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Summary

A STUDY REGARDING FINANCING HEALTHCARE SERVICES IN ROMANIA

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"A life is worth nothing
but nothing is worth a life"

Andre Malraux

CONTENTS

SUMMARY

Abbreviation list

HLY= Healthy Life Years

HLY 65 = Healthy Life Years at age 65

CJASS = National Health Insurance House of Cluj-Napoca

CNASS = National Health Insurance House

HEGNP = Health expenditure % of GNP

CT = Computed tomography

DALY = disability-adjusted life year

DRG = Diagnosis-related group

ECHI = European Core Health Indicators

ECHIM = European Community Health Indicators and Monitoring

FNUASS = Unique National Health Insurance Fund

INCDS = The National Research and Development Institute for Health from Romania

INS = The National Institute of Statistics from Romania

IOCN = "Prof. Dr. Ion Chiricuţă" Institute of Oncology Cluj-Napoca

l = litre

log = logarithm

MS = The Romanian Ministry of Health

WHO = The World Health Organization

GNP = The Gross National Product

PT = poverty threshold

QALY = quality-adjusted life year

MRI = Magnetic resonance imaging

SIUI = Unique Integrated Information System

SNSPMS = National School of Public Health, Management and Professional Development

Tab = Table

EU = The European Union

UNICEF = United Nations International Children's Emergency Fund

INTRODUCTION

Starting from the motto of this thesis "A life is worth nothing, but nothing is worth a life", We drew the conclusion that apart from genetic and climatic factors, education etc, premises allocated to health and the financing of the health system have one of the most important roles in the health of the population of a country.

This thesis started from the idea of making a real image of the healthcare system, idea present throughout the thesis by making research in the medical system, starting from the international scale to the national one.

Internationally we've taken all Member States of the European Union, and at national level through the case study, we performed an analysis of medical and financial indicators of "Prof. Dr. I. Chiricuţă" Institute of Oncology in Cluj-Napoca, during 2000-2015.

The fundamental objective of the scientific endeavour entitled "Financing of healthcare services in Romania" is to create "value added" in this domain, discussed and analysed since 1840 in developed countries: UK, Germany, France, Norway, Sweden.

The fundamental research direction of this thesis requires the completion of several purposes envisaged in the paper:

a) the synthesis of conceptual approaches in health system financing and the presentation of the current state of research in healthcare financing;

b) showing how public health issues, namely health and economic indicators, are evaluated and passed in statistical reporting at national and international levels, highlighting the information requirements of users of public health information;

c) identifying the positive / negative aspects by analysing the evolution of literature;

d) identifying indicators of health in terms of morbidity, mortality and healthcare resources made by Romania in the period 2000-2015 compared with those made by other ex-communist countries in the EU: Poland, Bulgaria, Croatia, Hungary, Albania or other countries:

UK, Germany, France, Switzerland, Spain and the Nordic countries: Norway, Sweden, Finland, Ireland;

e) presentation of medical health services management to form a true and fair image of what constitutes healthcare services funding issues;

f) the financing evolution of healthcare services, researchers and scientific works, which brought added value to this field of research over the time;

g) improving the types of financing such as to give a true image and to cover all the needs of the system;

h) factors affecting the level of healthcare financing.

To achieve these goals, we considered social, economic and public health policies.

Regarding social policies, some authors believe that they "represent those ways, models and mechanisms aimed at the distribution of resources according to a particular criterion of needs"[1]

In terms of trends of research, this paper falls into mainstream research theory having a positive, constructive theory, without missing some critical approaches. Regarding the types of research, this study combines fundamental theoretical research with the quantitative research. *"In conducting any scientific approach it is necessary to use methods and research tools whose purpose is to facilitate the scientific research process*[2]*."*

In terms of typology of research, the study combined fundamental theoretical research with quantitative research.

The qualitative research showed how healthcare indicators and performance indicators are regulated at national level and how they are reflected in the income and expenditure of a healthcare facility.

[1]*Popescu Livia (2004) Politicile sociale est-europene între paralelism de stat şi responsabilitate individuală, Cluj-Napoca, p 25-26*

[2] *Mustaţă R. (2008), Sistem de măsurare a armonizării şi diversităţii contabile – între unitate şi spontaneitate, Casa Cărţii de Ştiinţă, Cluj-Napoca, p 13*

The general research area is in the area of research on the financing of hospital healthcare services.

The topic is the research area - the healthcare domain, and the impact of public health issues at the macroeconomic level - the percent earmarked for health spending from the GDP, the poverty threshold, life expectancy at birth, mortality, mortality rate for cervical cancer, or at the microeconomic level: the mortality rate for cervical cancer in women from Cluj county treated in "Prof. Dr. I. Chiricuţă" Institute of Oncology.

The research plan was the documentation within a period of six years, gradually realized as the necessary information was gathered.

The collecting of information was based on articles published in journals both in the economic and medical area, legal acts and Eurostat data.

We used *the method of comparative research* by presenting the evolution of healthcare indicators for the period 2000-2015, statistical evaluation methods using econometric modelling to establish the link between certain health and efficiency indicators which are internationally significant, and the method of evolution analysis of these indicators for the case study analysed.

CHAPTER I "THE STATE OF PRESENT KNOWLEDGE REGARDING THE FINANCING OF HEALTHCARE SERVICES"

In this chapter, we conducted an analysis of the international and national literature. In this regard, we considered scientific publications for the period 2000-2015. Of the 88 articles published in international journals taken in the study, only 34 articles used the method of quantitative evaluation for research, and of these almost 90% have studied the importance of increasing the share of public health expenditure from the GNP, in relation to the GNP fluctuation.

While the qualitative assessment method has been addressed in other articles that concluded that for an efficient system, it would be useful to supplement the private healthcare sector and to open up the competition.

Also, there is a concern from both physicians and economists to streamline the healthcare system.

In the research conducted for national journals, we identified 770 Romanian journals (9 in 2010) recognized by CNCSIS [National Council for Scientific Research in Higher Education] from which 58 ISI national journals with impact factor in 2009 of which: 9 medical journals, 3 economic journals, one journal of Public Administration. The latter led to this study.

After an analysis conducted in 2015, we found that only 56 journals remained ISI. Of these, only 49 are JCR-2014.

Of the 56, only 4 are from the economic field, 5 deal with medical themes and the rest belong to other domains / sub-areas.

At a national level, we observed a lack of interest in this area in the period before 1989, since there were few journals, due to a centralized system. For the period 1990-1999, there is an exponential increase of interest in this area, which continues to increase in the upcoming period 2000-2015, and an increase in the number of articles on financing healthcare services, especially in the period 2000-2010. This increase is mainly due to the transition from a centralized to a decentralized economy, creating a mandatory alignment to European standards regarding the academic field, but also in order to access funds from EU-funded projects.

CHAPTER II "BASIC NOTIONS IN FUNDAMENTING FINANCIAL SYSTEMS FOR HEALTHCARE SERVICES"

We started this study from the legislative prerequisites for the appearance of the healthcare system in Romania, the reforms that have transformed the centralized system based on fees in a

single social health insurance system based on contributions from the citizen as the insured and the employers. The healthcare system is coordinated by the Romanian Ministry of Health and the National Health Insurance House by: drafting legal acts, collecting funds for health, allocation of funds for special purposes such as health programs or payment of medical services.

Hospitals are healthcare facilities with beds providing medical services and not only, using about half of CNAS funds for this purpose, 9.060 million lei to 21.789 million lei in 2015.

In this chapter we presented the hospitals: their structure, their functioning, aspects of their accreditation, their administration and presentation of the types of healthcare services which they provide.

We have established in this regard, the main goal directions aimed at raising the health status by: increasing the access to healthcare services, increase of quality of healthcare, improvement of funding of the healthcare system in the context of decentralization.

Reforms in the healthcare sector were assessed through a set of indicators that reflect the health state of a country. In this regard we analysed demographic and mortality indicators at the national and EU level.

While in most EU countries the implemented healthcare systems became a tradition and produced effects since the 1800s, over the past 26 years our country has undergone a series of transformations, taking segments of other countries systems.

As to life expectancy, Romania is the EU country with the shortest life expectancy for women, although compared to 1989, Romanian life expectancy rose from 71.99 years in 2004 to 75.47 years in 2014.

In terms of ageing, we found that this is a social problem. In 2014 the ratio of people over 60 increased to 16.5% in Romania and to 18.2% in the EU. It is estimated for 2050 an increase of up to 21% of the population over 65 years. Thus, for 2060 it is estimated that the percentage of

people aged 65 years or over in the population between 15 and 64 years is 64.8%, meaning that about 8 people with working age have as correspondent one person retired, the most favourable situation in this regard is presented for Ireland.

While the ratio of population under 14 is decreasing, in Romania this figure fell to 15.5% in 2014 from 16.15% in 2004 and from 18.27% in 2000; in the EU it fell to 15.6% in 2014 from 16.22% in 2004 and from 17.11% in 2000.

The birth rate in our country, another important indicator in the diagnosis of health of a country was below 10 ‰ in 2013, one of the lowest values in peacetime. It was 39.7 ‰ in the 1901-1905 period, which decreased in value during the Second World War to 26.0 ‰ in 1940. The countries with the highest birth rate in the world are in Africa, with a rate of over 50 ‰. In Europe, the birth rate is between 8 ‰ in Germany and 16 ‰ in Ireland.

On the falling birth rate indicator, correlated with increasing mortality and associated with the "migration" factor studies say that in 2050 Romania will have a population of 16 million citizens.

We note that the health scenario in our country is not at all favourable. Switching from the Semaşko health system existing in our country before 1990 to a system based on a social health insurance system has been difficult.

In countries where the health system is based on citizen contribution, we find the following features:

- **positive**: life expectancy at birth is higher (80 years in Germany, 81 years in France);
- **negative**: the system relies on the ability to work of citizens and when unemployment increases, the amounts deducted to healthcare system decrease, for which governments should intervene through economic policies;

Although investments in healthcare system are made, the incidence of chronic diseases such as HIV and cancer in a population of 100,000 inhabitants is higher in developed countries than in other developing countries. This is explained by the fact that developing countries and

poor countries do not have screening programs or other programs implemented by the government as to the existence of national registers. So you can not obtain comparable statistics.

In conclusion, in countries where national screening programs exist, the number of cases of chronic diseases is higher, but the disease is in the early stages.

In this way, the costs needed to treat them to a large number of insured citizens are equivalent to the costs needed for treating a small number of patients in advanced stages of the disease in underdeveloped countries, this having an influence on the timeliness and quality of life.

CHAPTER III "HEALTH FINANCING MECHANISMS AT EUROPEAN AND NATIONAL LEVELS "

I investigated the characteristics of European health systems and their impact in financing the health sector. I noticed that in the former communist countries health has never been a priority, the only interest was to treat the disease, patients are put on waiting lists, with no private insurance that can fill the demand for services. Amid poverty, not many are those who can afford private insurance. Private insurance companies relying largely on funds from national social security system.

While countries applying Bismarck financing methods allocates a percentage of GDP on health between 8-9%, which is below the average of the Beveridge method, but well above countries coming from ex-communist sphere with a percentage that is below 8%, eg Hungary 8%, Poland 6.7%, Bulgaria 7.6%, Latvia 5.7% and Romania with the lowest proportion allocated 5.3% in 2013. All of these latter countries are the ones having the lowest share of employees in total population, but the highest percentage out-of-pocket as a surcharge on health, Romania registering a 97% of total expenses out-of-pocket health.

During the research I analyzed the expenditure on health and the components of this segment drawing a parallel for the same indicators that are used in the European Union.

As such, I choose to study all EU countries (Table 3.1.) grouped by the type of health system they apply and four relevant indicators with impact in financing health care.

From the table below , it is noted that Romania is the country with the lowest gross domestic product per capita after Bulgaria , making it 28th place among EU countries , first hovering Luxembourg, with a figure of 89 942 euro per capita , followed by Denmark and Sweden 45 532 euro , with EUR 44 545 per capita. Countries with high value of gross domestic product is above 30,000 euros per capita , are the Nordic countries : Finland , Ireland, Sweden , those who practice a type system Beveridge and those who apply the system Bismarck , such as Belgium , France, Germany . All these are countries with the highest public expenditures on health, respectively 7.981 USD per capita in Luxemburg followed by Denmark with 6.270 USD per capita.

It is noted that countries with a high gross domestic product , have a higher percentage allocated to health . For example Netherlands , has a gross domestic product per capita of 36 642 euros and a 12.9 % share health of gross domestic product .

Also countries that allocate a higher percentage of GDP on health , which in turn are collected from households largest funds in this regard. This is possible by increasing the share of employees in total , first hovering Denmark with 46.6 % , followed by Sweden with 46.2 % and Germany with 45.4 % of the total employed population. Number of employees reported by each country , includes black labor .

Table 3.1. Public expenditure, private expenditure and *out-of-pocket* expenditure as a percentage of total health expenditure in the EU countries in 2013

No.	**Country**	**Public expenditure in health (***USD percapita***)_**	**Private expenditure in health** *(% total from health expenditure***)**	**Out-of/ pocket as payment regarding health** *(% total from health expenditure)*	**% GDP for health** *(%)*	**GDP per capita** *(€/per capita)*	**Total population** (thousandspop)	**No. of employees** (thousands pop).	**Share of total employed population** (*%)*
0	1	2	3	4	5	6	7	8	9
1	Austria	5427	24.3	65.2	11	37659	8490	47328	43,8%
2	Belgium	5093	24.2	82.3	11.2	34911	11105	3874	34.9%
3	Bulgaria	555	40.7	97.3	7.6	5637	7271	2511	34.5%
4	Czech Republic	1367	16.7	94.1	7.2	14506	10513	4223	40.2%
5	Croatia	982	20	62.4	7.3	10432	4253	1244	29.3%
6	Cyprus	1884	53.7	86.5	7.4	19047	867	299	34.5%
7	Denmark	6270	14.6	87.4	10.6	45532	5612	2613	46.6%
8	Estonia	1072	22.1	85.4	5.7	14640	1340	583	43.5%
9	Finland	4449	24.7	75	9.4	36253	5439	2185	40.2%
10	France	4864	22.5	32.9	11.7	33077	65741	2469	37.5%
11	Germany	5006	23.2	55.6	11.3	34613	82098	37994	45.4%
12	Greece	2146	30.5	86.6	9.8	16813	10815	2545	23.5%
13	Ireland	4233	32.3	52.1	8.9	35093	4602	1556	33.8%
14	Italy	3155	22	82	9.1	26704	61049	18415	30.2%
15	Latvia	874	38.1	95.7	5.7	11696	2014	791	39.3%
16	Lithuania	1614	0	84	7.5	12310	2958	1141	38.6%
17	Luxembourg	7981	16.3	66.2	7.1	89942	545	214	39.3%
18	Malta	2000	33.9	93	8.7	17594	423	156	36.9%
19	Netherlands	6145	12.9	41.7	12.9	36642	16800	7167	42.7%

20	Poland	895	30.4	75	6.7	10303	38514	12170	31.6%
21	Portugal	2037	35.3	75.4	9.7	15945	10482	3916	37.4%
22	UK	3598	16.5	56.4	9.1	30436	64087	25407	39.6%
23	Romania	504	20.3	97	4	6854	20121	6473	32.2%
24	Slovakia	1454	30	73.9	8.2	13620	5413	1967	36.3%
25	Slovenia	2085	28.4	42.7	9.2	17505	NA	NA	NA
26	Spain	2581	29.6	77.1	8.9	22423	45918	14721	32.1%
27	Sweden	5680	18.5	88.1	9.7	44545	9601	4436	46.2%
28	Hungary	1056	36.4	75.5	8	10312	9894	3662	37.4%

Source: author interpretation based on Eurostat data NA = not accessible

It was also observed that the former communist countries such as Poland , Hungary , Croatia , Slovakia, etc., are at the middle of this classification with a GDP per capita of 10.303 euro , allocated 6.7% of domestic product profit for health , reaching a value of USD 895 per capita public spending on health.

In this chapter we also described the authorities of the health system in our country , type and profile of public hospital as such as the funding mechanisms, collection and allocation of health funds . CNASS budget implementation of the Fund is an increase in income from contributions for the period 2009-2015 although the number of taxpayers has decreased, which presented the analysis of the number of unemployed for the period 2000-2015, due to mandatory payment of social health insurance and the other professional categories.

I also introduced indicators underlying the financing of hospitals. The presentation was made for 2005 because it was the year of introduction of the system of financing health services in hospital -based continuing DRG (diagnostic group relative) .

The analysis was based on the study conducted by SNSPMS regionally and was funded under a pilot program . After that date could not perform a similar analysis because data are not reported at the regional level .

After the study , it was found that the differences between different regions in terms of affordability, complexity index is different between areas of the country , the number of surgical procedures performed in surgical wards , have yielded values far different the duration of hospitalization , which is around 10 days in all regions .

CHAPTER IV "MANGEMENT INDICATORS AND REFLECTION IN THE BUDGETS OF SANITARY UNITS WITH BEDS"

The indicators which show the managerial performance of a hospital and also health indicators that also included in the income and expenses are presented in this chapter, where we combined the theoretical knowledge with the practical legal issues through a case study Indicators analysis. at the IOCN level. As such we found some shortcomings at the way in which the types of analysis of performance indicators is carry out.

At the end of a period, an institution may acquire in the evaluation certificate " very good " if it forecast at the beginning of the year lower incomes from the previous year, compared to another health unit that assumed higher revenues but it has not achieved them although they were higher compared to the previous period or a health facility compared with the same profile.

Looking at the income and expenditure "Prof. Dr. Ion Chiricuţă " Cluj-Napoca is noted that the Institute's budget for 2006-2015 increased 5.4 times while the number of discharges has increased by 1.08 times while the number of medical services performed in hospitalization day care increased 1.49 times.

This is explained by increasing tariffs for medical services , increase which was realized by interest from institutional decision makers and their involvement in legislative changes .

In this way it obtained a budget increase only for medical services performed in day hospitalization care unit at 16 625 thousand RON in 2015 to 6992 thousand in 2006.

CHAPTER V "THE IMPACT OF THE FINANCING ANALYSIS ON HEALTH INDICATORS "

Personal contribution was made within each chapter, but more using empirical study presented by data processing to achieve regression analysis using econometric software "Eviews 7".

We presented descriptive statistics of the variables considered on a panel made up of the 28 European Union member states for the period 2004-2014. Eurostat data are reported by each Member State as it joined the European Union.

From the study we observed that the healthy life expectancy at birth ranges from a low of 52 years for countries like Portugal, Finland and maximum of 73.9 years reported by countries such as Sweden , Malta . Most countries are moving mean value between and Romania being included with a value of 62.5 in 2007 is decreasing , so that in 2014 the amount was 59 years. .

The " healthy life years over the age of 65. " limits are between 2.7 (min) in Slovakia and 16 in Iceland . Romania, registering a drop here from 7.8 years in 2007 to 5.7 years in 2014 .

The poverty threshold is between 13.7 and 61.3 limits. Romania with values between 45.9 in 2007 and 40.2 in 2014 , approaching the upper limit of this threshold.

However it should be noted that in the last ten years, Romania has managed to record a decrease of poverty, while countries such as Austria , Denmark , Greece , Luxembourg , Italy, Germany , Malta had for the same period a rising trend .

Health expenditure in GDP is between the value limits : minimum 1.6% in countries like Slovakia, Cyprus , Bulgaria and Switzerland and a maximum of 8.9 % for countries like Denmark, the Netherlands , Finland and France.

Our country has increased the percentage allocation of health expenditure from 3.7 % of GDP in 2007 to 4% in 2014.

The death rate for all cases of disease is very low , close to the limit of 848.3 in countries like Liechtenstein , Italy, Spain and high values, the maximum being of 1877.5 in countries such as Latvia , Bulgaria , Lithuania . Romania is the last four places with a value of 150.6 in 2014.

We analyzed indicator " death rate per 100 thousand inhabitants for cervical cancer , so values between 1 and 17.8% , indicating that the lowest incidence recorded in countries like Italy , Switzerland , Malta , United Kingdom , Finland and even Albania , and the highest values close to the maximum , namely 17.8 in countries such as Romania , Latvia .

Romania being on the last place with a value of 16.2 in 2014 , has the highest mortality in EU countries this sickness .

The correlation coefficients between these indicators shows that the link between the two variables is negative if the link is down, and if positive link is a direct relationship.

Research methodology is analysis on panel data regression .

Regression models analyzed the correlation between the variables of healthy life years and costs of health financing as a share of GDP.

Descriptive statistics of the analyzed variables were made using econometric software " Eviews 7" .

The following table 5.7., presents descriptive statistics of the variables considered in the empirical study on the panel of the 28 states for the period 2004-2014.

Table 5. 1. Descriptive statistics

Indicators	**HLY**	**HLY65**	**HEGDP**	**PT**	**DR**	**DRCC**
Mean	62.09407	8.809091	5.954545	24.30593	1199.338	5.087352
Median	62.60000	8.800000	6.500000	22.00000	1087.900	3.500000
Maximum	73.90000	16.00000	8.900000	61.30000	1877.500	17.80000
Minimum	52.00000	2.700000	1.600000	13.70000	848.3000	1.000000
Std. Dev.	4.540191	2.832569	1.741496	8.642930	258.7050	3.531356
Skewness	-0.085167	0.153827	-0.802919	1.481106	0.833980	1.398612
Kurtosis	2.671587	2.458020	2.901472	5.451420	2.460747	4.561816
Jarque-Bera	1.442823	4.094315	27.28627	155.8497	32.39336	108.1969
Probability	0.486066	0.129101	0.000001	0.000000	0.000000	0.000000
Observations	253	253	253	253	253	253

Source : Processing statistical panel data

Where :

HLY = Healthy Life Years
HLY65 = Healthy Life Years over 65
HEGDP = health expenditure as percentage of GDP
PT = poverty threshold
DR = death rate for all cases of illness
DRCC = death rate for cervical cancer

We note that the healthy life **expectancy** at birth ranges from a low of 52 years for countries like Portugal, Finland and maximum of 73.9 years reported by countries such as Sweden , Malta .

Most countries are moving mean value between being included and Romania with a value of 62.5 in 2007 is decreasing, so that in 2014 the amount was 59 years.

The " healthy life years over the age of 65. " limits are between 2.7 (min) in Slovakia and 16 in Iceland. Romania , registering a drop here from 7.8 years in 2007 to 5.7 years in 2014.

Poverty threshold is between 61.3 13,7şi limits . Romania with values between 45.9 in 2007 and 40.2 in 2014 , approaching the upper limit of this threshold. However it should be noted that in the last ten years, Romania has managed to record a decrease of poverty , while countries such as Austria , Denmark , Greece , Luxembourg , Italy, Germany , Malta, recorded for the same period , a trend increasing.

Health expenditure in GDP of between 1.6 % value limits in countries like Slovakia and maximum of 8.9 % for countries like Denmark .

Our country has increased the percentage allocation of health spending from 3.7 % of GDP in 2007 to 4% in 2014 .

The death rate for all cases of disease is very low , close to the limit of 848.3 in countries like Liechtenstein and high values, the maximum being of 1877.5 in countries such as Latvia. Romania is the last four places with a value of 150.6 in 2014.

The indicator registered between 1 (Malta, 2005) and 18.8 (Romania , 2002) for the analyzed period 2002-2013 . The lowest values of the indicator are recorded in countries like Italy, Switzerland , Malta , United Kingdom , Finland, and even Albania. Romania and Latvia recorded the highest values of constant mortality by this sickness.

The correlation coefficients between these indicators 5.8.- see table , measures the intensity of the relationship between two variables . If the link is reverse coefficient is negative and if it is positive the connection is direct.

Table 5. 2. Correlation Coefficients

Variable	LOG(HLY)	LOG(HLY65)	HEGDP	PT	LOG (DR)	LOG(DRCC)
LOG(HLY)	1.000000	0.817730	0.222102	-0.039895	-0.407161	-0.370691
LOG(HLY65)	0.817730	1.000000	0.436938	-0.311141	-0.585852	-0.508691
HEGDP	0.222102	0.436938	1.000000	-0.353952	-0.426434	-0.341540
PT	-0.039895	-0.311141	-0.353952	1.000000	0.641441	0.531150
LOG (DRCI)	-0.407161	-0.585852	-0.426434	0.641441	1.000000	0.852658
LOG(DRCC)	-0.370691	-0.508691	-0.341540	0.531150	0.852658	1.000000

Source : Processing statistical panel data

Variable	HLY	HLY65	HEGDP	PT	DR	DRCC
HLY	1.000000	0.798388	0.209422	-0.033662	-0.394686	-0.355620
HLY65	0.798388	1.000000	0.365737	-0.335065	-0.543705	-0.496282
HEGDP	0.209422	0.365737	1.000000	-0.353952	-0.446698	-0.409177
PT	-0.033662	-0.335065	-0.353952	1.000000	0.670529	0.609628
DRCI	-0.394686	-0.543705	-0.446698	0.670529	1.000000	0.839558
DRCC	-0.355620	-0.496282	-0.409177	0.609628	0.839558	1.000000

Source : Processing statistical panel data

In Table 5.8. , can be observed that there is a strong relationship between the poverty of a country and the death rate . In fact, the greater the allocation of GDP spent on health, the lower the death rate.

Research methodology:

The empirical study is based on regression analysis on panel data.

Regression models will test the connection between healthy life years and costs of health financing as a share of GDP:

$$\log(HLY)_{it}=C_0+C_1 \text{ x } HEGDP_{it}+_{it} \quad (1)$$

$$\log(HLY65)_{it} =C_0+C_1 \text{ x } HEGDP_{it}+_{it} \quad (2)$$

Next, we study the impact of poverty variable on the dependent variables:

- life expectancy at birth
- life expectancy at birth over 65

$$\log(HLY)_{it} =C_0+C_1 \text{ x } PT_{it}+_{it} \quad (3)$$

$$\log(HLY65)_{it} =C_0+C_1 \text{ x } PT_{it}+_{it} \quad (4)$$

The impact of health expenditure as percentage of GDP over the death rate for all causes of disease, is studied through a model of simple linear regression and the cumulative impact of health expenditure as percentage of GDP and a variable " poverty line " on rate death is studied through a multiple linear regression model .

$$\log(DR)_{it} =C_0+C_1 \text{ x } HEGDP_{it}+_{it} \quad (5)$$

$$\log(DR)_{it} =C_0+C_1 \text{ x } HEGDP_{it}+ C_2 \, PT_{it} +_{it} \quad (6)$$

Next models explain the death rate from cervical cancer in the percentage of GDP spending on health and poverty threshold:

$$\log(DRCC)_{it} =C_0+C_1 \text{ x } HEGDP_{it}+_{it} \quad (7)$$

$$\log(DRCC)_{it} =C_0+C_1 \text{ x } HEGDP_{it}+ C_2 \text{ x } PS_{it} +_{it} \quad (8)$$

unde: HLY_{it} = Healthy Life Years in country i, year t (logarithmic values)

$HLY\ 65_{it}$ = Healthy Life Years over 65 in country i, year t (logarithmic values)

$HEGDP_{it}$ = health expenditure as percentage of GDP in contry i, year t

PT_{it} = poverty threshold in country i, year t

DR_{it} = death rate for all cases of illness in country i, year t

$DRCC_{it}$ = death rate for cervical cancer in country i, year t

C_0, C_1, C_2 = regression model parameters (coefficients of explanatory variables)

$_{it}$ = Regression models residues

Results and Conclusions:

Table 5. 3. The results of estimating models (1) and(3)

Dependent variable :Healthy Life Years (logarithmic values)

Explanatory variable model (1) HEGDP: (health expenditure in GDP)

Explanatory variable model (3): PT (poverty threshold)

Variable	Coefficient	Std.Error	t-Statistical	Prob.	Determination Coefficients
C	4.075730***	0.012126	336.1068	0.0000	R^2 0.100651
HEGDP	0.009869***	0.001747	5.647641	0.0000	R^2 adjusted 0.097495
C	4.161999***	0.009181	453.3433	0.0000	R^2 0.023385
PT	- 0.001037***	0.000382	-2.711291	0.0071	R^2 adjusted 0.020204

Source : Processing statistical panel data

Variable coefficient of health expenditure as percentage of GDP is positively and significantly to a significant margin of 1%.

The direct link between the two variables indicates that in countries with a high share of health expenditure in GDP increases hoping variable " healthy life years " and in countries with a low share of health expenditure in GDP shortens life years healthy.

Table 5. 4. The results of estimating models (2) and (4)

Dependent variable: HLY65 (Healthy Life Years over 65) – (logarithmic value)
Explanatory variable model (2):HEGDP (health expenditure in GDP)
Explanatory variable model (4): PT (poverty threshold)

Variable	Coefficient	Std.Error	t-Statistical	Prob.	Determination Coefficients	
C	1.627501***	0.04134	39.36879	0.0000	R^2	0.436214
HEGDP	0.009869***	0.005836	14.84961	0.0000	R^2 adjusted	0.434236
C	2.592922***	0.038274	67.74708	0.0000	R^2	0.276667
PT	- 0.017903***	0.001652	-10.83624	0.0000	R^2 adjusted	0.274311

Source : Processing statistical panel data

Variable coefficient expectancy of life over 65 is positive and significant at the 1% significance level .

The direct link between the two variables shows that in countries with a high share of health expenditure in GDP raises hopes variable " expectancy of life 65 years " and in countries with a low share of health expenditure in GDP , shortens expectancy of life over 65 years. R2 determination coefficient of 43.42 % indicates that the proportion of variance explained CSPIB log (HLY65) . R2de 27.43 % coefficient of determination indicates that the proportion of variance explained PS log (HLY65) .

Table 5. 5. The results of estimating models (5) and (6)

Dependent variable: DR (death rate for all cases of illness)
Explanatory variable model (5): HEGDP (health expenditure in GDP)
Explanatory variable model (6): HEGDP (health expenditure in GDP)
and PT (poverty threshold)

Variable	Coefficient	Std.Error	t-Statistical	Prob.	Determination Coefficients	
C	7.429782***	0.025151	295.4128	0.0000	R^2	0.543468
CSPIB	- 0.061856***	0.003543	-17.45706	0.0000	R^2 adjusted	0.541684
C	7.011178***	0.039895	175.7392	0.0000	R^2	0.898370
HEGDP	- 0.037159***	0.004364	-8.515734	0.0000	R^2 adjusted	0.897563
PT	- 0.011855***	0.000582	20.37377	0.0000		

Source : Processing statistical panel data

Variable coefficient 'health expenditure as a share of GDP' is negative and significant at 1% risk threshold indicating an inverse relationship to mortality rates. The variation 'health expenditure as a share of GDP' explains the variation in the proportion of 54.16 % mortality rate.

Variable coefficient 'poverty threshold' is positive and significant at the 1% significance threshold indicating a direct relationship to mortality rates, ie. countries with high poverty thresholds record and high death rates .

Death rate variation is explained by the variation rate of 89.75 % variable 'health expenditure as a share of GDP', ie the poverty threshold.

Variable coefficient 'health expenditure as a share of GDP' is negative and significant at 1% risk threshold indicating an inverse relationship with the death rate.

The variation 'health expenditure as a share of GDP' explains the variation in the proportion of 44.3 % death rate.

Tablel 5. 6. The results of estimating models (7) and (8)

Dependent variable: DRCC (rata de deces la cancerul de col uterin) – valoare logaritmată

Explanatory variable model (7): HEGDP (health expenditure in GDP)

Explanatory variable model (8): HEGDP (health expenditure in GDP) and PT (poverty threshold)

Variable	Coefficient	Std.Error	t-Statistical	Prob.	Determination Coefficients	
C	2.343710***	0.075842	30.9025	0.0000	R^2	0.445267
HEGDP	- 0.155726***	0.010906	-14.2786	0.0000	R^2 adjusted	0.443083
C	1.188536***	0.119016	9.986332	0.0000	R^2	0.596423
HEGDP	- 0.086130***	0.013732	-6.272199	0.0000	R^2 adjusted	0.593208
PT	0.031024***	0.002188	-14.17652	0.0000		

Source : Processing statistical panel data

Variable coefficient 'poverty threshold' is positive and significant at the 1% significance level , indicating a direct relationship with the rate of death or states with high poverty thresholds will record and high death rates

.

Death rate variation is explained by the variation rate of 59.32 % variable 'health expenditure as a share of GDP ' and 'poverty threshold.'

In all analyzed countries for 2002-2014 it has been registered a decrees in mortality from all causes including the one which makes the subject of this paper, namely cervical cancer .

In conclusion, all the countries analyzed for 2002-2014 period have registered a decrees in mortality from all causes including cervical cancer - for chronic diseases, increasing death rate is due to the low percentage of expenditure allocated on health of GDP besides genetic causes, climate, education, etc.

It appears that countries with a lower GD, are allocating a smaller percentage for health.
Regarding our country if we take a look at the numbers from 2002-2014, we note that although the percentage of health expenditure in GDP increased from 3.7 % to 4 % and the death rate for all cases of the disease fell from 1935.5 to 100,000 in 2002 to 1520.6 2014 and also there is a decrease in mortality from cervical cancer 18.8 (100 thous) in 2002 to 6.2 (instead of 100 000) in 2014

However we are the first country in Europe with a death rate of 100 thousand per capita caused by all types of disease including cervical cancer.

Case study:

Analyzing health indicators for cancer of the cervix, -a custom analysis for patients of Cluj county, I used as research methodology the comparative method .

For the analyzed period there was a decrease in deaths from 47 in 2002-8 deaths in 2015.

Most of them are recorded for stage III of the disease.

Furthermore, it decreases the number of deaths in stage II (10 to 1) and in stage IV (5-1) and in stage A in 2015 there were no deaths due to cervical cancer in patients from Cluj county.

These positive results were achieved due to the existence of additional financing sources through screening programs financed from the state budget and research projects.

Future prospects of the research can take the expansion of cancer registries throughout the country in view of the favorable results obtained at IOCN, studied in this thesis see table C1.

Table 1. Number of new patients registered between 2002-2015 with a diagnosis of cervical cancer at IOCN Cluj-Napoca

No of new patients	**Total**	**Urban from which:**	**15-44 years old**	**45-59 years old**	**60-74 years old**	**over 75 years old**	**Rural from which**	**15-44 years old**	**45-59 years old**	**60-74 years old**	**over 75 years old**
Total new patients	12839	4547	1400	1962	1055	130	8292	2548	4055	1512	164
Cluj County	1739	475	154	159	131	31	1264	433	526	249	56

Source: author interpretation based on IOCN dat

In IOCN were registered between 2002-2015 a total of 12 839 patients with a diagnosis of cervical cancer from which 13.54 % are from Cluj county and the rest from other counties (Alba, Arad, Arges, Bacau, Bihor, Bistriţa, Botoşani, Brăila, Braşov, Bucureşti, Buzău, Caraş-Severin, Cluj, Constanţa, Covasna, Dambovița, Dolj, Galaţi, Gorj, Harghita, Hunedoara, Ialomiţa, Iaşi, Maramureş, Mehedinţi, Mureş, Nemţ, Olt, Prahova, Sălaj, Satu Mare, Sibiu, Suceava, Teleorman, Timiş, Tulcea, Vaslui, Vâlcea, Vrancea) , Appendix no.5 - These results were

possible due to the existence of a cancer register at the Oncology Institute Cluj. To get results relevant to the national level on the whole the register should be extended at national level with data useful in future decisions / legislative initiatives.

The conclusion is only one, namely, health is one of the most important components for a country. For having a healthy population, due to this research, we noticed that we must focus on reducing mortality. To reduce the mortality of all cases of illness, we must focus on disease prevention rather than on treatment.

To obtain an mortality indicator comparable to those achieved in developed countries it is imperative to reach a percentage of the allocated GDP to health expenditure that is comparable to theirs 7-8 % , that if we look at the macroeconomic level, and in each health units with beds, interest management should be directed towards creating additional sources of financing.

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Key words:

health expenditure, expenses, cost per day of hospitalization, diagnostic early financing, group relatively diagnoses, financial indicators, indicators medical index case-mix, number of deaths, performance in health, poverty threshold, gross domestic product, mortality, medical services continued hospitalization, day hospital medical services, medical services, health system, hospital, life expectancy, health status, health units with beds, revenues.