, Nutrition (Nutritional) and Metabolic, Operating Room Procedures, Other	4	0,76	5.613	7.385
MDC - 08 Musculoskeletal and Connective Tissue Diseases	I72A	Muscle - tendon (Musculotendinous) Diseases, Original, 79 Years Old or Catastrophic / Severe CK Found	3	1,68	13.649	8.125
MDC - 01 Nervous System Diseases	B71B	Cranial and Peripheral Nerve Diseases, KK none	54	0,80	8.174	10.217
MDC - 01 Nervous System Diseases	B67C	Degenerative Nervous System Diseases, 60 Years Old, Catastrophic / Severe KK None	45	0,58	6.551	11.294

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Assessment of Organizational Health Literacy in a Group of Public, Private and University Hospitals in Istanbul

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ABSTRACT

The aim of our study was to investigate and compare organizational health literacy in a group of public, private and university hospitals in Istanbul.

This cross-sectional study was conducted in a group of hospitals (n=30) in Istanbul, Turkey. An Organizational Health Literacy Observation (OHLO) form was filled for each of the 30 hospitals (10 public, 10 university and 10 private hospitals) by researchers. Six managers from each hospital (n=180) filled the Turkish version of The Health Literate Health Care Organization 10 item Questionnaire (HLHO-10) during face-to-face

OHLO and HLHO-10 scores were highest in private hospitals and lowest in university hospitals, but the difference between the hospitals was not statistically significant. ($p = 0.18$ and $p = 0.45$ respectively). There was a positive correlation between observation (OHLO) scores and manager evaluation (HLHO-10) scores in private hospitals and this correlation is statistically significant ($r = 0.668$, $p = 0.035$). There was a negative correlation in the public and university hospitals. However, the correlation coefficient was not statistically significant ($r = 0.310$, $p = 0.384$ and $r = 0.118$, $p = 0.746$

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respectively). According to mean scores of HLHO-10 items, “Provide access” has the highest score. “Integration”, “High-risk” and “Costs” followed this item. “Provide Access” has the highest score in both university and public hospitals and “Costs” got the highest score in private hospitals. When the differences between hospitals for each item of the HLHO-10 are analyzed, the “Health literacy skills range” and “Costs” items were found to be statistically significant (“p” values = 0.011 and 0.018 respectively). Post hoc analyses indicated that there was a significant difference between public and private hospitals for the “Health literacy skills range” item while the difference between university and private hospitals was significant for the “Costs” item. Private hospitals got the highest and university hospitals the lowest mean scores for both of the OHLO and HLHO-10 questionnaires. The high literacy of the public hospitals for individualized health information and the private hospitals’ about out-of-pocket payments are normal and expected findings.

Keywords: Organizational health literacy, HLHO-10, hospital

INTRODUCTION

Health literacy has become an important issue in healthcare systems because of its relations with the utilization, effectiveness and efficiency of healthcare services. Findings of various studies suggest that the level of health literacy of the individuals is associated with better health outcomes (Aboumatar et. al., 2013; Kaphingst et. al., 2014,) and decreased health expenditures (Hardie et. al., 2011; Koh et. al. 2012).

People with low level of health literacy are at greater risk for chronic diseases and are known to have a higher rate of hospital admissions (Charet, 2010; DeWalt et. al., 2010; Volandes and Paasche-Orlow, 2007), more serious medication errors (Schillinger et. al., 2005), worse preventive care and health outcomes for their children (Sanders et. al., 2009), and increased mortality (Bostock and Steptoe; 2012; Sudore et. al., 2006) compared with individuals with adequate health literacy.

Health literacy at individual level is defined as “people’s knowledge, motivation and competences to access, understand, appraise, and apply health information to make judgements and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve

quality of life during the life course." (Sorensen et. al., 2012).

There is now a growing recognition that health literacy is not just individual responsibility but also that health institutions and the health system have an important and critical role in it. Health literacy is the product of individuals' capacities and the health literacy-related demands and complexities of the healthcare system (Baker, 2006). The effectiveness and efficiency of services are influenced by the interactions between individuals and the healthcare organizations that provide the service. So, the demands and complexities of the healthcare system have also important role besides individual skills and abilities (Hernandez, 2012; Palumbo and Annarumma, 2014). Health institutions and hospitals differ in their structures and layouts. These differences indicate that each institution has its own language. Signs, symbols, directions and written documents are usually prepared under the influence of medical language and sometimes they may be incomprehensible for ordinary people. They may be user-friendly in some cases but important barriers in others. It is important that organizations providing services should be designed according to the individuals' needs and facilitate access as well as individuals knowing how to search for, find and use which health service they need. Therefore, organizational health literacy has become an important issue in recent years due to its impact on the correct use of health services.

Organizational health literacy is defined as "the ability of health institutions to provide clear services and information for all those seeking services to find and understand, and to assist them in decisions they make, and to eliminate existing barriers in these issues" (Brach et. al., 2012, p. 12-18; CDC, 2017). The abilities and characteristics of the organization should be independent of the individual's level of health literacy. Regulations made within health institutions should target people with poor health literacy. A health literate organization should have the ability to help individuals in the best possible way to reach, understand and use services and information in spite of their differences in literacy levels (Schillinger and Keller, 2011). Health services and regulations such as the physical structure, the website, signs, directions, writings in the institution should be arranged in such a way that each individual can easily understand and access them.

Brach et al. defined Health Literate Health Organizations (HLHOs) as

healthcare organizations that "make it easier for people to navigate, understand, and use information and services to take care of their health" (Brach et. al., 2012). The term health literate organization describes organizations that can make patient navigation easier and anticipate and meet the needs of all patients notwithstanding their level of health literacy (Schillinger and Keller, 2011).

Ten attributes of health literate health care organizations were proposed as following by a group of experts during a roundtable discussion in 2012 (Brach et. al., 2012):

1. Has leadership that makes health literacy integral to its mission, structure, and operations
2. Integrates health literacy into planning, evaluation measures, patient safety, and quality improvement
3. Prepares the workforce to be health literate and monitors progress
4. Includes populations served in the design, implementation, and evaluation of health information and services
5. Meets the needs of populations with a range of health literacy skills while avoiding stigmatization
6. Uses health literacy strategies in interpersonal communications and confirms understanding at all points of contact
7. Provides easy access to health information and services and navigation assistance
8. Designs and distributes print, audiovisual, and social media content that is easy to understand and act on
9. Addresses health literacy in high-risk situations, including care transitions and communications about medicines
10. Communicates clearly what health plans cover and what individuals will have to pay for services

Kowalski et al. used these attributes to measure the health literacy level of healthcare organizations and developed the Health Literate Health Organizations 10 item questionnaire (HLHO-10) as an assessment tool. The questionnaire HLHO-10 was found to be a reliable and valid instrument for assessing the health literacy of health care organizations (Kowalski et. al.,

2015). In Turkey there are several studies on individual health literacy, but organizational health literacy is a relatively new concept. Our study aimed to investigate and compare the organizational health literacy level of a group of Turkish hospitals using the HLHO-10 questionnaire.

METHODS

This cross-sectional study was conducted in a group of hospitals (n=30) in Istanbul, Turkey. Data were collected between February and July 2017 in two stages.

In the first stage, an Organizational Health Literacy Observation form was filled for each of the 30 hospitals (10 public, 10 university and 10 private hospitals). All of the hospitals were selected randomly among the accredited hospitals in Istanbul. In the second stage, six managers from each hospital (n=180) filled in the Turkish version of The Health Literate Health Care Organization 10 item Questionnaire (HLHO-10) during face-to-face interviews. Managers were selected from various departments that are supposed to be associated with organizational health literacy of the hospitals such as the Hospital Administrative Director, Hospital Medical Director/Chief Physician, Deputy Chief Physician, Quality Department Director, Health Care Services Director, and R&D Director.

DATA COLLECTION AND ANALYSIS

Organizational Health Literacy Observation (OHLO) form: This form was prepared by modification of The Health Literacy Environment of Hospitals and Health Centers guide of Harvard University (Rudd and Andersen, 2006). In the form, there are questions to evaluate hospitals' communication systems such as their call center and website, as well as how user-friendly and health literate their indoor are. The contact information of the hospitals was assessed, and the level of organizational health literacy was examined through a short tour in each hospital. A detailed examination of organizational health literacy could not be conducted because there was a permission problem in reviewing documents used in the hospitals and interviewing relevant staff. Therefore, hospitals were only assessed through observations. Findings from the observations were scored, and an organizational health literacy observation

score was calculated for each hospital. Scores ranged from 10 to 40 where high scores indicated a high level of health literacy.

The Health Literate Health Care Organization 10 item Questionnaire (HLHO-10): The HLHO-10 questions were adapted from a recent survey titled the Health-Literate Healthcare Organization 10 Item Questionnaire (Kowalski et. al., 2015).

The questionnaire was adapted into Turkish following translation and reverse translation by two translators. Two health management academics and a public health specialist assessed its content validity. In the questionnaire, managers were asked to evaluate regulations regarding leadership, integration, the inclusion of the served, health literacy skills range, communication standards, provision of access, media variety, information about high-risk situations, costs and training of the workforce. Each of the items was answered on a seven-point scale ranging from "1-not at all" to "7-to a very large extent". Data were collected from 180 managers from 30 hospitals. The internal consistency of the HLHO-10 was found to be high (Cronbach $\alpha = 0.916$ for all hospitals, 0.917 for university hospitals, 0.951 for private hospitals and 0.856 for public hospitals).

Trained interviewers collected all of the study data. SPSS 23.0 was used for data analysis and statistical evaluation. Data were summarized by means, standard deviations, and percentages. T-test, ANOVA, Chi-Square and Mann-Whitney U Test were used for the comparison among groups and values of p less than 0.05 were accepted as significant. Post hoc analysis of significant differences in the outputs of the ANOVA test was assessed by the Tukey test. Pearson Correlation Analysis examined the associations between different variables.

Ethical approval for the study was taken from Istanbul Medipol University Non-Interventional Clinical Research Ethics Committee.

FINDINGS

Organizational Health Literacy Observations (OHLO) were conducted in 30 hospitals. Six managers from each hospital (n=180) filled in the HLHO-10 questionnaire during face-to-face interviews. The mean values of the OHLO scores and the HLHO-10 scores according to the hospitals are presented in Table 1.

Table 1: Organizational Health Literacy Observation (OHLO) scores and HLHO-10 scores according to hospital types

Hospital Types	**OHLO scores Mean ± SD**	**HLHO-10 scores Mean ± SD**
University	32.10±8.13	47.40±2.78
Public	34.20±2.74	51.30±1.59
Private	36.50±2.79	51.80±3.36
Total	34.26±5.34	50.16 ± 8,42
	F=1.78 p=0.18	F=0.80 p=0.45

As it is seen from the table, OHLO scores were highest in private hospitals and lowest in university hospitals, but the difference between the hospitals was not statistically significant (F=1.78, p=0.18). Similarly, in these hospitals, the mean score of the HLHO-10 was found to be the highest in private hospitals and the lowest in university hospitals, but again the differences between hospitals were not statistically significant (F = 0.80, p = 0.45).

Table 2 presents the results of the correlation analysis between OHLO scores and HLHO-10 scores of the hospitals.

Table 2: Correlations between OHLO scores and HLHO-10 scores according to hospital types

University Hospitals:		HLHO-10 scores
OHLO scores	r	-0.310
	p	0.384
	n	10
Public Hospitals:		HLHO-10 scores
OHLO scores	r	-0.118
	p	0.746
	n	10
Private Hospitals:		HLHO-10 scores
OHLO scores	r	0.668
	p	0.035
	n	10

There was a negative correlation between observation (OHLO) scores and manager evaluation (HLHO-10) scores in university hospitals and public hospitals. However, the correlation coefficient was not statistically significant. (r=-0.310, p=0.384 and r=-0.118, p=0.746 respectively). In the private

hospitals, a positive and statistically significant correlation was found between OHLO and HLHO-10 scores ($r = 0.668$, $p < 0.05$).

Table 3 shows the means of the responses given to HLHO-10 items by all hospital managers to assess the organizational health literacy.

Table 3: Mean scores of HLHO-10 items in all hospitals

Patients have varying levels of health literacy. Health literacy is the ability to find, understand and put health information into practice. The following statements relate to measures at your hospital, which consider and promote the health literacy answering the questions. Please assess your hospital with each question on a scale of your patients. Please think about your hospital in from 1 'absolutely not' to 7 'to a very large extent'.		
To what extent?	**Score**	
	Mean	**SD**
1- …is the management at your hospital explicitly dedicated to the subject of health literacy (e.g. mission statement, human resources planning)? **(leadership)**	5.02	1.62
2- …is the topic of health literacy considered in quality management measures at your hospital? **(integration)**	5.37	1.53
3- …is health information at your hospital developed by involving patients? **(inclusion of the served)**	4.64	1.63
4- …is individualized health information used at your hospital (e.g. different languages, print sizes, braille)? **(health literacy skills range)**	4.82	2.01
5- …are there communication standards at your hospital which ensure that patients truly understand the necessary information (e.g. translators, allowing pauses for reflection, calling with further queries)? **(communication standards)**	4.98	1.99
6- …are efforts made to ensure that patients can find their way at your hospital without any problems (e.g. direction signs, information staff)? **(provide access)**	5.67	1.47
7- …is information made available to different patients via different media at your hospital (e.g. three-dimensional models, DVDs, picture stories)? **(media variety)**	4.17	1.71
8- …is it ensured that the patients have truly understood everything, particularly in critical situations (e.g. medication, surgical consent), at your hospital? **(high-risk)**	5.31	1.51
9- …do you communicate openly and comprehensibly at your hospital to your patients in advance about the costs which they themselves have to pay for treatment (e.g. out-of-pocket payments)? **(costs)**	5.31	1.68
10- …are employees at your hospital trained on the topic of health literacy? **(workforce)**	4.76	1.66

As shown in the table, "Provide access" assessed by the item "... are efforts made to ensure that patients can find their way at your hospital without any problems?" has the highest score. The "Integration", "High-risk" and "Costs"

items followed this item.

Mean HLHO-10 item scores according to the hospital types are presented in Table 4.

Table 4: Distribution of HLHO-10 item scores according to hospital types

HLHO-10 items	University (n=60)	Private (n=60)	Public (n=60)	F	p
	Mean ± SD	Mean ± SD	Mean ± SD		
1-Leadership	4.77± 1.70	5.28 ± 1.76	5.02 ± 1.37	1.528	.220
2-Integration	5.25 ± 1.47	5.48 ± 1.67	5.37 ± 1.46	.346	.708
3-Inclusion of served	4.37 ± 1.49	4.95 ± 1.55	4.62 ± 1.80	1.948	.146
4-Health literacy skills range	4.83 ± 1.95	4.30 ± 2.05	5.33 ± 1.93	4.085	.018
5-Communication standards	4.78 ± 1.92	5.40 ± 1.99	4.77 ± 2.03	1.990	.140
6-Provide access	5.40 ± 1.57	5.67 ± 1.59	5.93 ± 1.18	2.001	.138
7-Media variety	3.78 ± 1.70	4.38 ± 1.73	4.35 ± 1.65	2.368	.097
8-High risk	5.00 ± 1.44	5.58 ± 1.67	5.35 ± 1.39	2.287	.105
9-Costs	4.85 ± 1.77	5.77 ± 1.59	5.32 ± 1.59	4.616	.011
10-Workforce	4.27 ± 1.50	4.98 ± 1.72	5.02 ± 1.66	4.042	.019

As it is seen from Table 4, the "Provide Access" item has the highest score in both university and public hospitals and "Costs" got the highest score in private hospitals. When the differences between hospitals for each item of the HLHO-10 are analyzed, three items were found to be statistically significant: "Health literacy skills range", "Costs" and "Workforce" ("p" values: 0.011, 0.018 and 0.019 respectively). Post hoc analyses indicated that there was a significant difference between public and private hospitals for the "health literacy skills range" item while the difference between university and private hospitals was significant for the "Costs" item. The differences for the mean score of the item "Workforce" was statistically significant between university hospitals and public hospitals and also university hospitals and private hospitals, where university hospitals had the lowest score.

RESULTS AND CONCLUSION

In this study, we investigated the organizational health literacy levels of 30 hospitals in Istanbul through two different assessment tools: the Organizational

Health Literacy Observation (OHLO) form and the HLHO-10 questionnaire. The Turkish version of HLHO-10 had a high internal consistency (Cronbach's alpha= 0.916) and content validity.

Criteria validity of the HLHO-10 could not be evaluated due to the lack of a gold standard. Private hospitals got the highest, and university hospitals the lowest mean scores for both of the OHLO and HLHO-10 questionnaire. However, there were no statistically significant differences between the three groups of hospitals. The scores of both methods were significantly correlated in private hospitals but not in public and university hospitals. This result may be due to the differences between the physical structures of the hospitals. Some of the public and university hospital buildings had been constructed and used for different purposes previously, such as shopping malls and business halls, which was problematic regarding physical structure and utilization as a hospital. The unwillingness of the public hospital managers towards the study was another factor that might have influenced the quality of the data. However, we conclude that the Turkish version of the HLHO-10 may be used as a reliable and valid measurement for assessment of organizational health literacy at least in private hospitals.

When the distribution of answers to the items of HLHO-10 was examined regarding hospitals, it was seen that item "Accessibility" had the highest score in both university and public hospitals. The item that got the highest score in private hospitals was the "Cost". Kowalski et al., who developed the measurement tool, used and showed its validity and reliability in Breast Cancer Treatment Centers in Germany, found that answers which got the highest score was "High-risk" and then the "Cost" and "Accessibility", contrary to our study (Kowalski et. al., 2015). The lowest scores in the same study were answers given to questions related to "health literacy skills range" and "Inclusion of served ". In our study, "media variety" had the lowest score and it was followed by "Inclusion of served".

Mean scores of three items of HLHO-10 were significantly different between hospital groups. These items were: communication with the patients about the out-of-pocket payments ("costs") (p=0.011), use of individualized health information ("health literacy skills range") (p=0.018) and training of the employees about health literacy ("workforce"). Public hospitals had the highest

score for "health literacy skills range", private hospitals had the highest score for "costs", and university hospitals had significantly lower scores for "workforce". We conclude that the high literacy of the public hospitals for individualized health information and the private hospitals' about out-of-pocket payments are normal and expected findings. However, the lowest score of the university hospitals for the training of the employees about health literacy was not an expected result, since universities are institutions for education and training.

Studies on organizational health literacy in our country are very limited. Existing studies are focused on measuring individual health literacy and developing measurement methods for this purpose. How organizational health literacy will be implemented and how it will achieve its goals needs to be addressed systematically and to be regulated if necessary. The things to be done to achieve these goals are summarized under three headings (Briglia et. al., 2015):

1. To find a leadership to support health literacy
2. To have an effective health literacy vision throughout the organization
3. To ensure continuous training and supervision of all staffs on this topic

RECOMMENDATIONS

According to the results of this study, our suggestions are as follows:

- There is a need to raise awareness of individual and organizational health literacy for all personnel, especially managers in hospitals providing health services, and to organize appropriate trainings for this purpose.
- A participatory process should be developed where the views of patients and their relatives will be included in the regulations to be made related to organizational health literacy.
- The Turkish version of the HLHO-10 is a good assessment tool with high internal consistency and may be used at least by private hospital managers for monitoring organizational health literacy.
- Health policies related to organizational health literacy should be developed and considered as an important quality improvement criterion by the Ministry of Health.

LIMITATIONS OF THE STUDY

It is not correct to make conclusions about determinants of the organizational health literacy due to the cross-sectional nature of our study. The lack of a gold standard for assessment of organizational health literacy and the unwillingness of public hospital managers to participate in the study are the major reasons that limit the validity of the findings.

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Analysis of Transaction Cost Theory of Magnetic Resonance Imaging (MRI) Services Provided by Outsourcing in Hospitals: A University Hospital Example

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ABSTRACT

As in the literature, hospitals often resort to outsource within the framework of transaction cost theory in service provision, also its observed in the result of this study; hospitals are getting profit via outsourcing services and they could focus on providing their basic ability "health services." Transaction cost theory seeks to find the most productive boundaries of the enterprise by seeking an answer to the question of whether it is more appropriate for businesses to produce goods or services themselves or buy them from the market. "Core Competence" and "outsourcing" are two important interrelated concepts in businesses. One of the areas that is the most observed in Turkey is the outsource of imaging services. With this study, MRI services performed for nine months in 2017 through outsourcing in a university hospital were examined within the framework of the transaction cost theory and it was determined that the hospital earned 511.798,18 TL profit. As in the literature, hospitals often resort to outsourcing within the framework of transaction cost theory in service provision, outsourcing services for their profit and they were also observed

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in the result of this study, where they could better focus on providing health services with core competence.

Keywords: Health Services, Transaction Cost Theory, Outsourcing, Profitability, Magnetic Resonance.

INTRODUCTION

Globalization and rapidly evolving technology make the change necessary to reach its goals such as profitability, competitiveness and sustainability. As in other sectors, the change in the health care sector causes many innovations in the hospitals. In health services; It is important to manage change and innovation, which is characterized by accidental consumption, lack of redundancy, difficulty in determining satisfaction and quality, failure to pre-test, inadequacy leading to social problems, and external benefit or harm.

Businesses need to operate their sources efficiently and economically. This is the subject of transaction cost theory. Businesses that want to compete the theory of transaction costs, to make profit, to provide social benefits and to maintain their continuity are required to follow. Theory seeks to find the most productive boundaries of the organization by seeking answers to the question of whether businesses should produce goods or services themselves or whether it is better to buy them from the market.

Two interrelated concepts in business are “basic ability” and “outsourcing”. Once the businesses have met their basic skills meticulously, they can do the remaining work through outsourcing. Outsourcing has become a widespread and indispensable part of hospitals like other businesses day by day. In hospitals in our country, cleaning services, security services, catering services, data preparation services, laboratory services and imaging services are the most outsourced areas.

In this study, magnetic resonance imaging services performed by outsourcing between 01.02.2017 - 01.10.2017 in a university hospital were examined within the framework of transaction cost theory. There is no study conducted to examine in the framework of transaction cost theory of magnetic resonance imaging services performed by outsourcing in health institutions and organizations in Turkey. Most of the studies related to the field are studies prepared by literature review only. It is aimed to complete these deficiencies in our literature with this study.

TRANSACTION COST THEORY

The theory of transaction costs was first introduced by Ronald Coase (1937) by focusing on neo-classical economic theory. In the article named "The Nature of The Firm" published by Coase in 1937, the market and the organization (company) were discriminated and the answer was asked in the question "If the markets are active, why are there organizations?" Coase (1937) argued that while the choice between market and organization (firm) in the production of goods and services is the most important determinant of which one to choose, to lower the transaction cost to a minimum and put the transaction cost at the center of the analysis of this problem. Coase's theory of transaction costs has been developed by Williamson (1975a); Williamson (1979b); Williamson (1981c); Williamson (1985d) by incorporating new areas and dimensions such as transaction and transaction cost definitions, market and hierarchy concepts. Both authors saw the market and the organization as alternatives; in terms of the price of the market, and the organization as regulatory instruments in terms of authority relations.

In transaction costs is the basic decision-making within the "organization" (hierarchy), or is it "on the market" to be more efficient? Transaction cost theory also seeks to answer the question whether production of goods and services will be provided by an internal organization (hierarchy) or by specialized organizations (market) from outside. While trying to identify the most productive boundaries of the organizations in this search, the efficiency of the operations within the organization is seen instead of the basic analysis level of the organization (Kalemci, 2013). This process also examines how organizations will protect themselves from shopping risks when they are in contact with other organizations.

In the process cost theory, the most fundamental element in determining the governance mechanisms is seen as productivity (Ouchi, 1980). This issue is expressed as "Make or Buy" in the transaction cost theory. Organizations should only focus on the basic competence that they do best, that they cannot be imitated in competitions, and that someone is not as successful as it is, and that there is no substitute, and should supply everything else from the outside. Thus, the organization is increasing its chances of success and growth (Tengilimoğlu, 2009).

Costs in transaction cost theory change depending upon whether the production of goods or services is opted within the organization or purchased from outside the organization. Transaction costs of goods and services production in the organization include;

- Coordination costs,
- Monitoring and follow-up of employees,
- Positioning the right people in the right place,
- The correct establishment of the organizational structure,
- The search and placement of human resources workers,
- Specialization training if business requires specialization,
- Expert operating costs arise;

Transaction costs when goods and service production are purchased from outside the organization include;

- Finding the right supplier,
- Negotiation,
- Regulation of contract,
- Monitoring costs of the supplier (Williamson, 1981).

Costs arising from contracts are subject to transaction costs when goods and service production are purchased from outside the organization. These are pre-contract transaction costs and post-contract transaction costs (Williamson, 1981). Pre-contract costs are;

- Designing a contract
- Negotiating the contract
- Considering the protection of the contract,

Post-contract transaction costs are;

- Costs that arise if the transactions depart from the previously determined boundary,
- The cost of tight negotiations arising from breaches of the border and carried out mutually vigorously to rectify,
- Initiation and execution of costs resulting from the directing of disputants to governance for settlement,
- Cover collateral-like costs to secure commitments.

As mentioned above, it is seen that there are costs in many items before and after the contract.

ASSUMPTIONS OF THE TRANSACTION COST THEORY:

Behavioral and environmental assumptions of transaction cost theory exist. These are discussed in detail below.

BEHAVIORAL ESTIMATES:

• **Bounded Rationality:** Williamson (1985) states that in this hypothesis, people are limited in their ability to acquire, store, re-access and manipulate knowledge without errors due to their cognitive capacities. In other words, in Bounded Rationality, it is not possible to conclude a contract that will respond to the requests of both parties due to the cognitive deficiency of the parties.

• **Opportunism:** It is defined as "the attitude aiming at setting the behavior in the power situation so that it conforms to the interests of the people, rather than the moral rules or regular thought" (Williamson, 1985).

The parties are often assumed to be honest by economic theorists. But it is not possible to recognize the limited rationality of recognizing that the parties are not honest. Here, the mutual trust of the parties comes to mind, hence confidence, the parties are confronting each other, is important. What they do is not a loss from the actions but a wait for benefits. The theorists state that the parties need to develop opportunistic screening and protection methods for "opportunism" before and after the contract (Williamson, 1985).

ENVIRONMENTAL ASSUMPTIONS:

• **Asset Specificity:** Asset specificity assumption has a critical prescription within the contracting parties. Williamson (1975, 1985) explains the reason for this as because of the investments in the contract, the parties are in a long-term relationship. The supplier party makes contractual investments in favor of the buyer. Although contractual investments are thought to be locked only by the supplier, they make both sides dependent on the transaction so that the buyer cannot find a source to make his own investment in a short time.

• **Uncertainty:** The difficulty of estimating the situations that parties may encounter during the execution of a transaction. It is due to the difficulty of adapting contracts to changing circumstances. Inverse selection and moral collapse are two main causes.

• **Small numbers:** It is expressed for the cases where the parties are

interdependent, the parties cannot make an alternative connection, the mutual monopoly situation occurs, and the parties are defenseless. The situation of small numbers increases the opportunistic nature of the parties according to Williamson (1975).

- **Frequency:** The operation of the Parties refers to how often you perform.

Behavioral and environmental assumptions form the basis of transaction cost theory. Knowing the assumptions is important in order to understand the theory.

CRITICISM OF TRANSACTION COST THEORY

Each theory has strengths and weaknesses. The following are the most discussed and criticized topics on transaction cost theory.

- Discussion of the ability of economic organizations to differentiate capacities in constructions,
- The theory explains macro-formations, but their assumptions are based on micro-formations (Kalemci, 2013),
- Neglecting the power relations of the parties (Yenidoğan, 2013),
- To reduce the cost of the focus point,
- Considering organizations in a one-sided economic perspective, neglecting social aspects,
- Ignoring the costs of organizing and integrating (Barney and Hesterly, 1996),
- Hierarchy, always relatively alternative to solving the nonconformities, relatively to the market (Sözen and Basım, 2015),
- Based on the criticisms, Williamson (1993) states that the concept of trust cannot be economic actions, that the parties in the commercial contracts are misleading and that the concept of trust can be formed within the account.

The above criticisms have led to the theory of transaction costs being the most debated theory within the economics-based organization approach.

OUTSOURCING

Businesses wanted to do all the work on their own until a short time ago and had a tendency not to do business outside the enterprise. Businesses that did not perform all their business within the company in this period were to be described as powerless and incompetent. But in the 21st century, globalization

and major developments in technology have led to reforms in the business and management models of enterprises (Gözüküçük and Çelik, 2012). This has led to serious competition between private and public enterprises. In order to be able to compete, reach their goals and realize themselves, businesses tend to their basic skills, which are their own and cannot be imitated by other businesses (Koçel, 2018). Today, the vast majority of businesses are outsourcing their core activities outside of their core competencies in order to make good use of their core competencies and gain a competitive advantage (Karahan, 2009).

The concept of "outsourcing" is an abbreviation of "Outside resource using" (Bühner and Tuschke, 1994). The most common definition of outsourcing is that "businesses are not only those that are based on their own abilities and capabilities, outsourcing in order to get jobs that do not use core or basic skills from other businesses that are specialized in their field from outside the company" (Mersin, 2003, para. 5). Outsourcing was described by Lacity and Hirschheim (1993) as "the process of purchasing a goods or service previously provided within the organization."

In the past, the first outsourcing applications started in the automotive industry in the USA. In the ongoing process, the use of the application has become widespread due to the positive effects such as cost reduction and staff saving (Cengiz, 2015). Outsourcing is becoming widespread in many sectors where both services and goods-producing enterprises are involved, and it is increasingly involved. Many different areas such as human resources management, information technology, customer service, accounting-finance, logistics-transportation, sales-marketing, food, personnel transportation, security, cleaning, car rental are used. In Turkey, staff transport, catering, cleaning and security services outsourcing sector are most commonly used (Özcan, 2015).

Despite the significant risks that may arise in the event of outsourcing failure, the business hopes to achieve many benefits through successful outsourcing (Mersin, 2005).

Outsourcing is a common practice used as a management strategy and business model in enterprises. Increasing outsourcing by businesses has made the concept of "Outsourcing" become widespread in the literature and has become a research topic for many studies (Çatı, et al., 2015).

OUTSOURCING IN HOSPITAL BUSINESSES

The most important value people have in their lives and an indispensable element of their daily life is the concept of health. Everyone wants to be healthy, to maintain and improve their health. Individuals apply for health services to fulfill their requests. The Ministry of Health describes the definition of health services as *"the destruction of a variety of factors that harm human health and the protection of the community from the effects of these factors, the treatment of patients, the services for the rehabilitation of persons with reduced physical and mental abilities and competencies"* (Ministry of Health on the Execution of Health Services Directive, 2005). By definition, health services have the characteristics of protecting, treating, rehabilitating and improving health for the individual. Health services are provided by health institutions and institutions, and hospitals are the institutions with the largest share in this regard.

Within health systems, hospitals are the most complicated organizations. There are many professional departments and many service units in their structures and they are required to work in a multidisciplinary manner (Nazlıoğlu and Yar, 2016). Both private and public hospitals, like other businesses, want to profit, maintain their continuity and provide social benefit. They focus on the provision of health services with the basic skills to make these requests. Complementary work outside of health services can be covered by outsourcing. In hospitals, food, cleaning, security, laboratory and imaging services are the most frequently used areas of outsourcing (Ekin et al., 2012).

According to a survey conducted in 2010 by the Ministry of Health, in Turkey, for at least one service that meets the external source from the hospital was found to perform in 2001-70.8%, in 2006-88%, and in 2008-93.3%. As a result of this data, outsourcing of health services continues to increase as well as in other sectors with day by day.

METHODS

The research is a cross-sectional study. The data obtained from the technical specifications, administrative specifications, contracts, bills and payment documents of the Magnetic Resonance Imaging (MRI) services tender in made by the service tender method for 9 months between 01.02.2017-01.10.2017 at a

university hospital which was used for the research. In order to use the data in the research, permission was obtained from the university hospital, provided that the name of the hospital was not used. In the survey, payments made to the university hospital were calculated by using the Magnetic Resonance Imaging part, which was included in the Health Practice Statement (SUT) updated by the T.C. Social Security Institution on 18.06.2016. The "Transaction Disclosures" specified in this part of the Health Practice Statement are taken into consideration in the calculations. The research covers a university hospital and is limited to MRI services. The only work to be done in this area in health institutions and organizations in Turkey are the strengths of our research.

FINDINGS

Many components are coordinated in the presentation of health services. In the diagnosis and treatment processes of the hospitals, health services are provided in a coordinated manner to many areas such as outpatient services, bedside services, laboratory services, catering services, cleaning services and medical imaging services (İşçi, 2004). The main medical imaging services used in hospitals are X-ray, Ultrasounds (US), Tomography (CT), Positron Emission Tomography (PET/CT), Magnetic Resonance Imagining (MRI) and Scintigraphy. In hospitals, one of the most used medical imaging techniques is Magnetic Resonance Imaging (MRI).

MRI is the radiological imaging method with the highest soft tissue contrast resolution power. This is a radiological imaging technique that does not contain harmful ionizing radiation to the tissues used in the examination of all the soft tissues and organs in the body, especially to the nervous system. MRI devices generate images by sensing the signals that are transmitted back to the body tissues placed in a magnetic field and then echoed back to the tissues (Kaya et al., 1996).

It is used in the diagnosis of tissue curing, brain and pituitary gland tumors, vertebrae, brain and joint infections, imaging of muscle contractions in the genitals, carpal and tarsal joints, imaging of the shoulder injuries, inflammation of muscle fibers and evaluation of the masses in the soft tissue region of the body (Baert, 2009).

Major disadvantages are, it cannot be done to those with heart plyers, who are claustrophobic (afraid of closed places), the MRI device makes too loud

sound during scanning, the patient must stand motionless for a long time during scan in the MRI device (up to 20 to 90 minutes), a small movement of any part of the body portion (such as artificial joints) in the screening area causes severe visual impairment (Yeşildağ and Oyar, 2003). Despite these disadvantages, MRI is one of the most preferred medical imaging modalities.

The Organization for Economic Cooperation and Development (OECD) in the 2017 report on Turkey in 2015 to 10.2 per 1 million persons per MRI device. Turkey ranks 23 among the OECD countries with the number of MRI machines. 144 MRI examinations are performed in every 1,000 people in Turkey. Turkey ranks first among OECD countries with the number of inspections. This data shows that there was too much MRI examination in Turkey, despite the small number of MRI equipment. A MRI device operated under suitable conditions for maximum 60-70 examinations in 24 hours. But in Turkey, this number exceeds the 100 in many health center and approaching 200 examinations per a day in some. This makes the efficiency and effectiveness of MRI examinations open to debate.

The financing structure of the health system in Turkey, health insurance (Bismarck model), public assistance (Beveridge model) show mixed features including private spending. The main funding source for this mixed structure is public financing (Mutlu and Isik, 2002). In Turkey individuals' medical expenses are only met by attendant institution is the Social Security Institution (SSI). The SSI specifies the working procedures and principles according to the legislation of Health Practice Statement (HPS).

Within the scope of the Social Security Institution Law No. 5502 and the Law No. 5510 and the General Health Insurance Transactions Act, the legislation called the Health Practice Statement (HPS), allows the government to implement, guide, price, organize and rest all the details of health-related social policies. HPS includes provisioning procedures, participation fees, surcharges, methods of providing financed health services and payment rules, principles of payment of medical supplies, invoicing and payment, arrangement of bills of health institutions and institutions, payment transactions and many other matters. Hospitals are invoicing all the services and transactions who are ill under the HPS framework within the scope of the health services presentation. SSI is paying for the services and transactions they offer to the hospitals within

the framework of the prices specified on the HPS list.

SSI is paying to hospitals, only looking at the rules in the HPS. It does not look at whether the service or process being offered is through the hospital's own resources or outsourcing. Hospitals are able to deliver services through outsourcing rather than their own resources due to low costs, inadequate staff in terms of quality or quantity, and various reasons. The university hospital in the study offers Magnetic Resonance Imaging Services outsourced.

In the HPS, the MRI Services code is 3945. The description of this service is as follows; *"Radiology is billed by a specialist physician report. Each examination under this heading shall be invoiced at most once per month for the same patient in outpatient treatment, except for emergencies in the same health care provider. On the same day, if more than one transaction is performed under this heading, all the transactions with higher transaction points will be invoiced, and 50% of each transaction will be invoiced".* It is clear from the explanation that the SSI will not pay for the MRI service offered for the same patient more than once a month, without a radiology doctor report and in the same hospital emergency cases. It is also stated that for the same day more than one MRI service will be paid for the service with the highest score and half of the other services.

Table 1. Health Practice Statement (HPS) Magnetic Resonance Imaging Service Outside Score List, SSI Payment Amount and Company Payment Amount

Queue No	Code	Action Name	Explanation	Action Points	Buying from SSI (Item Price: 0,593)	Paid to Company (Item Price: 0,393)	Difference by Transaction
21.10.1910	804.180,00	MR, abdomen, low		109,61	64,99	43,07	21,92
22.10.1910	804.190,00	MR, brain		109,61	64,99	43,07	21,92
23.10.1910	804.200,00	MR, cerebrospinal fluid, current		109,61	64,99	43,07	21,92
24.10.1910	804.210,00	MR, neck		109,61	64,99	43,07	21,92
25.10.1910	804.220,00	MR, diffusion	If done in conjunction with other MR operations, 50% of the transaction score will be invoiced.	109,61	64,99	43,07	21,92

3951 (Revision: official newspaper - 24/12/2014-29215/ 19-a matter. Force: 01/01/2015)	804.220,00	MR, diffusion		109,61	64,99	43,07	21,92
26.10.1910	804.230,00	MR, dynamic	Not invoiced with 804.270.	109,61	64,99	43,07	21,92
27.10.1910	804.240,00	MR, Joint single		109,61	64,99	43,07	21,92
3954	804.250,00	MR, extremity one sided		109,61	64,99	43,07	21,92
3955	804.260	MR, functional		109,61	64,99	43,07	21,92
3956	804.270	MR, pituitary	Not invoiced with 804.230.	109,61	64,99	43,07	21,92
3957	804.280	MR, cardiac		109,61	64,99	43,07	21,92
3958	804.281	MR T2 * cardiac		109	64,63	42,83	21,80
3959	804.290	MR, cardiac functional		109,61	64,99	43,07	21,92
3960	804.300	MR, cardiac perfusion		109,61	64,99	43,07	21,92
3961	804.310	MR, ear		109,61	64,99	43,07	21,92
3962	804.320	MR, vertebra, lumbar		109,61	64,99	43,07	21,92
3962 (Revision: official newspaper - 05/08/2015-29436/ 28-c matter. Force: 05/08/2015)	804.320	MR, vertebra, lumbar (printed, unprinted)		109,61	64,99	43,07	21,92
3963	804.330	MR, breast		109,61	64,99	43,07	21,92
3964	804.340	MR Angiography		109,61	64,99	43,07	21,92
3965	804.350	MR Cholangiography		109,61	64,99	43,07	21,92
3966	804.360	MR myelography		109,61	64,99	43,07	21,92
3967	804.370	MR Spectroscopy (Single voxel single echo)		103,04	61,10	40,49	20,61
3968	804.380	MR Spectroscopy (Multivoxel single echo)		109,61	64,99	43,07	21,92
3969	804.390	MR urography		109,61	64,99	43,07	21,92
3970	804.400	MR arthrography		109,61	64,99	43,07	21,92
3971	804.410	MR, other		109,61	64,99	43,07	21,92
3972	804.411	MR T2 * liver		109	64,63	42,83	21,80
3973	804.412	MR Enterocolitis		109	64,63	42,83	21,80

3974	804.413	MR, Fetal		109	64,63	42,83	21,80
3975	804.414	MR Cisternography		109	64,63	42,83	21,80
3976	804.415	MR, Diffusion Tensor Imaging, Tractography		109	64,63	42,83	21,80
3977	804.416	MR 3d Imaging		109	64,63	42,83	21,80
3978	804.420	MR, Nasopharyngeal		109,61	64,99	43,07	21,92
3979	804.430	MR, Orbital		109,61	64,99	43,076	21,92
3980	804.440	MR, Perfusion		109,61	64,99	43,07	21,92
3981	804.450	MR, Vertebra, Cervical		109,61	64,99	43,07	21,92
3982	804.460	MR, Temporoman-dibular joint (Single joint)	Mouth open / closed included	109,61	64,99	43,07	21,92
3983	804.470	MR, Vertebra, thoracic		109,61	64,99	43,07	21,92
3984	804.480	MR, Abdomen, Up		109,61	64,99	43,07	21,92
3985	804.490	MR, whole body metastasis screening, with movable table		109,61	64,99	43,07	21,92
3986	804.500	MR, Interventional		109,61	64,99	43,07	21,92
3987	804.510	MR, Face		109,61	64,99	43,07	21,92

Source: *Social Security Institution Health Practice Statement, 2016.*

Table 1 shows the 41 different MRI services mentioned in the HPS and the service point score list, order number, code, related statements, the prices of the transactions received from the SSI and the amount paid to the hospital, and the amount per transaction to the hospital. For the MRI services with a transaction score of 109.61, SSI receives a payment of TL 64.99, the company is paid TL 43.07 and the patient remains TL 21.92. For MRI services with a transaction score of 109, SSI receives a payment of TL 64.63, a payment of TL 42.83 to the company and TL 21.80 to the hospital.

Table 2. 9 Months MRI Payment Plan Schedule which Payed to the Firm

Date	Invoice Amount	VAT	Total Amount	VAT Resolution (5/10)	Stamp Duty (Per Thousand 9.48)	Minimum Wage Support Amount	Must Pay
01.02.2017	87.101,15	6.968,09	94.069,24	3.484,05	825,72	-	89.759,47
01.03.2017	112.904,11	9.032,33	121.936,44	4.516,16	1.070,33	646,02	115.703,93
01.04.2017	115.187,18	9.214,97	214.402,15	4.607,49	1.091,97	695,97	118.006,72
01.05.2017	104.116,46	8.329,32	112.445,78	4.164,66	987,02	739,26	106.554,84
01.06.2017	109.888,74	8.791,10	118.679,84	4.395,55	1.041,74	799,20	112.443,35
01.07.2017	93.131,89	7.450,55	100.582,44	3.725,28	882,89	795,87	95.178,40
01.08.2017	119.021,00	9.521,68	128.542,68	4.760,84	1.128,32	799,20	121.854,32
01.09.2017	114.885,64	9.190,85	124.076,49	4.595,43	1.089,12	719,28	117.672,66
01.10.2017	125.353,28	10.028,26	135.381,54	5.014,13	1.188,34	669,33	128.509,74
TOTAL	981.589,45	78.527,15	1.150.116,60	39.263,59	9.305,45	5.864,13	1.005.683,43

Source: *A University Hospital 2017 Year Magnetic Resonance Imaging System Service Fee for Technical Specification*

Table 2 below, the MRI services performed by a university hospital through service acquisition have a 9-month payment schedule for the company that purchased the service. Amount to be paid to the company, invoice amount, VAT, total amount, tax VAT (5/10), stamp tax (9.48 per thousand) and minimum wage support items were added to the account. The hospital carried out the minimum payment of 89,759,47 TL in February, and the highest payment in October of 128,509,74 TL. The hospital has paid a total of TL 1,005,683.43 to the company for 9 months of MRI services. It is observed that the payment made to the company in July decreased by TL 17,264.95 compared to the previous month.

Table 3 below shows the number of MRI shots, payments received from the SSI, payments made to the company, and the remaining amount to the hospital, based on the monthly MRI services performed by a university hospital. While the minimum MRI capture was in February with 2084 shots, the most MRI shots were in October with 2983 shots. Parallel to these figures, the minimum amount for the hospital was 45,479,12 TL in February while the highest amount was 65,399,36 TL in October. A total of 23,346 MRI scans were performed at the hospital for 9 months. SSI received 1,517,481.61 TL for these MRI shots and TL 1,005,683.43 was paid to the company. The hospital obtained a profit of 511.798,18 TL.

Table 3. Number of MRIs Taken, Receivable from SSI, Profit Table Needed to be Paid to the Company

Date	MR Number Taken	Received from SSI (Item Price:64,99873)	Need to Pay to the Company (Item Price:	
43,07673)	Profit (For One Item: 21,922)			
01.02.2017	2084	135.438,59	89.759,47	45.679,12
01.03.2017	2686	174.586,34	115.703,93	58.882,41
01.04.2017	2739	178.061,03	118.006,72	60.054,31
01.05.2017	2474	160.781,22	106.554,84	54.226,38
01.06.2017	2610	169.666,43	112.443,35	57.223,08
01.07.2017	2210	143.615,24	95.178,40	48.436,84
01.08.2017	2829	183.866,70	121.854,32	62.012,38
01.09.2017	2732	177.556,97	117.672,66	59.884,31
01.10.2017	2983	193.909,10	128.509,74	65.399,36
TOTAL	23346	1.517.481,61	1.005.683,43	511.798,18

Source: *A University Hospital 2017 Year Magnetic Resonance Imaging System Service Fee for Technical Specification*

DISCUSSION AND RESULTS

In transaction costs is the basic decision-making within the "organization" (hierarchy), or is it "on the market" to be more efficient? This issue is expressed as "Make or Buy" in the transaction cost theory. Organizations should focus exclusively on core competence that they do best, that they cannot be imitated in competitions, and that they are not as successful as they are, and that they do not have any substitutes (Outsourcing). Thus, the organization is increasing its chances of success and growth (Tengilimoğlu, 2009). Transaction cost theory is the most debated theory in the economics-based organization approach.

Businesses are not only those that are based on their own abilities and capabilities; "outsourcing" is the process by which businesses that do not use core or core competencies receive business from other businesses specializing in their own field. Hospitals focus on the delivery of health services with basic skills and complementary work outside of health services can be met through outsourcing. Outsourcing of food, cleaning, security, laboratory and imaging services in hospitals is the most frequently used area.

In hospitals, one of the most used medical imaging techniques is Magnetic Resonance Imaging (MRI). The Organization for Economic Cooperation and Development (OECD) in the 2017 report on Turkey in 2015 to 10.2 per 1 million persons per MRI device. Turkey ranks 23 among the OECD countries with the number of MRI machines. 144 MRI examinations are performed every 1,000 people in Turkey. Turkey ranks first among OECD countries, with the number of inspections. This data shows that there was too much MRI examination in Turkey, despite the small number of MRI equipment. A MRI device operated under suitable conditions for maximum 60-70 examinations in 24 hours. But in Turkey, this number exceeds the 100 in many health center and approaching 200 examinations per a day in some. This makes the efficiency and effectiveness of MRI examinations open to debate.

Within the scope of the Social Security Institution Law No. 5502 and the Law No. 5510 and the General Health Insurance Transactions Act, the legislation called the Health Practice Statement (HPS), allows the government to implement, guide, price, organize and rest all the details of health-related social policies. Hospitals are invoicing all the services and transactions from SSI who they are ill with under the HPS framework within the scope of the health services presentation. SSI is paying for the services and transactions they offer to the hospitals within the framework of the prices specified on the HPS list.

SSI, without a radiology physician report, and in the same hospital, except for emergency cases, the same patient will not be paid more than once a month for the MRI service offered. It is also stated that for the same day more than one MRI service will be paid for the service with the highest score and half of the other services.

For the MRI services with a transaction score of 109.61 in the HPS, SSI receives a payment of TL 64.99, the company is paid TL 43.07 and the patient remains TL 21.92. For MRI services with a transaction score of 109, SSI receives a payment of TL 64.63, a payment of TL 42.83 to the company and TL 21.80 to the hospital.

The hospital has paid a total of TL 1,005,683.43 to the company for 9 months of MRI services. A total of 23,346 MRI scans were performed at the hospital for 9 months. SSI received 1,517,481.61 TL for these MRI shots and TL 1,005,683.43

was paid to the company. There is 511.798,18 TL left to the hospital.

As a result, hospitals often resort to outsourcing in the provision of health services within the framework of transaction cost theory, gain profits from outsourcing services, and can better focus on provision of health services with core competencies. Longer duration and inclusion of more than one hospital is recommended for future research in this area.

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The Historical Background of Transition from Socialization in Health Policy to Family Medicine Practices: Organizational Network of Primary Care in Turkey

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ABSTRACT

Organization of primary health care services is the backbone of a health system. The aim of this study is to scrutinize the policy trends regarding primary healthcare services and try to understand the transitions among them.

The health policy changes and the related legislative documents were investigated throughout Turkish Republic period. The data were collected through document review method, and content analysis was made.

Apart from political controversies and utterances, it is seen that in various time frames of the Turkish Republic, health policy has depicted the same issues as its objective. These issues have taken place not only in the country's political agenda, but also in lots of others in the new global view as well.

Keywords: Family Practice, Health Policy, National Health Plan, Primary Care, Socialization in Health.

INTRODUCTION

The effects of the health care reforms implemented in the last 15 years in Turkey are well known (Atun et al., 2013; Bariş, Mollahaliloğlu, & Aydin, 2011; Tatar et al., 2011). The primary healthcare services based on family medicine

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practice, constitute a significant component in this reform process.

Healthcare policies during the early years of Turkish Republic, which go back to almost hundred years, were mainly focused on public health issues "hıfzıssıhha" under the leadership of the first Health Minister Dr. Refik Saydam. The other well-known Minister of Health who tried to put concrete plans and programs about primary health care into action during 40's and 50's was Dr. Behcet Uz. Along with these policies, reorganization of primary health care services became more remarkable in healthcare system after 1960, with the concept of "socialization of healthcare services".

The aim of our study is to scrutinize the policy trends regarding primary healthcare services and try to understand the transitions among them without tending to a positive or negative point of view. Some conflicting issues within these policies can be seen as expected, since they emerged in different times with different point of views. We believe that political preferences and polarization prevented them to be evaluated independently enough in an objective comparable manner. It should be evenly normal that they influenced each other, and they passed favorable knowledge on each other during the time sequence. We believe that this approach, the driving force of this study, will have a positive effect on the development of future healthcare policies.

MATERIAL AND METHOD

Qualitative research methods were used in this study. National Health Plan, National Health Program, the Law on Socialization of Healthcare Services together with Social Security and General Health Insurance Law, and Family Medicine Law which were mainstreams of Health Transformation Program were reviewed in details. The data were collected through document review method and content analysis was made.

The "First Ten-Year National Health Plan", which we can call the first health plan in the history of the Turkish Republic, was approved by the Higher Council of Health in 1946. This plan was announced by the Minister of Health Behçet Uz in 1946. As a continuation of the first Ten Year National Health Plan, "National Health Program and Studies on Health Bank" was also announced by Dr. Behçet Uz during his second term in the ministry in 1954, which was one of the cornerstones for the planning and organization of the Turkish national

health system. (Akdağ, Demirel, & Aydın, 2009)

The Law no.224 on the Socialization of the Healthcare Services was adopted in 1961. The socialization began in 1963 and became widespread in the country in 1983. The Law on the Socialization of Health promoted the establishment of an integrated health service scheme with a three-tiered health system managed by the Ministry of Health and Social Affairs (Atun et al., 2013)

The Health Transformation Program was prepared and announced to the public opinion by the Ministry of Health in 2003. The Health Transformation Program aimed reforms in the framework of 8 themes including universal coverage and family medicine practice (Akdağ, 2012). Turkish Grand National Assembly enacted the Law on Pilot Implementation for Family Medicine in 2004. Pilot implementation was first initiated in Düzce and the implementation was expanded to other provinces during the following years. In 2006, the Grand Assembly ratified the Social Insurance and the General Health Insurance Law to bring together the five health insurance schemes within a unified General Health Insurance scheme integrated within the Social Insurance Organization with synchronized benefits. (Akdağ, Aydın, & Demirel, 2007; Atun et al., 2013)

DISCUSSION

National Health Plan and National Health Program, the Socialization in Health and Health Transformation Program are the corner stones of health policy actions which focus on primary health care. Evaluating them in a time sequence revealed that in a way they are the successive policy chain rings. We observed that they have common goals such as providing an integrated healthcare organization throughout the whole country starting from small settlement sites, modernizing the city and district hospitals compatible to the current expectations and to providing adequate and competent human resources in the field of healthcare services.

The socialization and transformation programs both essentially gave importance to patient choice to select physicians. Health Transformation Program aimed to establish the health regions similar to the National Health Plan and Program. These regions were planned to have their own performance goals with adequate supplies. On the other hand, consistent with these programs, socialization in health care policy aimed to establish somewhat a

similar approach within the hierarchy of district, city and region hospitals (Akdağ, 2012; Demirel, 2008; Sağlık Hizmetlerinin Sosyalleştirilmesi Hakkında Kanun, 1961; Uz, 1946, 1954).

It is a surprising issue that, along with the socialization in health, the hospitals of Social Insurance Institution were legally transferred to the Ministry of Health (Sağlık Hizmetlerinin Sosyalleştirilmesi Hakkında Kanun, 1961). Unfortunately, for the implementation of this reform, we had to wait for 45 years for Health Transformation Program, in which the same issue was raised again. The plan prepared in 1961 within socialization policy was realized in 2005 during the implementation of Health Transformation Program. According to the law numbered 5283, all healthcare units belonging to state institutions and organizations, all kinds of duties, rights and obligations, portables, premises, vehicles related to these healthcare units along with the belongings of Social Insurance Institution were transferred to Ministry of Health in exchange for current market value (Bazı Kamu Kurum Ve Kuruluşlarına Ait Sağlık Birimlerinin Sağlık Bakanlığına Devredilmesine Dair Kanun, 2005).

National Health Program sought means for health financing and addressed "social healthcare bank", as a social security fund (Uz, 1954). On the other hand, Socialization Policy principally required the allocation of financial resource by the state (Sağlık Hizmetlerinin Sosyalleştirilmesi Hakkında Kanun, 1961). However, for financial sustainability, the proposed law included items related to "social security contributions" and "direct and indirect taxes". Nevertheless, the articles including these decrees were not passed in the General Assembly. It is obvious that not realizing these articles badly affected the sustainable integrity of the system and its applicability. Thus, the foreseen additional taxes were not materialized, the compulsory insurance previously foreseen in the National Health Plan within the scope of socialization was not put on the agenda. In short, the cited reform policies were tried to be materialized within the shoestring budget of that period.

With the implementation of Health Transformation Program, a mixed model mainly based on premiums was put into practice under the name of General Health Insurance. However, it also comprised general budget contributions as non-contributory payments and direct contributions undertaken by the state. Article 60 of law 5510 encompasses those considered as insured by the

General Health Insurance and henceforth lists two types of citizens covered by this law: first, those based on the designated test methods and data used by Social Security Institution and taking into account the expenditures, considering premises and movables and benefits stemming from these as such; and second, those citizens whose monthly revenue within the family per person is less than one third of minimum wage or those younger than 18 years of age -without applying an income test- who are not covered by a health insurance or dependency (Sosyal Sigortalar ve Genel Sağlık Sigortası Kanunu, 2006). Assessing the Law in its entirety; it is duly presumed that a social health insurance has been designated pooling not solely by income basis premium covering a certain number of population with a limited benefit package, instead of a health insurance based on actuarial balances. Article 62 of the same law states that provision of health services and other rights provided within the boundaries of the general health insurance is a basic right for those and their dependents, and financing these services and rights is in fact a commitment for the Social Security Institution (Sosyal Sigortalar ve Genel Sağlık Sigortası Kanunu, 2006).

Usually, the health financing models are categorized on the way their resources are built either as tax or premium based. Reviewing the background of today's models, it is not easy to classify them as the historical known Beveridge, Bismarck or Semashko models. Having experienced a series of reforms based on their own needs and perspectives, most countries formulated a distinguished financial model of their own by time.

Issues such as the organization and financing aspects of the health systems, distribution mechanisms of resources, quality and volume of healthcare services, range of benefit package and coverage of the population are becoming main topics of health care reforms. Recently, hybrid systems have become more viable by mobilizing resources both through taxes and compulsory or optional premiums with different ratios. In this respect, even though basic differences like the tax based national health systems or social health insurance systems may theoretically ease comprehension, it will not be clear enough to capture the core of financial aspects of the system properly and compare it with those of other country models. As a matter of fact, this categorical approach in the health financing system, instead of concentrating on the society and system

thereof as a whole, limits the success and failures of critical applications within the system and complicates the developments of probable policy alternatives (Kutzin, 2010).

Both socialization of health services and family medicine legislation documents declared that services are free of charge. Overall, there is a current misleading perception on the political front that health services are free. The consequence of this perception leads to imaginary implications and dynamics of transition and complicates the comparative analysis of health policies in our country. Neither socialization nor the current health policies do have claims that provide complete free health service for everyone at every step.

Article 2 of Law titled 224 refers to premium and partial contribution to expenditures. Article 5 describes personal fee payment for those living in areas where health services are socialized, if they apt to choose health personnel or institution. In addition; article 14 of the law specifies conditions in which payment is required (Sağlık Hizmetlerinin Sosyalleştirilmesi Hakkında Kanun, 1961) . Law 5258, organizing family medicine practice refers to partial payments for those individuals who directly attend to hospitals without having been referred by a family physician except emergency and force major situations (Aile Hekimliği Kanunu, 2004). The main aim of both legislations is to promote primary health care, instead of imposing financial burden to the patients. The logic behind these documents is to provide strategic directions for health care delivery and use copayments as control mechanisms leading the patient accordingly.

Once we analyze the socialization policy deductively, we reach the conclusion that the objectives are to organize and plan centrally, to distribute health personnel evenly throughout the country, to increase the effect of local share within the health management system, to set up the health care service network reaching as far as distant locations such as villages, to encourage patient visits at home, to focus on preventive health services, and to enforce civil servant physicians work full time allowing a space for private organizations. It is also possible to repeat almost all of these issues for family physician scheme, which has been implemented through Health Transformation Program (Aydın, 2010). It is known that in various time frames of the Turkish Republic, health policy has depicted the same issues as its objective. These issues have taken

place not only in our political agenda, but also lots in that of other countries' agenda as well in the new global restructuring following World War 2.

Even though many European countries tried to organize health services in a widespread and integrated manner after World War 2, UK case was the one which made primary care reaching every corner of the country in an efficient manner. In 1946, the National Health System (NHS) has been adopted and is still in use today with several changes and updates. Even though several pros and cons of UK NHS may be put forth, one of its significant shortfalls is that it could not achieve filling the gap fully between treatment and protective support services (Sharmanov, 2008). Apart from UK, primary care services based on health insurance principles have been experienced in countries like Sweden, France and Germany.

Another system based on outpatient clinic and dispensary services was developed within the former Union of Soviet Socialist Republic. Health Services Community Commissioner N Semashko and Red Army Health Commission Chief Z Soloviev, having visited European Countries, have carried over the organizational aspects of UK and Germany into their country. As a result, a new reorganization has been initiated targeting the widespread access to primary care services (Aydın, 2010; Sharmanov, 2008).

The important thing is to set up a structural organization which will pave the targeted outcome of the health system in the end. Ignoring the primary objectives of the health system and evaluating the organization or corporate structure as indispensable elements would no doubt prevent it from adapting and upgrading itself in accordance with the changing environment.

As a result, presenting the organizational structure of primary care aimed by socialization in health care and the family medicine scheme within Health Transformation Program as if they are opposing elements, prevents us from reaching the details of both systems, analyzing their successful and unsuccessful aspects, and thus, finally prevents us from designing the right reforms.

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