# THE EFFECTS OF PUBLIC HEALTH AND SOCIAL SPENDINGS ON HEALTH OUTCOMES: A PANEL DATA ANALYSIS OF OECD COUNTRIES

Seda AYDAN [*]
Gamze BAYIN DONAR [**]
Cengiz ARIKAN [***]

**ABSTRACT**

*Health promotion is seen as a fundamental right, as health is of vital importance. Therefore, it is important to reveal the impact of public health spending and public social spending, which are considered to be important determinants of health, on health outcomes. This study aimed to examine the effects of both public health and social spendings on health outcomes among OECD countries. Public health spending and social spending were evaluated as independent variables and life expectancy at birth, life expectancy at birth for males and females, infant mortality rate and maternal mortality rate were evaluated as the dependent variables. Data were collected from OECD database and it covers the years between 2006 and 2017 for all OECD countries. Panel data analysis was conducted where pooled, fixed and random effect models were estimated. According to findings of the study, public health and social spendings had an impact on life expectancy at birth and infant mortality rate, but not on maternal mortality rate. The coefficients of explaining the life expectancy at birth and infant mortality rate of social spending were higher than health spending. In order to increase life expectancy at birth and reduce the infant mortality rate, it is recommended that OECD countries should attach importance to social spending.*

**Key Words:** *Health spending, social spending, health outcomes, panel data, OECD countries*

# KAMU SAĞLIK VE SOSYAL HARCAMALARININ SAĞLIK SONUÇLARI ÜZERİNDEKİ ETKİSİ: OECD ÜLKELERİNDE BİR PANEL VERİ ANALİZİ

Seda AYDAN [†]
Gamze BAYIN DONAR [**]
Cengiz ARIKAN [***]

***ÖZ***

*Sağlık hayati önem taşıması nedeniyle, sağlığın geliştirilmesi temel bir hak olarak görülmektedir. Bu nedenle, sağlığın önemli belirleyicilerinden olduğu düşünülen kamu sağlık harcamalarının ve kamu sosyal harcamalarının sağlık sonuçları üzerindeki etkisini ortaya koymak önemlidir. Bu çalışma, OECD ülkelerinin kamu sağlık ve sosyal harcamalarının sağlık sonuçları üzerindeki etkilerini incelemeyi amaçlamaktadır. Çalışma kapsamında, kamu sağlık harcamaları ve sosyal harcamalar, bağımsız değişkenler olarak değerlendirilmiştir. Doğuşta beklenen yaşam süresi, erkek ve kadınlarda doğuşta beklenen yaşam süresi, bebek ölüm hızı ve anne ölüm hızı, çalışmanın bağımlı değişkenleridir. Değişkenlere ilişkin veriler, OECD veri tabanından toplanmıştır ve tüm ülkeler için 2006 ile 2017 yılları arasını kapsamaktadır. Havuzlanmış, sabit ve rastgele etkiler panel veri modelleri tahmin edilmiştir. Çalışmanın bulgularına göre, kamu sağlık ve sosyal harcamaları, doğuşta beklenen yaşam süresi ve bebek ölüm hızı değişkenlerine anlamlı etki etmekte, ancak anne ölüm hızı değişkenine anlamlı etki etmemektedir. Sosyal harcamaların doğuşta beklenen yaşam süresi ve bebek ölüm hızını açıklama katsayıları, sağlık harcamalarına göre daha yüksek bulunmuştur. Doğuşta beklenen yaşam süresini artırmak ve bebek ölüm hızını azaltmak için OECD ülkelerinin sosyal harcamalara önem vermesi önerilmektedir.*

***Anahtar Kelimeler:*** *Sağlık harcaması, sosyal harcama, sağlık sonuçları, panel veri, OECD ülkeleri*

## I. INTRODUCTION

The promotion of health is substantial because health is vital, a fundamental right and includes public interest. Today, however, most countries face increased health care costs that provide limited improvement in health outcomes. One of the best examples of this issue is America, which has highest healthcare spending among Organisation for Economic Co-operation and Development (OECD) countries while remaining lower in fundamental health indicators (Lobb, 2009; Bradley et al., 2011). This fact makes policy makers, researchers and other stakeholders think about the relationship between health spending and health outcomes and leads to the search for other factors to explain health outcomes. The most prominent of these factors is the social determinants of health. While several studies have been conducted in different countries that examine the relationship between health spending and health outcomes (Nixon and Ulmann, 2006; Çevik, 2013; Çevik and Tasar, 2013; Kim and Lane, 2013; Bein et al., 2017; Kofi et al., 2018; Rahman et al., 2018), the role of spending in social services, such as financial aid, housing, unemployment insurance and other social support activities, which may be important for health, is less studied. Although health professionals have long recognized the importance of socioeconomic, environmental and behavioral determinants of health, healthcare reforms have largely focused on healthcare spending and have shown less interest in social policy areas (Bradley et al., 2011). Researches aimed to improve health generally focus on health systems, healthy behaviors, and health spending. Factors directly related to health services has often considered as related to poor health outcomes (Rubin et al., 2016).

OECD (2010) indicated that there is a clear need to include public spending on health care in a report. According to the report, the countries that spend most for health are not necessarily the ones that have best health outcomes. Thus, this suggests that there is a need to improve the cost-effectiveness of spending. Similarly, Lobb (2009) argued that spending more on healthcare does not increase health, and the evidence indicates that social policies are the best investments for health. According to the OECD data, while health spending in United States is above the OECD average, it is seen that social spending is less than the average of OECD countries, and the health outcomes of the United States are often not very good compared to other countries (OECD, 2019). Bradley et al. (2011) concluded that health care reformers' attention to wider social policy areas may help to achieve targeted health improvements.

Rubin et al. (2016) indicated that the fact that countries that spend more on social programs than health have better health outcomes raises strategic issues for governments seeking to improve health outcomes. This wider perspective on health helps to consider outcomes as the product of a complex of social, economic and cultural factors with health behaviors, medicine and health services. Since social spending may affect these socio-economic factors, it ought to be taken account as a determinant of health, as much as health spending. In this study, it was aimed to examine the effects of both public health and social spendings on health outcomes, between 2006 and 2017, among OECD countries. Since the results of the study were thought to be guiding for public health and social policy makers, the study focused on only public spendings.

## II. MATERIALS AND METHODS

### 2.1. Data Collection

The data that support the findings of this study are openly available in OECD data at https://data.oecd.org/ (OECD, 2019). Data covers the years between 2006 and 2017 for all OECD countries. The country group that will cover the most countries and the widest time interval among OECD countries was selected for the study. Health data is published with a delay by the OECD. The data of 2017, which is the most recent year for data collection, was used in the study. As data for all years for each country could not been collected, unbalanced panel data was used. In the study, public health spending and social spending were evaluated as independent variables and life expectancy at birth, infant mortality rate and maternal mortality rate were evaluated as dependent variables.

### 2.2. Data Analysis

While panel data set contains data both time series and cross-sectional observations, it allows working with more data. As the number of observations and degrees of freedom increase, multiple linear relationship between variables decreases and the effectiveness and reliability of estimations increases (Tatoglu, 2018). On the other hand, the panel is a method to analyze the economic problems observed in the time series extent for a particular group. Therefore, panel data analysis was used in this study which investigates OECD countries and the effects of social and health spendings on health outcomes were examined via panel data models. Thus, panel data analysis was conducted where pooled, fixed and random effect models were estimated. The analyzes were performed in Stata 14 software.

### III. RESULTS

Among OECD countries, United States, Germany, Sweden, Japan and Norway, respectively, had the highest share in health spending, while France, Finland, Denmark and Austria had the highest share in social spending, respectively (Figure 1). While the average life expectancy at birth in OECD countries was 78.4 in 2006, the value increased to 80.7 in 2017. The average infant mortality rate decreased from 9.2 in 2006 to 3.2 in 2017; maternal mortality rate decreased from 9.2 in 2006 to 5.2 in 2017. Percentage of social spending increased from 18.2 in 2006 to 21.1 in 2017, while percentage of health spending increased from 5.7 in 2006 to 6.6 in 2017.

**Figure 1. Public Health and Social Spendings as a Percentage of Gross Domestic Product among OECD Countries for 2017**
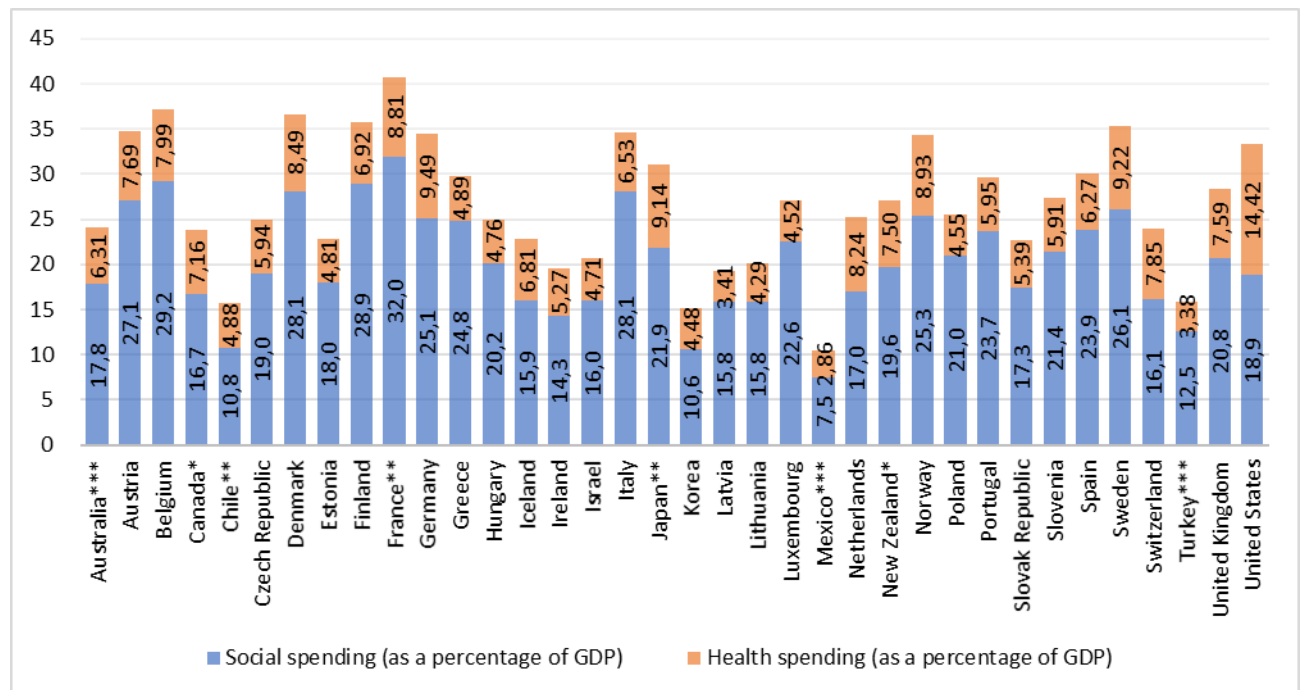


*Data for 2014, **Data for 2015, ***Data for 2016

Among OECD countries, the average life expectancy at birth was 79.65, the infant mortality rate was 4.24, and the maternal mortality rate was 7.70 between 2006-2017. While average percentage of social spending was 20.09, average percentage of health spending was 6.27 among OECD countries between 2006-2017 (Table 1).

**Table 1. Distribution of Spending and Health Outcome Variables across OECD Countries, 2006-2017**

| Variables | Mean ± Standard Deviation |
|---|---|
| Life expectancy at birth (years) | 79.65 ± 0.75 |
| Life expectancy at birth for male (years) | 76.76 ± 0.88 |
| Life expectancy at birth for female (years) | 82.51 ± 0.63 |
| Infant mortality rate (year per 1,000 live births) | 4.24 ± 0.52 |
| Maternal mortality rate (deaths per 100,000 live births) | 7.70 ± 1.04 |
| Social spending (% of GDP) | 20.09 ± 1.07 |
| Health spending (% of GDP) | 6.27 ± 0.32 |

For each dependent variable, fixed effects, random effects and pooled panel models were estimated. In order to determine which model was the most appropriate model for each dependent variable, Breush Pagan test was conducted firstly. To test whether random effects was valid against the null hypothesis that the pooled model was valid, and the null hypothesis was rejected at 1% significance level. Then, Hausmann test was conducted to test hypothesis that fixed effect models were valid against null hypothesis that random effects model was valid. Whereas the null hypothesis was rejected at 1% significance level for life expectancy at birth, life expectancy at birth for male and female, the null hypothesis was rejected at 5% significance level for infant mortality rate and 10% significance level for maternal mortality rate. It was decided that fixed effects model was appropriate for all dependent variables at conventional significance levels. The estimated results obtained using the defined variables are given in Table 2.

**Table 2. Effects of Social and Health Spendings on Health Outcomes (Panel Model Estimation)**

| Variables | Expected life years at birth | Expected life years at birth for male | Expected life years at birth for female | Infant mortality rate | Maternal mortality rate |
|---|---|---|---|---|---|
| Constant | 74.167*** (135.790) | 70.339*** (111.200) | 78.073*** (165.420) | 6.784*** (11.410) | 10.703*** (3.740) |
| Social Spending | 0.282*** (9.120) | 0.325*** (9.070) | 0.231*** (8.650) | -0.111*** (-3.300) | -0.142 (-0.880) |
| Health Spending | -0.031 (-0.500) | -0.021 (-0.280) | -0.035 (-0.640) | -0.046 (-0.670) | -0.016 (-0.050) |
| F test | 52.390*** | 53.040*** | 46.330*** | 9.020*** | 0.540 |
| Breusch-Pagan test | 1,599.310*** | 1,626.040*** | 1,581.790*** | 1,432.600*** | 902.080*** |
| Hausmann test | 25.010*** | 71.510*** | 7.890** | 5.410* | 8.310** |
| Autocorrelation (LBI Test) | 0.686 | 0.588 | 0.640 | 1.066 | 2.055 |
| Crosssection Dependency (CD Test) | 60.711*** | 63.071*** | 55.241*** | 17.600*** | 2.508** |
| Heteroskedasticity (Modified Wald) | 5,145.050*** | 8,054.140*** | 4,758.080*** | 98,470.070*** | 45,290.230*** |

The values in parenthesis are t statistics and *,**,*** statistically significant at the 10%, 5%, 1% level, respectively.

The fixed effects model was estimated for each of the dependent variables. Then, in order to test the validity of the estimated models, the violations of econometric assumptions like heteroscedasticity, autocorrelation and cross section dependency were examined. The presence of cross-sectional dependence was investigated by Pesaran CD LM test, autocorrelation by Baltagi Wu LBI test, and

heteroscedasticity by the modified Wald test. The null hypotheses were rejected at 1% statistical significance level for cross-sectional dependence and heteroscedasticity. Autocorrelation problem was observed in the models except the model on maternal mortality rate since the LBI test statistic calculated for other variables was quite different from 2, which is accepted as the threshold value.

As a result, in all models except the model on maternal mortality rate, there was a cross-section, heteroscedasticity and autocorrelation problem, whereas in the model on maternal mortality rate, there was a cross-section and heteroscedasticity problem. In the case of heteroscedasticity, autocorrelation or cross-sectional dependence problems in the models, validity of variances and hence validity of standard errors, t and F statistics are affected. In order to eliminate this situation, the estimation methods that produce robust standard errors should be used. Therefore, the models were estimated by Driscoll Karay, which produces robust standard errors for fixed effects, and the results are given in Table 3.

**Table 3. Effects of Social and Health Spendings on Health Outcomes (Driscoll Karay Panel Model Estimation)**

| Variables | Expected life years at birth | Expected life years at birth for male | Expected life years at birth for female | Infant mortality rate | Maternal mortality rate |
|---|---|---|---|---|---|
| Constant | 74.167*** (36.210) | 70.339*** (28.370) | 78.073*** (45.480) | 6.784*** (5.460) | 10.703*** (7.640) |
| Social Spending | 0.282*** (2.800) | 0.325** (2.680) | 0.231** (2.740) | -0.111* (-1.770) | -0142 (-1.430) |
| Health Spending | -0.031** (-2.330) | -0.021 (-1.470) | -0.035** (-2.660) | -0.046** (-2.740) | -0.016 (-0.080) |
| F test | 5.440*** | 4.200** | 5.590*** | 26.130*** | 2.020 |

The values in parenthesis are t statistics and *,**,*** statistically significant at the 10%, 5%, 1% level, respectively.

According to the estimated fixed effects model for 2006-2017 period; in OECD countries, the average life expectancy at birth was 74.167, 70.039 for males and 78.083 for females. It was found that social spending had a positive and statistically significant effect on life expectancy at birth, life expectancy at birth of males and life expectancy at birth of females. When social spending (% of GDP) increased by 1%, life expectancy at birth increased by an average of 0.282. This value was estimated to be 0.325 for males and 0.231 for females. It was determined that social spending affect males' life expectancy at birth more than females'. On the other hand, it was found that health spending (% of GDP) had a negative and statistically significant effect on life expectancy at birth and life expectancy at birth of females. In addition, it was found that health spending had a negative but not statistically significant effect on life expectancy at birth of males. When health spending (% of GDP) increased by 1%, the expected life expectancy at birth decreased by 0.031 and this value was estimated as 0.035 for females.

The average infant mortality rate in OECD countries was estimated to be 6.784, which was statistically significant at a 1% significance level. At 10% statistical significance level when social spending (% of GDP) increased by 1%, infant mortality rate decreased by 0.111. Health spending (% of GDP) increased by 1%, infant mortality rate was decreased by 0.046 at 5% statistical significance level.

At the 1% significance level, the average maternal mortality rate in OECD countries was estimated at 10.703. According to the results of the model, social and health spending (% of GDP) had a negative but statistically insignificant effect on the maternal mortality.

## IV. DISCUSSION

Since 2006, there has been an increase in life expectancy and decrease in maternal and infant mortality rates in OECD countries. The rate of decrease in infant mortality rate is higher than the decrease in maternal mortality rate. It is observed that the percentages of health and social spendings has increased in gross domestic product, gradually. All countries reserve a share more to social spending than health. Given the wider scope of social spending, this can be said to be expected.

Within the scope of this study, public health and social spendings had an impact on life expectancy and infant mortality rate, but not on maternal mortality rate. It was concluded that public health spending has a negative and small effect on the life expectancy and the life expectancy in females. Furthermore, health spending did not have a significant effect on life expectancy in men. Similar to this study, Hlafa, Sibanda and Hompashe (2019) evaluated the relationship between public health spending and health outcomes in South Africa, and concluded that health spending in some regions had a negative impact on life expectancy, but in some regions, it had no significant effect. Babazono and Hillman (1994) found that only life expectancy in females was significantly affected by health spending. Barlow and Vissandjee (1999) stated that life expectancy is not affected by health spending. Sango-Coker and Bein (2018) stated that while public health spending had a positive effect on life expectancy, private health spending had a negative effect. Nixon and Ulmann (2006) found that the increase in health spending made only a marginal contribution to improving the life expectancy of males and females. These results can be explained by the fact that life expectancy is affected by other factors not directly related to the health system. In most of the studies, health spending was used as an input measure and life expectancy or infant mortality as an output measure. However, it may not always be possible to make a generalization that high spending on health services increases the life expectancy. Heterogeneity in health outcomes in countries can often depend on lifestyle choices, the existence of chronic diseases, inequality in income distribution, women's education level, genetic and geographical factors, environmental factors, ethnic diversity, availability of medical resources and the efficient use of these resources. On the other hand, Rana et al. (2018) compared the relationship between health spending and health outcomes for countries with different income groups and concluded that the increase in health spending in low-income countries affected health outcomes more. Based on this finding, they emphasized that the impact of increasing health spending on health outcomes may be insignificant since high income countries already have better health outcomes. Also, OECD (2009) indicates that the relationship between health spending and life expectancy is less pronounced amongst countries with higher health spending. This may be derived from diminishing returns to health spending on life expectancy.

Another reason for the negative impact of health spending on the expected life expectancy may be related to the quality of health spending, as stated by Duba et al. (2018). Countries that spend more efficiently on health care tend to have a higher life expectancy. In these countries, more financial resources are allocated to increase the use of medical equipment, research and development investments and drug use, which can be the main driver of increased spending (Chandra and Skinner, 2012). Therefore, inefficient health spending may not be expected to have a positive effect on health outcomes. Another reason could be that countries with more chronic diseases are spending more health. Thus, life expectancy may be shorter due to chronic diseases, although they spend more on health. It may be recommended to use health care resources or services to improve quality (doctors' training or quality of health care) or intensity (doctors' working hours) rather than quantity.

Another finding of the study is that the increase in public health spending significantly reduces the infant mortality rate. Supporting the findings of this study, Nixon and Ulmann's (2006) research findings in the sample of the European Union countries showed that the increase in health spending was significantly related to the major improvements in infant mortality. Similarly, Dhrifi (2020) found that public health spending had a significant and positive effect on infant mortality. Rezapour et al. (2019) also found that public health spending led to decrease infant mortality rate. Rahman et al. (2018) emphasized that health spending significantly reduces infant mortality and that a 1% increase in health spending (% of GDP) led to a 0.27% decrease in infant mortality rates. Bein et al. (2017)

highlighted the important role of both public and private health spending in reducing infant mortality in a study conducted with East African countries. Crémieux et al. (2005) examined the effect of public drug expenditures on health outcomes and found that expenditures had a negative and significant effect on infant mortality rate. All these results show that infant mortality can be reduced by better health care, procedures and improved health financing and delivery systems. On the other hand, the effect of the increase in public health spending on reducing infant mortality was less than the effect of social spending. This result shows that the effect of social spending on the fight against infant mortality is very important.

An impressive finding of the study was that while health spending has a negative impact on life expectancy, social spending has a positive impact. Similar to our findings, Bradley et al. (2017) found that countries with lower ratios of social service spending to health care spending on average have worse health outcomes. They also indicated that limited attention to the social determinants of health can result in extremely high health care costs and poor health outcomes. Bradley et al. (2017) concluded that greater investment in addressing the social, behavioral and environmental determinants of health may foster better health without accelerating health care costs. Van den Heuvel and Olaroiu (2017) similarly found that health care spending is not the main determinant of life expectancy, but social protection spending is. Dutton et al. (2018), investigated that the effects of social and health spending (as a ratio, social/health) on health outcomes in Canada and found that a 1-cent increase in social spending related to health was associated with a 0.01% increase in life expectancy. Social spending is thought to has a significant impact on health outcomes as they support socio-economic factors that have significant impacts on health. Each of the social service spending, such as income support, housing and nutritional aid, unemployment insurance and other social policy objectives, can be considered as factors that provide exhibiting healthy behaviors, living in a healthy environment and benefiting from health services, especially quality health services. As Swain (2016) indicated social and economic factors can support healthy behaviors, affect ability to access clinical care, and live in a healthier physical environment. Therefore, social spending can be a factor that enables individuals to live longer if properly used and distributed. As a matter of fact, there are many studies (Preston, 1975; Rodgers, 1979; Wilkonson, 1992; Prichett and Summers, 1996; Gilbride et al., 1998; Krieger and Higgins, 2002; Marmot, 2002; Leigh and Jenks, 2007; Robert Wood Johnson Foundation Commission, 2011; Patel et al., 2015; Schanzenbach et al., 2016) revealing the relationship between health and various socio-economic factors such as income level and income inequalities, housing and nutrition, for many years. For example, Navarro et al. (2006) found a negative correlation between economic inequality and life expectancy.

In addition, it was found that increasing social spending significantly reduced infant mortality rate. Similarly, Narayan (2017) found that higher budgetary spending on social sector favorability affected the infant mortality rate in the various states of India. In line with our study, Navarro et al. (2006) found that policies aimed at reducing social inequalities among OECD countries are associated with both longer life expectancy and lower infant mortality. Bradley et al. (2011) used ratio of social spending to health spending and found that the ratio was significantly associated with a decrease in infant mortality and increase in life expectancy and potential life years lost, for OECD countries. Bradley et al. (2016) found in another study that states had a higher ratio of social to health spending had significantly better health outcomes for some measure such as mortality rates for lung cancer, acute myocardial infarction, and type 2 diabetes. The report published by RAND Europe, a non-profit research organization, showed that countries have higher social spending has also better health outcomes. The report also found that the relationship between life expectancy and public social spending was 4 times stronger than total social spending (Rubin et al., 2016).

It is thought that income support that is provided within the context of social support may have a reducing effect on infant mortality rate. Cukur and Bekmez (2011) found that increasing income level decreases the mortality rate of infants and children under five years of age. Rodgers (1979) also found both income and income inequality as a powerful explanatory of the differences between health outcomes such as life expectancy and infant mortality rate.

According to a Canadian report the health system contributes to population health but is associated with only 25% of health outcomes (Keon and Pépin, 2009). Filmer and Pritchett (1999) found that health spending is not a powerful determinant of mortality, however 95% of cross-national variation in mortality can be explained by some other socio-economic factors. Mostly, the health care system reacts after diseases and illnesses have occurred. The Canadian report emphasizes that socio-economic environment is the most powerful determinant of health. So, there is a need to take an active approach to health and act before individuals get sick (Keon and Pépin, 2009). Health spending is essential for the treatment of disease. However, interventions before people become ill are very important for their well-being and this can be achieved mostly, through social spending. In addition, social benefits help people to gain health by providing access to health care services when they become ill. Social benefits enable babies both in the womb and after birth and individuals to go to the controls without any discomfort and to receive the necessary treatment when they are ill. In this way, social spending is thought to have a positive effect on life expectancy and infant mortality rate. The findings of the study mean social supports, which have social purposes that target education, housing, nutrition and poverty for low-income households, the elderly, disabled, sick, unemployed, or young persons, were identified as important social determinants of good health.

There are also studies that have found that social spending has a significant effect on health indicators besides maternal mortality rate, infant mortality rate and life expectancy. For example, Park et al. (2020) found that a higher ratio of social to healthcare expenditure is associated with significantly better mental health outcomes for OECD countries. They also found that there is no statistically significant association between healthcare spending and population mental health. They suggested that OECD countries can have a significant impact on population mental health by investing a greater proportion of total expenditure in social services, in conclusion.

## V. CONCLUSION

Although various studies emphasize the social determinants of health, it can be said that health policies and reforms mostly focus on health care spending and show less interest in spending in social policy areas. However, according to the results, social support, which makes a fundamental contribution to the improvement of social determinants, is also very important in the improvement of health. Therefore, health reforms in health promotion need to be developed not only for health services, but also by taking into account the social determinants of health. Since reforms targeting only health spendings may miss important opportunities for improvement in health, further investment and reform in wider social policy areas such as unemployment, housing and education might be necessary, as well as health spending, to achieve the desired health improvements.

According to our findings, spending aimed to improve social determinants was found more associated with health outcomes than health spending. Swain (2016), in the way of supporting of our study, indicated that social determinants affect individuals' access to quality health care, their ability to behave healthy, and physical environments' safety. Consequently, social determinants of health are related to other health factors. Thus, policies aimed to improve health should address not only health care, but also the socio-economic conditions that strongly affect the basis of health.

Papanicolas et al. (2019) found that countries that spent more on social services tended to spend more on health care and debunked the idea that the countries spend more on healthcare because they do not spend enough on social services. In our study, it is seen that the social spending of the countries is higher than the health spending. However, even if countries are spending enough on health and social spending, perhaps it is also important and necessary developing health improvement policies by working of health and social services in cooperation for better health outcomes. According to Exworthy et al. (2010), integrated care provides better access, improved satisfaction and experience for patients and health professionals. It also provides more appropriate care, enhanced preventive care. So, avoidable hospital and emergency admissions could be reduced, health status and quality of life could be improved and cost-effectiveness could be enhanced. Busetto et al. (2017) also mentioned that integrated care is expected to improve health outcomes, patient experiences and increase cost

effectiveness. According to all these, it is recommended that health and social service policies should be evaluated together for improving health outcomes, beyond focusing on health or social services stand alone. Authorities should find a way how health care and social services organizations work coordinated to meet the interrelated health and social needs of individuals. Also, allocation of spending may be important in improving health outcomes.

The data of the countries used in the study are limited to the data provided by the OECD. The scope of the study can be expanded by including more diverse health indicators. In addition, a more comprehensive perspective could be obtained by examining the categories of health and social spendings separately. In addition, in this study, an evaluation was made on the basis of all OECD countries. Rubin et al. (2016) indicated that social protection may be more important in more unequal societies for health outcomes. Especially, in low-income countries and more disadvantaged groups, the effects of spending and support may be more significant. Edney et al. (2018) also revealed that regions which have poorer health outcomes have the greatest potential to have benefit from increase in public health spending. So, further studies may focus on various characteristics of countries such as regional, status of health, income level and can be a guide for policy makers in different countries.

The effectiveness of health and social spending can be important on health outcomes. Afonso et al. (2008) found that public social spending is more effective and efficient in countries which have strong education performance. Importance should be given to education to ensure the effectiveness of both health and social spending. Therefore, further studies may also include other factors such as education level, health literacy, and healthy behavior in countries. Identifying the relationship between social spending and health outcomes provides more foundation for national policy for health improvements, as we found that relationship was significant.

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