

Economic Development of Countries and Health Technology Assessment (HTA) in Healthcare Decision Making

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Abstract: The research indicated the relationship between the formal criteria of Health Technology Assessment (HTA) availability and the economic development of countries considering HTA to be an indicator for the effectiveness of the healthcare management process. HTA is at the very end of the evidence data generation. It makes possible forecasting medical, economic and social outcomes of healthcare management decisions and is the base for rational use of healthcare resources. Effective allocation of healthcare funds leads to an increase in human capital and economic development opportunities followed by the overall healthcare expenditures growth. The number of countries using HTA increases with the growth of per capita GDP, reaching a maximum in the countries with 40-50 thousand USD GDP per capita value range and decreases with further growth of this indicator. The low level of economic development, characterized by a low per capita GDP, makes it difficult to implement HTA due to strict regulations aimed at expenditures decrease and preventing using effectiveness criteria for health management assessment. Nevertheless, a significant number of low-income countries (below 10 thousand USD) per capita GDP are striving to improve the efficiency of health management and are at different stages of the HTA creation and implementation into healthcare systems. The opposite countries with high (above 50 thousand USD) per capita GDP are mostly tax haven countries (offshore zones) and as a rule these indicators are not linked with the real economic and industrial development. These countries do not use HTA for expert support of healthcare management decisions. Regional international cooperation increases the possibility of creating and using HTA in both low and high per capita GDP countries.

Keywords: Health Technology Assessment (HTA), healthcare management, healthcare decision making, expert support for decision making, economic development, per capita gross domestic product (GDP), low-middle income countries, high income countries.

1. INTRODUCTION

Modern economic models consider healthcare as a tool providing states with labor resources for their economic development. A strong economy, in its turn allows us increasing healthcare expenditures, contributing to further economic growth [1-3]. An important place in this cycle is occupied by the effectiveness of healthcare decision making and control providing different results at the same cost. Meanwhile the assessing of the overall effectiveness of healthcare systems in terms of cost-benefit ratio is difficult due to significant number and variety of safety and effectiveness criteria. The reduction to an integral indicator or an artificial restriction cause doubts on the evidence-based nature of the results obtained [4]. However, despite these weaknesses, this approach is currently the only one available for evaluating and comparing the effectiveness of health systems. Bloomberg's assessment of the effectiveness of healthcare systems is based on the life expectancy criteria without taking into account its quality, morbidity and prevalence of diseases, without highlighting the

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importance of other factors that shape the health of the population and affect life expectancy, in addition to the health system. Expenditures are determined by the share of per capita gross domestic product (GDP) used for health care and medical services [5]. Another approach can be based on the healthcare decision making process assessment. The inclusion of comparative effectiveness criteria in the process indicates the focus of healthcare systems to increase efficiency and vice versa, the use of other than effectiveness criteria (like expenditures restrictions) demonstrate the other priorities. In the presented study, effective healthcare management is considered as a process with formal criteria of using modern specific methodology, including situation analysis based on real (evidence-based) data, predictive modeling of possible solutions based on comparative assessment of safety, efficacy, efficiency and effectiveness data [6]. The analysis and the forecast of medical, economic and social results of management decisions are provided by the Healthcare Technologies Assessment (HTA) organizations (agencies) in accordance with local legislation and regulatory documents. In majority of cases the decisions are related with budgeting of medical technologies (intervention). The clinical evidence-based data is available at the international databases while economic and social features are country-specific leading to the necessity of HTA agencies establishment at the country level or below (region of the country or hospital) depending on the local situation [7-18]. In the presented study, the existing of specialized organizations (agencies) conducting HTA and integrated into the decision-making process in healthcare system is considered as a formal criterion for effective healthcare systems. In accordance with these statements the formal criterion for the availability of HTA in the country should be interconnected with the economic development of countries.

2. OBJECTIVES

To assess the relationship between the availability of Health Technology Assessment (HTA) organizations (agencies) and their involvement in healthcare decision making process with the economic development of countries.

3. METHODS

The following criteria were applied for assessing of HTA at the country level:

1. Presence of HTA organizations (agencies) in countries;
2. Legislative and regulatory documents defining the role of HTA agencies and HTA procedures in the frames of healthcare systems;
3. Any other official documents related to HTA (defining the creation of OTP organizations at the national level or the use other countries HTA data for healthcare decision making, etc.).

The WHO database was used for the primary assessment [19] and then the obtained results were clarified by publications presented in the PubMed and Cambridge Core databases (243 publications, including reviews) and reviewing of HTA agencies websites followed, in some cases, by personal communication. 44 countries met the first 2 criteria: the presence of agencies and a clear definition of their role and interaction with the healthcare decision-making system in accordance with legislation and regulatory procedures. 43 other countries did not use HTA for expert support of healthcare decision making but had organizations declaring their participation in HTA (without procedures defining their role in healthcare management) or regulatory documents defining the process of HTA creation and interaction with the healthcare system in future. The rest 114 of overall 211 countries had neither agencies nor any documents

Economical level of the countries was carried out by the gross per capita product (GDP per capita) amount according to the World Bank [20].

We calculated the number of countries falling within 10 000 USD per capita GDP intervals (Fig.1) and next the proportion of countries using HTA in their practice (44 countries) or having HTA elements (43 countries) without impact on healthcare decision making in these intervals (Fig. 2). A correlation analysis (Spearman's criterion for heterogeneous statistical data) was performed between the medians of per capita GDP and the share of countries using HTA in the same intervals.

4. RESULTS

The distribution of countries (number of countries in the range) according to GDP per capita is presented on the Fig.1. The shares of countries in the same ranges using HTA or intending to do it are presented on the Fig. 2.

The majority of the countries worldwide (124 out of 211) do not use HTA in healthcare practice. 44 countries have specialized organizations (HTA agencies) and use their expertise for expert support of management decisions in healthcare. 43 countries have separate elements of the HTA system or documents regulating the creation of such systems, but do not currently apply them.

A significant number of low-income countries do not have HTA. Just 2 of 125 (Bulgaria and Serbia) countries in the range of 0 – 9 999 USD per capita GDP use HTA in the decision-making system. These countries established HTA agencies in accordance with the EU directive but do not have appropriate resources for a full-fledged assessment and thus are forced to use the results obtained by other countries [21-23, 33].

30 countries in this interval declare their intention to create and use HTA in healthcare, but they are at different stages of this process, starting from the early beginning [24] to the creation of full-fledged detailed roadmaps [25, 26].

32 countries are represented in the range of 10 000-19 999 USD. 8 of these countries use HTA and 11 of the just demonstrate their intention to do it. 13 countries are represented in the next interval (20 000 - 29 000 USD). 6 of them have HTA fully implemented into healthcare decision making. All of them are the part of the European region and developing effective healthcare decision making in accordance with the EU directive. 1 country in this range (Saudi Arabia) is going to establish HTA. 6 (European region, South Korea and Japan) of 12 countries in the 30 000 – 39 999 USD GDP per capita range have already established and used HTA.

In the next interval (40 000 – 49 999 USD), HTA operates in 9 out of 12 countries located in different regions worldwide. 1 country (United Arab Emirates) is making efforts to establish it.

There are just 3 countries in the 50 000 - 59 999 USD GDP per capita interval. 2 of them use HTA and 1 country (Iceland) is at the stage of its creation. The next interval (60 000 - 69 999 USD) is represented by 5 countries, 3 of them have already implemented HTA in decision making and 1 is doing it now (Singapore), 1 country does not have and is not going to create it (Qatar). 7 countries are representing the GDP per capita above 70 000 USD and 5 of them use HTA in their practice.

For further analyses in accordance with the curve indicating the share of countries with HTA the data set was divided into countries in which the use of HTA increases with an increase in per capita GDP (left, ascending part of the graph) and countries in which the use of HTA decreases with a further increase in income (right part of the graph). The interval from 40 000 to 49 999 USD contained the transition point (the final point for the ascending branch of the chart and the initial one for the descending branch) with maximal number of countries using HTA. Spearman's rank correlation coefficient for heterogeneous statistical data between the medians of the per capita GDP intervals and the share of countries with HTA in these intervals was 0.238 (very weak correlation), but showed a very high (0.9) correlation for the ascending and a very high (- 0.9) statistically significant inverse

correlation for the descending branches of the graph taken separately. Despite the limitations associated with the possibility of using correlation analysis in these conditions, the results obtained suggested the presence of at least two different factors hindering the creation of HTA systems in countries with low per capita GDP and in countries with high per capita GDP.

An analysis of the publications indicated that low-income countries are characterized by similar features preventing from creation and using of HTA: an insufficient number of specialists capable preparing expert opinions on HTA and using its results in health practice; weak information infrastructure, making it difficult to obtain national evidence-based data on morbidity and mortality; fragmented health systems; lack of priorities at national levels, making it difficult to form a unified approach to assessment the effectiveness of healthcare and the quality of medical care; the peculiarities of financing and national legislations that excessively strictly regulate the possibility of financing medical technologies according to criteria other than budget savings, as well as the burden on health budgets associated with an increase in morbidity and complicating the possibility of forming flexible and evidence-based decision-making mechanisms [27-30]. Accordingly, the increase of economic development reduces the impact of these factors and opens up opportunities for the rational use of health resources based on HTA expertise.

The share of countries with HTA decreases with an increase in per capita GDP in the countries shown on the right side of the graph which indicates a lack of interest or the possibility of establishing a CTA in these countries. The assessment of economies of these countries indicated that 10 of 17 countries with per capita GDP above 50 000 USD are the tax haven countries and absolutely all countries with a per capita GDP of more than 80 000 USD (Cayman Islands, Isle of Man, Ireland, Bermuda, Switzerland, Luxembourg, Liechtenstein, Monaco) belong to this category or belonged to it until 2023 (Cayman Islands, Bermuda) [31,32].

In this case, financial flows pass through the budgets of countries without real activity, which distorts economic data and leads to artificially inflated GDP per capita figures [33]. In this group of 8 countries with a per capita runway of more than 80 thousand USD, only 4 formally use HTA. All these countries (Ireland, Switzerland, Liechtenstein and Luxembourg) are a part of the European region and, accordingly, are the subject to the European Directive on HTA improvement [33].

Thus, the use of HTA as a criterion for the effectiveness of the healthcare management process has a connection with the real economy. With an underdeveloped economy, countries are usually forced to strictly regulate health care costs, ignoring its effectiveness, reducing the quantity and quality of labor resources and losing the opportunity for economic development. The high per capita GDP in countries primarily over 80 000 USD are not affecting the real economy of these countries due to financial flows passing through offshore zones.

Despite the difficulties associated with HTA establishing and implementation in countries with low and high per capita GDP, the presence of 43 countries with separate elements of HTA suggests the creation of full-fledged structures in these countries in the future to ensure an effective process of national health management. International regional cooperation can play a significant role in HTA creation using the example of Bulgaria, Serbia and other countries involved in appropriate regional cooperation.

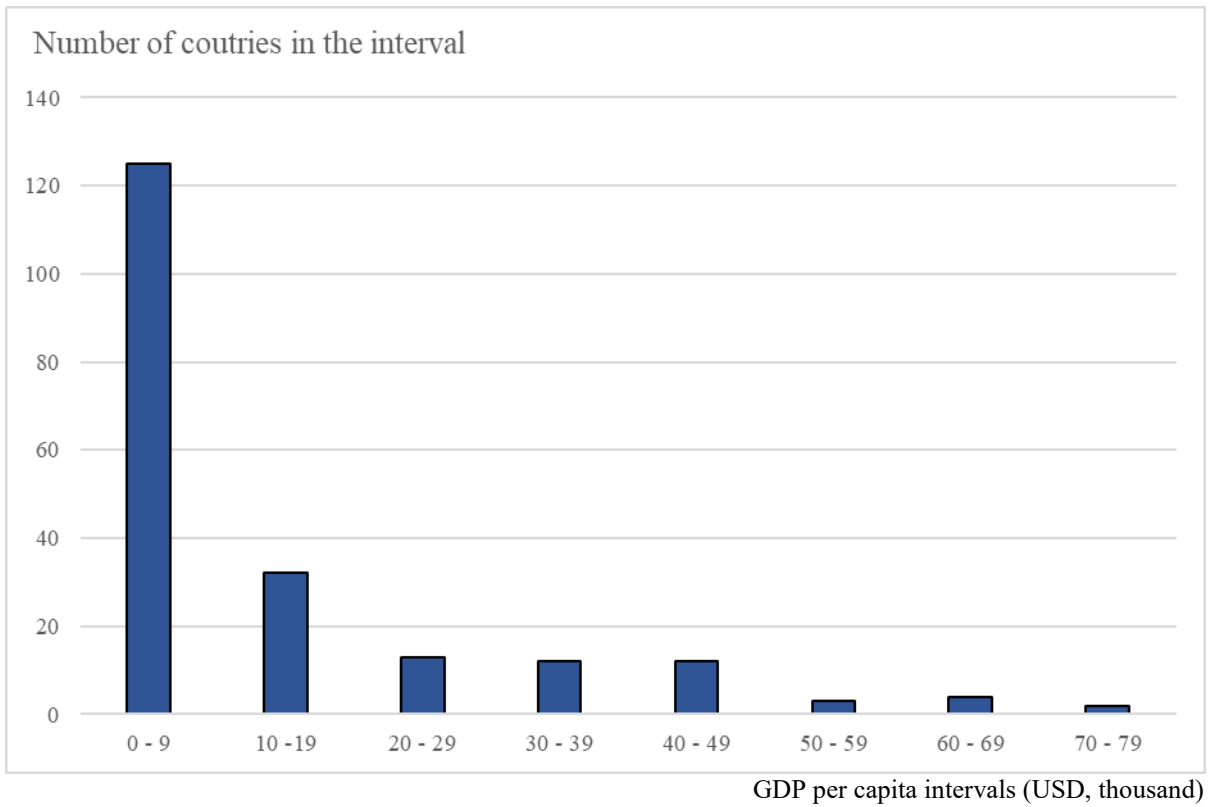


Fig. 1. The number of countries falling into the per capita GDP intervals of 10 000 USD increments.

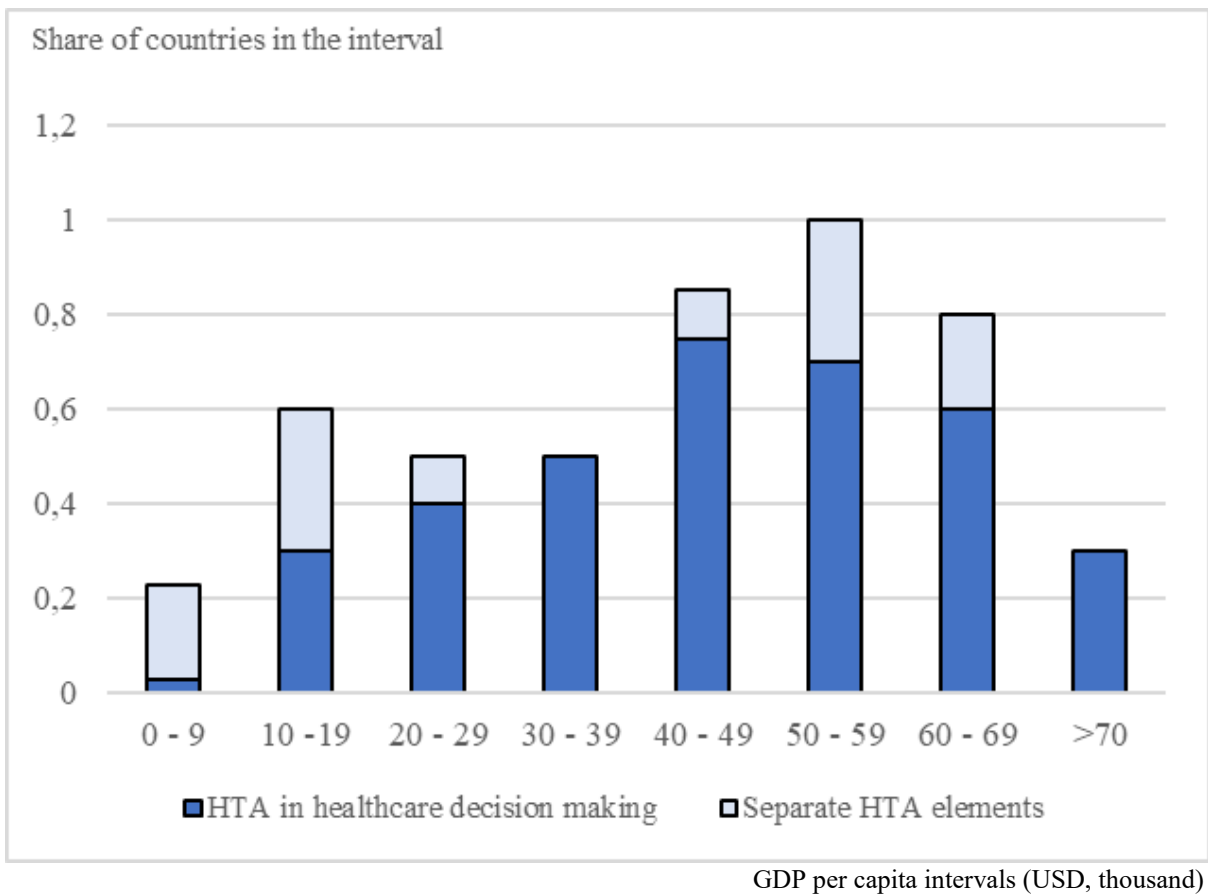


Fig. 2. The share of countries using HTA in healthcare decision making or having separate HTA elements and falling into the per capita GDP intervals of 10 000 USD increments

5. CONCLUSION

1. The research indicated the relationship between the availability of Health Technology Assessment (HTA) organizations (agencies) and their involvement in healthcare decision making process (44 of 211 countries) with the economic development of countries indicated as the amount of per capita GDP.
2. The low level of economic development, characterized by a low per capita GDP makes it difficult to create and implement HTA into healthcare decision making due to legislative landscape and preventing from effective healthcare management and leading to a decrease in human capital and loss of opportunities for economic growth in these countries.
3. 43 countries (predominantly with low- and middle-income) are striving to improve the efficiency of health management and are at different stages of HTA creation and implementation into healthcare decision making.
4. Tax haven countries (offshore zones), despite the high GDP per capita, as a rule do not use HTA in healthcare management. Obviously, in these countries, GDP does not reflect real economic growth, since the local development is not related to the volume of international cross-cutting financial flows. The exception is the countries of the European region that have created HTA agencies in accordance with the European Directive 2011/24/EU.
5. International regional cooperation expands opportunities and accelerates the creation and implementation of HTA both in low- and high-income countries, as well as provides an opportunity to use the HTA-based decision-making process in countries with low expertise or insufficient resources for full-fledged HTA.

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