

THE IMPACT OF ENVIRONMENTAL DEGRADATION ON HEALTH EXPENDITURE

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Abstract:

The purpose of this paper is to highlight the link between economic growth, environmental quality and health of the population and their implications on health expenditure growth. Health is influenced by multiple factors known as the determinants of health, whose action can not always be kept under control. One of the determinants of health is the quality of the environment, which, together with the quality of the people (genetic heritage, lifestyle), standards of living, health system characteristics, has a bearing both on health and on health expenditure. Most of the determinants of population health have a mutual connection with the degree of economic development of a country and its level of education. In this respect, the high level of the health-related human capital has a positive effect on labor productivity and economic growth rate. Economic growth induces both an increase in standards of living, with positive effects on health, and a deterioration of the environmental conditions, which triggers changes in the degree of incidence of the disease, consequently favoring an increased financial burden on the health system.

Key- words: economic growth, health determinants, environmental pollution, impact of diseases, health expenditure.

Clasificare JEL : I15, Q51

1. Introduction

The functioning of the health system within normal parameters supposes the action of a complex of factors able to harmonize the demands, which are not always convergent, of all the actors acting on the healthcare services market.

Regarded from the perspective of the individual as a component of the system of needs, nevertheless for society health represents larger concept with economic-social implications.

In the conditions of a bigger volume of the healthcare expenses compared to the funds allocated to healthcare, it is necessary for the States to analyze the reasons determining the increase and the diversification of the health needs.

The aim of this paper is to highlight the connection between economic growth, environmental quality, population's health condition and health expenses.

2. Literature review

The specialized literature provides different approaches of the way health is influenced by the environmental condition, by the environmental quality. The repercussions of the deterioration of the environment (air, water, soil) let their mark on the increase of the incidence of certain maladies, the growth of the healthcare expenses, and have an influence on indexes such as infant mortality, life expectancy, morbidity.

F. Caiazzo and others from U.S. Environmental Protection Agency draw people's attention on industrial or traffic pollution, leading to about 200,000 premature deaths per year. "The results are indicative of the extent to which policy measures could be undertaken in order to mitigate the impact of specific emissions from different sectors — in particular black carbon emissions from road transportation and sulfur dioxide emissions from power generation." [1].

In the U.S. Environmental Protection Agency Report mention is made of the benefits of the costly investments for maintaining a clean air. This can prevent the premature death of a number of about 230,000 people until 2020 and 160,000 people until 2010, as the agency study for the period 1990-2020 highlights. "The economic value of these improvements is estimated to reach almost \$2 trillion for the year 2020, a value which vastly exceeds the cost of efforts to comply with the requirements of the 1990 Clean Air Act Amendments." [2].

Johanna Lepeule, Francine Laden and others present the results of an epidemiologic study realized in six cities of Massachusetts, during a period of 11 years, a study whose objective was the identification of a connection between the exposures to a polluted atmosphere (filled with fine particles, diameter $\leq 2.5 \mu\text{m}$) and the mortality level. “Each increase in PM_{2.5} (10 $\mu\text{g}/\text{m}^3$) was associated with an adjusted increased risk of all-cause mortality of 14%, and with 26% and 37% increases in cardiovascular and lung-cancer mortality, respectively” [3].

Andrew Correia and others have shown, using the regression model, on a studio, between 2000-2007, that the reduction of air pollution by PM_{2.5} triggers the improvement of life expectancy: “A decrease of 10 $\mu\text{g}/\text{m}^3$ in the concentration of PM_{2.5} was associated with an increase in mean life expectancy of 0.35 years (SD = 0.16 years, P = 0.033)” [4].

Perera and others [5] demonstrate, through monitoring, that pregnant women living in urban areas or an area of high urban density, where the atmosphere is polluted, give birth to children with serious health problems (anxiety, depression, concentration problems).

On the other hand, the consumption or even the fact of swimming in polluted waters may lead to diverse diseases, from dysentery and hepatitis, to cholera and cancers.

On the EPHA (European Public Health Alliance) site [6], it is mentioned that one sixth of the world’s population, approximately 1.1 billion people, do not have access to safe water and 2.4 billion lack basic sanitation.

Fogel [7], Barro and Sala-i-Martin [8](2003) have studied the relation between health and economic growth, and also between health and fortune. In this sense, the high health level of the human capital has a positive effect on work productivity and economic growth. Healthy employees determine - on the level of a community, of an organization - a diminution of the number of days in a state of physical or psychological incapacity, of the absenteeism due to illness, a higher likelihood to increase one’s education level and performances. A healthy employee is less prone to illness, energetic, alert and productive and earns more. At the same time, a worker who is not ill is strong, vigorous and resilient, and, along with his skills, creativity and technological knowledge, he generates positive turnovers.

3. Methodology

The study will employ the method of statistical data analysis. The source of these data will consist from the official national and international reports issued by the institutions involved in these tasks.

Having as start point the reality of the increasing needs and limited resources for the health care aims, results the necessity of diminishing the impact of risk factors, besides the well-balanced resources management.

The social dimension of health analysis has to take into account that health care market does not operate by the rules of a free market; it is a typical case of "market failure". The analysis of risk factors with social implications (environmental, alcohol, tobacco, drugs, poverty) is about to be done in conjunction with health services market, with income and, not least with government health policy.

4. The analyse of the linkage of environmental quality - health

The systemic analysis of the health state determiners imposes the study of the mutual connections between the different categories of indicators, bringing to light the direct and indirect implications of the interactions.

The development level of a society at a certain moment, which leaves its mark on the health condition of a population, largely depends on the economic growth level of the respective society. It is generally accepted that health has a positive effect on the economic growth level.

Pan American Health Organization and Inter-American Development Bank have made a research on the impact of health on economic growth in the long run, and on domestic productivity [9]. The study was carried out in less developed countries and has led to the following conclusions: there is a relation between poverty and inequality and the accumulation of human capital, as between the variations of economic growth and social development. Even though life expectancy has grown, the different degrees of implementation of the health policies, sometimes in different areas of the same country, lead to inequalities between the poor and the rich.

The population’s health condition is influenced by multiple factors, interacting with one another and whose action cannot always be kept under control, generically called, among others, health determiners (Figure 1.).

The main factors that determine health status are:

- the individual’s quality (heredity, general education level, elementary medical education, food habits, preventive attitude, etc.);
- the quality of the environment where the individual lives (air quality, water quality, pollution level, urbanization level etc.);
- standard of living (material and financial conditions);
- features of the healthcare system (healthcare institutions, technical endowment, training degree of the healthcare personnel, quality of the medical act etc.).

In the specialized literature we find the following *health determiners*:

- determiners intrinsically related to the individual (genetic features);
- factors related to the individual’s behavior (lifestyle);
- socioeconomic conditions;
- social and community networks.

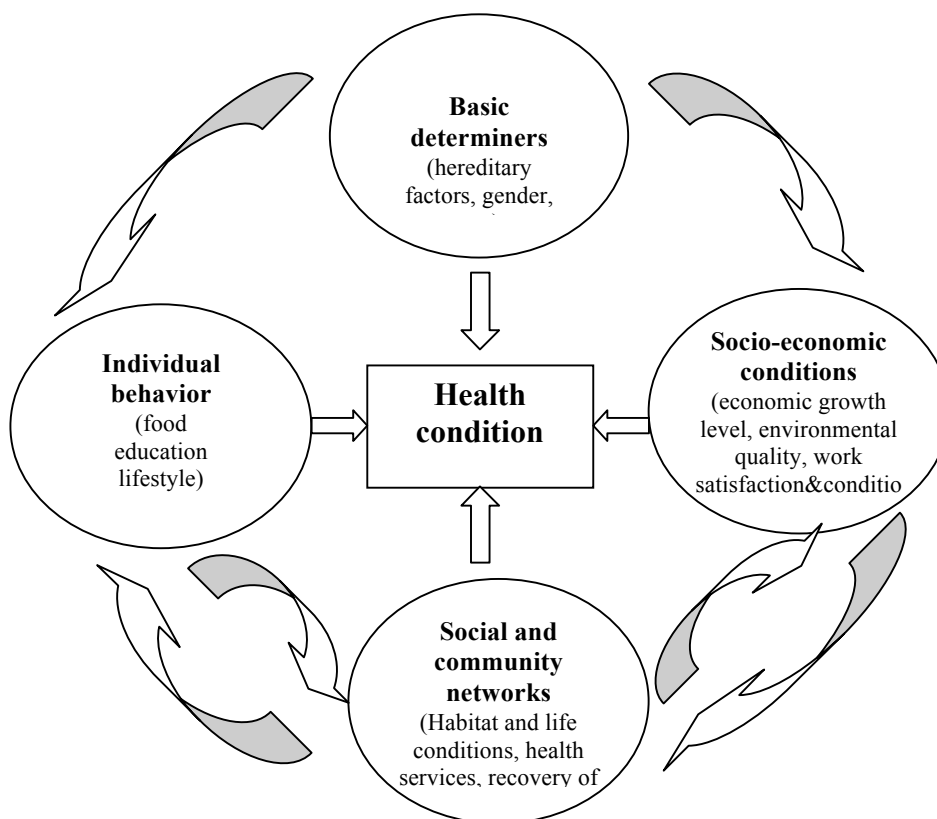


Figure 1. Determinants of health

A Report of the Millennium Ecosystem Assessment, “Ecosystems and Human Well-Being Health Synthesis”, identifies the impact that the economic growth may have on the ecosystem, with direct or indirect consequences on health.

According to the respective Report, “economic growth may lead to:

- climate changes;
- depreciation of the ozone layer;
- diminution of the forested areas;
- land degradation and extension of the desertification process;
- wetland areas reduction and deterioration;
- biodiversity reduction;
- water quality decrease;
- urbanization and its impact;
- coastline ecosystem deterioration” [10].

Air quality should be considered from the following perspectives:

- depreciation of the ozone layer, with implications on the risk of exposure to UV rays, triggering an increase of the number of skin diseases;
- carbon dioxide and other greenhouse effect gases emission, leading to the global warming phenomenon and implicitly to climate changes, which in the medium and long term may affect the population’s health condition;
- the elimination of fine particles of solid materials in the air, leading to the increase of the number of lung diseases.

The principal air-pollution sources, according to their incidence degree, are:

- gases coming from the means of transport; this type of pollution is specific for the developed countries and megalopolises;

- the industrial activity, specific for the developing countries, where the economic growth is realized by means of an extensive industrial development, more often than not without being supported by adequate investments in environmental protection;
- the use of solid fuels for heating and for preparing food; this type of pollution is specific, with few exceptions, for the least developed countries.

Water quality represents another essential element when we analyze the implications of the quality of the environment on the population's health.

From this perspective, water quality needs to be considered from at least three perspectives:

- surface and underground water pollution degree and sources;
- water treatment and purification possibilities;
- possibility of providing the population with water from safe sources.

Water pollution has a high impact on health, being the main reason of a high number of diseases: intestinal diseases, hepatitis, urinary diseases etc. The more developed a country is, the more frequent its pollution sources become but also, at the same time, the water treatment possibilities become higher and the ratio of the population provided with water from safe sources is higher.

The analysis carried out on the available data for the 27 European Union States highlight more or less intense connections between the economic development degree (expressed by the GDP/capita expressed in PPT), the level of environmental pollution (expressed in metric tons per capita), the ratio of the population supplied with water from safe sources (%), funds allocated for health (ratio of health expenditures in GDP), and healthcare effects (expressed by infant mortality, life expectancy at birth, incidence of different illnesses, etc.). (Table 1).

Table1. Interdependencies between environment and health

Indicators	Gross National Income per capita	% GDP health expenditures	% GDP environmental protection expenditures	Health expenditures /capita	CO2 emissions /capita	% population supplied with water from safe sources	Deaths attributed to the deterioration of the environmental conditions/ 100000 habitants	% Deaths attributed of the environmental to total deaths	Infant mortality	life expectancy at birth
Gross National Income per capita	x	0,45	0,29	0,95	0,77	0,41	-0,55	-0,48	-0,64	0,61
% GDP health expenditures	0,45	x	-0,19	0,64	0,06	0,56	-0,42	-0,77	-0,54	0,69
% GDP environmental protection expenditures	0,29	-0,19	x	0,19	0,50	0,22	-0,22	0,04	-0,18	0,08
Health expenditures /capita	0,95	0,64	0,19	x	0,65	0,48	-0,61	-0,61	-0,67	0,71
CO2 emissions/ capita	0,77	0,06	0,50	0,65	x	0,34	-0,25	-0,13	-0,48	0,24
% population supplied with water from safe sources	0,41	0,56	0,22	0,48	0,34	x	-0,20	-0,48	-0,54	0,54
Deaths attributed to the deterioration of the environmental conditions/ 100000 habitants	-0,55	-0,42	-0,22	-0,61	-0,25	-0,20	x	0,53	0,61	-0,67
% Deaths attributed of the environmental to total deaths	-0,48	-0,77	0,04	-0,61	-0,13	-0,48	0,53	x	0,45	-0,80
Infant mortality	-0,64	-0,54	-0,18	-0,67	-0,48	-0,54	0,61	0,45	x	-0,54
life expectancy at birth	0,61	0,69	0,08	0,71	0,24	0,54	-0,67	-0,80	-0,54	x

More often than not, the analysis focuses on the pair connections between indicators and population's health condition:

- Need for health care – healthcare service offer;
- Financial resources for health – expenses for health;
- Standard of living – health condition;
- Health condition – work productivity – economic growth;
- Economic growth – environmental quality;
- Environmental quality – health condition, etc

The examples could continue as one can identify numerous such connections. More often than not, the interactions have an indirect, much more complex character.

This analysis highlights the following aspects:

- the economic growth determines an increase of the CO₂ quantities emitted in the atmosphere following the industrial development, the growing urbanization, the growth of the car number, which implicitly leads to a more significant environmental pollution (correlation coefficient $r=0.77$ between the GDP per capita and the CO₂ emissions);
- the high development degree allows, at the same time, the allocation of a higher GDP ratio for health, which in turn brings about an increase of the health expenditures per capita, a fact that allows a diminution of the influence of the environmental degradation on health.
- between the level attained by the GDP/capita and the number of deaths / 100000 inhabitants there is an inverse connection of average intensity ($r=-0.55$), connection whose sense remains valid also if we check the ratio of deaths attributed to environmental pollution in the total death causes ($r=-0.48$);
- CO₂ emissions usually affect the very young and the elderly. Their impact on infant mortality has an average intensity (-0.48) which has a slight influence on life expectancy at birth;
- life expectancy at birth is inversely proportional to the weight of the deaths attributed to environmental pollution ($r=-0.80$);
- the high welfare level as a consequence of a high GDP per capita and of the urbanization degree assures a high ratio of the population supplied with water from safe sources in most EU States. Water supply from safe sources triggers a lower weight of the deaths attributed to environmental pollution.

It is generally accepted that health-related investments assure an adequate health condition for the population, which triggers higher work productivity, leading to economic growth and a better standard of living in the medium and long term and consequently having direct repercussions on health.

The interdependence economic growth – health is a complex one, leaving its mark both on the resources used for financing health and on the health-related expenses following a higher need for healthcare (Figure 2)

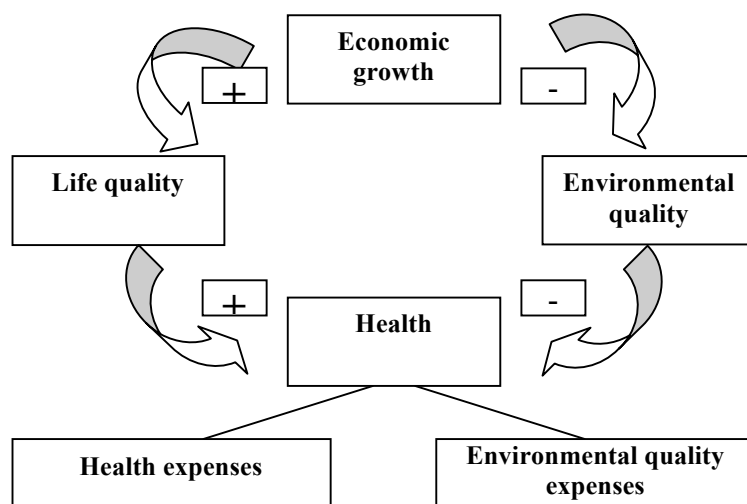


Figure 2. The interdependence economic growth – health

4. Conclusion

The statistic data highlight the fact that the incidence of the illnesses generated by a poor quality of the water resources is inversely proportional to the population's possibility of being supplied with water from safe sources.

Yet, we should not neglect the fact that, regardless of the way in which the economic growth is assured, intensively or extensively, it may have a negative influence on the environmental quality, with direct or indirect implications on the population's health condition, which implicitly leads to the increase of the healthcare expenses.

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