

# The Predictors of Healthcare Utilization and Analyzing Equity Level in Healthcare Utilization in Türkiye: Cross-Sectional Research

## Sağlık Hizmetleri Kullanımında Hakkaniyet: Türkiye Sağlık Sisteminin Değerlendirilmesi: Kesitsel Araştırma

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**ABSTRACT Objective:** This study aims to analyse and evaluate the equity level of healthcare utilization by years in Türkiye by exploring the relationship between health services utilization and the factors that are predisposing, enabling and need factors in "Behavioural Model" developed by Andersen. **Material and Methods:** The concentration index and regression analyses were used to estimate equity levels and to explore the effects of predisposing, enabling and need factors. Data of 5 Türkiye Health Surveys conducted in years of 2008, 2010, 2012, 2014 and 2016 was used to reach this study's purposes. Equity in healthcare utilization was investigated for four healthcare utilization indicators: 1) Services provided by family/practitioner physicians, 2) Services provided by specialized physicians, 3) Day care/outpatient care services, and 4) Inpatient care services provided by hospitals. **Results:** Estimated concentration index values for income level, education level, and number of diseases showed that health services utilization was concentrated among people having less income and education level as well as more diseases. Regression analyses also indicated that the variables of income and education level, and disease existence and number of diseases as well as some other socio-demographic characteristics of individuals had significant effects on health services utilization. **Conclusion:** Considering the effects of predisposing, enabling and need factors on the utilization of health services in Türkiye by years, it might be concluded that equity level in Turkish Healthcare System has been improved.

**ÖZET Amaç:** Bu çalışmanın amacı, Andersen tarafından geliştirilen davranışsal model çerçevesinde eğilim faktörleri, kolaylaştırıcı faktörler ve ihtiyaç faktörleri ile sağlık hizmeti kullanımı arasındaki ilişkiyi incelemek ve Türkiye'de yıllar içerisinde sağlık hizmeti kullanımında hakkaniyet seviyesinde iyileşme olup olmadığını analiz etmek ve değerlendirmektir. **Gereç ve Yöntemler:** Eğilim faktörleri, kolaylaştırıcı faktörler ve ihtiyaç faktörlerinin etkisini incelemek hakkaniyet seviyesini tahmin etmek için konsantrasyon indeksi ve regresyon analizi kullanılmıştır. Bu çalışmanın amaçlarına ulaşmak için 2008, 2010, 2012, 2014 ve 2016 yıllarında gerçekleştirilen Türkiye Sağlık Araştırması'nın 5 yıllık verileri kullanılmıştır. Sağlık hizmeti kullanımında hakkaniyet 4 sağlık hizmeti kullanım göstergesi için araştırılmıştır: 1) Aile/pratisyen hekimler tarafından sağlanan hizmetler, 2) Uzman hekimler tarafından sağlanan hizmetler, 3) Gündüz/ayakta bakım hizmetleri ve 4) Hastaneler tarafından sunulan yataklı tedavi hizmetleri. **Bulgular:** Gelir, eğitim düzeyi ve hastalık sayısı için konsantrasyon indeksi değerleri, daha düşük gelir ve eğitim düzeyine sahip kişiler ile daha fazla hastalığa sahip kişiler arasında sağlık hizmeti kullanımının yoğunlaştığını göstermiştir. Ayrıca regresyon analizleri bireylerin diğer bazı sosyodemografik özelliklerinin yanı sıra gelir ve eğitim düzeyi, hastalık varlığı ve hastalık sayısı değişkenlerinin de sağlık hizmeti kullanımı üzerinde önemli etkileri olduğunu göstermiştir. **Sonuç:** Sağlık hizmetleri kullanımına eğilim faktörleri, kolaylaştırıcı faktörler ve ihtiyaç faktörleri açısından bakıldığı zaman Türkiye Sağlık Sistemi'nde hakkaniyetin sağlandığı ve yıllar içerisinde sağlık hizmetine erişimde hakkaniyet seviyesinde iyileşme olduğu söylenebilir.

**Keywords:** Health equity; patient acceptance of health care; health services accessibility

**Anahtar Kelimeler:** Sağlıkta hakkaniyet; sağlık hizmetinin hasta tarafından kabulü; sağlık hizmetlerine erişim

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Equity in health services utilization is considered to be an essential objective of all healthcare systems to decrease inequities in health services utilization.<sup>1,2</sup> Equity in health is defined as unjust and unfair, but preventable differences among regions or communities. Equity has moral and ethical aspects, and it goes beyond mathematical equality. Every person in need of health service utilization can use needed health care without confronting any barrier.<sup>1,3</sup> Evaluating health inequalities, regardless of how differences are socially dispersed, is not a standard of equity analysis and does not reflect justice in health.<sup>4</sup> But these differences are defined as injustice when they are strongly and systematically associated with the characteristics of a particular social group such as wealth or education level, urban or rural living.<sup>5</sup>

Behavioural Model that was developed in 1968 by the United States medical sociologist and health services researcher Ronald M. Andersen is one of the most widely accepted and used in equity analyses in health through the world. Behavioural Model first emerged in 1968 and has been revised in 1995, passing through many stages. In this model, the variables are categorized under 3 main groups to explain the healthcare use of families: trend (predisposing), enabling (facilitator, opportunity) and need (requirement) factors. The individual's decision about seeking health services and the amount of services he receives are affected by predisposing factors that are the characteristics of the individual, enabling factors that is the ability of individuals to obtain health services, and need factors that indicate the severity of need for health care.<sup>6-8</sup> According to the Behavioural Model, "effective access" is reached when utilization studies show that healthcare use improves health status or consumer satisfaction with received services, and "efficient access" is a case when the level of health status or satisfaction with services increases relative to the amount of consumed health care services.<sup>9</sup> Access is equitable to the extent that predisposing and need-related demographic factors such as age and sex as well as illness account for health care utilization. Inequity is, however, suggested if services appear to be distributed on the basis of other predisposing and enabling variables rather than need.<sup>8</sup>

Equity of access to care is measured based on the relative importance of need compared to other determinants of health care utilization. Access is equitable to the extent that predisposing, need-related demographic factors such as age and sex, as well as illness, account for health care utilization. Inequity is, however, suggested if services appear to be distributed on the basis of other predisposing, enabling variables, rather than need.<sup>8</sup>

Türkiye has made radical changes its healthcare system in the last 2 decades. Changing health financing system to reach universal health coverage, introducing family physicians to ease accessibility to primary health care, and restructuring the Ministry of Health as a leading body rather than providing or financing healthcare are among some major areas that have been reformed. It is the interest of many stakeholders to investigate whether these reforms have created an equal healthcare system in healthcare utilization.

The aim of this study is to examine the equity in the use of health services within the framework of the "Behavioural Model" developed by Andersen. The equity in utilization of family physician services, specialist physician services, day/outpatient care services and inpatient service utilization was tested by using concentration index, and the data of 2008, 2010, 2012, 2014 and 2016 Türkiye Health Surveys (THS) was used for study purposes.

## MATERIAL AND METHODS

This study has 2 main purposes: 1) To analyse and evaluate the equity level of healthcare utilization by years, and (2) To determine the effects of predisposing, need, and enabling factors in Behavioural Model of Andersen on healthcare utilization.

The type of this study is a cross-sectional study. The concentration index formula recommended by O'Donnell et al. was used to estimate equity levels to examine the effects of enabling and predisposing factors, which were household income level and education level of individuals, and one need factor, which was the number of diseases.<sup>10</sup>

The following formula was used to estimate the concentration index:

$$C = \frac{2}{\mu} \text{cov}(h,r)$$

In this formula,  $C$  represents concentration index value while  $h$  represents standardized health services utilization,  $\mu$  indicates the mean of standardized health services utilization, and  $r$  is the ranked variable (income, education, and number of diseases in this study) whose effect is tested. Covariance is represented by  $cov$ . Concentration index value varies between -1 and +1. Concentration index has positive value if concentration curve is below equity line. Otherwise its value is 0 or negative. Positive and higher concentration index values indicate inequity in favour of advantageous groups and more healthcare utilization of advantageous groups such as rich people. Concentration index gets negative value if people with low income or disadvantaged groups use more healthcare compared to advantageous group. If its value is zero (0), it means that there is no socioeconomic-related inequality in healthcare utilization.

## STUDY POPULATION

THS conducted in years of 2008, 2010, 2012, 2014 and 2016 were used to reach this study's purposes. THS collects data on the indicators of diseases and accidents witnessed by respondents in the previous 6 months prior to survey conducted, and the kind of health services that were used due to these diseases and accidents. THS is a nationally representative study and it provides data enabling international comparisons and proves evidence for national requirements. Although THS collects data from children under 15 years old, those respondents who were 15 and more years old were selected for this study.

Based on the definition of predisposing, enabling and need variables of Andersen's Behavioural Health Utilization Model, the variables of age, gender, marital status, education level were thought to be indicators of predisposing variables in this study while health insurance type, working status, and monthly household income were selected to measure the effects of enabling variables and general health status and number of chronic diseases were used to test the effects of need variables in this study. Equity levels by years were examined by determining the effects of these variables on selected 4 different healthcare services utilization indicators: 1) Services provided by family/practitioner physi-

cians, 2) Services provided by specialized physicians, 3) Day care/outpatient care services, and 4) Inpatient care services provided by hospitals. This study was conducted and data were analysed according to the Declaration of Helsinki.

## STATISTICAL ANALYSIS

Regression analyses were used to determine likely predictors and effects of predisposing, enabling and need factors on selected healthcare utilization indicators while concentration index values were calculated to examine equity levels in healthcare utilization by years.

Concentration index values were estimated for the variables of education level, monthly household income and number of diseases. These variables were categorized into 5 categories. Those answers indicating at least one use of selected healthcare utilization indicators were categorized into 5, and no users were excluded in concentration index calculations. This procedure was followed due to the fact that people might not use healthcare if they are not in need of healthcare utilization even they are defined as disadvantaged groups in terms of socio-economic status.

## RESULTS

**Table 1** summarizes the socio-demographic characteristics of the sample of this study. The majority of individuals were aged mostly between 15-54 years old. The number of illiterate individuals in the last THS (2014 and 2016) was higher than other individuals. The percentage of female respondents was higher and around 55% in all examined years. Majority of individuals were married and jobless. The big majority were covered by general health insurance while around 50 percent of individuals' monthly household income level was reported as in the poorest and 2<sup>nd</sup> income quartile. When need factors were considered, it was found that the majority of individuals rated their general health status as good and they did not have any chronic disease while around 20% said they had only 1 disease.

The likely predictors and their effects on healthcare utilization from family physicians as well concentration index values were provided in **Table 2** by

**TABLE 1:** Descriptive characteristics of respondents in the subsample of this study by 2008, 2010, 2012, 2014 and 2016 Türkiye Health Surveys.

Variables	2008		2010		2012		2014		2016	
	n	%	n	%	n	%	n	%	n	%
<b>Predisposing factors</b>										
Age										
15-24	2,878	19.6	2,667	18.5	5,119	18.2	3,388	17.7	2,905	16.8
25-34	3,311	22.6	2,902	20.1	5,605	20.0	3,661	19.1	3,006	17.4
35-44	2,888	19.7	2,819	19.5	5,555	19.8	3,768	19.7	3,444	20.0
45-54	2,429	16.6	2,505	17.3	4,921	17.5	3,332	17.4	3,007	17.4
55-64	1,609	11.0	1,756	12.2	3,459	12.3	2,555	13.4	2,368	13.7
65-74	946	6.5	1,115	7.7	2,116	7.5	1,498	7.8	1,545	9.0
75+	594	4.1	683	4.7	1,280	4.6	927	4.8	967	5.6
Gender										
Male	6,662	45.5	6,287	43.5	12,925	46.1	8,721	45.6	7,668	44.5
Female	7,993	54.5	8,160	56.5	15,130	53.9	10,408	54.4	9,574	55.5
Marital status										
Single	3,263	22.3	3,163	21.9	6,403	22.8	4,153	21.7	3,575	20.7
Married	10,277	70.1	10,030	69.4	19,220	68.5	13,161	68.8	11,912	69.1
Spouse dead	879	6.0	983	6.8	1,810	6.5	518	2.7	532	3.1
Widow	236	1.6	271	1.9	622	2.2	1,297	6.8	1,223	7.1
Education level										
Illiterate	2,881	19.7	2,753	19.1	4,581	16.3	9,004	60.2	7,642	57.4
Primary	6,884	47.0	6,851	47.4	13,484	48.1	3,362	22.5	3,106	23.3
Secondary	1,154	7.9	1,076	7.4	1,682	6.0	885	5.9	811	6.1
High school	2,457	16.8	2,280	15.8	4,937	17.6	1,474	9.8	1,524	11.4
University	1,279	8.7	1,487	10.3	3,371	12.0	242	1.6	229	1.7
<b>Enabling factors</b>										
Health insurance type										
General health ins.	12,664	86.4	11,690	86.9	26,165	93.3	17,770	92.9	14,145	89.7
Private	19	0.1	174	1.3	144	0.5	77	0.4	480	3.0
No insurance	1,972	13.5	1,585	11.8	1,746	6.2	1,282	6.7	1,147	7.3
Working status at the last seven days										
Yes	5,474	37.4	5,243	36.3	10,445	37.2	7,415	38.8	6,457	37.4
No	9,181	62.6	9,204	63.7	17,610	62.8	165	0.9	84	0.5
Temporarily jobless	-	-	-	-	-	-	11,549	60.4	10,701	62.1
Monthly household income level										
Poorest	4,026	27.5	2,543	17.8	1,992	16.5	5,894	30.8	3,671	21.3
2 <sup>nd</sup> quintile	3,115	21.3	3,117	21.8	1,705	14.1	3,859	20.2	4,707	27.3
3 <sup>rd</sup> quintile	3,064	20.9	2,995	20.9	3,105	25.8	3,115	16.3	3,152	18.3
4 <sup>th</sup> quintile	2,482	16.9	2,850	19.9	2,569	21.3	3,274	17.1	2,944	17.1
Richest	1,968	13.4	2,816	19.7	2,687	22.3	2,987	15.6	2,768	16.1
<b>Need factors</b>										
General health status										
Very good	1,465	10	1,395	9.7	1,605	14	2,169	11.3	1,554	9.0
Good	7,564	51.6	7,504	52.0	5,957	52	8,988	47	8,720	50.6
Moderate	4,018	27.4	3,911	27.1	2,860	24.9	5,646	29.5	4,901	28.4
Bad	1,396	9.5	1,392	9.6	915	8	1,982	10.4	1,852	10.7
Very bad	208	1.4	232	1.6	126	1.1	344	1.8	215	1.2
Number of diseases										
No disease	5,154	35.2	5,910	41.3	18,452	65.8	7,193	37.6	6,772	39.3
1 disease	2,600	17.7	3,465	24.2	5,649	20.1	4,081	21.3	3,816	22.1
2 diseases	2,141	14.6	1,879	13.1	2,161	7.7	2,810	14.7	2,440	14.2
3 diseases	1,148	7.8	1,148	8.0	942	3.4	1,835	9.6	1,551	9.0
4 diseases	975	6.7	671	4.7	453	1.6	1,234	6.5	1,028	6.0
5 and more diseases	2,637	18.0	1,242	8.7	398	1.4	1,976	10.3	1,635	9.5

**TABLE 2:** Determinants of healthcare utilization from family physicians by years.

Variables	2008			2010			2012			2014			2016		
	B	SE	t value	B	SE	t value	B	SE	t value	B	SE	t value	B	SE	t value
(Constant)	-0.10	0.04	-2.56	0.22	0.06	3.48	0.40	0.09	4.48	0.41	0.07	5.66	0.65	0.08	7.98
Predisposing factors															
Age	0.02	0.01	2.97*	0.01	0.01	0.56	0.01	0.01	1.18	0.05	0.01	5.39*	0.05	0.01	3.81*
Marital status															
Married	Ref.			-0.03	0.04	-0.71	Ref.			Ref.			0.06	0.046	1.22
Single	-0.01	0.02	-0.31	Ref.			-0.05	0.04	-1.36	-0.03	0.04	-0.87	Ref.		
Widow	0.04	0.03	1.13	-0.03	0.06	-0.53	-0.02	0.04	-0.48	-0.10	0.08	-1.27	-0.09	0.09	-1.00
Separated	0.04	0.06	0.65	0.15	0.09	1.62	0.09	0.09	0.96	-0.02	0.06	-0.30	0.01	0.08	0.11
Gender															
Male	Ref.			Ref.			Ref.			Ref.			Ref.		
Female	0.10	0.02	6.78*	0.02	0.03	0.61	-0.07	0.04	-1.73	0.10	0.03	3.91*	0.11	0.03	3.72*
Education level	-0.01	0.01	-0.92	-0.01	0.01	-0.97	-0.02	0.01	-1.05	-0.03	0.02	-1.89	-0.01	0.02	-0.64
Enabling factors															
Health insurance															
Social security institution	Ref.			Ref.			Ref.			Ref.			Ref.		
Other	-0.14	0.02	-6.77*	0.04	0.04	1.05	0.09	0.05	1.82	-0.15	0.05	-2.92*	0.12	0.05	2.49*
Monthly income	-0.01	0.01	-1.37	0.00	0.01	0.05	-0.03	0.01	-3.18*	-0.06	0.01	-7.21*	-0.07	0.01	-6.74*
Need factors															
General health status	0.12	0.01	11.76*	0.11	0.02	6.62*	0.13	0.02	7.73*	0.13	0.02	8.04*	0.10	0.02	4.56*
Number of diseases	0.06	0.00	12.73*	0.07	0.01	8.41*	0.06	0.01	5.12*	0.04	0.01	4.37*	0.06	0.01	5.69*
Model statistics	R=0.27 R <sup>2</sup> =0.07 F=111.52			R=0.19 R <sup>2</sup> =0.04 F=28.74			R=0.18 R <sup>2</sup> =0.03 F=23.19			R=0.23 R <sup>2</sup> =0.05 F=62.39			R=0.204 R <sup>2</sup> =0.042 F=41.21		
Concentration indexes															
Equity (income)	-0.020			-0.018			-0.023			-0.040			-0.033		
Equity (education level)	-0.038			-0.022			-0.034			-0.033			-0.024		
Equity (number of disease)	0.044			0.028			0.002			0.035			0.034		

\*p&lt;0.05. SE: Standard error.

years. Of predisposing variables, increasing age and being female were the variables increasing healthcare utilization from family physicians in all years. It was found that not being covered by general health insurance was a decreasing effect in 2008 and 2014 THS. However, its effect became positive in 2016. This might be interpreted as those people who were not covered by general health insurance started to use family physician services because it is almost free of charge in Türkiye. Increased household income was found to be negative and had a decreasing effect in the last three THSs. As shown in Table 2, worsening health status and disease existence increased the utilization of healthcare services of family physicians in all years in a significant way. Estimated concentration index values for income and education level variables had negative values which were close to 0. The estimated concentration index values for disease existence were positive and close to 0. Negative and lower index values for utilization of family physician services suggested that disadvantaged groups were not discriminated and they

were better off when the effects of education and income level were considered. All estimated concentration index values were close to perfect equity level in all examined years.

The results of regression analyses and estimated concentration index values for the use of services from specialized physicians were provided in Table 3. The effect of increased age was insignificant in 2008, 2010, and 2012 THSs, but its effect became significant and negative in the last 2 2014 and 2016 THSs. Of predisposing factors, being single and female had a positive and significant effect on the use of services from specialized physicians although its effect was negative and significant in 2008 and 2012 THSs. Increasing education level was found to be a significant predictor and its effect was positive on the use of specialized physician services in only in 2010 THS, but its effect was insignificant in other THSs. Of 2 enabling factors, the effect of monthly household income was found to be statistically significant and negative in 2014 and 2016 THSs. The effects of need factors were found to be as expected and their

**TABLE 3:** Determinants of healthcare utilization from specialized physicians by years.

Variables	2008			2010			2012			2014			2016		
	B	SE	t value	B	SE	t value	B	SE	t value	B	SE	t value	B	SE	t value
(Constant)	-0.30	0.04	-6.88	-0.06	0.06	-0.95	0.31	0.09	3.57	0.58	0.08	7.64	0.59	0.08	7.26
Predisposing factors															
Age	0.00	0.01	0.62	0.00	0.01	-0.19	-0.01	0.01	-0.97	-0.04	0.01	-3.84*	-0.04	0.01	-3.46*
Marital status															
Married	Ref.			0.06	0.04	1.65	Ref.			Ref.			0.17	0.044	3.79*
Single	-0.05	0.02	-2.11*	Ref.			-0.13	0.04	-3.03*	0.09	0.04	2.48*	Ref.		
Widow	-0.01	0.04	-0.35	-0.04	0.06	-0.64	-0.07	0.05	-1.41	0.01	0.08	0.10	0.11	0.09	1.28
Separated	0.14	0.06	2.32*	0.07	0.08	0.86	-0.03	0.10	-0.31	0.08	0.07	1.18	0.15	0.08	1.95
Gender															
Male	Ref.			Ref.			0.01	0.047	0.130	Ref.			Ref.		
Female	0.11	0.02	6.99*	0.03	0.02	1.09	Ref.			0.13	0.03	5.01*	0.16	0.03	5.34*
Education level	0.02	0.01	1.77	0.03	0.01	2.09*	0.00	0.02	-0.07	-0.03	0.02	-1.68	-0.01	0.02	-0.31
Enabling factors															
Health insurance															
Social security institution	Ref.			Ref.			Ref.			Ref.			Ref.		
Other	-0.17	0.02	-7.69*	-0.02	0.04	-0.63	0.07	0.05	1.36	-0.09	0.05	-1.69	0.07	0.05	1.53
Monthly income	0.03	0.01	4.11*	0.00	0.01	0.41	-0.01	0.01	-1.07	-0.048	0.09	-5.176*	-0.063	0.010	-5.983*
Need factors															
General health status	0.19	0.01	17.16*	0.17	0.02	10.81*	0.16	0.02	8.48*	0.22	0.02	12.97*	0.18	0.02	8.82*
Number of diseases	0.06	0.01	12.43*	0.06	0.01	7.542*	0.08	0.01	6.31*	0.05	0.01	5.62*	0.08	0.01	7.88*
Model statistics	R=0.29 R <sup>2</sup> =0.09 F=33.65			R=0.21 R <sup>2</sup> =0.04 F=38.35			R=0.19 R <sup>2</sup> =0.04 F=24.08			R=0.22 R <sup>2</sup> =0.05 F=62.73			R=0.21 R <sup>2</sup> =0.05 F=51.97		
Concentration indexes															
Equity (income)	-0.008			-0.025			-0.021			-0.034			-0.029		
Equity (education level)	-0.022			-0.012			-0.055			-0.038			-0.031		
Equity (number of disease)	0.037			0.037			0.008			0.050			0.054		

\*p&lt;0.05. SE: Standard error.

effects were positive and increased the utilization of services of specialized physicians. The estimated concentration index values for income, education level, and disease variables reveal that there was no discrimination for the respondents with lower level of income and education as well as more disease in the utilization of specialized physician services in all examined THSs.

The more likely determinants and concentration index values for day/outpatient care services utilization were given in Table 4. The results showed that age, marital status and gender were statistically significant predictors. Increasing age, being male, being single and separated were the factors decreased the probability of using day/outpatient care services. The effects of being male and single were not consistent for all THSs. Of enabling factors, having other health insurance types rather than general health insurance or not having health insurance decreased the probability of using day/outpatient care services even its effect was found to be statistically insignificant in the last 2018 THS. Increasing monthly household income was found to be an insignificant predictor in

latest years. Both worsening health status and disease existence were found to be statistically significant predictors. All concentration index values examining the equity level considering the effects of disease existence, income and education level were close to 0 indicating almost perfect equity.

Table 5 shows the more likely predictors and concentration index values estimated for inpatient care services provided by hospitals. Increasing age increased the probability of using more inpatient services especially in the 2014 and 2016 THSs. According to the results, being single or separated decreased the probability of inpatient care services utilization compared to married respondents in 2008-2014 THSs. However, being single and widow increased the probability of inpatient care services in 2016 compared to separated respondents, but being married did not have statistically significant effect. The effect of increased education level was found to be statistically significant in 2010, 2012 and 2014 THSs. But its effect was not significant in 2016 THS. Health insurance type did not have a significant effect on inpatient care services utilization in the last 4 THS



**TABLE 4:** Determinants of day/outpatient care services by years.

Variables	2008			2010			2012			2014			2016		
	B	SE	t value	B	SE	t value	B	SE	t value	B	SE	t value	B	SE	t value
(Constant)	-0.18	0.08	-2.14	1.29	0.19	6.88	0.48	0.12	3.99	2.08	0.08	24.61	2.26	0.10	23.81
Predisposing factors															
Age	-0.05	0.01	-3.98*	0.01	0.02	0.31	0.11	0.01	7.46*	-0.07	0.01	-5.79*	-0.06	0.01	-3.89*
Marital status															
Married	Ref.			Ref.			Ref.			Ref.			0.27	0.052	5.22*
Single	-0.23	0.04	-5.31*	0.16	0.12	1.41	-0.04	0.05	-0.90	0.13	0.04	3.19*	Ref.		
Widow	-0.03	0.07	-0.45	0.17	0.12	1.48	-0.02	0.06	-0.34	0.15	0.09	1.71	0.16	0.10	1.56
Separated	-0.06	0.12	-0.50	-0.13	0.21	-0.60	-0.14	0.14	-1.01	0.07	0.08	0.97	0.22	0.09	2.44*
Gender															
Male	Ref.			Ref.			Ref.			Ref.			-0.27	0.034	-7.94*
Female	0.26	0.03	8.39*	-0.18	0.07	-2.51*	-0.03	0.05	-0.58	0.29	0.03	9.79*	Ref.		
Education level	0.04	0.02	1.88	0.00	0.04	0.02	-0.02	0.02	-0.95	0.04	0.02	1.88	-0.00	0.019	-0.04
Enabling factors															
Health insurance															
Social security institution	Ref.			Ref.			Ref.			Ref.			Ref.		
Other	-0.55	0.04	-12.74*	-0.02	0.10	-0.22	-0.23	0.06	-3.77*	-0.32	0.06	-5.35*	-0.07	0.05	-1.25
Monthly income	0.06	0.01	4.63*	-0.06	0.03	-2.26*	-0.02	0.01	-1.38	0.01	0.01	0.73	0.00	0.012	0.07
Need factors															
General health status	0.45	0.02	20.63*	0.11	0.02	6.62*	0.02	0.02	0.83	0.33	0.02	16.85*	0.28	0.03	11.49*
Number of diseases	0.17	0.01	17.42*	0.00	0.02	0.04	0.01	0.02	0.49	0.19	0.01	18.40*	0.18	0.01	14.64*
Model statistics	R=0.36 R <sup>2</sup> =0.13 F=209.99			R=0.21 R <sup>2</sup> =0.04 F=6.05			R=0.15 R <sup>2</sup> =0.02 F=22.71			R=0.35 R <sup>2</sup> =0.12 F=168.17			R=0.32 R <sup>2</sup> =0.11 F=104.02		
Consentration indexes															
Equity (income)	-0.022			-0.050			-0.019			-0.015			-0.018		
Equity (education level)	-0.020			-0.052			-0.011			-0.027			-0.032		
Equity (number of disease)	0.073			0.062			0.011			0.081			0.078		

\*p&lt;0.05. SE: Standard error.

**TABLE 5:** Determinants of inpatient care services utilization from hospital by years.

Variables	2008			2010			2012			2014			2016		
	B	SE	t value	B	SE	t value	B	SE	t value	B	SE	t value	B	SE	t value
(Constant)	-0.06	0.03	-2.01	3.14	0.05	67.51	0.16	0.04	3.68	1.31	0.21	6.24	1.23	0.28	4.40
Predisposing factors															
Age	0.00	0.00	-0.15	-0.03	0.01	-4.51*	0.03	0.01	6.49*	0.24	0.03	9.43*	0.21	0.03	7.07*
Marital status															
Married	Ref.			Ref.			Ref.			Ref.			-0.01	0.13	-0.09
Single	-0.04	0.02	-2.69*	-0.33	0.02	-14.21*	0.00	0.02	0.06	-0.36	0.12	-3.02*	0.48	0.20	2.43*
Widow	-0.01	0.02	-0.20	0.00	0.04	0.10	0.04	0.02	1.75	-0.35	0.23	-1.50	0.51	0.24	2.08*
Separated	0.03	0.04	0.73	-0.23	0.06	-3.97*	-0.02	0.05	-0.45	-0.48	0.18	-2.68	Ref.		
Gender															
Male	Ref.			Ref.			Ref.			Ref.			Ref.		
Female	-0.01	0.01	-0.48	-0.38	0.02	-22.32*	0.00	0.02	-0.17	-0.22	0.07	-3.02*	-0.02	0.08	-0.29
Education level	-0.01	0.01	-0.89	-0.19	0.01	-21.55*	-0.04	0.01	-6.09*	-0.10	0.05	-2.19*	-0.44	0.04	-1.02
Enabling factors															
Health insurance															
Social security institution	Ref.			Ref.			Ref.			Ref.			Ref.		
Other	-0.07	0.02	-4.28*	-0.03	0.03	-1.24	-0.03	0.02	-1.40	-0.26	0.15	-1.78	0.17	0.11	1.52
Monthly income	-0.01	0.00	-1.45	-0.12	0.01	-19.56*	-0.03	0.01	-6.11*	-0.04	0.03	-1.55	-0.06	0.03	-2.22*
Need factors															
General health status	0.10	0.01	12.65*	0.08	0.01	6.61*	0.01	0.01	1.20	0.33	0.04	7.56*	0.36	0.05	7.24*
Number of diseases	0.02	0.00	6.32*	0.01	0.01	1.60	-0.01	0.01	-1.40	0.03	0.02	1.16	0.03	0.03	1.02
Model statistics	R=0.19 R <sup>2</sup> =0.04 F=54.95			R=0.39 R <sup>2</sup> =0.16 F=221.75			R=0.16 R <sup>2</sup> =0.06 F=28.81			R=0.43 R <sup>2</sup> =0.18 F=51.83			R=0.41 R <sup>2</sup> =0.16 F=37.19		
Consentration indexes															
Equity (income)	-0.027			-0.010			-0.006			-0.039			-0.050		
Equity (education level)	-0.057			0.000			-0.040			-0.056			-0.063		
Equity (number of disease)	0.068			-0.009			0.032			0.091			0.082		

\*p&lt;0.05. SE: Standard error.

data. Household income decreased the probability of using inpatient care services in 2010, 2012 and 2016 THSs. The effects of both need factors were statistically significant and worsening health status and having more disease increased the probability of inpatient care. All estimated concentration index values were close to 0 meaning Turkish Healthcare System has not discriminated the citizens according to their disease existence, income or education levels.

## DISCUSSION

This study has focused on examining equity levels in health care utilization and predicting the effects of important determinants, which were classified as predisposing, enabling and need factors by Andersen, on the utilization of health services in Türkiye by years. It was found that increasing age increased the probability of health care utilization indicators (not for services received from specialist physicians). This finding is consistent with many conclusions of studies because the elderly is expected to have more chronic diseases and they are more fragile against infection diseases as a result of increasing age and changes in their immune systems.<sup>8,11</sup> However, this study also found that the tendency of health care utilization by those who were aged 75 and more years decreased compared to those aged 55-64 aged and especially 65-74 aged. This finding can be interpreted as the elderly is get used to live with prolonged chronic diseases and they might be using home care services more or they do not contact with health care providers as long as their illness severity get more serious. A similar discussion was made by Şengül et al. in their study.<sup>12</sup>

This study showed that female respondents used family physician and specialized physician services (except 2012 THS). These results are consistent with the findings of other studies.<sup>11,13,14</sup> However, male respondents are more likely to use more inpatient care services compared to female respondents in 2010 and 2014 THSs. Being female is one of the most significant determinants of almost all kind of health care services in many countries.<sup>8,15-17</sup> However, the studies done in developing countries also usually report that female users are more likely to use less health care even they are in need of using more health care.<sup>15</sup> It has been sci-

entifically evidenced that women have more risk to be sick, to live longer and to use more health care.<sup>6,18,19</sup>

Single respondents were more likely to use less health care services compared to widow, married and separated respondents. It can be concluded that especially those who were separated and widow are more likely to use more health care due to fact that they might be stressed, abused, or loneliness. Some studies investigating the relationship between marital status and physical health indicated that those who are separated are expected to have more chronic diseases, subjective health complaining, low level perceived health, more workplace accidents, and other social, health and work-related problems and diseases compared to married people.<sup>20,21</sup>

Increased education level did not have a statistically significant effect on the utilization of family physician and day/outpatient care services. However, increased education level was found to be a significant determinant of specialized physician services in the year of 2010. But its effect turned out to be insignificant in other years. Its effect on the utilization of inpatient care services provided by hospitals had a negative trend in the years of 2010, 2012, and 2014. This study revealed that those covered by general health insurance and with higher income were more likely to use more health services as expected. These findings might reveal that more educated people have more tendency to use preventive health care services and they might have healthier behaviours. Similar to our findings, Şengül et al. found that more educated people used less curative care services since they were more likely to use preventive and primary health care services and gave more priority to their health and healthy life.<sup>12</sup>

Estimated concentration index values for income level, education level, and number of diseases showed that health services utilization was concentrated among people having less income and education level as well as more diseases. Estimated values were very close to 0 and had expected signs. This finding might indicate that equity in health services utilization in Turkish Healthcare System was improved and its level can be considered as very acceptable. A similar finding was also found by a study investigating the trend in overall and catastrophic



health expenditures in Türkiye. The author of that study concluded that there was a trend in increasing overall health expenditures, however there was an improvement in equal share of financial risk in out-of-pocket health expenditures of lower and higher income categories by years.<sup>22</sup>

## CONCLUSION

There have been inequities in health services utilization not only in least developed or developing countries but also in developed countries. This study showed that predisposing, enabling and needs variables had a significant effect on health services utilization. However, considering the effects of these variables on the utilization of health services in Türkiye by years, this study indicated that equity level in Turkish Healthcare System has been improved. Similar findings were found by a study that aimed in testing the equity level in health care utilization in Türkiye by years and the authors also discussed that age, gender, income and health insurance coverage as enabling and predisposing factors were associated with health care utilization.<sup>23</sup>

This study showed that those who were might be defined as disadvantaged (widow, separated, and

aged 75 and more, etc.) were more likely to use health services more. All these findings are as expected and interpreted as Turkish Healthcare System has not discriminated disadvantageous groups, and these groups are capable of accessing health services when they need health services. At this point, it might be recommended that the risk factors increasing the disease existence and severity of illness affecting disadvantageous groups should be investigated in more detail and necessary attempts should be taken to use scarce healthcare resources in a more efficient manner.

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### Conflict of Interest

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

### Authorship Contributions

*All authors contributed equally while this study preparing.*

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