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Effects of Some Indicators on Life Expectancy at Birth and Infant Mortality Rates in Turkey

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ABSTRACT

Health indicators are directly related to the health systems and development of countries. Since health indicators are one of the main factors that determine the level of development, insufficiency of health services negatively affects development. Although there are many parameters which can be used to monitor the health system in a country, life expectancy at birth and infant mortality can be used as two main indicators. The aim of this study is to determine the impact of GDP, doctor's consultation rate, the number of doctors and nurses and hospital beds on life expectancy at birth and infant mortality rates during the period of 15 years in Turkey. The data has been collected from different databases of OECD, World Bank, World Health Organization, Turk Stat and Ministry of Health publications and then has been analyzed by correlation and regression analyzes. In the study, variables such as GDP, number of physicians and nurses, hospital beds and doctor's consultation rates have been found to be highly correlated with life expectancy at birth and infant mortality rates. As a result of the analyzes performed, it has been determined that the variance in life expectancy at birth is explained by the variables of GDP, number of hospital beds per 1000 people, physician's consultation rate, number of physicians and nurses per 1000 patients.

Improvement of the quality and quantity of health manpower, improvements in economic indicators and reorganizing of health facilities might help to bring health indicators to the level of developed countries. In this study, in the light of specified indicators, the subject was handled for the first time within the framework of the model established for the 2000-2015 period of Turkey. The study has the quality to contribute to the literature in this field.

Keywords: Health, Health System, Health Indicators, LEAB, IMR

1. Introduction

Health is expressed as one of the most basic human rights. Therefore, every single person should be provided with access to healthcare and quality health services. Besides, the basic principle of social justice is to have access to the necessary elements for a healthy and satisfying life. On the other hand, the provision of these opportunities increases the productivity of the society both economically and socially and provides economic benefits in the long term (Oral and Sayın, 2013).

Health services are the services that concern the whole society, improve the health conditions of the community, rather than addressing a specific section of the society. Therefore, it is an undeniable fact that health services have a social feature. In addition, health care is of great importance for the creation of prosperity, economic development, a life worthy of human dignity and healthy new generations.

There is a mutual relationship between the developments in the health level of the society and economic development. In the societies that have achieved a certain level of economic development, the resources allocated to health increase and the awareness of individuals about health also increases. It has been determined that the improvements in economic indicators have a positive effect on health indicators (Ersöz, 2009).

Even in countries with the highest levels of welfare, individuals with relatively lower welfare have less life expectancy and are more likely to suffer from disease (Wilkinson and Marmot, 2003). Therefore, it is obvious that economic indicators affect health indicators. The development status of a country is explained by elements such as

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education, health and economic conditions which are sub-systems of that country. Health indicators have a different position among these variables Health and welfare are in a two-way interaction that affects each other. It is argued that in a country with a high level of health status, the production will increase due to the healthy workforce structure; the high production will increase the economic well-being and thus the health level will be increased by preventing health access problems (Myrskylä, 2010**)**. On the other hand, health indicators are influenced by the variables such as the economic situation of a country, the structure of the health system, health expenditures, and the qualitative and quantitative adequacy of health manpower. Since health indicators are among the main factors that determine the level of development, the insufficiency of health services affects the development negatively (Oral and Sayın, 2013). The mutual relationship between health and economic growth is evident. On the one hand, health is an important factor of economic development, on the other hand - economic growth has a significant and positive impact on public health, affecting the overall welfare level (Romaniuk vd., 2016). Improving health indicators not only increases the quality of life, but also has a positive impact on the country's economic development (Murroy, 1988). On the other hand, economic growth contributes to the improvement of health indicators (Kannisto, 2000). For example, an increase of 5% on the basis of Gross Domestic Product (GDP) may, on average, lead to a 1% decrease in infant mortality. So there is a mutual relationship between health and economy (Biggs vd., 2010; Pourmohammadi vd., 2018).

2. Similar Studies in the Literature

There are many studies on this subject in the literature. In the study conducted by Şener and Yiğit (2017), it was aimed to measure the technical efficiencies of the health systems of OECD countries by using the data envelopment analysis method. As a result of the research, some suggestions were made by determining the efficient and inefficient countries. In the study, the number of hospital beds per person, number of physicians per person, per capita health expenditure, numbers of MRI per capita and smoking rates were used as input variables and infant mortality rate and healthy life expectancy were used as output variables. In this study, Turkey was determined to be among efficient countries (Şener and Yigit, 2017). Bayın (2016), in his study, which was conducted in order to determine factors affecting life expectancy at birth and at age 65 in men and women, used the indicators of life expectancy at birth and at age 65 in men and women as dependent variables and used perceived health status, number of hospital beds, per capita national income, per capita health expenditure, per capita drug consumption expenditure, maternal mortality rate, infant mortality rate, doctor visits, number of hospitalization and rate of urban population as independent variables. Therefore, he created a regression model with these variables. As a result of the analyzes performed, it was determined that the most significant variable affecting the life expectancy at birth is the infant mortality rate and the most influential variables in life expectancy variables at age 65 are found to be per capita health expenditures and health service usage level (doctor visits and hospitalization days) (Bayın, 2016). Sonğur (2016) examined how OECD countries are clustered according to various health indicators and analyzed differences in health indicators among clusters. In this study, analyzing the differences relating to 12 health indicators in total, it has been found that there are statistically significant differences between the clusters in terms of 10 indicators. Besides, it has been found that Turkey, Israel, Chile and Mexico are in the same cluster and except for exceptions, the health system of the countries collected in each cluster is similar. In addition, although the US has the highest per capita health expenditure among OECD countries, it has been found that many health indicators drop behind countries those with much lower health expenditure per capita. In this context, it would not be wrong to say that health expenditures can increase the level of health only if other efforts are performed (Sonğur, 2016). Barlas et al. (2014) examined the differences in infant mortality rates according to the different regions of Turkey and correlation analysis was conducted to investigate the variables associated with infant mortality in this study. Accordingly, the Middle East Anatolia region in 2012 is the region where the infant mortality rate is the highest. In addition, it was found that there is a statistically significant negative and strong correlation between infant mortality and birth rates in health institutions, antenatal care and application to physicians in primary care between 2009-2012.The model was found to be significant in the regression model with three variables and infant mortality rate and it was found that the three variables explained the infant mortality rate by 94% (Barlas et al., 2014). The regression model which consists of these three variables and infant mortality rate was found to be significant and it was

found that three variables explain the variance of infant mortality rate by 94% (Barlas et al., 2014). Another study was conducted by Ersöz (2009). According to this study Turkey is among the 10 countries that joined OECD countries later and have similar characteristics with those countries in terms of health indicators (Ersöz, 2009). Gürbüz and Karabulut (2009) examined the relationship between the average life-time indicator and the socio-economic variables that are thought to affect this indicator in post-communist countries. In this study, linear regression models were used to examine the functional relationships between dependent variables and independent variables. As a result of the research, it has been revealed that there are statistically significant relationships between many demographic, environmental and socio-economic variables and average life expectancy (Gürbüz and Karabulut, 2009). In a similar study, Tüylüoğlu and Tekin (2009) examined the relationship of income level and health expenditures with life expectancy at birth and infant mortality rate. A multiple regression model was established with these data of 176 countries in 2003 and it was concluded that health expenditures are more effective than income level on the life expectancy and infant mortality rate. Therefore, it was concluded that increasing the level of income alone is insufficient to improve these health indicators, health expenditures also should be increased (Tüylüoğlu and Tekin, 2009). Kabir (2008), in his study which aims to examine the socio-economic determinants of life expectancy at birth in 91 developing countries, first classified countries as having low-medium and high life expectancy at birth and then included explanatory variables affecting these indicators in the model. Accordingly, it was found that most of the explanatory variables were not statistically significant. This means that socioeconomic factors such as income per capita, education, health expenditures, access to safe water and urbanization cannot always be effective in determining the life expectancy in developing countries (Missow, 2010). Therefore, it is stated that countries should put into effect certain social policies which can increase access to health services and health literacy and prevent bad nutrition conditions (Kabir, 2008).

Table 1. **Data of the Study**

Years	GDP- Million TL	Health expenditure per capita- Million TL	Hospital bed per 1000 people	Doctors' consultation	Physician number per 1000 people	Nurse number per 1000 people	Life expectancy at birth	Infant mortality rate
2000	166658	-	2,08	2,80	1,30	1,06	70,01	28,40
2001	240224	-	2,14	3,00	1,38	1,11	70,57	28,60
2002	350476	284	2,48	3,10	1,39	1,10	71,10	29,60
2003	454781	363	2,46	3,40	1,41	1,12	71,60	29,10
2004	559033	444	2,45	3,70	1,44	1,12	72,06	27,40
2005	648932	517	2,48	4,60	1,47	1,14	72,48	25,80
2006	758391	636	2,50	5,30	1,51	1,19	72,87	24,50
2007	843178	726	2,52	6,10	1,55	1,35	73,22	16,50
2008	950534	813	2,56	6,70	1,59	1,41	73,55	15,70
2009	952559	804	2,60	7,30	1,65	1,46	73,86	13,90
2010	1098799	843	2,72	7,30	1,69	1,57	74,15	12,00
2011	1297713	924	2,60	8,20	1,70	1,68	74,44	11,60
2012	1416798	987	2,65	8,20	1,73	1,79	74,71	11,60
2013	1567289	1110	2,64	8,20	1,76	1,83	74,98	10,80
2014	1748168	1232	2,66	8,30	1,76	1,85	75,24	11,10
2015	1952638	1345	2,66	8,40	1,81	1,95	75,50	10,20

When the literature is examined, it is seen that the most frequently used health indicators are life expectancy at birth and infant mortality rate. In addition, life expectancy at age 65 and maternal mortality rates are also frequently used. This study aims to determine the effect of variables such as GDP, number of physicians and nurses, number of hospital beds and doctors' consultations on health indicators such as life expectancy at birth and infant mortality rates in the last 15 years in Turkey.

In this context, the relationship of various health indicators and economic indicators with life expectancy at birth and infant mortality rates have been examined in this study. The main question of

the research is; "is there a relationship between various health/ economic indicators and life expectancy at birth and neonatal mortality rates?". The data of the period covering the last 15 years have been used in the analyzes and the relations among the variables were examined and interpreted.

3. Material and Method

The study was limited to the independent variables such as GDP, number of physicians and nurses, number of hospital beds, doctors' consultations and dependent variables as life expectancy at birth and infant mortality rates. Another limitation of the study is the use of data between 2000 and 2015. Since the data of the study is not possible to be obtained from a single database, it has been compiled from different databases such as OECD, World Bank, World Health Organization, Turk Stat and publications of Ministry of Health. Due to the fact that some of the variables in the study have not been available for the last three years, the data between 2000 and 2015 has been evaluated and interpreted. The data used in the research is summarized in the table above;

After obtaining the data of the study, the data has been edited in an excel document and transferred to the SPSS 23.0 software to be able to conduct analyses. The research model has been established to determine the relationship between the variables thought to affect health indicators and life expectancy at birth and infant mortality rates, if there is any relation, to measure the strength of the relationship and revealing explained variance of dependent variables by independent variables. The research model is summarized below;

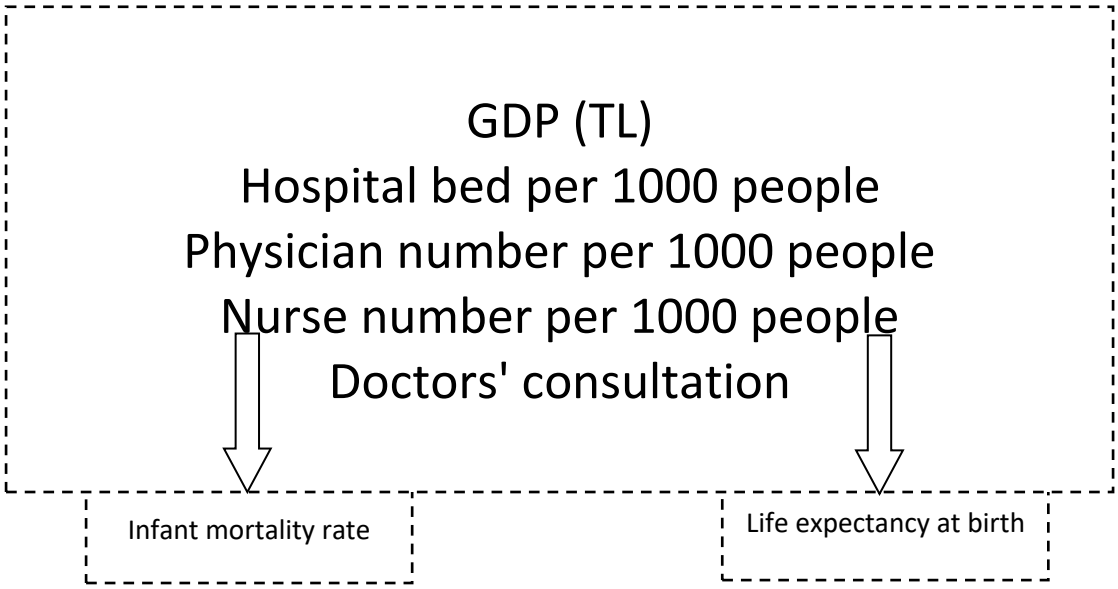

Figure 1. **Model of the Study**

The relationship between independent variables and dependent variables has been investigated for the purpose of the study. It has been determined by Kolmogorov-Smirnov that whether the analyzes which would be used in determination of this relationship should be parametric or non-parametric. Results of Kolmogorov-Smirnov are as follows;

Table 2. **One-Sample Kolmogorov-Smirnov Test analysis**

		Life expectancy at birth	Infant mortality rate
N		18	18
Normal Parameters	Mean	73,0835	19,4833
	Std. Deviation	1,94726	8,57323
Most Extreme Differences	Absolute	,099	,198
	Positive	,085	,198
	Negative	-,099	-,165
Test Statistic		,099	,198
Asymp. Sig. (2-tailed)		,200[c,d]	,062[c]

According to Kolmogorov-Smirnov analysis, dependent variables have been found to be suitable for normal distribution (p> 0.05). In this respect, parametric analyses have been used to examine the relationships between variables.

Table 3. **Pearson Correlation Coefficient analysis**

	Life expectancy at birth			Infant mortality rate		
Variables	**p**	**r**	**Correlation**	**p**	**r**	**Correlation**
GDP (TL)	0,000	,965	+/Very Strong	0,000	-,923	-/ Very Strong
Hospital bed per 1000 people	0,000	,854	+/ Very Strong	0,000	-,777	-/Strong
Physician number per 1000 people	0,000	,991	+/ Very Strong	0,000	-,967	-/ Very Strong
Nurse number per 1000 people	0,000	,935	+/ Very Strong	0,000	-,941	-/ Very Strong
Doctors' consultation	0,000	,973	+/ Very Strong	0,000	-,985	-/ Very Strong

4. Findings

According to the results of the correlation analysis, it has been found that there is a strong positive correlation between all the independent variables and the life expectancy at birth variable (p <0.05, r> 0.81). Similarly, a very strong negative correlation has been found between the independent variables except the hospital bed variable and the infant mortality rate (p <0.05, r> 0.81). A strong negative correlation has been found between the hospital bed variable and infant mortality rate (p <0.05, r = -0.77). As a result of the statistically significant relationships between independent variables and dependent variables, regression analyzes have been performed. One of the important points to be considered in regression analysis is that there should not be multicollinearity problem. Therefore, at first the relationships among the independent variables have been examined. The table for analysis is as follows.

Table 4. **Pearson Correlation Coefficient analysis**

		GDP (TL)	**Hospital bed**	**Doctors' consultation**	**Physician number**	**Nurse number**
GDP (TL)	Pearson Correlation	1	,786**	,948**	,966**	,975**
	Sig. (2-tailed)		,000	,000	,000	,000
	N	17	17	17	17	17
Hospital bed	Pearson Correlation	,786**	1	,829**	,818**	,770**
	Sig. (2-tailed)	,000		,000	,000	,000
	N	17	18	18	18	18
Doctors' consultation	Pearson Correlation	,948**	,829**	1	,974**	,952**
	Sig. (2-tailed)	,000	,000		,000	,000
	N	17	18	18	18	18
Physician number	Pearson Correlation	,966**	,818**	,974**	1	,957**
	Sig. (2-tailed)	,000	,000	,000		,000
	N	17	18	18	18	18
Nurse number	Pearson Correlation	,975**	,770**	,952**	,957**	1
	Sig. (2-tailed)	,000	,000	,000	,000	
	N	17	18	18	18	18

**. Correlation is significant at the 0.01 level (2-tailed).

It has been determined that there is a multicollinearity problem among the independent variables because of the high correlations among the independent variables. Therefore, multiple regression assumptions cannot be fulfilled. So, independent variables have been included in the model one by one and simple linear regression analyzes have been used. The results of the analyzes are as follows;

Table 5. **Multiple Regression Analysis**

Model Summary - ANOVA Statistics – Multicollinearity Statistics								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Tolerance	VIF
1	,965[a]	,932	,927	,50871	204,889	0,000	1,000	1,000
a. Predictors: (Constant), GDP (TL)								
	Non-Standardized Coefficients				Std. Coeff.		t	Sig.
	B		Std. Error		Beta			
Constant	70,046		0,236				296,750	0,000
GDP (TL)	3,241E-6		0,000		0,965		14,314	0,000

**Dependent Variable Life Expectancy at Birth*

The model has been found to be significant, and there is not multicollinearity problem. R^2 has been calculated as 0.92 and it means that the GDP (TL) variable explains 92% of the variance in life expectancy at birth (R^2 = 0.927).

Table 6. **Multiple Regression Analysis**

Model Summary - ANOVA Statistics – Multicollinearity Statistics								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Tolerance	VIF
1	,854[a]	,729	,712	1,04527	42,998	0,000	1,000	1,000
a. Predictors: (Constant), Hospital Bed								
	Non-Standardized Coefficients				Std. Coeff.		t	Sig.
	B		Std. Error		Beta			
Constant	49,343		3,629				13,597	0,000
Hospital Bed	9,423		1,437		,854		6,557	0,000

**Dependent Variable Life Expectancy at Birth*

Table 7. **Multiple Regression Analysis**

Model Summary - ANOVA Statistics – Multicollinearity Statistics								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Tolerance	VIF
1	,973[a]	,947	,943	,46408	283,305	0,000	1,000	1,000
a. Predictors: (Constant), Doctors' consultation								
	Non-Standardized Coefficients				Std. Coeff.		t	Sig.
	B		Std. Error		Beta			
Constant	68,234		,308				221,42	0,000
Dr. Consultation	,825		,049		,973		16,84	0,000

** Dependent Variable Life Expectancy at Birth*

Table 8. **Multiple Regression Analysis**

Model Summary - ANOVA Statistics – Multicollinearity Statistics								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Tolerance	VIF
1	,991[a]	,983	,982	,26404	908,617	0,000	1,000	1,000
a. Predictors: (Constant), Number of psychians								
	Non-Standardized Coefficients				Std. Coeff.		t	Sig.
	B		Std. Error		Beta			
Constant	56,942		,539				105,623	0,000
Number of psychian	10,314		,342		,991		30,143	0,000

** Dependent Variable Life Expectancy at Birth*

The model has been found to be significant and when multicollinearity statistics are examined it can be seen that there is not multicollinearity problem. It has been determined that the physician variable

explains 94% of the variance in life expectancy at birth (R^2 = 0.943).

This model has also been found to be significant and according to multicollinearity statistics, there is not multicollinearity problem. It has been determined that the hospital bed variable explains 71% of the variance in life expectancy at birth (R^2 = 0.712). It means 1-point change in hospital bed variable leads to 0,72 points change in the variance of the life expectancy at birth variables' variance.

This model is also significant and there isn't multicollinearity problem, therefore statistics values can be reported. R^2 has been found to be 0.98, it means that the number of physician variable explains 98% of the variance in life expectancy at birth (R^2 = 0.982).

Table 9. **Multiple Regression Analysis**

Model Summary - ANOVA Statistics – Multicollinearity Statistics								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Tolerance	VIF
1	,935[a]	,874	,867	,71141	111,368	0,000	1,000	1,000
a. Predictors: (Constant), Number of nurses								
Non-Standardized Coefficients					Std. Coeff.		t	Sig.
B			Std. Error		Beta		86,893	0,000
Constant	65,347		,752		,935			
Nurses	5,421		,514				10,553	0,000

**Dependent Variable Life Expectancy at Birth*

The model has been found to be significant there isn't multicollinearity problem. It has been determined that the number of nurses variable explains 86% of the variance in life expectancy at birth (R2 = 0.867). This statistic means that if there is a 1-point change in number of nurses variable, then there will be 0.86 point change in life expectancy at birth variable s' variance.

Table 10. **Multiple Regression Analysis**

Model Summary - ANOVA Statistics – Multicollinearity Statistics								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Tolerance	VIF
1	,923[a]	,851	,841	3,38204	85,915	0,000	1,000	1,000
a. Predictors: (Constant), GDP (TL)								
Non-Standardized Coefficients					Std. Coeff.		t	Sig.
B			Std. Error		Beta		20,673	0,000
Constant	32,442		1,569		-,923			
GDP (TL)	-1,395E-5		,000				-9,269	0,000

**Dependent Variable Infant Mortality Rate*

The model has been found to be significant. According to multicollinearity statistics, there isn't multicollinearity problem. It has been determined that the GDP (TL) variable explains 84% of the variance in infant mortality rate (R^2 = 0.841). This statistic means that 1-point change in GDP leads 0.84-point change in infant mortality rate variables' variance.

Table 11. **Multiple Regression Analysis**

Model Summary - ANOVA Statistics – Multicollinearity Statistics								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Tolerance	VIF
1	,777[a]	,604	,579	5,56424	24,358	0,000	1,000	1,000
a. Predictors: (Constant), Hospital bed								
Non-Standardized Coefficients					Std. Coeff.		t	Sig.
B			Std. Error		Beta		5,933	0,000
Constant	114,601		19,317		-,777			
Hospital bed	-37,753		7,650				-4,935	0,000

**Dependent Variable Infant Mortality Rate*

Significance value shows that model is significant and according to multicollinearity statistics there isn't multicollinearity problem. Therefore, It has been found that the patient bed variable explains 57% of the variance in infant mortality rate (R^2 = 0.579).

Table 12. **Multiple Regression Analysis**

Model Summary - ANOVA Statistics – Multicollinearity Statistics								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Tolerance	VIF
1	,985[a]	,971	,969	1,51370	529,33	0,000	1,000	1,000
a. Predictors: (Constant) Dr. Consultation								
Non-Standardized Coefficients					Std. Coeff.		T	Sig.
	B		Std. Error		Beta		40,893	0,000
Constant	41,102		1,005					
Dr. Consultation	-3,678		,160		-,985		-23,007	0,000

**Dependent Variable Infant Mortality Rate*

Significance value shows that model is significant and according to multicollinearity statistics there isn't multicollinearity problem. Therefore, it has been found that the physician consultation variable explains 96% of the variance in infant mortality rate (R^2 = 0.969).,130.

Table 13. **Multiple Regression Analysis**

Model Summary - ANOVA Statistics – Multicollinearity Statistics								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Tolerance	VIF
1	,967[a]	,935	,931	2,24909	231,015	0,000	1,000	1,000
a. Predictors: (Constant), Number of psychians								
Non-Standardized Coefficients					Std. Coeff.		t	Sig.
	B		Std. Error		Beta		19,340	0,000
Constant	88,813		4,592					
Number of psychians	-44,300		2,915		-,967		-15,199	0,000

**Dependent Variable Infant Mortality Rate*

This model has also been found to be significant and there is not multicollinearity problem. It has been determined that the number of physicians explains 93% of the variance in infant mortality rate (R^2 = 0.931). It means a point change in the number of physician's variable, leads to 0.93-point change in infant mortality rate variables' variance.

Table 14. **Multiple Regression Analysis**

Model Summary - ANOVA Statistics – Multicollinearity Statistics								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Tolerance	VIF
1	,941[a]	,885	,878	2,99171	123,604	0,000	1,000	1,000
a. Predictors: (Constant), Nurses								
Non-Standardized Coefficients					Std. Coeff.		t	Sig.
	B		Std. Error		Beta		16,998	0,000
Constant	53,759		3,163					
Nurses	-24,016		2,160		-,941		-11,118	0,000

**Dependent Variable Infant Mortality Rate*

This model has also been found to be significant and there is not multicollinearity problem. It has been determined that the number of nurses explains 87% of the variance in the infant mortality rate variables' variance (R^2 = 0,878).

5. Discussion and Conclusion

There are many factors that are thought to be

related to health indicators. Some of these factors are economic, while others are related to health labor, physical infrastructure and resources. In this study, variables that are thought to have an impact on life expectancy at birth and infant mortality rate have been examined. As a result of the analyzes performed, it has been determined that the variance in life expectancy at birth is explained by the variables of GDP, number of hospital beds per 1000 people, physician's consultation rate, number of physicians and nurses per 1000 patients by 92%, 71%, 94%, 98% and 86% respectively. On the other hand, the variance in infant mortality rate is explained 84%, 57%, 96%, 93% and 87%, respectively, by the same variables. As it can be seen in the analysis, the models established are significant. Therefore, it can be said that the independent variables included in the research model explain the dependent variables with a large percentage of the variance. Besides, it is an undeniable fact that some indicators taken as independent variables in this research model can be considered as dependent variables in another model. In the analysis performed at the beginning of the research, it has been determined that there is a problem of multicollinearity between the independent variables, so, variables have been included in the analyzes one by one. Because the multicollinearity problems are likely to occur when the time series of data are included in the analysis, in future studies, it may be suggested to include the cross-sectional variables with time series in the model. For a better interpretation of the results, it can be suggested to include the data of the countries with similar characteristics with Turkey. In addition, examining health indicators by taking into consideration the situation in countries that are similar to and different from Turkey can provide a more detailed framework for the subject.

There are many studies in the literature examining life expectancy at birth and infant mortality rate. In these studies, the effects of different variables were examined. In general, both health-related and economic variables were found to be related to life expectancy at birth and infant mortality rate. For example, according to the results of a study, there is a long-term relation between health expenditures and economic growth. The causality test of this relation is bidirectional, and there is a mutual interaction between health expenditures and economic growth (Akıncı ve Tuncer, 2016). In a study, it was found that there are statistically significant relationships between many demographic, environmental and socio-economic variables and average life expectancy (Gürbüz and Karabulut, 2009). In another study, the increase in GDP was found to reduce infant mortality rates (Biggs et al., 2010). As a result of the analyzes performed in another study, it was found that the most affecting variable on life expectancy at birth was infant mortality rate and the most affecting variable on life expectancy variable at the age of 65 was per capita health expenditures and health service usage level (number of doctor visits and hospitalization days) (Bayın, 2016). In another study, it was concluded that health expenditures are effective on life expectancy and infant mortality rate (Tüylüoğlu and Tekin, 2009). The results of these studies in the literature are consistent with the present study. However in many studies, it has been adapted limited and different indicators that couldn't manifest health care sector comprehensively, despite the fact that several studies have confirmed the relationship between health and economy (Safe et al., 2017).

In conclusion, there are many studies that show the impact of both socio-economic indicators and health indicators in a country on the life expectancy and infant mortality rates at birth. In this study, it has been found that variables such as GDP, hospital bed, number of physicians and nurses, doctors' consultations are highly correlated with life expectancy at birth and infant mortality rate. On the other hand, this study has excluded the health system and Turkey's unique geographical and social features and risks, lifestyle and behavior out of the model. These can be considered as the limitations of the study. In future studies, it is recommended to examine the relationship between the health indicators and the variables not included in this study. Moreover, it is required to carry out the health and economic policies in a way that increases the level of health and to be municipal services such as access to clean water, purification and waste management in a harmony with health policies. Moreover, bringing health facilities and health manpower to the level of developed countries both in quantity and quality can improve health-related indicators.

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