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Impact of the economic crisis on health indicators: A Panel Data Analysis in Eastern Mediterranean Countries

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ABSTRACT

One of the affecting factors on health outcomes in any country is macro- economic environment, Studying the impact of unemployment on health outcomes is important because unemployment is an important social determinant of health and is strongly linked to a number of health outcomes. We aimed to examine the impact of the economic crisis on health indicators in the Eastern Mediterranean Countries**.** In this study, life expectancy and infant mortality rate were considered as indicators of health status and unemployment rate was a proxy of economic crisis. We estimated the model using the panel data of Eastern Mediterranean Countries between 2005 and 2014. Data was taken as World Bank database and the calculations were performed by using the statistical software STAT 12. The results showed that the unemployment rate and health expenditure per capita had a strong relationship with health outcomes. So, increase of 1% unemployment rate lead to decreasing of 0.17 life expectancy and increase of 1% of the health expenditure per capita decrease of 4.54 in infant mortality rate. The findings imply that during the economic crisis there is a decrease in life expectancy for Eastern Mediterranean Countries, the unemployment rate and health expenditure per capita are important predictors for health status.

Keywords: economic crisis, health indicator, panel data, Eastern Mediterranean Countries

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INTRODUCTION

According to the World Health Organization reports, health is one of the main preconditions for social welfare [1]. The health status of a community is measured based on health indicators, therefore, health transition can be estimated by changes of these indicators [2]. So, various indicators are used to measure community health status. Among these indicators, life expectancy at birth and infant mortality rate are the most important which were used in several studies [3, 4-5].

One of the affecting factors on health outcomes in any country is macro- economic environment, while some countries spend more than 12% of Gross Domestics Product [GDP] and other countries spend less than 3% of GDP on health [6]. Moreover, one of the proxies of macroeconomic conditions, at the ground of macroeconomic impact on welfare use, is the unemployment rate, as it is the most common indicator of macroeconomic condition [7, 8]. Studying the impact of unemployment on health outcomes is important because unemployment is an important social determinant of health and is strongly linked to a number of health outcomes such as all-cause mortality, self-assessed health, cardiovascular diseases, liver cirrhosis, suicide and mental health problem in a number of countries. [9, 10]

Many studies have examined the effects of the economic crisis on the health outcomes which most of them indicated an adverse effect between health status and unemployment rate. [11, 12-13] For instance, Portela et al. [2013] indicated that the increase of 1% of the unemployment rate led to the decrease of 14% in the total health care expenditure. [14]

Although many studies have been conducted over the past decade on the relationship between health outcomes and crisis economics, but few of them were done on the basis developing counties and Eastern Mediterranean Countries, therefore, it is necessary to design a study about the impact of crisis economics on health indicators in Eastern Mediterranean Countries.

METHODS

We collected annual data for 19 member countries of World Health Organization [WHO] in the Eastern Mediterranean Region during 2005 to 2014, to develop a retrospective panel. These countries are: Afghanistan, Bahrain, Arab republic of Egypt, Islamic republic of Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Pakistan, Saudi Arabia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, and Republic of Yemen.

The economics data [unemployment rate] were taken from the World Bank database and International labor Organization [ILO], which defines unemployment as all people who were without work yet available for or seeking employment. [15] According to database of World Bank, Health expenditure capita is the sum of public and private health expenditures as a ratio of total population, and this variable is as purchasing power parity. [16]

The health indicators [life expectancy at birth and infant mortality rate] were obtained from World Bank database and the WHO database, which defines life expectancy as the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life, and infant mortality rate defines the number of infants dying before reaching one year of age, per 1,000 live births in a given year.[17] The calculations were performed by using the statistical software STAT 12.

We started our research with a descriptive analysis which would allow us to explore the data and identify specific trend of the study's variables. Subsequently, a correlation analysis provided us with the information about the degree of association between the quantitative variables.

The end for assessing the association between health indicators and unemployment rate, we would perform a regression analysis, by ordinary least square, to identify the impact of the unemployment rate on the health indicators. Hausman test showed that we could not use fixed effects model, thus was used random effects approach or pooled ordinary least squares.

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We would consider the rate of unemployment [%], as a proxy of recession, and life expectancy at birth and infant mortality rate were considered as health status indices.

Regarding the health financing systems is an important predictor for health indicators, we would consider health expenditure per capita, as a proxy of health care financing, that studies published in this field of research [18, 19].

After, were performed a correlation analysis to evaluate the degree of association between the unemployment rate and the variables of health status, by calculating Spearman's coefficient. This elementary analysis would allow a comparison with the results already obtained by other researchers in connecting the same issues.

Finally, we ran a multivariate regression analysis, by ordinary least squares that was a random effects model. As a first, equation 1 was applied, for each one of the regression, Y_{it} represents different variables: life expectancy at birth for all people [model 1], life expectancy for men [model 2] and life expectancy for women [model 3]. Y_{it} is the dependent Variable and shows life expectancy in the time of t and in the country of i.

$$Y_{it}= a_0+ a_1X_{it} + a_2E_{it} + e \quad [1]$$
$$Y_{it}= a_0+ a_1X_{it} + a_2E_{it} + e \quad [2]$$

After, according to equation 2, we want to indicate the impact of unemployment rate on infant mortality rate, which in the equation 2, Y_{it} is infant mortality rate in the time of t and in the country of i and X_{it} is an explanatory variable [unemployment rate] and in the two equations E_{it} is health expenditure per capita.

RESULTS

According table 1, during the period 2005 to 2014, the average of unemployment rate was 9.48[5.12], for the 19 Countries of WHO's Eastern Mediterranean Region**,** the minimum was 0.54 for Qatar and the maximum was 18.91 for Libya. The mean of life expectancy for all people was 71.39 [5.52], the maximum and the minimum value was 58.74 for Afghanistan and 78.25 for Lebanon, respectively. The average for health expenditure per capita was $ 474 USA, between 2005 and 2014. The minimum value of $34.9 was observed for Pakistan and the highest value of $ 1806 was attained for Qatar.

Table 1: descriptive statistics of the variables considered in the research

Variable	Number of observation	Mean	Standard deviation	Minimum	Maximum
Unemployment rate	190	9.48	5.12	0.54	18.91
Life expectancy for all	190	71.39	5.52	58.74	78.25
Life expectancy for women	190	73.15	5.62	59.91	80.17
Life expectancy for men	190	69.7	5.55	57.62	76.42
Health expenditure per capita	171	474.01	487.19	34.9	1806

When considering the correlation analysis, as presented in table 2, we can observe that there is an average negative association between unemployment rate and life expectancy, which spearman's correlation coefficient is -0.61 [p<0.001] between unemployment rate and life expectancy for men and this value is -0.5 [p<0.001] between unemployment rate and life expectancy for women. To considering the correlation between unemployment rate and infant mortality rate, we can observe a positive association [0.56, p<0.001].

Table 2: spearman's correlation coefficient between unemployment rate and health indicators

	Unemployment rate	P value
Life expectancy [all]	-.057	< 0.001
Life expectancy [women]	-0.50	< 0.001
Life expectancy [men]	-0.61	< 0.001
Infant mortality rate	0.56	< 0.001

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According to descriptive analysis, we can observe the trend of life expectancy and unemployment rate has an opposite pattern, as show at the figure 1, life expectancy trend increases by 2005 to 2014 but unemployment rate trend decreases during period 2005 to 2014. Furthermore we can show that the trends of unemployment rate and infant mortality rate, nearly is same.

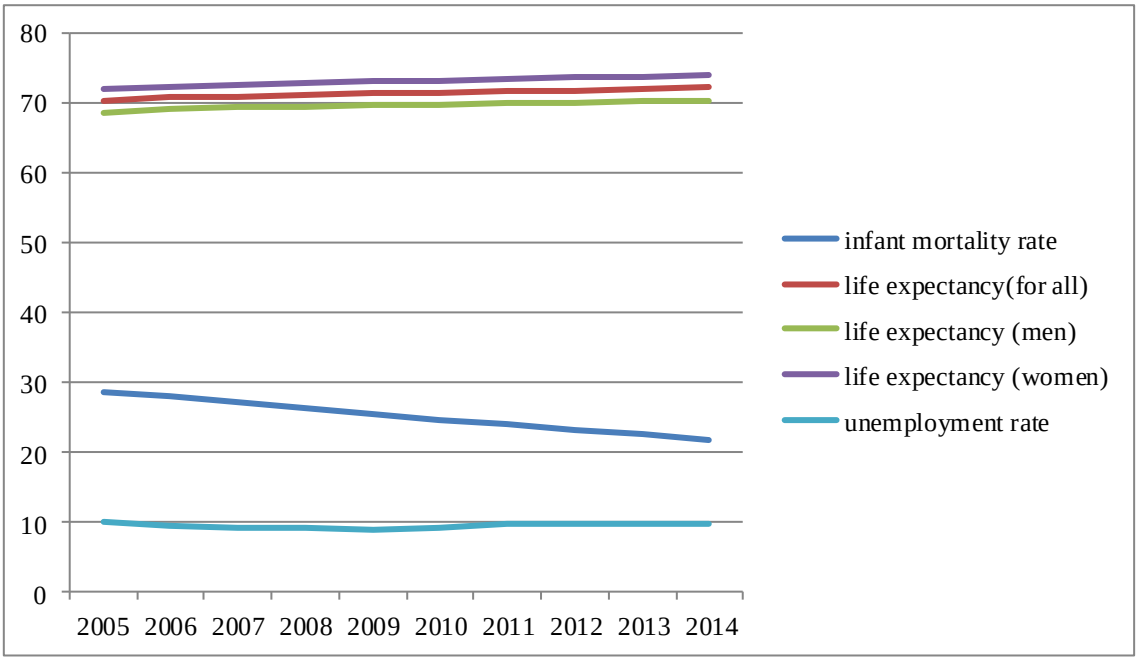

Figure 1: trend health indicators and unemployment rate in the 19 country in the Eastern Mediterranean Region, from 2005 to 2014.

According to Equation 1 [Table 3] there is a statistically significant relationship between unemployment rate and life expectancy, so increase of 1% unemployment rate lead to decreasing of 0.17 life expectancy for all people [model 1] and decreasing of 0.26 life expectancy for men [model 2]. According to the data obtained by Equation 1, there is a statistically significant increase of 1.45 [p<0.001] life expectancy for all associated with the increase in 1% in health expenditure per capita and this value for life expectancy for men is 1.86 [p<0.001].

The results of the multivariate analysis are shown, according Equation 2 [table 3] there is a statistically significant decrease of 4.54 in infant mortality rate with the increase of 1% of the health expenditure per capita.

Our research was shown, unemployment rate and health expenditure per capita are significant predictors for health indicators, as in the table 3 can show R square for equation 1 in the model 1 and model 2 is 0.62 and 0.68, respectively. R square for equation 2 [model 4] was obtained 0.7.

Table 3: The results of estimating the model with OLS random effects

	Model 1	Model 2	Model 3	Model 4
Constant	64.87 [< 0.001]	61.72 [< 0.001]	67.74 [< 0.001]	51.56 [< 0.001]
Unemployment rate	-0.17 [0.003]	-0.26 [< 0.001]	-0.06 [0.199]	0.06 [0.742]
Log Health expenditure per capita	1.45 [< 0.001]	1.86 [< 0.001]	1.06 [< 0.001]	-4.54 [< 0.001]
R^2	0.62	0.68	0.57	0.70

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DISCUSSION

This research is the first cross- countries study in the Eastern Mediterranean Region of the World Health Organization to assess the effects of the economic crisis on health outcomes, according to descriptive findings, we have shown that the growth rate of life expectancy at birth was 2.7 percent [70.26 in 2005 and 72.19 in 2014] in the 2005 to 2014 in the Eastern Mediterranean Countries and the growth rate of life expectancy was 2.8 [72 for 2005 and 74.05 for 2014] and 2.6 percent [68.62 for 2004 and 70.43 for 2014] for women and men, respectively. According to world health statistics in the 2012, the 10 top countries with the highest life expectancy are not any of the countries of the Eastern Mediterranean Region. [20]

Moreover, the growth rate of infant mortality rate was -23.7 percent [28.62 for 2005 and 21.82 for 2014] in the 2005 to 2014. Our results have demonstrated that the growth rate of unemployment for Eastern Mediterranean Countries is -2.9 percent which the value of unemployment rate was 9.94 in the 2005 and this value was 9.65 for 2014.

It is important to notice that socio – economics and organization pattern for Eastern Mediterranean Countries is different, for this reason, the impact of crisis economics will be different at the member state level. Our research indicates that the unemployment rate and health expenditure per capita are important predictor for health status, as so that, R square [R^2] is between 57 to 70 percent for models.

In this study has revealed, unemployment rate is influential factor in life expectancy, so 1% decrease in unemployment rate leads to an improvement in life expectancy at birth by approximately 0.17 and 0.26 years for all people and men, respectively, and this relationship is significant at 1% level.

For survey the impact of unemployment rate on life expectancy, there is not existence researches that were cross – country and panel study, but a study was, in order to comparison of socio-economic indicators explaining inequalities in Healthy Life Years at age 50 in Europe which has indicated, unemployment rate is inversely related to healthy life years at age 50, [21] it is important to notice that study is a cross section.

Furthermore, there have been some studies in the country level, that have revealed inverse related life expectancy with unemployment rate, [22, 23-24] for example a study conducted by Ohemeng et al. have reported if unemployment rate decreased 1%, life expectancy increased 4%. [25]

Our results have indicated health expenditure per capita is an important predictor for health status, as if health expenditure per capita increases a 1%, life expectancy all people, men and women increase 1.45, 1.86 and 1.06 years, respectively, and infant mortality rate reduced by 4,45units. Studies have reported that health expenditure per capita have a positive related with health outcomes. [19, 26]

There is a limitation to our study, as so that one of the important variables affecting on health status is financing health system. We could not find financing health system for Eastern Mediterranean Countries, for solution this problem we use as health expenditure per capita.

CONCLUSION

our results have shown that health status improve in Eastern Mediterranean Countries in during the decade from 2005 to 2014, but compared to developed and high income countries have been lower rating. We founded that during the economic crisis there is a decrease in life expectancy for Eastern Mediterranean Countries, unemployment rate and health expenditure per capita are important predictor for health status.

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