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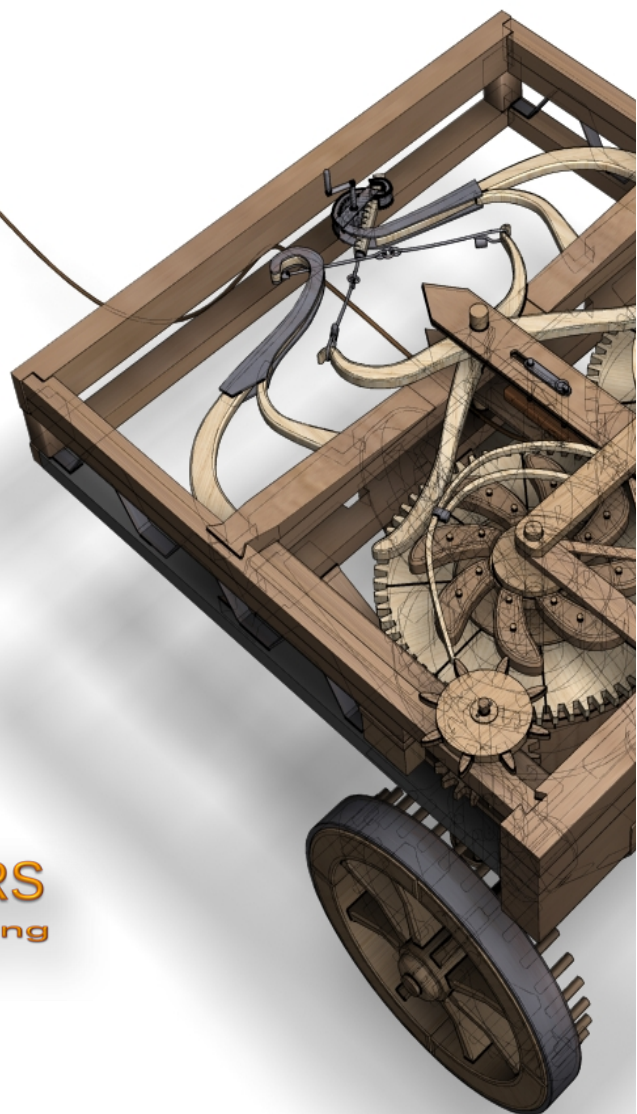
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Potential of Health Resort Treatment of Cardiovascular Diseases

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Abstract

The current study is devoted to the problems of using the health resort potential of the Republic of Dagestan for the implementation of cardiovascular rehabilitation programs. The main objective of this study is to develop measures that improve accessibility of cardiac rehabilitation for population and increase the efficiency of using the health resort facilities of the region. Methods of statistical data analysis, retrospective and comparative analysis of indicators are used in the study. Using these methods, the results on the incidence of cardiovascular diseases (CVDs) and the development of the health resort facilities of the Republic of Dagestan are obtained.

Results of the study of the incidence of CVDs in the Republic of Dagestan allow to make a conclusion that CVDs are the leading cause of mortality and disability in the Republic of Dagestan. Dagestan is a relatively prosperous region of Russia in terms of prevalence of CVDs, disability and mortality of the population from CVDs. Nevertheless, the death rate from CVDs remains quite high. Results of the analysis of health resort facilities show that the existing recreational potential for implementing cardiac rehabilitation programs in the region is not being used efficiently enough.

The following is proposed as the main areas of development of the cardiac health resort infrastructure: to develop a cardio health resort of the regional level that implements specialized rehabilitation programs; to comprehensively modernize the health resort facilities that implement rehabilitation programs for patients with CVDs; to develop measures to encourage the use of undeveloped land plots and unfinished construction sites located in the resort areas of the Republic of Dagestan. Regional authorities need to take measures to create favorable conditions for the industry infrastructure.

Keywords: cardiovascular diseases; heart and blood vessel diseases; cardiac rehabilitation; circulatory diseases; health resort facilities; recreational potential; infrastructure

JEL Classification: I10; I11; I19

Introduction

Unfortunately, CVDs are a frequent cause of disability and mortality of population. According to the World Health Organization (WHO), 31% of all lethal outcomes in the world are death from CVDs. Of these, 41.8% of deaths were caused by a coronary heart disease and 37.9% by a stroke (Cardiovascular diseases, 2017).

In Russia, every fourth patient with cardiac problems passes away too early. The severity of the problem was noted by the President of the Russian Federation back in the "May decrees" 2012, when he set the task to reduce the mortality from CVDs to 649.4 cases per 100 thous people by 2018 (Presidential Decree No. 597 dated May 7, 2012).

Despite the successes achieved in reducing the level of mortality from vascular pathologies over the past 15 years, Russia significantly lags behind countries with developed healthcare systems, where this indicator averages to 250-300 cases per 100 thous people. This is due to the low availability of efficient cardiohelp for Russians with CVDs. Patients with cardiopathology cannot afford many drugs because of their high price, while the prescribed fully subsidized drugs do not always correspond to the required quality.

Practice of countries with a developed health system shows that efficient prevention, timely treatment and subsequent rehabilitation can slow the development of diseases, avoid complications and reduce the number of hospitalization, disablement and lethal outcomes from CVDs (Aronov and Bubnova 2013).

Health resort treatment, which is the most important link in the entire complex of therapeutic and preventive measures, rightly enjoys popularity among the numerous methods of prevention and treatment of CVDs. The results of numerous studies on the issues of development of the health resort industry reveal that the efficiency of treatment conducted in the health resort organizations is high and allows for a 2-6-fold decrease in the number of acute conditions in both adults and children. Recent medical studies claim that cardiovascular rehabilitation can extend life up to 5 years (Oganov *et al.* 2011). These data refer to patients who suffered from myocardial infarction, angioplasty with stenting of the coronary arteries, CABG and cardiac valve prosthetics, stable angina and chronic heart failure, and had undergone the entire cardiac rehabilitation program. (News of the cardiac rehabilitation. 18/05/2016).

At the same time, almost 40% of the areas allocated for rehabilitation of population are not used in Russia, which is due to the low level of facilities of most health resorts. Some regions that have a significant recreational potential for treatment and rehabilitation of patients with CVDs use it inefficiency. The Republic of Dagestan belongs to these regions.

The main objective of this work is to determine the perspective areas of the development of the cardiac health resort infrastructure in the Republic of Dagestan, which contribute to an improvement of accessibility of cardiac rehabilitation for population. A number of tasks have been accomplished to achieve this objective:

- estimation of the incidence of CVDs among the population of Dagestan in comparison with the average Russian indicators;
- stating characteristics of recreational potential and health resort infrastructure in Republic of Dagestan;
- identification of prospects for development of the cardiac health resort complex in Republic of Dagestan.

1. Methods

Solving the above-mentioned tasks, a comprehensive study was carried out, which included analysis of scientific literature on the topic under study. The formation of balneology fundamentals and the analysis of operation of certain elements of health resort facilities were considered in the works of Amirkhanov M.M., Aslanov D.I., Bokov M.A., Bykova O.N., Mironenko A.S., Nikitina O.A. and others.

Alexandrova A.Yu., Drozdov A.V., Kolotova E.V., Kuksova I.V., Morozov M.A. and others made a substantial contribution to the development of theoretical and methodological aspects of functioning of the related fields of activity, including health improvement activities.

A complex study using a system approach was carried out. The sources of information were data from relevant state bodies and research organizations, such as the Federal State Statistics Service of the Russian Federation and its territorial office in the Republic of Dagestan, the Ministry of Health of the Russian Federation

and the Republic of Dagestan, the territorial administration of the Federal Agency for State Property Management of the Russian Federation for the Republic of Dagestan, etc.

Methods of analysis of statistical data, retrospective and comparative analysis of indicators were applied during the research.

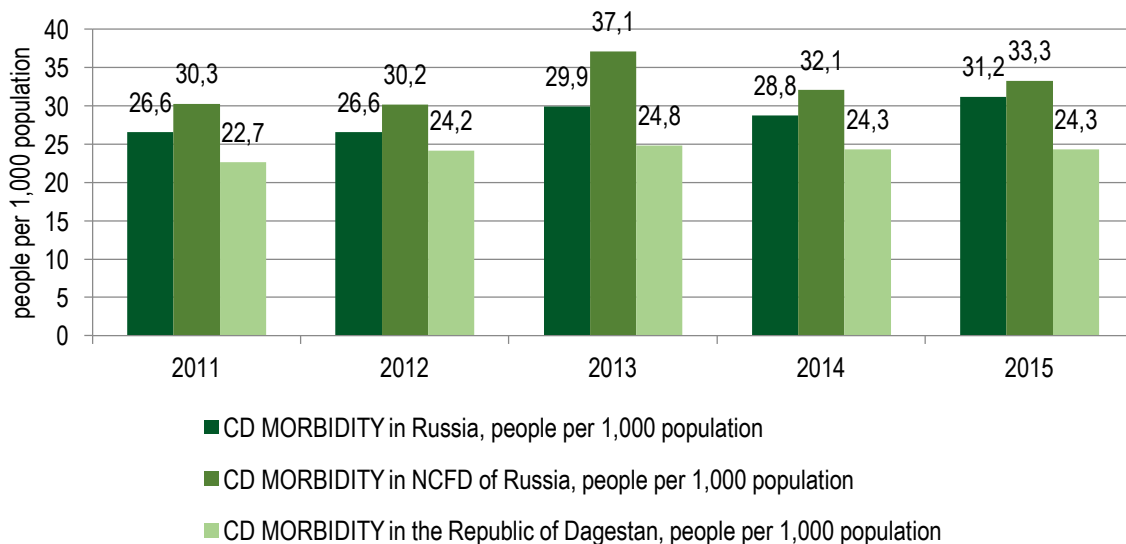
2. Results

2.1. Incidence of the cardiovascular diseases in Republic of Dagestan

Cardiovascular diseases (CVDs) are one of the most important causes of increase in mortality in Russia. The Republic of Dagestan is considered to be a relatively prosperous region: the mortality rate of the population from CVDs in the Republic of Dagestan is 2.9 times lower than the average Russian indicator and almost half the level of the North Caucasian Federal District of the Russian Federation.

The prevalence of circulatory diseases (CDs) is 24.3 cases per thousand people (in Russia, the average figure is 31.2 cases per thousand people (Territorial body of the Federal State Statistics Service for the Republic of Dagestan, Healthcare, 2016), in the North Caucasian Federal District it is 33.3 cases per thousand people) (Morbidity of population by key classes of diseases, Federal State Statistics Service). The dynamics of morbidity of population with CDs in the Republic of Dagestan, North Caucasian Federal District and Russia in general is presented in Figure 1.

Figure 1. Dynamics of morbidity of population with CD in the Republic of Dagestan, North Caucasian Federal District (NCFD) and Russia in 2011-2015



The dynamics of growth in the number of registered patients with CDs must be emphasized: this indicator has increased from 66 thous. people to 73 thous. people over 2010-2015. On the one hand, an increase in the statistics of this indicator may indicate an increase in the incidence of CVDs, while on the other hand, it can indicate an increase in the level of detectability of diseases in the course of medical examination of citizens.

The share of CDs in the total number of registered patients in the Republic of Dagestan increased from 2.8% in 2011 to 3.1%, but remains below the average Russian indicators over the period under study (Table 1).

Table 1. Indicators of the incidence of CDs in population in the Republic of Dagestan and the Russian Federation

Indicators	2011	2012	2013	2014	2015
Patients with a diagnosis set for the first time in life with CDs registered in the Republic of Dagestan, thous. people	66	71	73	72	73
Patients with a diagnosis set for the first time in life with all diseases registered in Republic of Dagestan, thous. people	2,356	2,395	2,413	2,429	2,369
Share of CDs in the total number of registered patients in the Republic of Dagestan, %	2.8%	3.0%	3.0%	3.0%	3.1%
Patients with a diagnosis set for the first time in life with CDs registered in the Russian Federation in total, thous. people	3,804	3,814	4,285	4,205	4,563
Patients with a diagnosis set for the first time in life with all diseases registered in the Russian Federation, thous. people	113,922	113,688	114,721	114,989	113,927
Share of CDs in the total number of registered patients in the Russian Federation, %	3.3%	3.4%	3.7%	3.7%	4.0%
Incidence of CDs in children at the age of 0-14 years in the Republic of Dagestan, thous. people	6.1	6.6	6.9	6.6	6.7
Incidence of CDs in children at the age of 0-14 years in the Republic of Dagestan, thous. people	831.2	896.7	936.3	891.0	900.1

In Republic of Dagestan, as well as all over the world, CVDs are on the first place in the structure of the causes of death, but there has been a decline in the death rate and disability associated with CDs in recent years, against the backdrop of measures that have been taken in the republic since 2012. For example, the number of people suffering from acute myocardial infarction in Dagestan is 3.8 times less than the average for Russia – their number fell by 1.7% in one year and is now 3.8 times below the national average.

Disability from CDs decreased from 62.8 people per 100 thous. people in 2011 to 59 people per 100 thous. people in 2016. The leading causes of population disability are stroke and infarction.

According to the statistics of the Ministry of Health of the Republic of Dagestan, mortality from CDs in Dagestan is three times lower than in the country in general and half the level of the North Caucasian Federal District. There has been a systematic decrease in the number of patients who died from the CVDs since 2013 in the republic: over 2011-2015, their number decreased from 257 to 222 people per 100 thous. people. At the same time, mortality from cardiovascular pathology in the structure of the overall mortality of the population in the republic remains high and amounted to 41.2% by the end of 2015.

The coronary heart disease takes the first place in the structure of mortality from CDs, cerebrovascular diseases take the second place. The share of myocardial infarction is more than 8% and, according to epidemiological studies, this level is 2-2.5 times higher than official statistics, which is due to a high level of mortality at the prehospital stage (RIA Dagestan). Mortality from acute cerebrovascular events amounts to 67.1% in the structure of cerebrovascular diseases.

Overall, it must be noted that new medical diagnostic and treatment technologies are actively developed and introduced in the Republic of Dagestan on the basis of established vascular centers. The results of numerous scientific studies indicate the efficiency of the health resort stage of treatment of patients with CVDs. For example, 1.5 times more people return to a productive life if they underwent rehabilitation after suffering an infarction.

In accordance with the amendments made to the federal legislation, rehabilitation of the working population is not covered by the funds of the Social Insurance Fund since 2003. Since 2009, cash payments for the cost of bookings for aftercare in health resorts right after the hospital have been canceled. These changes negatively affected the financial and economic state of health resorts and the state of their facilities and did not contribute to improving the quality of services for patients.

At the moment, health resort treatment is subsidized only for certain categories of citizens in the form of social help, which proves the state's attitude to rehabilitation and healthcare as not to medical activity, but rather to social help. Despite the proven efficiency of health resort treatment for CVDs, its accessibility to population remains low.

2.2. Characteristics of recreational potential and health resort infrastructure in the Republic of Dagestan

The Republic of Dagestan is the southern region of Russia with the largest area and is located in the eastern part of the North Caucasus. The name of the Republic means "the country of mountains". Mountains and foothills of the great Caucasus with an area of 25.5 thous. sq. km occupies the southern and middle part of the region. The region has significant water resources and takes the first place in the length of the river network among the regions of the federal district. The river network is represented by 6,255 rivers with a total length of 18,346.5 km, most of which are small rivers and streams. More than 90% of the rivers in the republic are mountainous, while others flow in foothill and flat areas. Large rivers of Dagestan – Terek, Kuma, Sulak and Samur – flow into the Caspian Sea. The total length of the sandy beaches of the Caspian Sea is 530 km.

A large number of lakes rich in therapeutic mud, largely located on the coast of Dagestan, are important recreational resources. In addition, the recreational potential of the territory is defined by a significant number of mineral springs of medicinal waters of various composition and temperature.

On the territory of the Republic of Dagestan, there are the Dagestan State Nature Reserve (19.1 thou. ha); 3 federal reserves (Samursky, Tlyaratinsky, Agrakhansky – 152.7 thous. ha); the Mountain Botanical Garden of the Russian Academy of Sciences (41.0 ha); 12 reserves of the republican level (465.7 thous. ha); the mountain botanical garden "Gunibsky Plateau"; the water park "Ak-Gel Lake"; 27 nature reserves of the republican and local level; the region of the mountain sanitary protection of the mineral springs "Rychal-Su"; natural park "Itzari".

Favorable geographical location, beautiful nature, balneo-mud and mountain climatic resources of Dagestan ensure favorable conditions for the formation and development of a diversified health resort complex, including the infrastructure for the treatment and prevention of CVDs.

As of 01.01.2017, the register of objects of the resort and recreational facilities of the Republic of Dagestan accounts for 203 enterprises, among which there are 18 health resorts for rehabilitation of the adult population that operate under the licenses issued by the Ministry of Health and 2 for children that are not under the Ministry of Health. All healthcare institutions are of mixed profile and are private property. Dynamics and capacities of the health resort organizations of the Republic of Dagestan are presented in Table 2.

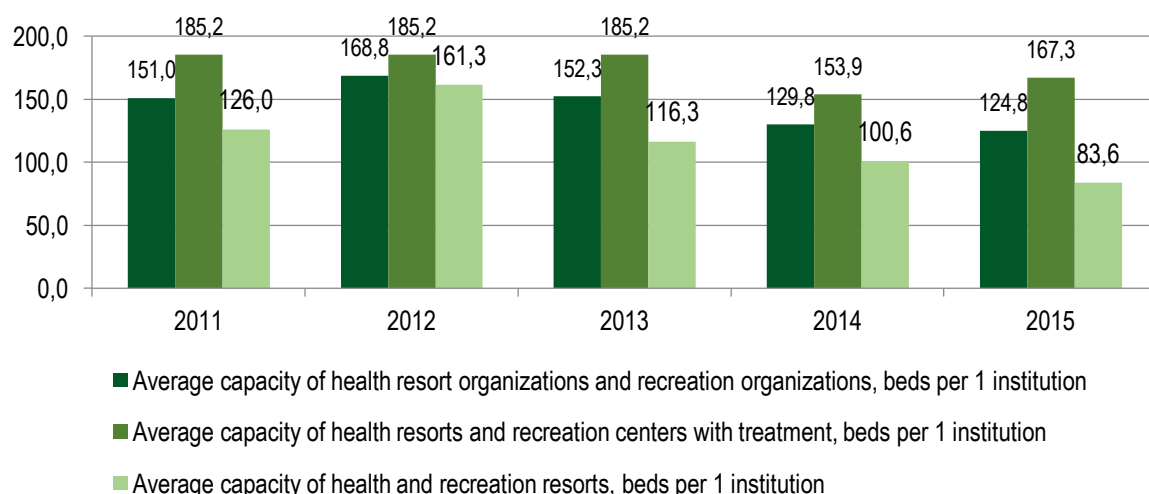
Table 2. Characteristics of the health resort facilities of the Republic of Dagestan

Indicator	2011	2012	2013	2014	2015	Change 2015/2011, +/-
Number of health resort organizations and recreation organizations – total	14	16	16	19	18	4
in which there are beds (places)	2,114	2,701	2,436	2,466	2,246	132
Number of health resorts and recreation centers with treatment	6	6	6	8	7	1
in which there are beds	1,111	1,111	1,111	1,231	1,171	60
of health resorts and recreation centers with treatment – there are health resorts for children	4	4	4	4	4	0
in which there are beds	310	310	310	310	310	0
Number of health and recreation resorts	8	8	8	8	7	-1
in which there are beds	1,008	1,290	930	805	585	-423

Over 2011-2015, the number of health resorts in the Republic of Dagestan has decreased by 4 units with a simultaneous increase in beds by 132 units, or by 6.2%.

The share of health resorts and recreation centers with treatment is 38.8% among all health resorts in the region. Over the period under study, the number of health resorts and recreation centers with treatment increased by 1 unit in 2015 compared to 2011, while the number of health and recreation resorts decreased. Over the period under study, the total number of beds in health resorts with treatment increased by 60 units, in health and recreation resorts it decreased by 423 units. The average capacity of organizations of the health resort complex of the Republic of Dagestan has observed a declining trend since 2012 (Figure 2).

Figure 2. Dynamics of average capacity of organizations of the health resort complex of Republic of Dagestan in 2011-2015



Health resort organizations of the Republic of Dagestan accommodated 20,400 people in 2015, of which 10,300 people received treatment. According to Dagestanstat, the number of vacationers in health resort organizations of the Republic of Dagestan has increased by 6.6 thous. people in 2011-2015, or by 47.8% (Territorial body of the Federal State Statistics Service for the Republic of Dagestan).

Table 3 presents dynamics of the number of people that health resort organizations of the Republic of Dagestan have accommodated over 2011-2015.

Table 3. Number of people that health resort organizations of the Republic of Dagestan accommodated (thousand people)

Indicator	2011	2012	2013	2014	2015	Change 2015/2011, +/-
Health resort organizations and recreation organizations – total	13.8	22.1	21.3	19	20.4	6.6
of which:						
Health resorts and recreation centers with treatment	5.4	10.7	10.5	9.9	10.3	4.9
- of health resorts and recreation centers with treatment – there are health resorts for children	2.9	3.1	3.2	3.1	3.8	0.9
Health and recreation resorts	8.4	9.6	8.9	6.9	7	-1.4
Leisure centers	-	1.8	-	-	0.9	-
Tourist camps	-	-	1.9	2.2	2.2	-

Persons with disabilities are referred for health resort treatment by the regional department of the Social Insurance Fund, according to which 6,649 patients were referred to the health resort institutions over the last 3 years (1,834 in 2013, 2,526, in 2014, 2,289 in 2015), including 2,820 people who have been referred beyond the Republic – (681 in 2013, 1,135 in 2014, 1,004 in 2015) (Social field of the Republic of Dagestan).

The number of employees in the health resort industry of the Republic of Dagestan has decreased by 45.5% over 2011-2015. (BusinesStat. Analysis of the Russian market of health resort services in 2011-2015). Reduction in the number of health resort personnel was caused by uncompetitive salary and layoffs of specialized doctors with a view to reducing the cost of bookings. In result, cardiologists, gynecologists, physiotherapists and other specialists started leaving health resorts. In some institutions, there are only therapists now. 4 institutions are engaged in treatment and rehabilitation of patients with CVDs: Lezzet with 528 beds, Chayka with 320 beds, Kaspiy with 320 beds, and Tarnair with 300 beds.

Besides, the children's cardio-rheumatic health resort "Akhty", which is subordinate to the Ministry of Health of the Republic of Dagestan, is engaged in rehabilitation of children aged 7 to 15. The infrastructure of the health resort includes an administrative building, a therapeutic building, a bedroom building with an adjoining health resort department, and a restaurant. The building of the health resort and adapted facilities were built in 1937. The health resort buildings underwent overhaul repair in 2008-2012, and at present all fixed assets are in working order. The health resort "Akhty" has no analogues in Russia in its geographical location and unique climatic and natural resources. Expansion and strengthening of the health resort facilities of the sanatorium would allow using it not only for rehabilitation of children from Dagestan, but also for children from other regions of Russia.

It must be noted that despite the widespread incidence of CVDs, there is no specialized cardiac health resort in the country for the adult population so far. The facilities of the existing health resorts in the Republic of Dagestan that implement rehabilitation programs for patients with CVDs do not fully meet contemporary requirements. The level of service, comfort and quality of services for the rehabilitation of patients with CVDs remains low.

At the same time, the existing potential is not always used rationally and efficiently, there are unfinished buildings on the territories of the health resorts, which are not used but require quite substantial financial resources for their maintenance.

3. Discussion

Currently, there are many problems in the health resort industry of the Republic of Dagestan:

- too few health resorts engaged in the programs for rehabilitation of patients after myocardial infarction and cardiosurgical interventions.
- inefficient use of buildings, presence of unfinished buildings on the territory of health resort institutions;
- low level of the state of health resort facilities that implement programs for treatment and rehabilitation of patients with CVDs;
- buildings and premises of most health resort institutions do not meet the requirements for accessibility for disabled people and are not adapted for movement and accommodation of people with limited mobility.

The following measures are proposed to improve the quality and accessibility of the health resort treatment of CVDs:

- Developing a cardiac health resort of the regional level, which implements rehabilitation programs for patients who underwent cardiovascular surgery;
- Taking urgent measures to automate and improve the facilities of existing health resort institutions in the Republic of Dagestan that implement programs for rehabilitation and treatment of patients with CVDs;
- Taking measures to encourage the use of land plots on which unfinished buildings are located, as well as undeveloped and unused land plots located within the boundaries of health recreational areas and resorts of the Republic of Dagestan.

Currently, health resort institutions of the Republic of Dagestan are multi-field, and none of them implements the full program of cardiac rehabilitation in accordance with modern American and European recommendations (Perk Guy De BackerK and Helmut Gohlke 2014).

"Specialization" in dozens of fields actually discredits the very idea of a specialized rehabilitation program. At the same time, the practice of countries with a developed healthcare system reveals that it is impossible to conduct quality cardiac rehabilitation without proper specialization of the health resort institution.

Foreign rehabilitation centers usually specialize in 1-2 fields, rarely in 3-4 fields (with 500 or more beds) (Buzunov, Molchanov, Markeyev, Gavrilova and Tikhova 2015).

In the framework of the first measure, it is proposed to consider the possibility of placing a cardiological health resort in a free area. For example, there are about 300 places on the territory of the health resort "Lezzet" designed for a summer camp, as well as two other buildings designed for 700 people. However, these facilities are currently not in use.

Reconstruction and modernization of room supply of at least one building will allow to open a modern high-tech cardiac health resort that can engage in the following programs:

- Rehabilitation of patients who suffered the myocardial infarction and cardiosurgical interventions: coronary bypass surgery, balloon angioplasty with stenting, correction of congenital and acquired heart defects in the early period (from 14 days after surgery or infarction) and in the late recovery period.
- Rehabilitation treatment: cardiac angina, myocarditis, cardiomyopathy, hypertension, heart rhythm and conduction disorders.

Planned capacity of the health resort is 200 rooms for 350 people. In the framework of the second field, automation of all processes associated with both servicing of guests (check-in, room supply accounting, booking) and the medical support of the regional cardiac health resort is supposed.

Automation of the health resort will allow to solve a wide range of problems and to improve the efficiency of the health resort in three main fields:

- clinical efficiency;
- organizational efficiency;
- economic efficiency.

Introduction of the integrated cardiac health resort automation system will allow to unite various devices, systems and software into a single network with unified control, to significantly expand and improve the service, to increase the speed of guests servicing and to achieve an optimal load on the existing medical diagnostic infrastructure.

Besides, it is necessary to equip health resorts with modern technological equipment for instrumental physiotherapy, functional diagnostics, clinical diagnostic laboratory, as well as modern cardiac rehabilitation systems based on graduated exercise, etc.

Infrastructural projects of a health resort complex require raising investment. One of the priority measures is to form a mechanism for extra-budgetary financing of projects in the field of health resort treatment. According to the Health Minister Veronika Skvortsova, reconstruction and modernization of one facility requires investment of 85 to 200 million rubles (Speech of the Health Minister Veronika Skvortsova at the meeting of the State Council Presidium on increasing the investment attractiveness of Russian resorts. Official website of the Russian Ministry of Health, 2016).

In his report at the meeting of the State Council Presidium on increasing the investment attractiveness of the health resort complex in the Russian Federation, the Governor of the Altai Territory A. Karlin noted that one of the major roles in creating comfortable conditions for investors belongs to the regional and municipal authorities. Regional authorities of the Republic of Dagestan need to intensify work on improving the investment climate on the territory of resorts.

The regional authorities of the Republic of Dagestan need to take efforts to create the resort territories that have the greatest investment potential in the development of the health resort complex with the application of appropriate benefits and preferences. It seems expedient to use incentive taxation mechanisms in order to involve unused land plots located in the resort areas in economic activities. The owner of land plots of resort territories that are not used for their intended purpose must decide to either carry out construction using preferences provided by regional and local authorities or civilly abandon these plots and allow real investors to implement projects.

With the purpose of increasing the investment attractiveness of the health resort complex, the regional authorities need to develop and actively utilize such instruments to co-finance the implemented projects as public-private partnership (PPP), primarily on the basis of concession agreements and other mechanisms provided for in the law.

Conclusion

The conducted study allows to state that despite considerable positive shifts in diagnostics and interventional therapy, CVDs remain one of the main medical and socio-economic problems in the Western and developing countries, including in the Russian Federation. The solution of the tasks set within the study allows to make the following conclusions:

- Republic of Dagestan is considered to be a relatively well-situated region of Russia in terms of prevalence of diseases, disability and mortality of population from CVDs. At the same time, the mortality rate from CDs remains quite high. Besides, the number of registered patients diagnosed with CDs set for the first time in life has increased over five years, and the incidence of CVDs among children of the Republic of Dagestan was recorded.
- Results of numerous medical studies prove the efficiency of secondary prevention of CVDs, including cardiac rehabilitation in terms of reducing morbidity and mortality of population. However, secondary prevention and cardiac rehabilitation in the Republic of Dagestan and in Russia in general are poorly developed.
- Republic of Dagestan has a significant recreational potential for the rehabilitation of patients with CVDs but uses it inefficiently.
- The facilities of operating health resorts in the Republic of Dagestan that implement rehabilitation programs for patients with CVDs do not fully meet contemporary requirements.
- Level of access to cardiological rehabilitation in health and recreation resorts for the population in the region remains low. There is still no specialized health resort institution in the region that would engage in the rehabilitation programs for adults after myocardial infarction and cardiosurgical interventions.
- Fixed assets of health resorts are not always used efficiently, there are unfinished buildings that require significant financial resources for maintenance but are not used in economic activities.
- The following major measures aimed at improving the quality and accessibility of health resort treatment for patients with CVDs are proposed: developing a regional cardiac health resort that implements specialized rehabilitation programs. Complex automation and modernization of the health resort facilities implementing programs for treatment and rehabilitation of patients with CVD are proposed in order to improve the efficiency and optimal utilization of the existing treatment diagnostics infrastructure.
- Infrastructure projects of the health resort complex require raising investment. A promising mechanism of funding the infrastructure is a public-private partnership based on concession agreements.

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