

## How Socioeconomic Disparities Affects Child Mortality in EMRO Countries

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### **Abstract**

#### **Introduction**

All nations are striving for development. Economic development is one of the main parts of development process, but not all of it. Populations health is one of the main factors of economic development, and child's mortality is one of the main factors of population health status. The aim of this study is investigating the role of socioeconomic disparities in under 5 mortality in Eastern Mediterranean Regional Office (EMRO) countries.

#### **Materials and Methods**

This study is a retrospective and panel data type. Data used in this study inquired from the World Health Organization (WHO) and the World Bank database for 20 EMRO countries. In order to investigate socio-economic factors of under 5 mortality we used per capita income logarithm, health expenditure per capita, out-of-pocket health expenditure, access to improved sanitation and Measles vaccination, literacy rate in 15 to 24 years old females, female unemployment rate, and birth rate.

#### **Results**

According to results, all variables (Per Capita National Income, Health Expenditure Per Capita, Access to Health Facilities, Out-of-Pocket Health Expenditure, and Measles Immunization, Female Literacy Rate for 15 to 24 year old, Female Unemployment Rate and Crude Birth Rate) showed significant relationship with under 5 mortality except per capita health expenditure. Per capita income logarithm also had the greatest impact in reducing the mortality of children under 5 year in comparison with other variables.

#### **Conclusion**

Childs mortality is the symbol of development and have important role in population growth. Results of this study indicate that access to healthcare services have lower impact on child's mortality rather than economic variables.

**Key Words:** Child mortality, EMRO, Health indicators, Risk factors.

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## Introduction

According to World Health Organization's report on 2015, child mortality rates have plummeted to less than half of what they were in 1990. Under-five deaths have dropped from 12.7 million per year in 1990 to 5.9 million in 2015 (1). This a dramatic reduction in child mortality despite an increase in the number of livebirths. This is the first year that figure has gone below the 6 million mark (1).

Although the world has experienced this remarkable decrease in child's mortality over the past decade, but the rate of decline remains inadequate, particularly in developing and undeveloped countries (2). For example in 2013, according to World Bank's data, the rate of under 5 mortality in a developed country such as Japan was 3 per thousand live births while this index in Somalia as a undeveloped country was 146 per thousand live births (3). These data shows that indicators such as income per capita, literacy rate and other socioeconomic variables have a remarkable effect on child's mortality. Also we must consider that health system can explain only 30% of populations's health, thus policy makers have to find the key determinants of child mortality in order to improve child survival.

Although many studies have been conducted over the past decade on the relationship between child's mortality and socioeconomic determinants of child's health, but few of them were done on the basis of developing and undeveloped countries data (4-8). Therefore, the necessity of a study about socioeconomic determinants of under five of mortality in developing countries has been felt. This study has been conducted in order to evaluate the socioeconomic determinants of under five mortality in the EMRO countries (as a region with many developing countries).

## Materials and Methods

This retrospective time series study is based on the WHO data and statistics on under-five mortality and the World Bank data on socioeconomic variables. In these two cases, we have used the secondary sources and national-level data from the websites of the WHO, and World Bank. In this study 21 countries that are members of the Eastern Mediterranean Regional Office of WHO including: Afghanistan , Bahrain , Djibouti , Egypt , Iran (Islamic Republic of) , Iraq , Jordan , Kuwait , Lebanon , Libyan Arab Jamahiriya , Morocco , Oman , Pakistan , Qatar , Saudi Arabia , Somalia , Sudan , Syrian Arab Republic , Tunisia , United Arab Emirates , Yemen have been investigated for the time period between 1990 and 2013 (Due to lack of data Somalia, and Djibouti were excluded). Variables that have been used in this study are:

- Per Capita National Income (PCNI).
- Health Expenditure Per Capita (HEPC).

These two variables have been selected as the indicators of economic status. In order to consider the fact that the effect of income on child's mortality would be decreased by increasing income, we used the logarithm of PCNI (4, 6). For considering access to healthcare services three variable; Access to Health Facilities (AHF), Out-of-Pocket Health Expenditure (OPHE), and Measles Immunization (MI) (3). Female Literacy Rate for 15 to 24 year old (FLR), Female Unemployment Rate (FUR) and Crude Birth Rate (CBR) have been used as representatives of social status. These variables were extracted through literature review and availability.

For determining the main factors affecting under-five mortality in EMRO countries first we used the F- Limer test (for choosing panel or pool data). In this test, if

the null hypothesis is rejected, the panel data is preferred. In panel data models performing the sectional dependency test before analysing data is essential because all calculations related to unit root and co-integration tests will be invalid if there is a sectional dependency. Pesaran test has been used to investigate the sectional dependency. According to the results

(Pesaran test 3.015, prob=0026) the null hypotheses is rejectes and evaluation of unit root and co-integration tests without considering the cross dependency would lead to wrong conclusion. For analysing the unit root test we used Im-Pesaran-Shin test (9). Table.1 show the results of unit root test.

**Table 1:** Results of the unit root of Im-Pesaran-Shin test

Variables	CADF	P value
Under-5- year	-5.6289	<0.001
PCNI Log	-5.7092	<0.001
HEPC	-3.1499	0.1589
AHF	-4.604	<0.001
OPHE	-3.5136	<0.001
MI	-8.8371	<0.001
FLR	-2.7421	0.402
FUR	-3.5263	0.158
CBR	-13.9658	<0.001

Per Capita National Income (PCNI); Health Facilities (AHF); Out-of-Pocket Health Expenditure (OPHE); and Measles Immunization (MI) (3). Female Literacy Rate for 15 to 24 year old (FLR); Female Unemployment Rate (FUR) and Crude Birth Rate (CBR).

According to (Table.1) WLR and HEPC had unit root test. Therefore, the co-integration test has been applied to determine the presence or absence of a long-term relationship between the variables (Table. 3). According to results, there was a relation between variables in the long term, then it is ensured that the false regression has not been found by evaluating the model and results are valid.

At next step in order to determine whether the fixed effects or random effects methods must be used, hausman test has been applied. According to the test results, the random effects method

has been used. In panel data analysis, if the number of individual units (N) is more than the period (T) of the study ( $N > T$ ), there is possibility for heteroskedasticity. For this reason we LR test has been used. According to results model had heteroskedasticity ( $P < 0.001$ ). Wooldridge autocorrelation test has been applied for evaluating the autocorrelation, according to results P-value was smaller than 0.001 and it means that the absent of autocorrelation has been rejected . For this reasons FGLS model has been appliedd. Table. 2, shown the results of FGLS test.

**Table 2:** Results of Feasible Generalized Least Squares model

Variables	Coefficient	P value
PCNI Log	-0.8177122	0.024
HEPC	0.0001049	0.082
AHF	-0.7728282	>0.001
OPHE	0.4611256	0.091
MI	-0.59202	0.003
FLR	-0.2326289	>0.001
FUR	0.514596	>0.001
CBR	0.6700346	>0.001

## Results

According to (Table.2) all variables except HEPC have a significant association with under-five mortality. PCNI logarithm, MI, FLR and AHF have a inverse relation with under-five mortality. PCNI logarith showed strongest accosiation (coefficient -0.8177122) in decreasing the under-five mortality.

## Discussion

Child mortality is one of the important factors in development of each country so that many academician's believe that this indicator is the symbol of development. Thus investigating the determinants of this indicator will lead to increasing the life expectancy and economic growth. According to the results PCNI has the strongest effect on under-five mortality. In most of studies this indicator was one the most important determinants of child mortality. In studies indicators such as womens education level, health expenditure per capita, childs weigth, physician per capita and so on showed significant effect on under-five mortality (7, 8, 10, 11). Results also showed that with increasing the HEPC under-five mortality will decrease, but this is not significant. This can be due that in most EMRO countries are consumed their health expenditure on high tech hospitals

and preventing from non-communicable diseases and only a small part of this expenditure appropriated to primary cares such as prevention from child mortality.

Results also showed that MI and AHF have a inverse relation with under-five mortality and according to their coefficients (AHF=-0.772822) public health variables are more effective than curitic variables (MI coefficient= -0.59202) in reducing the under-five mortality.

According to Table.2, AHF coefficient is smaller than PCNI income. According to WHO report because major part of population health is not determined by health systems variables, economic factors have stronger effect than public health variables (12, 13).

FLR showed invers relation with under-five mortality. Importance of this result is from that according to economic thories individuals with higher education are more efficient in producing health, and due to this reason they use less resources to reach the same level of health. The importance of this indicator became double when we understand that women with higher education are more carefull about their chlid's and perform health procedures more efficient. Other studies such as Ansari and et al. , Emagholipour and et al. also showed that with increasing

the education level child mortality will decrease (6, 14). According to results with increasing the CBR, FUR, and OPHE under-five mortality will increase. In the case of CBR, according Quantity-Quality theories of Becker, with increasing the child birth rate expenditure per capita for each child will decrease and child health level and their mortality will increase (15). Association between FUR and under-five mortality is positive, this could be due to that in most of developing and under-developing (specially undeveloping) countries because of low economic development women don't have official jobs to do, but they have a lot of informal jobs to do (for example in under-developed countries women had to trek miles to collect water and haul it home by the bucket load before washing their clothes one piece of a time. This can take up six hours and need to be done five times a week). For these reasons they don't have enough time to take care of their children (16). Results also showed that with increasing the OPHE under-five mortality have increased. According to other studies and existing literatures the main reason is that OPHE acts as a barrier for accessing to health care services (specially in low income countries) and with decreasing access to services mortality will increase (17, 18).

### Conclusion

With regard that economic variables such as PCNI showed stronger effect in reducing under-five mortality, economic growth would be an effective way of reducing child mortality and increasing life expectancy. But policy makers should be aware that disparities in economic development or access to health care service couldn't be a serious obstacle in decreasing child's mortality.

### Abbreviation

- Per Capita National Income (PCNI)
- Health Facilities (AHF);
- Out-of-Pocket Health Expenditure (OPHE);
- Measles Immunization (MI);
- Female Literacy Rate for 15 to 24 year old (FLR);
- Female Unemployment Rate (FUR);
- Crude Birth Rate (CBR);
- Feasible Generalized Least Squares model (FGLS).

### Conflict of Interest

Authors declare that there is no conflict of interest

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