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Research Article

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Determinants of Life Expectancy at Birth: OECD Example During the Pandemic Period

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Abstract

Background/Aim: *The aim of the study is to investigate the factors affecting life expectancy at birth in OECD countries during the pandemic period.*

Materials and methods: *Data for 28 OCED countries were collected in OECD glance statistics for the latest year. The dependent variable is life expectancy at birth, the independent variables are; health expenditures, coverage of health insurance, number of doctors, number of patient beds, smoking, alcohol consumption, obesity/overweight, air pollution, effective primary care, effective preventive care, effective secondary care it is included as. Mean, standard deviation and extreme value analyses were made and the suitability of the data for normal distribution was evaluated with the Shapiro-Wilks test and Skewness and Kurtosis values. Spearman correlation and linear regression were used to evaluate the relationship between variables.*

Results: *In the Spearman correlation analysis, there was a significant negative relationships between life expectancy at birth and effective primary care (-.401 $p<0.05$), effective secondary care (stroke) (-.588 $p<0.01$), alcohol consumption (-.511 $p<0.01$), air pollution (-.538 $p<0.01$), and with obesity (-.436 $p<0.05$) was detected. When effective primary care, effective secondary care, air pollution and obesity are included in the model together, the prediction of life expectancy at birth in the model is statistically significant ($F=16.685$ $P<0.01$). The model explains 74% of the variance in life expectancy at birth (R square = .744).*

Conclusion: *In the study where the factors affecting life expectancy at birth were evaluated in OECD countries during the pandemic period, effective primary care and effective secondary care were found to be factors affecting life expectancy at birth. Management of life-threatening diseases, especially respiratory diseases, appears to affect life expectancy at birth. Air pollution can also be considered in this context. Alcohol consumption and obesity also stand out in this sense. When planning health policies, managing factors that threaten public health comes to the fore.*

Keywords: Life Expectancy, Health Care Quality, Health Expenditures, Air Pollution, Health Planning

1. Introduction

Life expectancy at birth is a specific measure of the mean number of years a person is expected to live from birth to death. Calculated by keeping death rates constant for all ages [1]. It is an important value that shows the development levels of countries [2]. Life expectancy is more than a number, it is an important indicator of health. It is a way of examining, determining and evaluating the causes and consequences of government policies, human behavior and tendencies and cultural factors in a country. Life expectancy at birth can affect many social and economic issues such as birth rates, society's consumption and spending orientation, amount and direction of social investments, retirement expenditures, public finance and economic development [3]. Improvements in healthcare lead to economic growth because it has been determined that increasing life expectancy increases investments in various areas such as technological developments and public production [4,5]. In studies examining economic development and economic growth, a positive relationship has been found between public health and economy, determined using life expectancy at birth [6]. The development of healthcare services, especially for

the elderly population, has established that increases in healthcare expenditures are associated with increases in life expectancy [7]. Health expenditure has been the main driver of the increase in life expectancy in recent years, according to the OECD, a 10% increase in per capita health expenditure is associated with a 3.5 month increase in life expectancy [8]. When determining policies on how to finance health, the resources allocated to meet the health needs of the society are considered. The purpose of health insurance is to finance the health care provided and to facilitate access to health services for all citizens and to overcome financial difficulties. The comprehensive health insurance that is promoted does not cover all health expenses of citizens, especially their extra special care needs, including over-the-counter medicines. These expenses are out-of-pocket and are usually reported as a percentage of overall healthcare expenses [9]. The study, which included more than 180 countries, showed that out-of-pocket expenses had a negative impact on life expectancy at birth [10]. Research has shown the positive impact of the increase in the number of doctors and hospital beds on life expectancy [11]. Improvements in the quality of medical care in European countries since 1980 have been associated with increases in life expectancy [12]. A joint study by Harvard, Boston and Stanford Universities found that in the United States, regions with a higher density of primary care physicians had lower death rates [13]. Long-term tobacco use can lead to various diseases such as vascular, prostate, lung and breast cancer [14]. In developed countries, tobacco was found to be responsible for approximately 30% of all deaths in those aged 35-69 in the 1990s and 14% of deaths in the elderly, demonstrating the importance of the role that smoking played in determining the mortality rates of the population between 1950 and 2006 [15]. Alcohol consumption also has a negative impact on lifespan, as it contributes to oral or esophageal cancer, ischemic stroke and diabetes. Alcohol consumption has a negative impact on life expectancy due to its negative impact on oral or esophageal cancer, ischemic stroke and diabetes. High alcohol consumption affects the assessment of chances of getting a job and can also lead to long-term unemployment, higher risk of drinking [16]. Additional studies have shown that moderate alcohol consumption combined with smoking increases the risk of disease, especially cancer, and shortens life expectancy [17].

2. Materials and Methods

The study is retrospective descriptive type. Health expenditures, coverage of health insurance, number of doctors, number of patient beds, smoking and alcohol consumption, overweight/obesity, air pollution, effectiveness of primary care, effectiveness of preventive care, effectiveness of secondary care parameters that are thought to affect life expectancy at birth (years), it was aimed to examine the relationship between life expectancy at birth and these parameters. Life expectancy at birth was taken as the dependent variable and other parameters were taken as the independent variables. Data were obtained from OECD Glance statistics. 28 OECD countries with available data were included in the study. Countries with missing data on all variables were excluded from the study. The numerical value for effective primary care and effective secondary care is inversely proportional to the quality scale. As the numerical value increases, the quality scale decreases.

2.1 Statically Analyses

All data was collected in a database. Obvious errors and missing data were cleaned. Mean, standard deviation, maximum, minimum and range values were used to describe the data. Compliance of the parameters with normal distribution was evaluated with the Shapiro Wilks test and Skewness and Kurtosis values. Spearman correlation test was applied to evaluate the relationship between dependent and independent variables that do not show normal distribution. Linear regression was applied to evaluate independent variables predicting life expectancy at birth. Whether there was an autocorrelation problem between variables was evaluated with Durbin-Watson and VIF value. All analyzes were carried out in SPSS for Mac. The confidence interval was accepted as 95% and the statistical significance level was taken as 0.05.

3. Results

Life expectancy at birth had a mean value of (80.6 ± 3.1). The highest was reported in Korea with 83.6, while the lowest was reported in Lithuania with 72.4. Range value is 11.2. Skewness value is -1.34, Kurtosis value is 0.928. The Shapiro Wilks value is statistically significant at <0.001 and the parameter is not normally distributed. Life expectancy at birth for countries is shown in table 1.

Australia	83.3
Austria	81.3
Belgium	81.9
Canada	81.6
Czech Republic	77.2
Denmark	81.5
Estonia	77.2
Finland	81.9
France	82.4
Germany	80.8
Iceland	83.2
Ireland	82.4
Israel	82.6
Italy	82.7
Korea	83.6
Lithuania	72.4
Luxemburg	82.7
Netherlands	81.4
Norway	83.2
Poland	75.5
Portugal	81.5
Slovakia	74.6
Slovenia	80.7
Spain	83.3
Sweden	83.1
Turkiye	78.6
United Kingdom	80.4
United States	76.4

Table 1: Life Expectancy at Birth of Countries (2021-2022) [18]

As a result of Spearman correlation analysis, there was a statistically significant moderate negative relationships between life expectancy at birth and effective primary care (-.401 $p<0.05$), between effective secondary care (stroke) (-.588 $p<0.01$), alcohol consumption (-.511 $p<0.01$), air pollution (-.538 $p<0.01$), obesity (-.436 $p<0.05$) was detected. The prediction of independent variables on life expectancy at birth was evaluated by simple linear regression analysis. First, it was examined how effective primary care predicted life expectancy at birth, and as a result of the analysis, the model was found to be statistically significant ($F=5.612$ $P<0.05$). Effective primary care explains 18% of the variance in life expectancy at birth (R square = .178). A one unit increase in effective primary care results in a 0.008-unit decrease. It was examined how effective secondary care (stroke) predicted life expectancy at birth, the model was found to be statistically significant ($F=18.258$ $P<0.01$). Effective secondary care explains 41% of the variance in life expectancy at birth (R square = .413). A one unit increase in effective secondary care results in a 0.657-unit decrease.

It was examined how predicted air pollution life expectancy at birth, the model was found to be statistically significant ($F=15.891$ $P<0.01$). Air pollution explains 38% of the variance in life expectancy at birth (R square = .379). A one unit increase in air pollution results in a 0.099-unit decrease. It was examined how predicted obesity life expectancy at birth, the model was found to be statistically significant ($F=5.246$ $P<0.05$). Obesity explains 17% of the variance in life expectancy at birth (R square = .168). A one unit increase in obesity results in a 0.247-unit decrease. Other independent variables are not statistically significant in predicting life expectancy at birth. When effective primary care, effective secondary care, air pollution and obesity are included in the model together, the prediction of life expectancy at birth in the model is statistically significant ($F=16.685$ $P<0.01$). The model explains 74% of the variance in life expectancy at birth (R square = .744). The results are shown in table 2.

Independent Variables	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics
	B	Std. Error	Beta	T	Sig.	VIF
Constant	91.013	1.519		59.911	p<.001	
Effective Primary Care	-.002	.003	-.078	-.600	.554	1.506
Effective Secondary Care	-.314	.137	-.307	-2.301	.031	1.597
Air Pollution	-.086	.024	-.532	-3.553	.002	2.011
Obesity	-.274	.078	-.454	-3.497	.002	1.515
Dependent Variable: Life expectancy at birth Durbin-Watson: 2.027 F=16.685 P<0.01 R:0.862 R square:0.744 Adjusted R square:0.699						

Table 2: Effect of Independent Variables on Life Expectancy at Birth

4. Discussion

In the study, life expectancy at birth; we found that it is associated with effective primary care, effective secondary care, air pollution and obesity. We show in regression analysis that other independent variables have no effect on life expectancy at birth. Roffia study and various studies have shown the positive impact of health expenditures on life expectancy at birth [19-22]. However, in our study, no correlation was found between health expenditures and life expectancy at birth. When evaluating this result, it should be taken into consideration that there may be deviations in the sample size and linear regression analysis. Grima found that out-of-pocket expenses were positively related to life expectancy at birth [23]. Moreno et al. found that out-of-pocket expenses negatively related to life expectancy at birth [24]. On the contrary, in our study, no relationship was found between out-of-pocket expenses and life expectancy at birth. In studies evaluating the effect of the number of doctors and the number of patient beds on life expectancy at birth; it was determined that the number of doctors and the number of patient beds had a positive effect on life expectancy at birth [19,20,22]. No findings in this direction were found in our study. Life expectancy at birth is not related to the number of doctors and number of patient beds. When interpreting these findings, it should be taken into consideration that the number of patient beds may reduce mortality and lead to an extension of life expectancy at birth. Its effect may seem limited in the long term [19]. The relationship between the number of doctors and longevity was determined by Roffia as put forward by, it can gain meaning when considered within the health system. Our study found that primary and secondary health care effectiveness have a positive effect on life expectancy at birth. These finding is similar. Various studies have emphasized the negative effects of alcohol consumption and chronic diseases on life expectancy at birth [19,20,25]. In a study conducted by et al., consumption of more than one liter of alcohol per year was associated with a decrease in life expectancy of 0.142 years. A ten percent increase in respiratory diseases was associated with a 1.1307-year reduction in life expectancy [19]. These findings are like the results of our study. Although it is not statistically significant that alcohol consumption predicts life expectancy at birth, there is a statistically significant negative correlation between life expectancy at birth and alcohol consumption. In the context of respiratory diseases, the effectiveness of primary care, COPD, is measured by avoidable hospital admissions. Life expectancy at birth explains 18% of the variance, a one-unit increase is associated with a 0.008 reduction in life expectancy at birth and is statistically significant.

5. Conclusion, Limitations and Future Research

Life expectancy at birth is one of the most important variables that show the welfare level of a country. It is a stimulant and a guide when making health policy plans. In our study, we found negative relationships between effective primary care, effective secondary care, alcohol consumption, air pollution and obesity, and life expectancy at birth. This reveals the fact that problems such as alcohol consumption and obesity, which concern public health, especially respiratory diseases, should be taken into consideration when making health plans. One of the most important limitations of the study is that the data was collected over a short period of time. 2021 or last year data was used. 28 OECD countries were included in the study, and the results may not reflect all OECD countries due to the limited number of countries included in the study. The study cannot be generalized to non-OECD countries. Considering that the period in which the data was collected was the COVID-19 pandemic period and the resulting shortening in life expectancy at birth and the factors affecting this, it should be considered natural that variables related to respiratory diseases affect life expectancy at birth. The study currently sheds light on the needs of the pandemic period and how to overcome the difficulty it creates in the healthcare system and emphasizes the importance of the post-pandemic society in preventing possible future pandemics, as well as prolonging life expectancy at birth and combating chronic problems such as obesity.

References

1. Laranjeira, E., & Szrek, H. (2016). Going beyond life expectancy in assessments of health systems' performance: life expectancy adjusted by perceived health status. *International Journal of Health Economics and Management, 16*, 133-161.
2. Ho, J. Y., & Hendi, A. S. (2018). Recent trends in life expectancy across high income countries: retrospective observational study. *bmj, 362*.
3. Shaw, J. W., Horrace, W. C., & Vogel, R. J. (2005). The determinants of life expectancy: an analysis of the OECD health data. *Southern Economic Journal, 71*(4), 768-783.
4. Bloom, D. E., & Canning, D. (2000). The health and wealth of nations. *Science, 287*(5456), 1207-1209.
5. Cervellati, M., & Sunde, U. (2013). Life expectancy,

schooling, and lifetime labor supply: theory and evidence revisited. *Econometrica, 81*(5), 2055-2086.
6. Bhargava, A., Jamison, D. T., Lau, L. J., & Murray, C. J. (2001). Modeling the effects of health on economic growth. *Journal of health economics, 20*(3), 423-440.
7. Mackenbach, J. P., Slobbe, L., Looman, C. W. N., van der Heide, A., Polder, J., & Garssen, J. (2011). Sharp upturn of life expectancy in the Netherlands: effect of more health care for the elderly?. *European journal of epidemiology, 26*, 903-914.
8. Papanicolas, I., Mossialos, E., Gundersen, A., Woskie, L., & Jha, A. K. (2019). Performance of UK National Health Service compared with other high income countries: observational study. *bmj, 367*.
9. Ranabhat, C. L., Atkinson, J., Park, M. B., Kim, C. B., & Jakovljevic, M. (2018). The influence of universal health coverage on life expectancy at birth (LEAB) and healthy life expectancy (HALE): a multi-country cross-sectional study. *Frontiers in pharmacology, 9,* 960.
10. Rhee, H. J. (2012). Effects of health care expenditure on the infant mortality rate and life expectancy at birth in Korea. *International Journal of Contents, 8*(3), 52-56.
11. Nixon, J., & Ulmann, P. (2006). The relationship between health care expenditure and health outcomes: evidence and caveats for a causal link. *The European journal of health economics, 7*, 7-18.
12. Nolte, E., Scholz, R., Shkolnikov, V., & McKee, M. (2002). The contribution of medical care to changing life expectancy in Germany and Poland. *Social science & medicine, 55*(11), 1905-1921.
13. Basu, S., Berkowitz, S. A., Phillips, R. L., Bitton, A., Landon, B. E., & Phillips, R. S. (2019). Association of primary care physician supply with population mortality in the United States, 2005-2015. *JAMA internal medicine, 179*(4), 506-514.
14. Lariscy, J. T. (2019). Smoking-attributable mortality by cause of death in the United States: An indirect approach. *SSM-population health, 7*, 100349.
15. Peto, R., Boreham, J., Lopez, A. D., Thun, M., & Heath, C. (1992). Mortality from tobacco in developed countries: indirect estimation from national vital statistics. *The Lancet, 339*(8804), 1268-1278.
16. Anderson, P., & Baumberg, B. (2006). Alcohol in Europe–public health perspective: report summary. *Drugs: education, prevention and policy, 13*(6), 483-488.
17. Xu, W. H., Zhang, X. L., Gao, Y. T., Xiang, Y. B., Gao, L. F., Zheng, W., & Shu, X. O. (2007). Joint effect of cigarette smoking and alcohol consumption on mortality. *Preventive medicine, 45*(4), 313-319.
18. Health at a Glance 2023.
19. Roffia, P., Bucciol, A., & Hashlamoun, S. (2023). Determinants of life expectancy at birth: a longitudinal study on OECD countries. *International Journal of Health Economics and Management, 23*(2), 189-212.
20. Crémieux, P. Y., Meilleur, M. C., Ouellette, P., Petit, P., Zelder, M., & Potvin, K. (2005). Public and private pharmaceutical spending as determinants of health outcomes in Canada. *Health economics, 14*(2), 107-116.
21. Jaba, E., Balan, C. B., & Robu, I. B. (2014). The relationship between life expectancy at birth and health expenditures estimated by a cross-country and time-series analysis. *Procedia Economics and Finance, 15*, 108-114.
22. Nixon, J., & Ulmann, P. (2006). The relationship between health care expenditure and health outcomes: evidence and caveats for a causal link. *The European journal of health economics, 7*, 7-18.
23. Grima, S., Spiteri, J. V., Jakovljevic, M., Camilleri, C., & Buttigieg, S. C. (2018). *High out-of-pocket health spending in countries with a mediterranean connection. Front Public Health 2018; 6: 1–11*.
24. Moreno-Serra, R., & Smith, P. C. (2015). Broader health coverage is good for the nation's health: evidence from country level panel data. *Journal of the Royal Statistical Society Series A: Statistics in Society, 178*(1), 101-124.
25. Berger, M. C., & Messer, J. (2002). Public financing of health expenditures, insurance, and health outcomes. *Applied Economics, 34*(17), 2105-2113.