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Health Policy / Sağlık Politikası

Analysis of Differences in Health Service Use by Socio-Economic Development Level in Turkey

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ABSTRACT

Purpose: In this research, comparisons were made with the socioeconomic development levels of the provinces in Turkey using some variables related to the use of health services.

Methods: SEGE-2017 index was used for the socio-economic development level, and the number of applications to physicians per person, the total number of applications to health institutions, the bed occupancy rate and the total number of surgeries were used for the health services utilization. Within the scope of the research, the provinces were ranked as low, medium and high according to the SEGE index and estimations were made according to the health services utilization.

Results: It was observed that the created model was 75.3% successful with logistic regression. According to the research results, it can be said that the socioeconomic development levels of the provinces are also reflected in the health services utilization. However, it is seen that the model fails to estimate the health services utilization in some provinces.

Conclusion: As a result, it is thought that the use of services can be facilitated if the difficulties in accessing health services are eliminated. It can be said that the factors affecting the use of health services and the planning of health services in these provinces should be reviewed.

Keywords: Health, Health Services Utilization, Socio-Economic Development, Turkey.

ÖZET

Amaç: Bu çalışmada sağlık hizmet kullanımına ilişkin bazı değişkenler kullanılarak Türkiye'deki illerin sosyo-ekonomik gelişme düzeyleri ile karşılaştırmalar yapılmıştır.

Yöntem: Sosyo-ekonomik gelişmişlik düzeyi için SEGE-2017 indeksi, sağlık hizmet kullanımını için de kişi başı hekime başvuru sayısı, sağlık kurumuna toplam başvuru sayısı, yatak doluluk oranı ve toplam ameliyat sayısı değişkenleri kullanılmıştır. Araştırma kapsamında, iller SEGE indeksine göre düşük, orta ve yüksek düzey olarak sıralanmış ve sağlık hizmet kullanımına göre tahminleme yapılmıştır.

Bulgular: Lojistik regresyon yöntemiyle oluşturulan modelin %75,3 oranında başarılı olduğu görülmüştür. Araştırma sonuçlarına göre, illerin sosyoekonomik gelişmişlik düzeylerinin sağlık hizmet kullanımına da yansıdığı söylenebilir. Ancak bazı illerde modelin sağlık hizmet kullanımını tahmin etmede başarısız olduğu görülmektedir.

Sonuç: Sonuç olarak, sağlık hizmetlerine erişimin önündeki zorlulukların ortadan kalkması durumunda hizmet kullanımında kolaylık sağlanabileceği düşünülmektedir. Bu illerde sağlık hizmet kullanımına etki eden faktörlerin ve sağlık hizmeti planlamasının gözden geçirilmesi gerektiği söylenebilir.

Anahtar Kelimeler: Sağlık, Sağlık Hizmet Kullanımı, Sosyo-Ekonomik Gelişmişlik, Türkiye

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While economic indicators such as gross domestic product and employment levels were previously considered the most important indicators of development, this understanding has evolved over time. The view that factors related to social development should also be taken into account has gained widespread acceptance. A number of studies have been conducted which compare countries, provinces and regions with a view to determining the level of socio-economic development. In these studies, which seek to identify and compare development differences and similarities, a ranking is typically produced using an index based on a range of indicators (1).

One such study is the Socio-Economic Development Ranking Studies (SEGE), which provides comparative analyses that objectively measure the socio-economic development levels of Level-2 regions, provinces and districts in Turkey. The objective of this study is to inform the development of various policies and strategies. The current SEGE study at the provincial level is SEGE-2017 (2). The SEGE-2017 index was constructed through the application of principal component analysis to a data set comprising 52 variables organised under eight headings: namely, demography, employment, education, health, competitive innovative capacity, finance, accessibility and quality of life (3). The results of the analysis led to the creation of the socio-economic development index scores and ranks for the provinces and regions, as well as the division of the provinces into six groups according to development levels and the Level-2 regions into four groups according to development levels (2).

An understanding of the factors that affect the utilisation of health services, particularly those resulting from unequal access, can assist policy makers in the planning of more effective policies and the reduction of undesirable conditions (4). In examining equity in access to health services in relation to need, it is first necessary to define the term 'need'. The term 'need' can be conceptualised in various ways. It can be defined as the initial health status, the capacity to benefit from care, the amount of care a person needs to achieve health equity, or the care required to achieve the highest possible health improvement (5). Nevertheless, in practice, need is frequently gauged in terms of health status (6,7).

The number of applications to health institutions, the number of applications to physicians per person, the procedures requested in examinations (MR imaging, CT imaging, ultrasound, doppler ultrasound, echo, mammography, etc.), the number of follow-ups (pregnancy, infant, child, puerperal), the number of surgeries performed, vaccination, births in health institutions, antenatal care coverage, etc. are indicators of health service use (8). As outlined by the OECD (9), indicators pertaining to the utilisation of health services encompass screening, diagnosis, prevention, vaccination activities, the average length of stay, transplants, acute care, dialysis, inpatient care, bed utilisation and discharge rates.

A review of the literature reveals a multitude of studies utilising diverse health indicators at the provincial level in Turkey. A selection of these studies is included in this section. Nevertheless, the number of studies that examine the relationship between the utilisation of health services at the provincial level and the level of development is relatively limited. It is anticipated that the present study will contribute to the existing literature by elucidating the discrepancies in the utilisation of healthcare services according to the level of socioeconomic development.

In their study, Kuvvetli and Dolu (1) corroborated the hypothesis that the level of socio-economic development in Turkey exhibited a decline from the cities in the west to those in the east. Furthermore, they substantiated the assertion that disparities in regional development were attributable to the index they devised through principal component analysis. In light of these findings, it was concluded that while major urban centres such as Istanbul, Ankara and Izmir exhibited the highest levels of general socio-economic development, the Ağrı, Şırnak and Hakkari provinces demonstrated the lowest.

In their 2023 study, Işıkçelik and Günaltay (10) employed the multidimensional scaling method using 2021 data pertaining to various health indicators. Their findings indicated that Istanbul was situated in a distinct position, while the provinces of Tunceli and Bayburt exhibited the most negative values.

Dörtkol (11) posited that the provinces with the highest scores as a result of the combined health index, developed on various health determinants such as education, income, employment, demography, air quality, physical environment, housing-infrastructure, health infrastructure and health workforce, along with various health outcomes, were Bolu, Karabük, Ankara, Trabzon and Istanbul, respectively. Conversely, the provinces with the lowest scores were Hakkari, Şanlıurfa, Muş, Ağrı and Şırnak.

In a study published in 2022, Erkılıç (12) compared the infrastructure and human resource indicators of public health services by region using the CRITIC and TOPSIS methods. The study concluded that there is a need for greater investment in public health services, particularly in terms of infrastructure and human resources, with a focus on low-performing regions. This investment should aim to eliminate regional disparities in infrastructure and human resource status and allocation, as well as to improve infrastructure and human resource indicators.

The study conducted by Eren and Ömürbek (13), which classified Turkish provinces according to their health indicators using the MULTIMOORA method, revealed that regional disparities in development also resulted in significant variations in health outcomes.

In a study conducted by Gençoğlu (14), the development levels of provinces in terms of health indicators were examined using cluster analysis with data from 2015. The study revealed a positive correlation between the social and economic development levels of the provinces and the quality of health services.

In their 2013 study, Çelik (15) classified the provinces according to their health indicators in 2010, with the aim of examining the development and differences in health across the regions. The results of the cluster analysis indicated that the provinces could be grouped into ten distinct clusters. The analysis revealed that Hakkari, Şırnak, Şanlıurfa, Van, Kilis, Muş and Ağrı exhibited the most unfavourable health outcomes. The research findings revealed that provinces with similar characteristics, such as underdevelopment and small size, were grouped together in the same clusters.

Methods

Despite the abundance of research employing province-based health indicators, as previously noted, no study has examined socio-economic development levels exclusively through the lens of health service utilization variables. Consequently, this study is poised to make a significant contribution to the existing literature by underscoring this crucial relationship.

The study covered 81 provinces in Turkey. The study used the latest SEGE-2017 index data published at the provincial level to measure the level of socio-economic development (3). To measure the use of health services, the number of physician applications per person, the number of surgeries, the bed occupancy rate and the total number of applications to health facilities were used. These variables related to the use of health services were taken from the data of the Health Statistics Yearbook 2019 (16). Although more recent data are available, the reason for preferring the 2019 data is that it was considered more accurate to choose a more recent date, as the SEGE index data belong to 2017. All statistical analyses were carried out using SPSS 26 (Statistical Package for the Social Sciences). Logistic regression analysis was used to analyse the data. Prior to the implementation of logistic regression analysis, province groups were categorized into six classes based on the SEGE-2017 index. These groups were then reduced to three classes and subsequently ranked as low, medium, or high. Provinces were also grouped according to health service use variables, with the classification system including categories of low, medium, and high. Consequently, the categorization of provinces in terms of health service utilization and socio-economic development levels was compared.

Findings

Looking at Table 1 and examining the model fit information (LR χ^2 =76.232; sd.=8; p=.000) and the Pearson (χ^2 =161.464; sd.=152; p=.281) and deviation (χ^2 =91.497; sd.=152; p=1.000) values, it can be seen that the established model is statistically significant and shows a good fit to the real data. It is also noted that the pseudo R2-squared values are high.

Table 1: Model Fitting Results

Model Fitting Information				
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	167,729			
Final	91,497	76,232	8	0,000
Goodness-of-Fit				
	Chi-Square	df	Sig.	
Pearson	161,646	152	0,281	
Deviance	91,497	152	1,000	
Pseudo R-Square				
Cox and Snell	0,610			
Nagelkerke	0,698			
McFadden	0,454			

In logistic regression analysis, the significance of the coefficients of the independent variables is tested using the likelihood ratio test. Looking at the information in Table 2, we can see that the effect of the number of physician applications per person is statistically significant at the 0.05 level, while the effects of variables such as the number of surgeries, the total number of the applications to health facilites and the bed occupancy rate are not significant.

Table 3 shows the results of the multinomial logistic regression analysis. Taking the reference category as high level, it was found that only the variable number of physician applications per person was statistically significant for assignment to low level. It was found that there was no statistically significant variable for assignment to the medium level.

Table 2: Likelihood Ratio Tests

Likelihood Ratio Tests				
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	115,463	23,966	2	0,000
Physician applications per person	142,211	50,713	2	0,000
Total surgeries	92,057	0,559	2	0,756
Bed occupancy rate	96,677	5,179	2	0,075
Applications to health facilities	91,932	0,435	2	0,805

Table 3: Multinominal Logistic Regression Test Results

		B	Std. Error	Wald	df	Sig.	Exp(B)
Low	Intercept	26,165	7,423	12,425	1	0,000	
	Physician applications per person	-3,657	0,937	15,222	1	0,000	0,026
	Total surgeries	0,000	0,000	0,462	1	0,497	1,000
	Bed occupancy rate	0,125	0,085	2,148	1	0,143	1,133
	Applications to health facilities	0,000	0,000	0,311	1	0,577	1,000
Medium	Intercept	7,554	4,271	3,128	1	0,077	
	Physician applications per person	-0,427	0,414	1,066	1	0,302	0,652
	Total surgeries	0,000	0,000	0,149	1	0,699	1,000
	Bed occupancy rate	-0,023	0,049	0,218	1	0,640	0,978
	Applications to health facilities	0,000	0,000	0,014	1	0,906	1,000

(Referance category: High level)

The estimation results of the logistic regression model are shown in Table 4. 9 out of 20 cities in the high category were correctly predicted and 45% successful classification was achieved for this level. All 11 cities in the high category that were incorrectly classified were classified in the medium category. 35 out of 41 cities in the medium category were correctly classified and 85.4% classification success was achieved. 5 of the cities misclassified at this level were classified as high level and 1 as low level. 17 out of 20 cities in the low level category were correctly classified and 85% classification success was achieved. All 3 cities misclassified as low level were classified as medium level. The overall classification success of the analysis was calculated as 75.3%.

Table 4: Classification Results of Logistic Regression Analysis

	Low	Medium	High	Percent Correct
Low	17	3	0	85,0%
Medium	1	35	5	85,4%
High	0	11	9	45,0%
Overall Percentage	22,2%	60,5%	17,3%	75,3%

Table 5: Estimation of SEGE Level of Provinces According to the Model

Provinces	SEGE Level	Health Utliziation Level		Provinces	SEGE Level	Health Utliziation Level		Provinces	SEGE Level	Health Utliziation Level
Adıyaman	**2**	**3**		Burdur	2	2		**Sinop**	**2**	**3**
Ağrı	1	1		Çankırı	1	1		Sivas	1	1
Ardahan	2	2		Çorum	1	1		Tokat	2	2
Batman	1	1		**Düzce**	**2**	**3**		Trabzon	2	2
Bayburt	2	2		Edirne	3	3		**Tunceli**	**3**	**2**
Bingöl	3	3		**Elazığ**	**2**	**3**		Uşak	2	2
Bitlis	3	3		Erzincan	3	3		Zonguldak	2	2
Diyarbakır	2	2		Erzurum	3	3		Ankara	2	2
Gümüşhane	3	3		Gaizantep	1	1		Antalya	1	1
Hakkari	2	2		Giresun	2	2		Aydın	2	2
Iğdır	**3**	**2**		**Hatay**	**3**	**2**		Bilecik	1	1
Kars	1	1		**Kahramanmaraş**	**3**	**2**		Bolu	1	2
Kilis	1	1		**Karabük**	**2**	**1**		Bursa	2	2
Mardin	**3**	**2**		Karaman	3	3		Çanakkale	2	2
Muş	2	2		Kastamonu	3	3		Denizli	1	1
Siirt	3	3		Kırıkkale	2	2		Eskişehir	2	2
Şanlıurfa	**3**	**2**		Kırşehir	2	2		Isparta	2	2
Şırnak	2	2		Kütahya	2	2		İstanbul	1	1
Van	2	2		Malatya	2	2		İzmir	1	1
Yozgat	**3**	**2**		Manisa	1	1		Kayseri	2	2
Adana	1	1		**Mersin**	**3**	**2**		Kırklareli	1	2
Afyon	2	2		Nevşehir	1	1		Kocaeli	1	1
Aksaray	2	2		Niğde	2	2		**Konya**	**3**	**2**
Amasya	2	2		Ordu	2	2		Muğla	2	2
Artvin	2	2		Osmaniye	2	2		Sakarya	1	2
Balıkesir	**3**	**2**		Rize	2	2		Tekirdağ	2	2
Bartın	**2**	**3**		**Samsun**	**3**	**2**		Yalova	2	2

In order to examine the results in more detail, the estimated level of each city was determined according to the logistic regression analysis and the results are compared in Table 5. In the table, the levels are coded as 1: low level, 2: medium level and 3: high level.

Discussion

In this study, comparisons were made with the socio-economic development levels of the provinces in Turkey using some variables related to the use of health services. In this context, the provinces were classified as low, medium and high according to the SEGE index and estimates were made according to the use of health services. It was found that the model created was 75.3% successful. According to the research results, it can be said that the level of socio-economic development of the provinces is also reflected in the use of health services. However, it was observed that the model failed to estimate the use of health services in some provinces. It was observed that there were some provinces with high SEGE levels but low use of health services (Iğdır, Mardin, Urfa, Yozgat, Balıkesir, Hatay, Maraş, Karabük, Mersin, Samsun, Tunceli and Konya). In the provinces with low SEGE levels and high service utilisation (Adıyaman, Bartın, Düzce, Elazığ, Sinop), this situation can be explained by the application of public service obligations and sufficient investment in health. It is believed that if the difficulties in accessing health services are eliminated, the ease of use of services can be achieved. It can be said that the factors affecting the use of health services and the planning of health services in these provinces should be reviewed.

Gözlü and Tatlıdil (17) examined the access to health services of provinces using principal component analysis with different variables, including the use of health services. According to the results, Istanbul, Gaziantep and Kocaeli are the provinces with the highest access to services, while Bayburt, Ardahan and Tunceli are the provinces with the lowest access to services. When the data from the study were compared with the SEGE-2011 index, it was found that some eastern and southeastern Anatolian provinces such as Şanlıurfa, Batman, Mardin, Diyarbakır, Şırnak, Ağrı, Adıyaman, Van, Siirt and Muş have higher access to health services but are lower in the SEGE ranking.

Doğan (18) conducted a cluster analysis on the total amount of investment in the health sector under the Investment Incentive System, which is a continuous variable for the period 2001-2018, the number of hospitals, the number of beds per capita, the number of general practitioners and specialists per capita, the number of medical applications per capita, the level of drug use (DID) per capita, the population and the mortality rate, and the level of socio-economic development of the provinces (SEGE 2017), which is a categorical variable for the 81 provinces in Turkey. As a result of the research, 77 provinces were divided into 4 clusters. It was found that the fourth cluster consisted of the provinces with the lowest level of socio-economic development and the smallest population. It was found that the number of hospitals, the amount of investment under the Investment Incentive System, the number of beds per capita, the number of general practitioners and specialists per capita, the amount of daily medicine consumption, the number of medical consultations per capita and the mortality rate were the lowest in these provinces.

Keleş (19) examined the provinces in Turkey by ranking them according to health indicators, including health service utilisation indicators, using various multi-criteria decision methods and found that provinces with small populations ranked lowest in terms of health performance. Köse (20) used cluster analysis to classify 12 statistical regions according to 2019 health service demand, production and capacity data. They found that the clustering of regions was influenced by the parameters of geographical proximity and population density, as well as the level of socioeconomic development. Kar and Özer (21) compared health care infrastructure, service use and health outcomes across statistical regions in Turkey. They found that Western Anatolia was the region with the highest use of health services, while Central-Eastern Anatolia was the lowest.

In 2005, maternal mortality rates were high in developing countries, in contrast to developed countries. Studies suggest that a significant proportion of maternal deaths could be prevented by providing access to essential maternal health services (22-24). It can be said that people living in poor and rural areas and small towns use health services at lower levels than other segments of society due to difficulties in accessing health services in terms of quantity and quality. This leads to differences in healthcare needs between different segments of society (25). Therefore, the removal of physical and financial barriers to accessing healthcare services is likely to have an impact on the use of healthcare services.

Conclusion

It is suggested that future studies could benefit from different health and population indicators and different decision making techniques that vary according to the regional level. Furthermore, data from disparate years

can be employed to ascertain whether the status of the provinces has undergone a transformation with respect to socio-economic development. Moreover, it should not be assumed that countries' health systems are independent of socio-economic development. A significant part of the sustainable development goals are directly and indirectly related to health. It is therefore evident that further studies are required which emphasise the relationship between development and health in developing countries such as Turkey. Also, when examining health indicators according to socioeconomic development status between provinces and regions, it is imperative to consider inequalities in health service utilization and to remove obstacles to health service utilization.

Declarations

Ethics Approval

In this study since secondary data were used, there is no need for ethics committee approval.

Conflicts of Interest

No conflicts of interest to declare.

Availability of Data and Material

Yes.

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