

Efficiency of healthcare systems: the problems of measuring and causal relations

Nadiya Dubrovina^{1*}, Vira Dubrovina², Andrzej Siwiec³, Olena Kolesnikova⁴, Stanislav Filip⁵

¹Assoc. prof., CSc., PhD, Bratislava University of Economics and Management, Slovakia.

²PhD student, Tulane University, USA.

³MD, PhD, Child and Family Health Center named after John Paul II in Sosnowiec, Poland.

⁴Professor, DrSc., SI Malaya Institute of Therapy, NAMS, Ukraine.

⁵Assoc. prof., PhD, Bratislava University of Economics and Management, Slovakia.

*Corresponding Author Nadiya Dubrovina

Assoc. prof., CSc., PhD,
Bratislava University of
Economics and
Management, Slovakia.

Article History

Received: 29.08.2024

Accepted: 12.09.2024

Published: 25.09.2024

Abstract: - In the paper the problems of the efficiency of healthcare systems are considered, the different definitions are presented and comparative analysis is provided. As the research problem the relation between financial mechanisms of healthcare and the quality of healthcare services and satisfaction of patients on the example of the EU countries is defined. In the work the relations between general government expenditure on health per capita, health life years and self-perceived health state have studied and proved that in some countries the policy of financing health systems was quite flexible and changed, while in other countries this policy was stable for a long term period. At the same time, a number of social, economic, political and institutional factors influence the policy of financing health systems, which should also be taken into account and studied in connection with the changing characteristics of financing the health system and its efficiency in the country.

Keywords: efficiency, healthcare, financial mechanisms, quality of medical services, health life years, self-perceived health state, satisfaction of patients.

JEL Classification: I10, I15, I18.

Cite this article:

Dubrovina, N., Dubrovina, V., Siwiec, A., Kolesnikova, O., Filip, S., (2024). Efficiency of healthcare systems: the problems of measuring and causal relations. *ISAR Journal of Medical and Pharmaceutical Sciences*, 2(9), 70-78.

Introduction

Population health is one of the important priorities of the modern society development. For some last decades in the advanced countries of the world we observed essential progress in achievements of medical science, technologies of diagnostics and treatment that has resulted in substantial growth of life expectancy, the improvement of its quality [3, 6, 7, 10, 16, 17, 18]. The high life expectancy greatly depends on the level of economic development of the country and population incomes. The high level of economic development of the country and population incomes made possible to increase the financing of national public health care system, to use modern achievements of medical science and engineering, to improve system of medical education, to attract more qualified staff etc. [5, 8, 9, 12, 13, 15].

Nevertheless, many papers and reports note that the significant differences in public health services systems and their financing in the OECD countries are existed and the influence and the support of public health services systems are essentially varied. In addition, human and material resources in national health systems have some specifics, which can be explained by different factors and features of the organizational mechanisms. Thus all these reasons influence the efficiency of public health services systems

in the various countries and it relates with availability of medical services to wide layers of the population [7, 15, 16, 17, 18].

It is should be noted that the problem of efficiency and equality in healthcare systems is emphasized by many scientists and researchers as one of the important issue for development of national health policy [3, 7, 18, 21]. The problems of efficiency were considered in the works written by D. Chisholm, J. Cylus, I. Papanicolas, P. Smith, A. Dixon, I. Joumard, C. André, C. Nicq, M. Kostičová, V. Ozorovský, L. Badalík, G. Fabian, L. Guryanova, A. Ostenda, etc. [3, 4, 6, 14, 17, 18, 22].

The definitions of efficiency of health systems are varied and there are different indexes and approaches used for its measuring, also the problems of relation of efficiency and efficacy terms with other socio-economic factors and quality of healthcare services should be taken into account [4, 11, 18, 22].

Let consider the terms of efficiency and efficacy and specifics of measuring efficiency in healthcare. According to the definition "Effectiveness is the degree to which processes result in desired outcomes, free from error and is appropriate to the clinical needs and based on the best current evidence" [11, 18]. Also effectiveness as a measure is considered by other authors as comparison between actual performance and the performance that ideally or under special conditions, could be expected to achieve.

Efficiency is the system's optimal use of available resources to yield maximum benefits or results. Donabedian understands efficiency as a system's ability to function at lower costs without diminishing attainable and desirable results [11, 18]. In some articles some scientists consider health care efficiency is a comparison of delivery system outputs, such as physician visits, relative value units, or health outcomes, with inputs like cost, time, or material [4]. Thus, efficiency can be reported then as a ratio of outputs to inputs or a comparison to optimal productivity using stochastic frontier analysis or data envelopment analysis [11]. Effectiveness is the degree to which something is successful in produced a desired result and efficacy is the ability to produce a desired or intended result [18].

There are different approaches based on the using one indicator for evaluation the efficiency in healthcare [1, 3, 14, 17]. One of the approach is based on the calculation of integral indexes [1, 14]. The importance to consider the set of different factors, their grouping and calculation of integral indexes are considered in paper E. Benova et al [1]. The relation of efficiency and quality of healthcare services, application of objective indicators (birth rate, infant mortality rates, prevalence of diseases, mortality rates, life expectancy) and subjective indicators based on the surveys and evaluation of self-assessment of health or satisfaction in the provision of healthcare services are described in paper A. Ostenda et al [22]. In the same time, it is necessary to characterize the relation of efficiency and efficacy with cost-benefit analysis [11]. The problems of relation of efficiency with financial mechanisms and their regimes should be taken into account. Thus, the brief analysis of tendencies of funding healthcare systems in the EU was carried out in some recent papers [5, 9, 13] and the classification of mechanisms of funding healthcare in the EU and their regimes are studied [8].

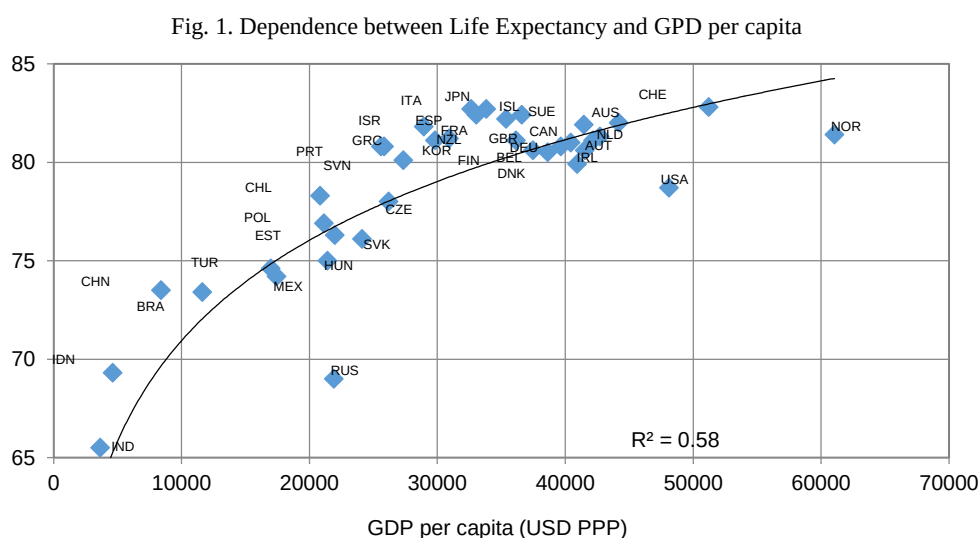
Thus, the problem of the analysis of efficiency of healthcare systems should be studied more detail, it is necessary to apply the system approach and to reveal the causal relations of efficiency of healthcare with different socio-economic, demographic factors, financial and organization mechanisms, capacities and key performance indicators in healthcare.

The purposes in this work are: to consider the problem of relation between financial mechanisms of healthcare and the quality of healthcare services and satisfaction of patients on the example of the EU countries; to study the relation between general government expenditure on health per capita and health life years, self-perceived health state, etc.

The main results and findings

Life expectancy is an important health status indicator based on average number of years a person at given age may be expected to life given current mortality rates. Life expectancy at birth is a common measure used to compare health status in and between countries. Life expectancy summarizes in, a standardized format, current information on the health situation of all age and sex groups of population [18]. During last years the visible annual trends are observed in life expectancy dynamics across countries. On the basis of some research and calculation it is shown, that rather high factor of correlation between parameters of average life expectancy and expenditures on financing the public health care system is observed [12, 18]. At the same time the average life expectancy depends not only on the level of financing of public health care system, but also on its efficiency and availability [1, 3, 17, 18]. Efficiency of the health care is the optimal use of available resources in this branch to gain highest benefits or result. Availability of health care services is the opposite measure to inequalities. Inequalities in health care comprise inequalities in health status itself and inequalities in finance and delivery of health services.

It is important to study the relationship between life expectancy and GDP per capita (Fig. 1). As we can see this relation may be explained as non-linear function of life expectancy indicator from GDP per capita. Coefficient of determination (R^2 -squared) is equal to 0,58 for this non-linear function. The value of the coefficient of determination is relatively big, but we should take into account the influence of other deterministic and stochastic factors on the life expectancy.



Source: OECD Health Statistics 2013, <http://dx.doi.org/10.1787/health-data-en>; World Bank for non-OECD countries

Another important indicator to study the efficiency of health care services is potential years of life lost under 70 years per 100 thousands of population. In table 1 the estimated potential years of life lost under 70 years per 100 thousands of population for EU countries is given.

Table 1. Potential years of life lost under 70 years per 100 thous. of population

Country	Ischaemic Heart Disease		Cerebrovascular disease		Cancer	
	Female	Male	Female	Male	Female	Male
Austria	235.3	830.8	157.7	238.0	1203.9	1508.3
Belgium	127.5	544.3	142.0	183.4	1232.5	1683.4
Denmark	246.6	809.2	181.6	197.7	1556.2	1479.8
Finland	190.3	1206.2	208.2	340.1	943.5	1148.7
France	61.4	380.5	100.3	191.4	1011.5	1936.4
Germany	214.9	860.4	149.5	227.4	1306.3	1649.7
Greece	148.6	781.1	165.8	275.2	961.6	1424.9
Ireland	300.4	1305.7	151.7	206.0	1372.4	1457.3
Italy	115.2	562.2	155.0	220.2	1125.8	1625.3
Luxembourg	181.1	731.4	234.8	179.1	1249.8	1634.7
Netherlands	198.2	692.2	134.2	164.1	1266.5	1448.7
Portugal	157.1	617.1	279.6	533.4	1119.3	1569.9
Spain	93.1	523.6	121.9	237.0	1000.3	1694.3
Sweden	67.6	746.0	115.3	183.8	1108.3	991.7
UK	311.5	1198.9	172.4	208.2	1370.6	1398.7
EU Average	187.2	803.2	166.3	243	1185.4	1497.7

Source: Jakubowski E., Busse R. Health Care Systems in the EU. A Comparative Study. Working Paper. European Parliament. Luxembourg. 1998.

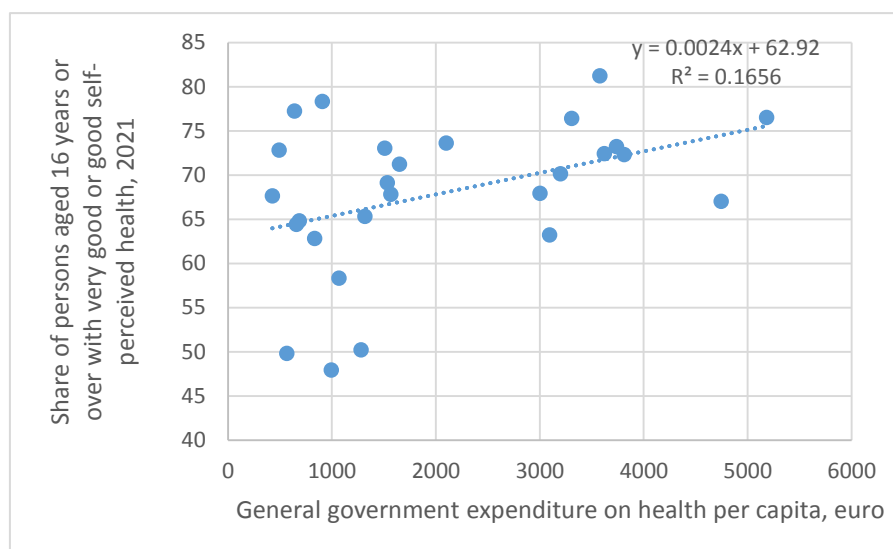
As it is seen from the data presented in table 1, the huge potential years of life lost under 70 years is connected with cancer and malignant neoplasm diseases. Due to the complex health care services and disease prevention the indicators of potential years of life lost under 70 years can be significantly reduced.

At first, it is necessary to emphasize on the complicate relation between funding of healthcare, health life years and perceived health state.

Let analyze the relationship between general government expenditure on health per capita, health life years and perceived health state. For this analysis the correlation coefficients were calculated and the plots were given.

In the Fig. 2 the relation between general government expenditure per capita and indicator of self-perceived health is shown. As it is clear seen from the table and simple regression model (Fig. 2), the correlation is low between general government expenditure per capita and share of persons aged 16 years or over with very good or good self-perceived health.

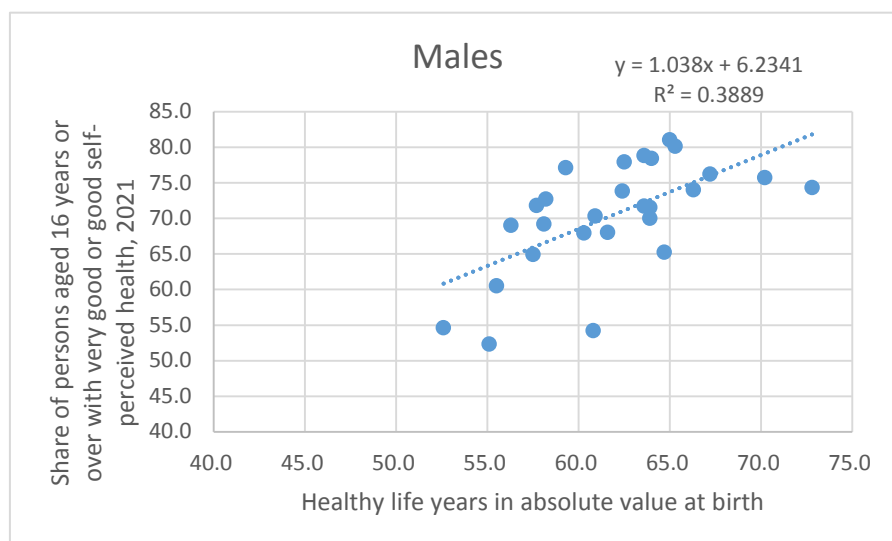
Fig. 2. The relationship between indicator of self-perceived health and general expenditure on health per capita (2021)



Source: own elaboration

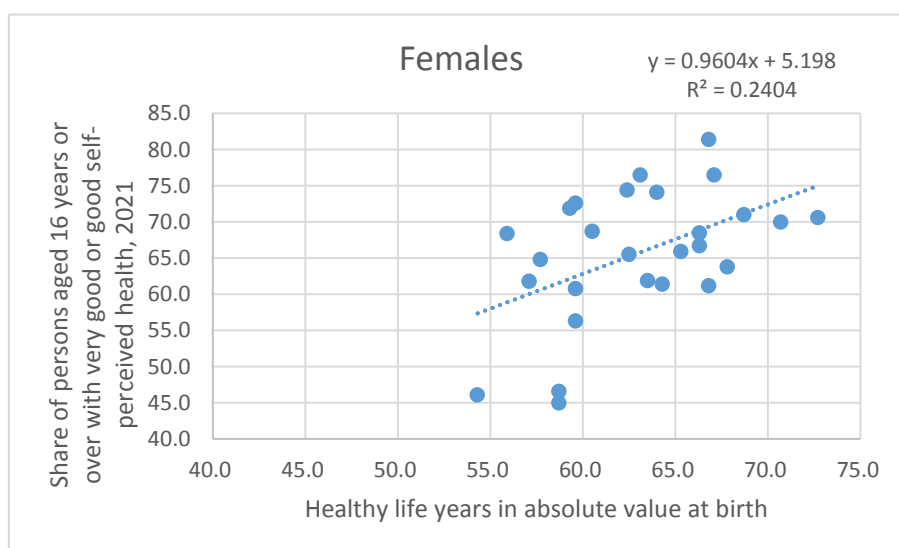
In Fig. 3 and Fig. 4 the relation between health life years in absolute value at birth and indicator of self-perceived health for males are given females.

Fig.3. The relationship between indicator of self-perceived health and health life years in absolute value at birth for males (2021)



Source: own elaboration

Fig. 4. The relationship between indicator of self-perceived health and health life years in absolute value at birth for females (2021)



Source: own elaboration

As an interesting result we can see that the power of relation between indicator of self-perceived health and health life years in absolute value at birth for males is higher than in case with females. Thus, the indicator of self-perceived health for female reflects influence of more subjective factors than the case with males. Nevertheless, it is necessary to mention the role of other measured and unmeasured factors which can have an impact on share of persons aged 16 years or over with very good or good self-perceived health. In the same time, life expectancy is more argued factors which reflects impact of personal and environmental factors more clearly. For example, life expectancy will dependent from individual health, life style, social safety, social standards, social safety and development of health care services, ecological factors, etc.

It is possible to reveal factors influencing the development of health care expenditure such as: influence of prosperity and the improvement in the standard of living; the accessibility of care; the quality of healthcare; the use of new medical technologies; demography, aging population and needs of long-term care.

In the table 2 the results of grouping EU countries to clusters according to regimes of healthcare funding are presented. In this research three macroeconomic indicators such as: total government expenditure on health as % of GDP (TGEH1); total government expenditure on health as % of total general government expenditure (TGEH2); total government expenditure on health per capita (TGEH3) were used.

Thus, first indicator TGEH1 characterizes more the government policy in healthcare; second indicator TGEH2 describes budget policy and social policy of the government in its relation to healthcare; third indicator TGEH3 shows the level of economic development of the country, well-being and relative values of the expenditure on health per capita, which are higher in rich and well-developed countries.

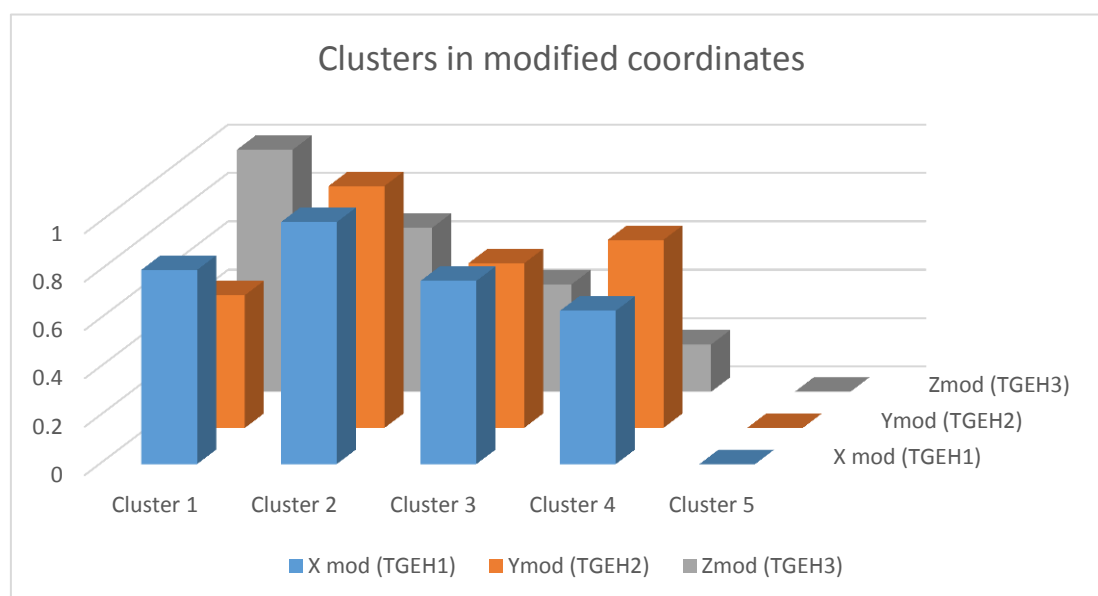
Table 2. The characteristics of clusters for grouping the EU-28 countries according the different regimes of funding healthcare during period of 2000-2017

Indicator	Variable	Cluster 1		Cluster 2		Cluster 3		Cluster 4		Cluster 5	
		Cluster contains 21 cases		Cluster contains 92 cases		Cluster contains 93 cases		Cluster contains 111 cases		Cluster contains 187 cases	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
TGEH ₁	X	6,75	1,86	7,23	0,92	6,64	0,77	6,34	0,79	4,8	1,16
TGEH ₂	Y	13,58	2,26	15,12	1,97	14,03	1,41	14,36	2	11,71	2,5
TGEH ₃	Z	4007,3	342,6	2860,8	251,59	2030,0	237,0	1141,2	214,5	446,2	199,4

Source: Dubrovina N. et al. Classification of financial mechanisms of healthcare systems in the countries of European Union. In: Itema 2020. Conference Proceedings. 4th International Scientific Conference on Recent Advances in Information Technology, Tourism, Economics, Management and Agriculture – ITEMA 2020, Belgrade. – s. 172.

The interpretation of the clusters can be made by means plot presented in Fig. 5.

Fig. 5. Presentation of clusters in modified coordinates for description of regime of healthcare funding according to indicators TGEH1, TGEH2 and TGEH3



Source: own elaboration

Thus, Cluster 1 characterizes the highest value of total government expenditure on health per capita (Z), the means for X (total government expenditure on health as % of GDP) and Y (total government expenditure on health as % of total general government expenditure) have relatively high values, but not the biggest. Cluster 2 contains cases of the countries, where the mean of X and mean of Y are the biggest, and they have very high value of Z in comparison with countries in other clusters, such as: Cluster 4 and Cluster 5. Cluster 3 has relatively high all values of indicators in comparison with Cluster 4 and Cluster 5, but lower than in Cluster 1 and Cluster 2. Cluster 4 contains characterizes relatively high values for indicators X and Y, but relatively low level of Z. Cluster 5 characterizes the lowest mean values for all indicators, this is “trap of poverty” included post socialist and emerging countries [8].

In the same time, the regimes of healthcare funding in EU countries should be characterized more detail by description of their national features and mechanisms of the allocation of financial resources on the different level and for different medical institutions.

In this research the grouping EU countries to clusters was made in the purpose to study the distribution of general government expenditure on health according to different levels: Central government (F_C); State government (F_S); Local government (F_L) and Social Funds (F_SF).

The results of the cluster analysis are given in table 3 and the plot of average values in the clusters is presented in Fig. 6.

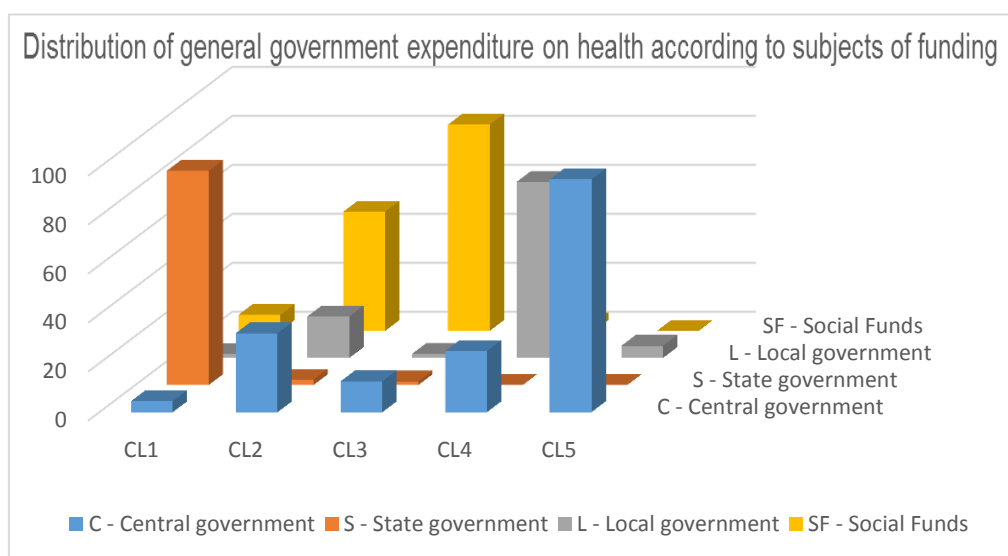
It should be noted that the level of centralization or decentralization of healthcare funding in EU countries dependent on the features of public budgets and tax systems in the different countries, as well the historical traditions and reforms towards the increasing decentralization should be taken into account.

Table 3. Characteristics of the clusters for distribution of general government expenditure on health according to different levels for period 2000-2017

Indicator	Variable	Cluster 1		Cluster 2		Cluster 3		Cluster 4		Cluster 5	
		Cluster contains 18 cases		Cluster contains 199 cases		Cluster contains 105 cases		Cluster contains 79 cases		Cluster contains 103 cases	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
F_C(%)	Y1	4,44	0,43	32,2	11,38	12,58	8,51	24,95	12,85	95,04	8,29
F_S(%)	Y2	87,47	10,75	2,17	6,89	1,47	2,69	0	0	0	0
F_L(%)	Y3	1,55	0,48	16,98	10,69	1,72	1,19	71,93	14,6	4,95	8,29
F_SF(%)	Y4	6,54	10	48,65	8,43	84,23	8,05	3,12	5,26	0,02	0,05

Source: own elaboration in Statistica

Fig. 6. Distribution of general government expenditure on health according to different levels in clusters (%)



Source: own elaboration

As it was mentioned earlier, it is important to analyze impact of financial mechanisms of healthcare funding on the indicators of satisfaction of health care services and indicators of health life years.

In tables 4 and 5 the relationship between clusters describing financial regimes and indicators of satisfaction of health care services in EU countries are presented for 2009 and 2013.

Table 4. Relation between clusters describing financial regimes and indicators of satisfaction of health care services in EU countries in 2009

	Characteristics	Very good	Fairly good	Fairly bad	Very bad	Total 'Good'	Total 'Bad'	Best case	Country	Worst case	Country
Cluster 1	Mean	0,23	0,65	0,1	0,02	0,88	0,12	Max	Luxembourg	Min	Denmark
	Standard deviation	0	0,01	0,01	0,01	0,01	0,02	0,88		0,87	
Cluster 2	Mean	0,27	0,59	0,09	0,04	0,86	0,13	Max	Belgium	Min	Ireland
	Standard deviation	0,14	0,12	0,1	0,07	0,19	0,17	0,97		0,53	
Cluster 3	Mean	0,18	0,63	0,14	0,03	0,81	0,18	Max	France	Min	Italy
	Standard deviation	0,12	0,1	0,11	0,04	0,15	0,15	0,91		0,54	
Cluster 4	Mean	0,06	0,52	0,32	0,09	0,58	0,41	Max	Spain	Min	Greece
	Standard deviation	0,04	0,18	0,14	0,08	0,22	0,22	0,81		0,25	
Cluster 5	Mean	0,01	0,24	0,43	0,26	0,25	0,69	Max	Malta	Min	Romania
	Standard deviation	0,09	0,16	0,15	0,09	0,22	0,22	0,81		0,25	

Source: own elaboration

Table 5. Relation between clusters describing financial regimes and indicators of satisfaction of health care services in EU countries in 2013

Clusters for financial regimes	Characteristics of satisfaction of health care services in clusters	Very good	Fairly good	Fairly bad	Very bad	Total 'Good'	Total 'Bad'	Best case	Country	Worst case	Country
Cluster 1	Mean	0,25	0,64	0,1	0,01	0,89	0,11	Max	Luxembourg	Min	Denmark
	Standard deviation	0,01	0,01	0,01	0,01	0,02	0,02	0,9		0,87	
Cluster 2	Mean	0,28	0,6	0,09	0,02	0,88	0,11	Max	Belgium	Min	Ireland
	Standard deviation	0,1	0,07	0,06	0,04	0,11	0,1	0,97		0,62	
Cluster 3	Mean	0,18	0,53	0,22	0,07	0,71	0,28	Max	United Kingdom	Min	Italy
	Standard deviation	0,18	0,02	0,15	0,05	0,21	0,2	0,85		0,56	
Cluster 4	Mean	0,11	0,54	0,25	0,09	0,65	0,35	Max	Malta	Min	Greece
	Standard deviation	0,11	0,15	0,14	0,1	0,23	0,23	0,94		0,26	
Cluster 5	Mean	0,05	0,44	0,35	0,13	0,49	0,49	Max	Estonia, Cyprus	Min	Romania
	Standard deviation	0,04	0,17	0,1	0,1	0,2	0,19	0,73		0,25	

Source: own elaboration

As it is seen from these tables in clusters with the different financial regimes it is possible to find the best and worst cases of countries, where the indicators of satisfaction of health care services were highest and lowest respectively. It means that in each cluster with certain regime of funding healthcare the seeking best solution for organization and management of healthcare should be studied.

Taking into account some subjective character of satisfaction of health care services, it is necessary to analyze other more objective indicators like healthy life years calculated for males and females.

In tab. 6 the results of grouping EU countries to clusters on healthy life years are given for 2016, 2018 and 2020.

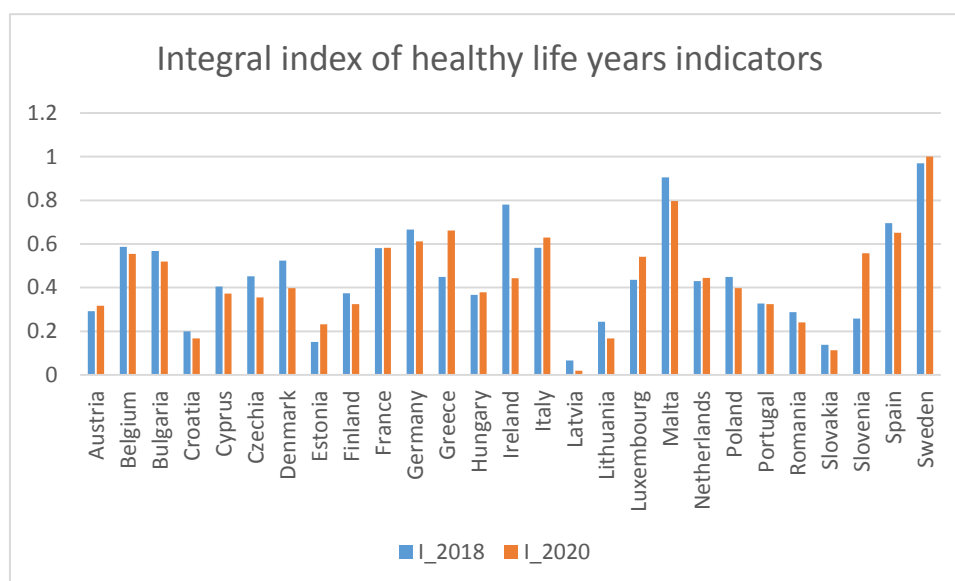
Table 6. Characteristics of the clusters for distribution of EU countries on healthy life years

Indicator	Variable	Cluster HL 1		Cluster HL 2		Cluster HL 3		Cluster HL 4		Cluster HL5	
		Cluster contains 17 cases		Cluster contains 21 cases		Cluster contains 19 cases		Cluster contains 17 cases		Cluster contains 7 cases	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Healthy life years in absolute value at birth for males	HL1	55,21	1,92	59,90	1,61	62,56	1,47	65,66	1,51	71,59	1,84
Healthy life years in absolute value at 65 for males	HL2	5,29	1,05	8,72	1,60	8,52	1,30	10,50	1,01	13,93	1,48
Healthy life years in absolute value at birth for females	HL3	57,22	2,05	58,39	1,41	63,89	1,21	67,31	1,10	72,13	1,19
Healthy life years in absolute value at 65 for females	HL4	5,61	1,17	8,50	1,99	8,98	1,66	11,08	1,11	14,71	1,56

Source: own elaboration in Statistica

On the basis of the indicators of healthy life years, which are available in Eurostat, the integral indicators were calculated for 2018 and 2020. The results are presented in Fig. 7.

Fig. 7. Values of integral index for healthy life years indicators in 2018 and in 2020



Source: own elaboration

As it is seen from the plot some countries (Austria, Denmark, Finland) with higher indicators of healthcare funding have lower values in healthy life years, and vice versa, other some countries, like Bulgaria or Malta, where government expenditures on healthcare are significantly lower demonstrate the better values in healthy life years. Thus it is possible to suggest that cultural traditions in the food preparation and consumption, climate and good ecology, physical activities, moderate life style and reduction of stressful situations, better satisfaction of the life have significant impact on the healthy life years indicators. These hypotheses were proved on the example of many countries, for instance, on the example of Poland the influence of socio-economic and demographic determinants on the satisfaction on health state and satisfaction on life are shown [10].

Conclusions

The problem of the definition and measuring efficiency in healthcare systems is important direction of study. There are different approaches for the description of efficiency as indicator or complex characteristics related with performance of the healthcare system. For the analysis of the efficiency the complex of different socio-economic and demographic factors should be taken into account, as well as features of financial mechanisms for healthcare systems must be analyzed too.

For most EU countries the switches from one type of cluster for financial regime to another cluster were occurred after long period, that it is possible to suggest these consequences as the results of the economic development, new strategies of government, or changes in politics. Nevertheless, some countries demonstrated the stable policy in funding their national healthcare and over all period these countries were in the same cluster, but their indicators in satisfaction of healthcare services or healthy life years may change.

It should be noted that in some countries the policy of financing health systems was quite flexible and changed, while in other countries this policy was stable for a long term period. At the same time, a number of social, economic, political and institutional factors influence the policy of financing health systems, which

should also be taken into account and studied in connection with the changing characteristics of financing the health system and its efficiency in the country.

Acknowledgement

This article is an output of the scientific projects: IGA 3/2020-M «Improving Healthcare efficiency: new trends and challenges» and 2/2023-M «Development of different organization and business structures in public and private sectors of health care, pharmaceutical industry, health education and promotion of health, rehabilitation, wellness and beauty sectors: international experience» founded by Bratislava University of Economics and Management

References

1. Benova, E., Dubrovina, N., Boyko, V., & Zamyatin, P. (2014). Classification and cluster analysis of health care systems in the OECD countries. *Public Administration and Regional Development. School of Economics and Management in Public Administration*, (2), 45-56.
2. Boulhol, H., Sowa, A., Golinowska, S., & Sicari, P. (2012). Improving the health-care system in Poland.
3. Chisholm, D., & Evans, D. B. (2010). Improving health system efficiency as a means of moving towards universal coverage. *World health report*, 28, 33.
4. Cylus, J., Papanicolas, I., Smith, P. C., & World Health Organization. (2016). *Health system efficiency: how to make measurement matter for policy and management*. World Health Organization. Regional Office for Europe.
5. World Health Organization. (2019). Countries are spending more on health, but people are still paying too much out of their own pockets. In *who. int*.

6. Dixon, A. (2006). Learning from international models of funding and delivering health care. *PENCHEON, D. et al*, 392-403.
7. Docteur, E., & Oxley, H. (2003). Health-care systems: lessons from the reform experience.
8. Dubrovina, N., Filip, S., & Dubrovina, V. (2020, October). Classification of financial mechanisms of healthcare systems in the countries of European Union. In *Fourth International Scientific Conference on Recent Advances in Information Technology, Tourism, Economics, Management and Agriculture* (p. 169).
9. Dubrovina, N., Gerrard, R., Filip, S., & Dubrovina, V. (2021). Modelling the trends of the healthcare funding in the EU countries. *Przegląd europejski*, (1), 61-80.
10. Dubrovina, N., Siwec, A., Ornowski, M., Boyko, V., Zamiatin, P., Zamiatin, D., & Gerrard, R. (2016). Social and demographic determinants of the health state and life satisfaction of population in Poland. In *Life Satisfaction: Determinants, Psychological Implications and Impact on Quality-of-Life* (pp. 1-54).
11. Dubrovina, N., Guryanova, L., Dubrovina, V. (2021). Cost analysis as a tools for the analysis of effectiveness and efficiency of health care system. In: *Improving living standards in a globalized world: opportunities and challenges: monograph*. - Editors: Tetyana Nestorenko, Tadeusz Pokusa. Opole: The Academy of Management and Administration in Opole. pp. 559-565.
12. European Commission. Joint Report on Health Systems. Occasional Papers, No. 74. 2010.
13. Funding health care: options for Europe. Edited by E.Mossialos, A.Dixon, J.Figueras, J.Kutzin. Open University Press. Philadelphia. USA, 2002. – 327 p.
14. Guryanova L., Dubrovina N., Syrotkina M. (2021). Models of evaluation of efficiency of healthcare systems. In: *National Health as Determinant of Sustainable Development of Society*. Editors: N. Dubrovina, S. Filip. Monograph. School of Economics and Management in Public Administration in Bratislava, pp. 721-732.
15. International Labour Organization. (2002). *Health Care in Central and Eastern Europe. Reform, Privatization and Employment in Four Countries*. International Labour Organization.
16. Jakubowski, E. (1998). Health care systems in the EU: a comparative study.
17. Joumard, I., Hoeller, P., Andre, C., & Nicq, C. (2010). Health care systems: Efficiency and policy settings. (*No Title*).
18. Kostičová, M., Ozorovský, V., Badalík, L., & Fabian, G. (2011). *An Introduction to Social Medicine*.
19. Special Eurobarometer Patient Safety and Quality of Care. (2013). European Commission. No. 411. 2013 / Wave EB80.2 – TNS Opinion & Social.
20. Special Eurobarometer Patient safety and quality of healthcare. (2009). European Commission. No. 327. 2009. / Wave 722. – TNS Opinion & Social.
21. Tavares, A. I., & Ferreira, P. L. (2020). Public satisfaction with health system coverage, empirical evidence from SHARE data. *International Journal of Health Economics and Management*, 20(3), 229-249.
22. Ostenda A., Dubrovina V., Martynyuk O. (2020). Evaluation of quality of services and management in the healthcare system In: *International Relations 2020: Current issues of world economy and politics. Proceedings of scientific works from the 21th International Scientific Conference 3rd- 4th December 2020*. Publishing Ekonóm. pp. 546-552.