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## **MEDICAL TOURISM IN ROMANIA. THE CASE STUDY OF CARDIOVASCULAR REHABILITATION IN COVASNA**

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### **Abstract**

Romania has one of the highest mortality rates in Europe for ischemic heart disease and, especially, for cerebrovascular disease. Taking into account the actual prevalence of cardiovascular diseases, an augmentation of the demand for specialized medical services is expected. As this paper argues, this situation can have an important impact on medical tourism. We analyze original data on the case study of a hospital, specialized in cardiovascular treatment, in the Romanian county of Covasna, which is offering specific balneal procedures, such as CO<sub>2</sub> hydrotherapy, alongside regular rehabilitation programs. The aim of our study is to evaluate the demographic characteristics, and the pathology of the hospitalized patients, as well as the specific rehabilitation procedures. Our findings suggest that the interest of patients, with cardiovascular diseases, for medical tourism can be influenced by accessibility, by some particularities of the location, but also by the holistic nature of the rehabilitation procedures.

**Keywords:** medical tourism, cardiovascular diseases, CO<sub>2</sub> hydrotherapy

**JEL Classification:** C46, I11, L83

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### **Introduction**

Medical tourism is an increasingly large phenomenon across the world (Connell, 2006, Bookman and Bookman, 2007, De Arellano, 2007). It represents the practice of travelling abroad in order to receive medical treatment, and usually involves lower costs for the patients, compared to their residence cities, or countries. Additionally, the medical tourism phenomenon can be triggered by the supply of specialized treatments that are available only in particular places, such as the case of balneal treatments, which are generally reliant on the supply of spring waters.

Atherosclerotic cardiovascular disease is the main cause of death in Europe (Perk et al., 2012), and Romania has one of the highest mortality rates due to ischemic heart disease

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and, especially, to cerebrovascular disease (Müller-Nordhorn et al., 2008). Taking into account the prevalence of cardiovascular diseases, a rise in the demand of medical services in this field is expected, with an important impact on medical tourism as well. In many European countries health care systems are providing rehabilitation services after an acute cardiovascular event like myocardial infarction or stroke. Some countries are promoting cardiovascular rehabilitation in residential centers, where the patients live in an optimal environment for 2–3 weeks, in order to become familiar with the necessary medication, and be prepared for a healthier lifestyle. Other countries favor for ambulatory rehabilitation units (Piepoli et al., 2010).

Our research on the medical tourism in Romania is based on the case study of the Hospital for Cardiovascular Rehabilitation “Benedek Geza”, which is a specialized center for cardiovascular diseases, located in Covasna County. This region is presently recognized as a holiday destination, but mostly as a landmark destination for cardiovascular rehabilitation. It is located in the eastern curve of the Carpathians, in the south-eastern corner of Covasna County. Its touristic destination status is improved by its accessibility: 35 km from Sfântu Gheorghe – the county capital, 60 km from Braşov – one of the largest cities in Romania, and 250 km from Bucharest-Romania’s capital. Most importantly, the resort benefits from springs that are rich in mineral components.

Covasna has flourished as a health resort since 1881, starting with the opening of "Devil Swamp Bath Institute" for public. The following year, the mineral water from Covasna won gold medal at the Trieste mineral water world-exhibition. However, the most important and specific natural conditions of Covasna are the carbon dioxide (CO<sub>2</sub>) springs (*mofete*). This is a post-volcanic activity that can be found only in a few other regions of the world, like in France, Italy, Java Island, or in the Yellowstone National Park in the United States.

Our study explores the complementarity between the usual rehabilitation programs provided by the studied medical center in Covasna, and the specific balneal procedures offered during the medical treatment period. Despite an activity that extends over more than 50 years, and the centripetal role in the regional touristic activities, there is no previous assessment of this phenomenon. Therefore, based on the empirical data of the “Benedek Geza” Hospital, covering patient demographics and pathology for 2012, we provide an original assessment of the characteristics and incentives that drive medical tourism in the Romanian county of Covasna.

### **1. Medical Specificities of the CO<sub>2</sub> Hydrotherapy**

The specific feature of Covasna is CO<sub>2</sub> hydrotherapy - a remedy with a wide spectrum of effects, which have been known and applied since the Middle Ages. Previous research suggests that carbon dioxide balneotherapy provides substantial benefits with regards peripheral arterial disease (Pagourelis et al., 2011). Coronary artery disease, arterial hypertension or chronic venous disease could also take advantage from this therapy, but further research is necessary to support these inferences.

There are very few studies that have analyzed the effect of CO<sub>2</sub> balneotherapy. In a systematic review of the literature, Pagourelis et al. (2011) have identified only nine studies with consistent research methodology on this issue, in the timeframe of 1980-2011. Fabry et al. (2009) have highlighted the improvement of total walking distance, the increase of ankle-brachial index, as well as the peripheral cutaneous oxygenation, in patients with

stage II Fontaine peripheral arterial disease, after 18 consecutive days of CO<sub>2</sub> treatment versus placebo (Fabry et al., 2009). Other positive effects in patients with intermittent claudication have been revealed by Hartmann et al. (1997), as patients with mild, bilateral, peripheral occlusive disease had a 300% augmentation of the Doppler laser flowmetry after immersion in CO<sub>2</sub>–enriched water compared with the immersion in fresh water. Toriyama et al. (2002) have reported good results even in case of critical limb ischemia.

Several experimental data have identified possible mechanisms implicated in the benefits of CO<sub>2</sub> therapy. One of these mechanisms consists in the production of an important vasodilatation with a shift of oxygen-binding curve that facilitates oxygen delivery in tissues (Resch and Just, 1994). Complementary, there is an increase in the expression of vascular endothelial growth factor (VEGF) conducting to nitric oxide (NO)-dependent angiogenesis, and the mobilization of endothelial progenitor cells in ischemic limbs treated with CO<sub>2</sub>—enriched bath (Irie et al., 2005). Other studies have addressed the balance of oxidative stress systems, which seemed to improve under CO<sub>2</sub> balneotherapy (Dogliotti et al., 2011).

## **2. Research Design and Empirical Evidence**

The main objective of this research was to assert the amplitude of the medical tourism in Covasna, the most important pathologic conditions for which the patients have been addressed to the “Benedek Geza” Hospital for Cardiovascular Rehabilitation, and the extent of balneal procedures in the rehabilitation program of the patients.

For our purpose of evaluating the traits and incentives for medical tourism in this region, we used descriptive statistics of the demographics of admitted patients, their diagnostics at discharge, as well as the procedures applied during their hospitalization. The statistical analysis was conducted with the Eviews software. Our sample consists of 13,878 patients, hospitalized in 2012, which have been included in the institution’s database, if they had a diagnosis of cardiovascular disease<sup>†</sup>. The demographic data comprises patients’ age and area of residence, which are relevant for the medical tourism phenomenon. The classification of cardiovascular diseases for which rehabilitation programs are applied, was based on the main diagnostic at discharge.

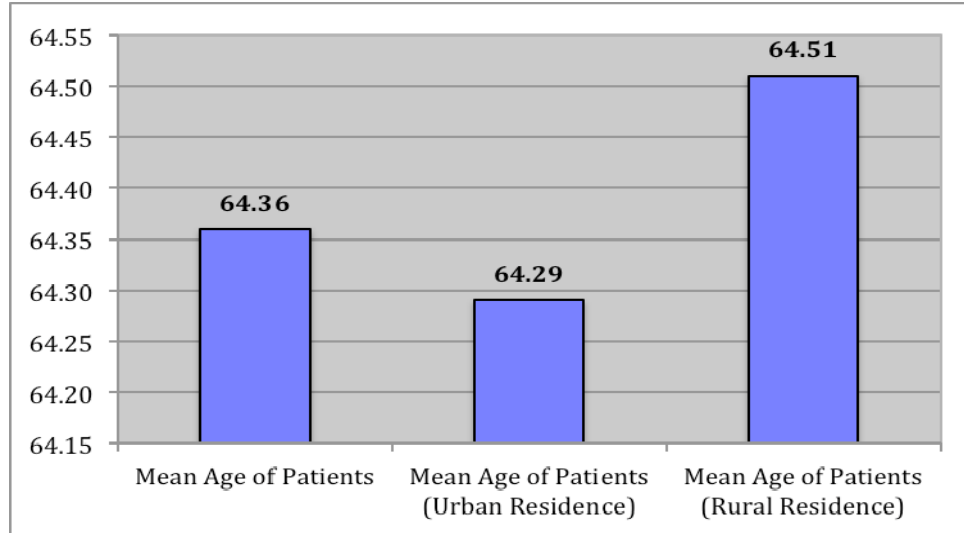
Of all the procedures realized during hospitalization we have evaluated only those specific for balneotherapy: hydrotherapy, kinetotherapy, therapeutic massage, stimulative therapy, thermotherapy and therapeutic ultrasound. However, the soft of the statistical evidence in the hospital did not allowed us to correlate the procedures with each type of diagnostic.

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<sup>†</sup> Patients with such cardiovascular pathology as ischemic cardiac disease, peripheral artery disease, arterial hypertension, chronic venous insufficiency are admitted in the Hospital for Cardiovascular Rehabilitation “Benedek Geza”, in Covasna if they have state insurance and are referenced by a cardiologist. During the hospitalization period, the patients are evaluated through clinical exam, ECG, exercise ECG, echocardiography and vascular ultrasound, ambulatory blood pressure monitoring, ECG Holter monitoring, oscillometry, pulmonary function tests, radiologic exam, laboratory tests and are applied rehabilitation programs consisting in education of patients regarding adequate life-style changes, appropriate diet, reevaluation of pharmacological therapy, metered physical training – all of which are associated to pharmacological therapy.

**3. Results and discussion**

Our sample of cases consists of 13,878 patients admitted at „Bendek Geza” Cardiovascular Rehabilitation Hospital, in Covasna, in 2012. The mean age of patients was 64.36 years. For the patients that resided in urban areas, the mean age was 64.29 years, while for those that resided in rural area, the average recorded age was 64.51 years (Figure 1).

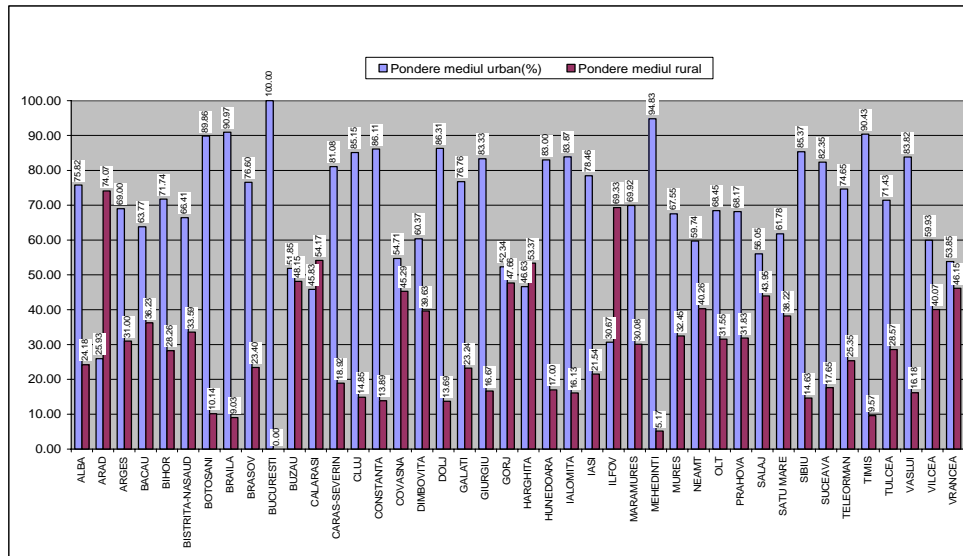


**Figure no. 1: Mean Age of Admitted Patients, 2012**

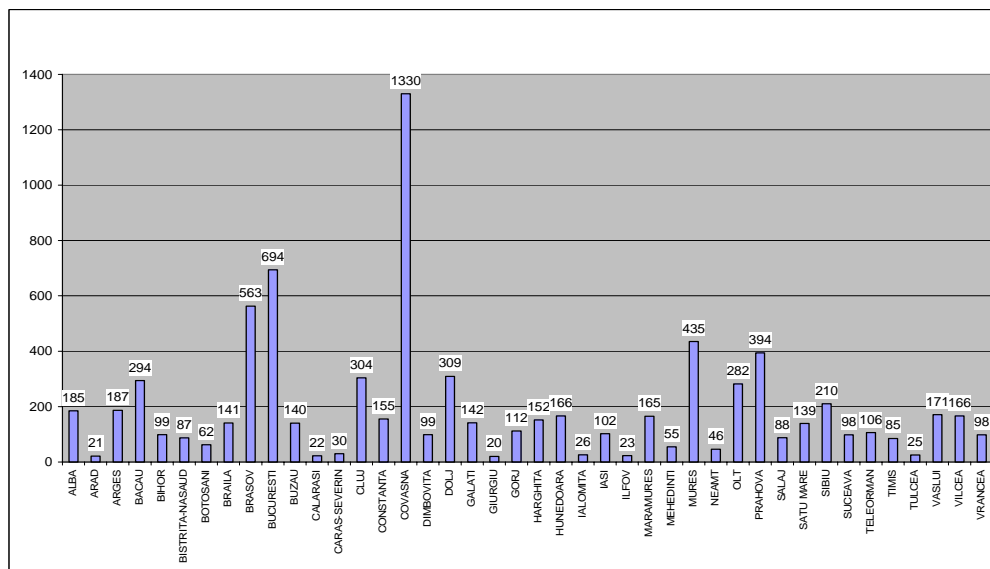
*Source: compiled by the authors based on „Bendek Geza” Patient Registry, 2012.*

As showed in Figure 2, the distribution of patients, by area of residence shows a clear prevalence of patients from the urban area, in the vast majority of counties. The records show a prevalence of patients from the rural area in the case of the counties Ilfov, Calarasi, Harghita, and Arad. Finally, from Buzau county, the proportion of admissions was quite similar between those from urban with those from the rural area of residence. The evidence suggests patients from rural areas of residence are at disadvantage, by comparison to subjects from the urban area. Further research would be needed to assert whether this situation is due physicians’ lack of involvement in such therapeutic options, or to the higher prevalence of patients without state insurance, in rural areas, which effectively prevents them from treatments at the state-owned „Bendek Geza” medical center.

In comparison to all the other Romanian counties, the biggest number of patients admitted in 2012, to the „Bendek Geza” Hospital were, predictably enough, residents of Covasna—1,330 persons. Still, the majority of hospitalisations (83.43%) were constituted by patients from outside this region, and thus, represented the core of the medical tourism in this hospital (Figure 3). As the hospitalisation in this facility is reliant on the public health insurance, we are unable to compare and contrast the national demand for such services with the international demand. In this sense, we believe that private facilities in the area should also collect and make available data on their patients background, which was not available for the present research.



**Figure no. 2: Distribution of patients by area of residence**  
 Source: compiled by the authors based on „Bendek Geza” Patient Registry, 2012.



**Figure no. 3: Distribution of patients from urban residence**  
 Source: compiled by the authors based on „Bendek Geza” Patient Registry, 2012.

The main diagnostics at discharge were arterial hypertension (56.37%) and chronic ischemic cardiopathy (30.53%) (Figure 4). In the last category should be integrated those with nonspecified angina (0.09%), other forms of angina (1%) and those with

atherosclerotic cardiopathy (2.37%). All of these are representing the same pathology, therefore we can conclude that ischemic cardiac disease was represented in the main diagnostic of discharge in 33.99% of cases. The very few patients with acute coronary syndromes, those with acute myocardial infarction (0.01%), acute transmural infarction (0.02%) and acute transmural infarction of the anterior wall (0.08%), where hospitalised in emergency. They were all residents in Covasna and they were not included immediately in rehabilitation programs.

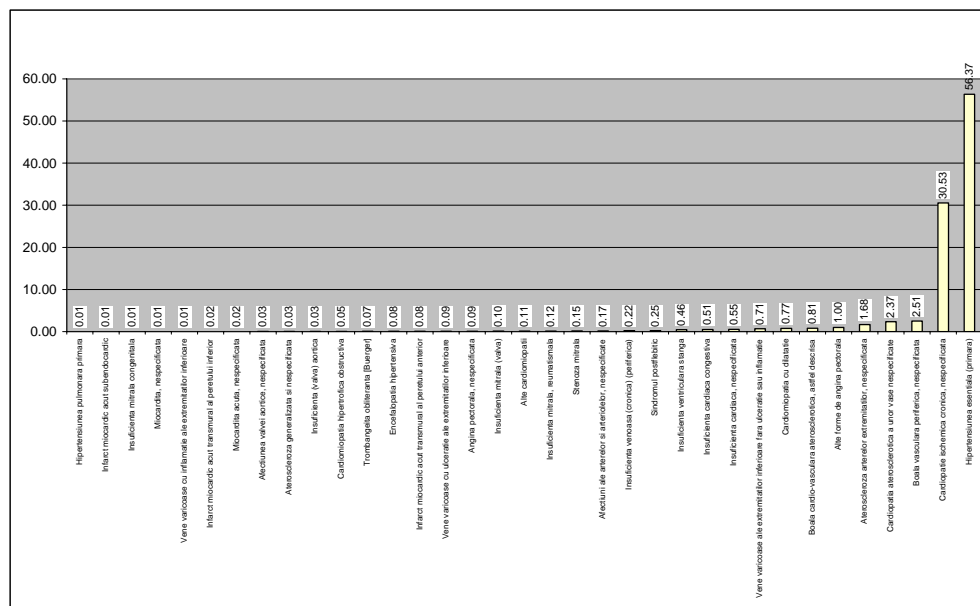


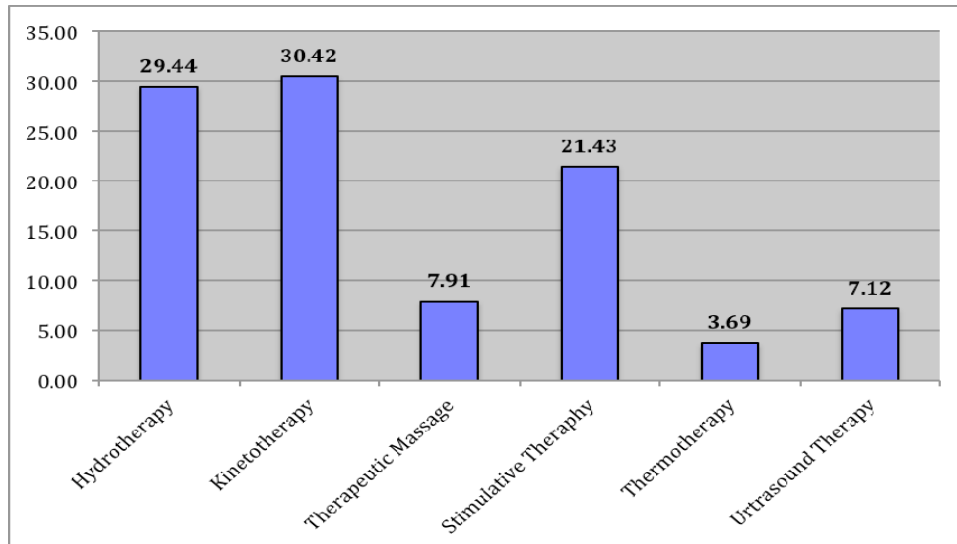
Figure no. 4: Main diagnostic at hospital discharge

Source: compiled by the authors based on „Bendek Geza” Patient Registry, 2012.

We were initially surprised by the fact that peripheral arterial disease that could have the main benefit from the specific CO<sub>2</sub> balneotherapy in Covasna was found in a very small number of cases compared with arterial hypertension and cardiac ischemic disease. This results needs a short comment. First of all, arterial hypertension and cardiac ischemic disease have the highest prevalence among cardiovascular diseases. On the other hand we have to notice that a lot of patients with arterial hypertension and/or cardiac ischemic disease have also peripheral arterial disease, but these cases have not been introduced in the statistical analysis because peripheral arterial disease was not the main diagnostic, was a secondary one. As a consequence, higher rates of peripheral arterial disease could be encountered in this patient, but we were not able to reveal it.

Based on the available empirical evidence, we evaluated the application rate of each of the specialized procedures of the “Bendek Geza” medical center (see Figure 5). Of all the procedures consisting in hydrotherapy, kinetotherapy, therapeutic massage, simulative therapy, thermotherapy and therapeutic ultrasound, hydrotherapy and kinetotherapy were most frequently applied, in 29.44% and respectively in 30.42% of cases. We can observe the important role played by CO<sub>2</sub> hydrotherapy as a treatment procedure, thus supporting our assumption that peripheral arterial disease might have higher rates than previously

reported for patients referred to cardiovascular rehabilitation. Also, we have to notice that, in a significant number of cases, have been applied rehabilitation procedures for rheumatic diseases like kinetotherapy, therapeutic massage or therapeutic ultrasound. We did not include in this analysis the usual procedures for cardiovascular rehabilitation, like education of patients regarding adequate life-style changes, appropriate diet, re-evaluation of pharmacological therapy, metered physical training.



**Figure no. 5: Specific procedures for rehabilitation**

Source: compiled by the authors based on „Bendek Geza” Patient Registry, 2012

## Conclusions

Rehabilitation is an important task in the management of cardiovascular diseases and might be a significant objective of medical tourism in Romania. This paper aimed at revealing, through descriptive statistical analysis, the extent, and the characteristics of medical tourism for cardiovascular diseases in Covasna, in 2012. We found that the majority of patients (83%) referred to the Hospital for Cardiovascular Rehabilitation “Bendek Geza” in Covasna come from another area of residence. This suggests that, at least on the national level, there is a medical touristic dynamics towards this region, for cardiovascular disease treatment.

Based on the empirical evidence collected, we assert that the interest of patients with cardiovascular diseases for medical tourism can be influenced by accessibility, by some particularities of the location, but also by the integrated feature of the rehabilitation procedures. Given the institutional admission procedures at the “Bendek Geza” Hospital, the most important driver for patients is the accessibility offered by the medical insurance. In this regard we have identified that patients from rural area of residence are at disadvantage, by comparison to subjects from the urban area. Another motivation to prefer this location is represented by the reputation of this hospital. However, we are emphasizing that CO<sub>2</sub> hydrotherapy was applied in a similar rate with certain procedures specific for rheumatic diseases. Considering the mean age of patients is quite advanced (64.36 years)



we can understand why this procedure has been also associated to cardiovascular rehabilitation program.

Further research would be needed to detail the drivers and restrictions of Romanian patients that might benefit from such therapies. While we have advanced the hypothesis that rural patients might be restricted by a lower public health insurance coverage rate, there is little evidence on this situation. Additionally, there is no estimate of the existence or dimension of an international demand for the Covasna CO<sub>2</sub> cardiovascular rehabilitation treatments. With a triangulation of data between public institutions, such as „Bendek Geza”, and other private facilities in the region, we might acquire a better sense of the real dimension of the medical tourism market in this region.

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