

The Correlation Analysis of Relative Values of Drugs and the Health Service Tariffs in Private Health Insurance System in Turkey

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ABSTRACT

Diagnostic Related Groups (DRG) is used to classify patients/cases that have similar services in the treatment as they have similar diagnoses. The costs of qDRG cases are represented by a numerical value called “relative value”. Initially developed for grouping hospital costs on the basis of diagnosis, DRG started to be taken as reference widely by insurance companies in the case based payment model. The first study about the DRG in Turkey was initiated in 2005 with public-university cooperation and has carved an important role in the global budget implementation of Ministry of Health (MoH) since 2009 using the Australian DRG model. However, any work related to the DRG in the private health insurance sector in Turkey has not been conducted. The payments of private hospitals by the private insurance companies are based on the pay for service payment model and the service prices are calculated mostly considering the minimum wage tariffs of the Turkish Physicians Association (TPA). Although some arrangements have been done on the relative values by the MoH regarding the wages in the public sector; there has been no study of how the relative values are in line with the prices in private hospitals. This study aims to measure the correlation between the DRG relative values of Turkey and the health care service prices that private hospitals charge to private

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health insurance companies. The data set gathered by CompuGroup Medical in a TUBITAK project includes the damage files and their corresponding DRGs. The correlation between damage amounts and relative values of 2.144 files is measured as 0,41. Secondly, the correlation between the average damage amounts of 235 DRGs and the relative value was also measured as 0.43. Thus, the relationship between the health care service prices of the private hospitals charged to private insurance companies and the DRG relative values used by the MoH has been measured to be weak.

Keywords: Diagnosis Related Groups, Turkish Medical Association, relative value, correlation analysis.

INTRODUCTION

From the first civilizations in the world, until this time, health services have always in existence. It has been observed that the services, which were previously focused on physicians and nurses, have been transformed since the second half of the twentieth century, gaining a size between sectors and professions (İstanbuluoğlu, Güleç & Oğur, 2010).

Health financing can be defined as the creation of the resources necessary to meet the costs that result from health services (Uğurluoğlu, Özgen, 2008). The basic resources are used to meet the health costs; taxpayers, social health insurance premiums, private health insurance premiums, individual medical savings accounts, out-of-pocket payments, debts and donations (Cutler, Reber, 1998).

According to the reimbursement model in a country and the health insurance of the person receiving the service, payment is made from the service provider from appropriate sources.

Common and accepted payment models are (Lilford, Brown CA, Nicholl, 2007):

- 1.Fixed budget-based payment
- 2.Pay per transaction
- 3.Pay per person
4. Pay per case
5. Result-based payment

Deciding which health reimbursement models are used in a country is one

of the most important issues in managing the country's health budget. However, this decision is not merely a matter of financial management, but rather an element that affects the performance and quality of the service offered (Tatar, 2011).

DRG Practice in the World

Diagnosis Related Groups is a case-based payment model. Based on clinical and demographic data of the patients, they are grouped according to cost-based systems (Cesur, 2015).

The DRG System was first used in 1973 by Yale University researchers in the United States for hospital cost and quality control. Most of the developed countries have also been the main intermediaries of the hospital reimbursement system (Aktulay, 2009), (Busse, Schreyögg, Smith, 2006), (Sarı, 2017). This system, which was initiated in 1973, used the updated version of ICD 9-CM because of the complexity of their health systems, although it was originated by US-Yale University.

Since the 1990s would be, other countries in this area have begun to come to the forefront. Scandinavian countries since the mid-1990s; Sweden, Norway, Denmark, Estonia, Latvia, Finland, Iceland have established Scandinavian patient classification system as "NordDRG". The first version was completed in 1996 and is updated every year.

Nord-DRG = (794 DRG GROUP).

Each country can use the DRG system for different purposes. These aims can be considered as the creation of hospital budgets, the calculation of costs, the development of health policies, the planning and researching, the improvement of service utilization, the increase of transparency level (Arık, 2016).

DRG Practice in Turkey

DRG work in Turkey at Hacettepe University Research Project (HUAP) started in 2005 as a sub-project (Akdağ, 2011).

The relative values of the 661 Diagnostic Related Group produced after the cost analysis study conducted in 81 hospitals in the pilot study carried out in Turkey DRG are taken into account (Tükel, 2010).

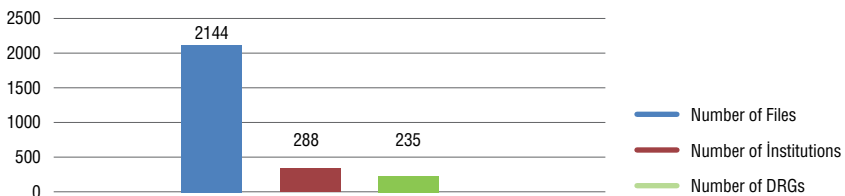
The Health Service Tariff of Turkish Medical Association

Another wage scale used in Turkey was a published tariff used by the Turkish Medical Association (TMA), showing doctors’s tariff charges and practice principles. This tariff, which is mainly used for physician services in private hospitals, is a basis for the payment of private health insurances and private hospitals. The wage is calculated by multiplying the general coefficient determined twice a year by the unit value determined for each medical procedure, separately for each province, and adding the 8% VAT (Turkish Medical Association Medical Practices Database, 2017). According to the agreement between the insurance company and the private hospital, this amount is multiplied by another coefficient to determine the final fee.

METHODOLOGY

The total number of files in the study, the number of different DRGs and different hospitals are shown in the graph below:

Number of files on DRG basis



Data Gathering

The data set in the study used the damage files that were transferred to the electronic centers of the insured who received the hospital treatment services for the underwriting of the patients under the TEYDEB project number 3110186 of CompuGroup Medical (CGM) (hereinafter referred to as Company). These files do not contain the identity information of the insured person, only the damage file information is included. The Company provides a wide range of private health insurance companies with the provision, compensation, risk assessment, etc. is a third-party service provider that offers services. For this reason, it can give provision of pharmacy and hospital provision, both through the call

center; and electronically as provision. Therefore it can manage this data. In this study, the data for 2012 were have been reviewed and the results were analyzed.

Determination of DRG Code and Relative Value of Damage Files

A total of 2,144 hospitalized treatment injury files were reviewed by a physician who was also a company employee, and the Ministry of Health's data set (diagnosis, procedures, length of stay, etc.) sent to the DRG system was determined. This data set was recorded in the Ministry's on-line DRG system and the Ministry of Health's DRG code for the relevant damage file was learned and the relative value of this TIG code and the MDC group that included this DRG were noted. At this point, the basic information of the damage file at hand can be added to the DRG code of the relevant file. The final set of data obtained is as follows:

1. Hospital Type (A, B)
2. Damage Date
3. Amount of Loss (TL)
4. MDC Code
5. DRG Code
6. Relative Value
7. Length of Stay (days)

Creating a Summary Table

From the data set obtained, the following indicators were calculated for each DRG group through the analysis screens developed with Qlikview™ Personal Edition:

1. Total Number of Files
2. Minimum Damage Amount (TL)
3. Maximum Damage Amount (TL)
4. Average Amount of Damage (TL)
5. Standard Deviation (Damage Amount, TL)
6. Total Damage Amount (TL)
7. Minimum Admission Time (Days)
8. Maximum Sleep Time (Days)
9. Average Sleep Time (Days)

Correlation Analysis

Correlation Analysis the measure of the relationship between the two variables and varies from -1 to +1 (Köse, 2018).

Regarding the strength of the correlation coefficient, the following definitions have been made;

0.01 - 0.25 Very weak relationship

0.26 - 0.49 Weak relationship

0.50 - 0.69 Intermediate relationship

0.70 - 0.89 High relationship

0.90 - 1.0 Very high correlation

Two different correlation analyses were performed in our study. In the first place, a correlation analysis was conducted between the payment amounts of 2,144 claim files for which the hospital requested payment from the insurance company for the health services provided by the private hospitals by the private health insurance companies and the DRG values for which the same files correspond.

In this analysis, separate correlation analysis for a different number of damaged files per DRG is examined and how the correlation with the increase in the number of files is measured.

In the second analysis, the correlation between the mean values of the damage files corresponding to 235 different DRG groups and the relative values of these DRG groups was calculated.

Finally, a third analysis was carried out and a correlation analysis was performed between the relative values of a set of DRG heights corresponding to the MDC groups.

RESULTS

Correlation Analysis between Claims Amount and Relative Value

The correlation between the damage amount of 2,144 damage files in our datum and the corresponding values of the corresponding DRG group in the same file was found as 0,4135. This value shows us that the power of the correlation coefficient is “weak”.

The low correlation between the damage amounts and the relative values of all the damage files made us think that it would be useful to do the same

correlation analysis for each MDC group as well. When we divide the data set for each MDC group in this framework into sub-clusters and re-analyze the correlation between the damage amounts and the relative values, the following tabular values are obtained:

Table 1: Correlation Analysis between Claims Amount and Relative Value

MDC Group	Number of DRG	Number of Files	Correlation Value	Correlation Coefficient Power
MDC - 01 Nervous System Diseases	13	45	0,78	High relationship
MDC - 02 Eye Diseases	14	84	0,30	Weak relationship
MDC - 03 ENT and Mouth Disorders	16	388	0,46	Weak relationship
MDC – 04 Respiratory System Diseases	16	221	0,44	Weak relationship
MDC - 05 Circulatory System Diseases	18	60	0,22	Very weak relationship
MDC - 06 Digestive System Diseases	28	271	0,37	Weak relationship
MDC - 07 Hepatobiliary System and Pancreas Diseases	11	59	0,09	Very weak relationship
MDC - 08 Musculoskeletal and Connective Tissue Diseases	29	184	0,46	Weak relationship
MDC - 09 Skin, Subcutaneous (Subcutaneous) Tissue and Breast Diseases	14	285	0,52	Intermediate relationship
MDC - 10 Endocrine, Nutritional (Nutrition) and Metabolic Diseases	9	51	0,67	Intermediate relationship
MDC - 11 Kidney and Urinary Tracts (Urinary Tract) Diseases	11	73	0,29	Very weak relationship
MDC - 12 Male Reproductive Organs Diseases	9	19	0,74	High relationship
MDC - 13 Female Reproductive Organs Diseases	10	139	0,41	Weak relationship
MDC - 14 Pregnancy, Birth and Puerperium	8	177	0,34	Very weak relationship
MDC - 15 Newborn (and Other Neonates)	3	21	0,15	Very weak relationship

MDC Group	Number of DRG	Number of Files	Correlation Value	Correlation Coefficient Power
MDC - 16 Blood and Blood making Organs and Immune Diseases	4	5	-0,7	High relationship in a negative direction
MDC - 17 Neoplastic diseases (Hematological and solid neoplasms)	6	7	0,37	Weak relationship
MDC - 18 Infectious and Parasitic Diseases	7	30	0,36	Weak relationship
MDC - 19 Mental Health Disorders	1	1	-	Correlation cannot be analyzed
MDC - 21 Injuries, Poisoning, and Toxic Drug Effects	5	20	0,58	Intermediate relationship
MDC - 22 Burns	1	2	-	Correlation cannot be analyzed
MDC - 23 Factors Affecting Health and Other Types of Contacts Established by Health Services	1	1	-	Correlation cannot be analyzed
Leading-Major Diagnostic Classes	1	1	-	Correlation cannot be analyzed

Correlation Analysis According to Damage Number of Files Per DRG

The number of damage files that are common to DRG groups in our data set varies. The higher the number of damaged files per DRG, the healthier the average damage corresponding to the DRG is. Therefore, the results were obtained when we do the correlation analysis by taking the data set which is more than 1, 2, 3, 4 and 5, and the number of damage files per DRG is given in Table 2.

Data set	Number of DRG	Number of Files	Correlation Value	Correlation Coefficient Power
All files	235	2.144	0,4331	Weak relationship
Damages with more than 1 file per DRG	157	2066	0,6328	Intermediate relationship
Damages with more than 2 files per DRG	126	2004	0,6635	Intermediate relationship
Damages with more than 3 files per DRG	107	1947	0,6888	Intermediate relationship
Damages with more than 4 files per DRG	92	1887	0,6753	Intermediate relationship
Damages with more than 5 files per DRG	80	1827	0,4763	Weak relationship

Table 2: Correlation Analysis According to Damage Number of Files per DRG

Correlation Analysis between Average Damage Amounts and Relative Value in DRG Groups

An analysis of the correlation between the damage amount of each damage file and the corresponding value of the DRG corresponding to the damage file gave us important information. However, since there may be a large number of damage files for the same DRG group, it has been evaluated that it is useful to perform a correlation analysis between the average damage amount of the damage files and the corresponding value of the DRG corresponding to the damage files, as well as the damage amount of each of the files. In this case, a correlation analysis was performed between the average damage amount and the relative values for 235 different DRGs.

In the calculation made, the correlation coefficient was found 0.4135 for 2.144 separate files and calculated as 0.4331 for 235 different DRGs. Although there is a slight increase as seen, the strength of the correlation coefficient is still in the “weak” class.

Table 3: Correlation Analysis between Average Damage Amounts and Relative Value in DRG Groups

MDC Group	Number of DRG	Number of Files	Correlation Value	Correlation Coefficient Power
MDC - 01 Nervous System Diseases	13	45	0,84	High relationship
MDC - 02 Eye Diseases	14	84	0	No relationship
MDC - 03 ENT and Mouth Disorders	16	388	0,31	Weak relationship
MDC - 04 Respiratory System Diseases	16	221	0,85	High relationship
MDC - 05 Circulatory System Diseases	18	60	0,14	Very weak relationship
MDC - 06 Digestive System Diseases	28	271	0,25	Very weak relationship
MDC - 07 Hepatobiliary System and Pancreas Diseases	11	59	0,04	Very weak relationship
MDC - 08 Musculoskeletal and Connective Tissue Diseases	29	184	0,40	Weak relationship
MDC - 09 Skin, Subcutaneous (Subcutaneous) Tissue and Breast Diseases	14	285	0,73	High relationship
MDC - 10 Endocrine, Nutritional (Nutrition) and Metabolic Diseases	9	51	0,67	Intermediate relationship
MDC - 11 Kidney and Urinary Tracts (Urinary Tract) Diseases	11	73	0,38	Weak relationship
MDC - 12 Male Reproductive Organs Diseases	9	19	0,77	High relationship
MDC - 13 Female Reproductive Organs Diseases	10	139	0,38	Weak relationship
MDC - 14 Pregnancy, Birth and Puerperium	8	177	0,84	High relationship
MDC - 15 Newborn (and Other Neonates)	3	21	0,60	Intermediate relationship
MDC - 16 Blood and Blood making Organs and Immune Diseases	4	5	-0,11	Very weak relationship in the negative direction

MDC Group	Number of DRG	Number of Files	Correlation Value	Correlation Coefficient Power
MDC - 17 Neoplastic diseases (Hematological and solid neoplasms)	6	7	0,33	Weak relationship
MDC - 18 Infectious and Parasitic Diseases	7	30	0,56	Intermediate relationship
MDC - 19 Mental Health Disorders	1	1	-	Correlation cannot be analyzed
MDC - 21 Injuries, Poisoning, and Toxic Drug Effects	5	20	0,72	High relationship
MDC - 22 Burns	1	2	-	Correlation cannot be analyzed
MDC - 23 Factors Affecting Health and Other Types of Contacts Established by Health Services	1	1	-	Correlation cannot be analyzed
Leading-Major Diagnostic Classes	1	1	-	Correlation cannot be analyzed

In our study, we found a correlation value of 0.4331 for the analysis of 2.144 files and 235 diagnostic related groups. From this, we can say that the correlation between the healthcare prices of private hospitals charged to private insurance companies and the DRG relative values that the Ministry of Health is using is low.

DISCUSSIONS AND CONCLUSIONS

Two different correlation analyses were conducted in our study in which we aimed to analyze the relationship between the relative values of the DRGs and the health service prices of private hospitals charged to private health insurance companies, as below.

In the first analysis;

The correlation between damage amounts and the relative value was analyzed and the correlation between the damage amounts of 2,144 distinct claim files in our data set and the corresponding relative values of DRG of this file was found as 0,4135. This value has shown us that the correlation is weak.

In the second analysis;

It is aimed to analyze the correlation between the average damage amounts and the relative value of DRG Groups. For this purpose, a correlation analysis was performed between the average damage amount and the relative value for 235 different DRGs. The correlation coefficient of this analysis is calculated as 0,4331. This value has also shown us that the correlation is weak.

Although there is a slight change in the results of the analysis by going out of this way, when analyzing the correlation analysis by both methods; it has been determined that the correlation between the relative values of the DRG and the health service amounts paid by private health insurance companies to private hospitals is weak.

However, when we look at the correlation between the payment amounts and the corresponding DRG relative values for each MDC groups; the correlation was only high for 2 out of 23 MDC groups. Similarly, when we look at the correlation between the average payment amounts and the corresponding DRG relative values for each MDC groups; 6 out of 23 MDC groups have a high correlation. The remaining correlation coefficients vary from moderate, weak, or very weak.

However, the determination of the DRG provisions for these cases in private hospitals has been rather troublesome as each damage file needs to be recorded in the on-line DRG system of the MoH. For this reason, the number of samples that our study is based on can cover up to 2,144 damage files and up to 235 DRG groups. Additionally, the 235 DRG groups we analyzed and the MDCs they were included had a very meaningful and useful result. The most valuable information for the decision makers on the relative values of the DRGs is that the result of the Damage Amount / Relative Value section in the current data set is the determination of the DRGs that are too high or too low than the data set average. Further studies covering more of the DRG groups in subsequent investigations will further advance the benefits obtained here.

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