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MEDICO-GEOGRAPHICAL ANALYSIS OF THE POTENTIAL FOR BALNEOTHERAPY AND CLIMATOTHERAPY IN THE MUNICIPALITY OF VELINGRAD AS A FACTOR FOR LOCAL DEVELOPMENT

DISSERTATION ABSTRACT

of a dissertation thesis for the award of educational and academic degree PhD in professional field 4.4. Earth Sciences (Economic and social Geography, Regional and local Development)

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CONTENTS

The dissertation was discussed and focused on the defense of the extended meeting of the Department of Socio-Economic Geography at the GTF of Sofia University "St. Kliment Ohridski" held on …… ..

A. GENERAL CHARACTERISTICS OF THE DISSERTATION

Relevance of the researched issues

The relevance of the topic is due to the lack of awareness about the healing properties of mineral water in the municipality of Velingrad. It is complemented by the illegal and inefficient exploitation of the numerous local water sources on its territory. We can continue with the indisputable facts about the beneficial effects of balneotherapy and climatotherapy and prevention on difficult to treat and progressive diseases of great social importance, compared to drugs that often have a number of side effects and which often lead to the so-called "drug disease".

From the point of view of the fact that the balneotherapy establishments and resorts are developing in territories, characterized by significantly more favorable geographical-landscape qualities and bioclimatic features (Georgieva, 2007), we could state that the attractiveness of Velingrad and the Chepino valley will be many times greater than the attractiveness of other areas that cannot boast of virtues such as: clean air, large number of sunshine hours, mountain eco-trails, qualified medical staff, procedures and equipment of the latest generation, etc.

Today our country is among the first in Europe in terms of diversity and richness of hydrothermal waters and resorts with spa treatment, and the Velingrad region claims the highest density of hot mineral springs in our country. In addition, the municipality of Velingrad is the leader in the Republic of Bulgaria in terms of mineral water capacity and is in second place in terms of the highest water temperature. All these advantages, in combination with the complex of the listed natural factors make Velingrad a first-class balneological, recreational and spa-wellness resort.

The center of Velingrad municipality is an attractive place for many generations. Together with several other settlements in the Chepino valley, for decades they have attracted sufferers of various diseases. The reason - the use of balneological resources, in addition to the bioclimate, is gaining popularity and proves its usefulness against the background of conventional treatment (Karakolev, 1994). Such a pattern is due to the realized and proven physicochemical benefits of the application of natural resources to the human body, as a result of expanding the contingent of patients at risk of diseases of the cardiovascular system, central and peripheral nervous system, and is as a result of the frequent cases of professional, domestic, urban damage, trauma, increased criteria for the physiological and mental capabilities of a person, etc.

In view of the above facts and based on a detailed review of various elements taken together, corresponding to balneology and climatotherapy, spa and wellness activities, recreation and leisure, we can identify a significant gap in the scientific literature regarding the application of hot mineral water springs on the treatment of rare and severe diseases and the improvement of the overall health status of patients.

Object and subject.

The object of study is the totality and diversity of mineral springs and climatic resources in the region of Velingrad municipality and their healing characteristics.

The specifics of the chosen topic, envisages its subject of study to be aimed at identifying all the benefits of hot mineral water springs in the study area and its climatic features, their condition and capabilities from a medical and environmental point of view, establishing their impact on patient health status. An additional focus of the study is the role of medical and economic activities related to these resources on the local development of the municipality, marking a methodology for its inclusion and positioning in the European thermal recreation cluster.

At the heart of the development is the interdependence and links between the effective use of natural resources in order to form a recreational cluster of activities to improve health and positioning Velingrad on the European spa and wellness market in the rehabilitation and recreation area. Significant place is given to the impact of these activities on the socio-economic and spatial development of the municipality and the region.

Purpose and tasks.

The purpose of this dissertation is to perform a medical-geographical analysis of the potential for balneotherapy and climatotherapy in the municipality of Velingrad as a factor for local development.

The tasks to be performed in view of the purpose thus set are:

 Clarification of the theoretical and methodological bases of medical geographic research;

 Analysis and assessment of the geographical location of the municipality of Velingrad;

 Analysis of the condition of the hot mineral springs and climatic resources in the municipality of Velingrad and the region;

 Establishing the influence of the healing factors of the resort on human health through recreation and rehabilitation of the musculoskeletal system, peripheral nervous system (PNS), cardiovascular system, respiratory system based on examples of patients from MC "Kamena Medical" - Velingrad NSSI clinical pathways;

 Argumentation of the uniqueness of the possibilities of the territory in the directions of balneology, bioclimatology, prevention, treatment and rehabilitation of socially significant diseases, which determine the possibility for its inclusion in a European thermal and climatic-recreational cluster.

 Study of the condition of the accompanying tourist (spa, wellness) and other services, sites and activities, which upgrade the potential of the municipality, proving their essential role in its local socio-economic and spatial development;

 Creating a model for combined and effective use of various geographical resources in order to establish the brand of the destination;

 Geographical analysis of the socio-economic and spatial-territorial impacts of balneology and climatotherapy on the development of the municipality and the region.

 Assessment of the impact of the crisis situation as a result of COVID 19 on the studied objects and activities.

The main hypothesis supported by the author is that the benefits of proper exploitation of mineral springs are not yet realized and a new sustainable policy is needed to encourage more responsible use of these resources, except as a renewable source for sustainable long-term development of spa and climatotherapy, as well as the potential for the establishment of a complex recreational cluster, combining activities for health prevention and rehabilitation with a high-category spa and wellness tourist product, which will contribute to the complex stimulation of local development.

The present study, through a complex methodology, including general scientific and private methods and approaches for analysis and research (systematic, inductive, deductive, comparative, analysis of spatial relationships, etc.) enriches the theoretical knowledge by introducing a model for evaluating individual components in use of hot mineral springs for recreation and provides in-depth analysis and assessment of the interaction between improving the overall health status of patients and the use of natural resources by increasing their importance, by assessing their current untapped potential and opportunities for sustainable use in the future.

The author emphasizes the new reading and holistic approaches to health, **presenting** facts about mineral springs and making a complex compilation of the so-called "Key-pillars", pillars or colossi: prevention, spa and wellness, rehabilitation and treatment in one, namely the integration of Velingrad in the thermal recreation cluster. **A conceptual model** of analysis is applied with regard to the historical review of hot mineral springs and the effective assessment of their role in recreation, health, ecology and other fields. The application of the literary method in the analysis of the variety of sources, as well as the review of the international and national normative acts - laws, directives, etc., is extremely important for the development of the work.

Gathering primary empirical information required serious efforts and meetings with representatives of various institutions. Information about the mineral water resources of Velingrad municipality was taken by the employees in Velingrad municipality, responsible for the archive and the current state of the springs as of the date of elaboration of the dissertation.

The differentiation of the hydromineral resources is in four fields by hydrogeological indicators, their names and numbering according to the Water Act, are mineral water deposits "Velingrad-Chepino" - № 18, "Velingrad-Ladzhene" - № 17, "Velingrad-Kamenitsa" - 16 in the town of Velingrad and “Draginovo” in the village of Draginovo - № 27. All of them are important not only for the development of tourism, but also for other household and economic activities. Their use for recreation, health, beauty and detoxification is combined with heating of several public buildings and facilities, as well as in large numbers for direct use in the lives of local households. They have a sufficient resource for the production of geothermal energy, which is extremely important for the ecological balance in the town. The hot springs on the territory of Velingrad occupy a central place in the development, leading the formation of a cluster for thermal and recreational activity.

Based on these and a number of other factors, the author considers that his chosen topic is of public importance, taking into account on the one hand the nature of research that is in border areas, in this case of geography, medicine and local development and on the other hand, the need for objective assessment and effective organization of natural conditions and resources, with a focus on health, prevention and recreation.

B. CONTENT OF THE DISSERTATION

I. Theoretical and methodological bases of the research

1.1. Regional geographical research - nature, role, conceptual apparatus

Clarification of the main points in the theory and methodology of regional geographical research is required by the dynamic spatial differentiation of nature and especially society, by tracking their development within the regional and complex geographical science. One of the essential points in methodological terms is the need to determine the scope of regional geographical research.

Regional geographical research presupposes the consideration of space and territory as a complex, dynamically functioning and, most importantly, constantly open geographical system. It consists of several main subsystems such as: nature, social, economic and others, which in turn represent a cultural geographical complex of constantly interacting and changing components. For the overall functioning of the territory as a geographical system is important not only the interaction of these components within the individual subsystems, but also the general interaction between them within the whole system (Patarchanov, 2017).

Regional studies have always been present in the scientific and in particular in the geographical literature. Their existence is a natural result of the territorial conditionality of all phenomena and the close relationship that exists between their spatial structures. On this logical basis, regional directions in many branch sciences arise and differentiate, and some of them even grow into independent regional sciences (regional economics, geopolitics, political regionalism, geodemography, etc.).

Regional research seeks appropriate approaches of thinking, theories and methods. It adopts and/or develops them in order to be able to conduct spatial analyzes on certain issues related to policies in the organization of space. Regional studies of non-geographical phenomena should not be attributed to one's own subject of geographical science, as they reflect only one aspect of the study of the phenomenon.

The term "region" was put into use in the first half of the last century in the economic geography and social practice of the former USSR, whence it gradually became established in the Bulgarian scientific, planning and normative literature. In our literature and social practice, this term is

used in the definition of various problem areas - central, peripheral, depressive, urban, rural, border, mountain and others.

The concept of "space" is fundamental to geographical science. Its essence is interpreted in many ways depending on specific research emphases. In geography, the term "space" is most often transferred from philosophy, but taking into account the peculiarities of the Earth. Geospace is understood as a form of existence of geographical objects and phenomena within the geographical sphere. Geographical space has structures that reflect its complex process. The private geographical spaces are separated according to the research goals, but also according to the content - according to geographical features. Today, the role of geographical area and its assessment will increasingly grow as a natural result of the active and parallel processes of globalization and regionalization. Thus, the strengthening of spatial connections at different territorial levels - locally, regionally and globally will allow a fuller and more efficient use of the resources of different types of spaces (Patarchanov, 2017).

One of the most commonly used terms in regional geographical research is **the term "territory"**. Relatively often it is used inaccurately, even incorrectly instead of the term space, as they differ significantly. The territory is characterized by specificity, attachment to certain two-dimensional coordinates, to certain boundaries. It is of Latin origin and is part of the land with its inherent natural and man-made properties and resources.

The term "development", similar to "integration" is often used in phrases such as: economic, territorial, spatial, development of the region, municipality, city and others. Very often it is associated with a certain spatial level - regional development, urban development, including intra-urban development.

Regional development is scientific knowledge of an interdisciplinary nature. Its purpose is a synthesis of spatial-territorial (natural, economic, social, environmental and technical) and policy-planning aspects of development, management, coordination and control at national, regional and local level. The problem is complicated in the interpretation of the categories "spatial development", "spatial planning", "spatial development policy".

According to the glossary adopted by the European Ministers responsible for Spatial Development at the Council of Europe, the term **"spatial development"** refers to the evolution/development of territories in all their dimensions. The concept of **"spatial planning",** in turn, is interpreted as an organized set of methods used to influence the distribution of people and activities in space of different scales, as well as the location of different types of infrastructure, urbanization, natural and recreational areas.

The analysis of the conceptual apparatus requires special attention to the concepts of **"local development"**, as it has the closest connection with the studied informal territorial communities at this level. The term **"local"** is defined as "specific to only one place", "which is located or affects only a certain place". Local development as an understanding used in Bulgaria includes both the development of only one settlement and the development of the smallest administrative community - municipality (Patarchanov, 2017).

The term **"spatial policy"** is interpreted as "a structured set of planned activities and interventions that affect: spatial development of different categories of territorial communities, production, market and communication systems and the distinctive environment of natural, urban and social nature."

A brief but meaningful review of these theoretical and methodological issues shows a variety of possibilities for interpretations of the content of regional geographical studies and the apparatus they use.

1.2. Medico-geographical research in scientific knowledge and social practice.

For centuries, on the border between the two basic sciences - geography and medicine, which at first glance are little connected, a scientific field is developing - medical geography, which is

increasingly established in the study of direct and indirect interactions of characteristics and features of geographical environment and health of man and the society in which he carries out his life and social activities.

The accumulated observations and research in the XVII and XVIII centuries became a solid basis for the emergence of the first special scientific works defining the subject of the new interdisciplinary science - medical geography. Significant contributions in this direction are made by authors such as: LL Finke (1792-1795) in Germany with his three-volume work "The Experience of General Medical Geography" and the works from the beginning of the XIX century by F. Schnurer "Geographical Nosology" (Keller, 1993) and K. K. Fuchs's "Medical Geography" (Fuchs, 1853); in France J. J. Vireya in 1817 and J. Buden in 1850 with the two-volume edition "Guide to Medical Geography".

Thus, towards the end of the century, science flourished (a kind of "golden age"), after which in the first decades of the twentieth century the interest in this borderline scientific field decreased due to the rapid development of private disciplines - geography, medicine, biology and others.

A number of teachings and concepts from the middle and second half of the last century can be considered as a new stage in the development of medico-geographical ideas: by E.N. Pavlovsky on the natural focus of communicable diseases and landscape epidemiology; of A.P. Vinogradov for the biochemical provinces and endemics; of J. May and A. Lermont on the ecology of human diseases and others.

The first medical-geographical data about the Bulgarian territory appeared in the XVIII century by foreign travelers (Ami Bue, Y.I. Venelin) and mainly Russian doctors (A.S. Georgievsky, Z.V. Mitsov), describing the geographical conditions and their influence on health, the spread of certain diseases (plague epidemics, malaria, cholera).

The development of medical geographical ideas is going at different rates, along with the creation and approval of hospital care and pharmacy in our country. In the first period of the development of medical geography Dr. D.P. Mollov and I.V. Grimm played a significant role and especially the first head of the Department of Hygiene of the Medical Faculty at Sofia University Prof. Dr. T. Petrov with his program "Sanitary survey of the settlements in the country".

The application of the medico-geographical approach is used in a number of studies related to some socially significant e.g., oncological diseases (Valkov, 1963), ecological problems in different regions (Chuchkova, 1989).

With the establishment of the Society of Medical Geography, the last stage of development actually began. Scientists and doctors from different institutions and fields take an active part in it at the beginning - the medics Y. Naumov, Em. Kamenov, Iv. Goranov and the geographers P. Penchev, D. Kanev, Dim. Dimitrov and Iv. Velchev. Later actively involved are Dr. A. Mateev, Dr. A. Nedeva and the geographers Em. Lozanov, D. Stoilov, D. Filipov, G. Stankov, N. Petrova and V. Petrova.

The modern development of medical geography in Bulgaria is associated with its slow and painful establishment as a university discipline, holding various scientific forums (congresses, conferences and symposia) of the society and publishing collections of medical geographic content. They include a variety of research materials by different authors. From this period the publications on the development of the medical geography of Y. Naumov (2004), D. Filipov (2004), V. Boyadzhiev (2009) and its influence on the regional development of N. Dimov and D. Filipov deserve interest; for the national, regional and local organization of health care and emergency medical care on Pl. Patarchanov (2009, 2010), Dim. Dimitrov (2009); for the influence of some demographic challenges and threats of G. Bardarov (2009) and others.

1.3. Theoretical and methodological aspects of medical geographic research.

For the purposes of medical geography, researchers have many opinions that have evolved over time. The main goal of medical geography is to give the necessary scientific explanations related to the influence of the geographical environment on the occurrence of diseases and morbidity of individuals, to show the geographical spread of diseases at the global, regional and local levels (Veselinova, 2021). The main research tasks of medical geography are many, but one of the most important is to study in depth the factors of the geographical environment that could affect the various diseases. Improving the predictability of human diseases, which are determined by the surrounding environment and how the geographical environment could contribute to overcoming a disease in humans are among the tasks facing medical geography (Veselinova, 2021).

The main object of medical geographic research are the geographical factors of a given area and their impact on the population and its way of life, morbidity, treatment and prevention. The creation of a system of complex measures aimed at preventing diseases, protecting and strengthening human health and ensuring high working capacity and active longevity are among the scientific priorities of medical geographic research. Of vital importance is the development of constructive prevention, whose system of measures aims to stimulate the positive effect of environmental factors on human health and the development of the body's defense mechanisms.

The subject of research in medical geography is comprehensive, mainly related to the processes related to the spread of diseases. New opinions about the research of medical geography are becoming more and more common. For example, according to Jonathan Meyer (Meade, 2010), a new focus for medical geography is the political ecology of disease.

In medical geography, many concepts are used, the essence of which is clarified by physicians. Geographers could also present their views on the content of the above terms, but over the years they have not given definitions. The use of a third type of concepts, other than geographical and medical, is logically related to these two sciences.

So far in the international and especially in the Bulgarian practice of medical geography are used exclusively medical concepts (anthropozoonosis, anthroponosis, zooanthroponosis, zoonosis, nozoareal, carrier areal, areal of the causative agent, epidemic, epidemiological region, pandemic, epizootic, epizootic panphytosis, endemic disease, etc.). Since the authors are exclusively medical professional, they would help each other by using geographical concepts, which can be explained in case of insurmountable need.

Medico-geographical research uses long-established and generally accepted by Bulgarian science and social practice geographical concepts. Such are, for example, the concepts from the regional hierarchy - region, subregion, microregion, and also - zone, belt, center, periphery and others. Before they can be used, the boundaries of medical geography need a special explanation. The most accessible and most easily understood are the linear boundaries and the boundaries between two contrasting traces. An example of the first case are the administrative-territorial boundaries, and for the second case - the boundaries between the main elements of the natural environment. As with other geographical studies, non-linear boundaries are drawn with the greatest risk and with the greatest difficulty in medical geography, especially when they are not visible. They are usually an area where the transition is not as contrasting.

The research apparatus of medical geographic research includes a variety of approaches and methods that are applied in them. They are both general and specific - applied separately in geographical and/or medical research. The use of various research methodologies creates conditions for objective results in the study of medico-geographical conditions and resources for the development of activities of different nature.

According to Filipov (2004), medical research methods are mainly used in medical geography. Geographical methods are comparison and subsequent analysis. The cartographic method is one of the

most important methods. It contributes to the study of morbidity in different areas and the need for healthcare improvements in these areas. Filipov (1981) studied in detail the medical-geographical mapping in Bulgaria.

An important complex approach in medical geography, which deeply studies the medical care of the population, is the medical-geographical one. The morbidity of the population in the different regions and the geographical location of the health establishments with their zone of spatial influence are studied. It gives clarity why these medical institutions are located in a certain place and why there is a need for them, right there.

Whatever new geography we try to make, in fact the new is only in the subject and the object. The methods (ways) of making geography remain the same. The core, the basis, is zoning as the main geographical method. Its application is a complex combination of general geographical requirements and features, combined with medical features.

Medico-geographical zoning is the result of constant, long-term, complex studies of the natural and socio-economic conditions of a given territory and their impact on the health of the population. The basic unit for zoning is the defined territory, which has similar natural living conditions - relief, climate, waters, soils, natural flora and fauna and population, in whose health there is a specific disease deviation, which can be determined. as a specific regional pathology. This disease deviation in a certain part of the population is most often caused by these similar natural and living conditions. The cleanliness of the environment is very important for the quality of life of the individual and his good health for a long period of time. An important place is occupied by the medical-geographical assessment of the geographical environment and of the geographical factors. This assessment of the quality of the environment is achieved very precisely through the medico-geographical zoning.

To determine the medical-geographical social area the most commonly used indicators are the number and density of the population, birth rate, mortality rate, natural growth, child mortality, sex and age structure of the population, average salary, unemployment rate, total morbidity according to the International Classification of Diseases, number of doctors, number of medical specialists, number of dentists, number of ambulances, number of emergency medical care centers, hospitalizations, hospital stays per day and other indicators of a certain number of population (Minkovska and Nikolova, 1981). More indicators could be included - housing conditions, literacy rate and others. However, the medico-social areas do not necessarily coincide with the administrative ones. What is special here? Political, administrative zoning collides with geographical zoning. And when there is no scientific connection between the two zones, the administrative authority is imposed.

Sometimes it is difficult to apply the classical geographical scheme for grouping the factors of natural and social and from there to construct the schemes of the respective geographical areas.

In our case, we have the specific feature of being interested in a complex medico-geographical system, the zoning of which actually includes three interconnected zoning. The first is the place of origin of the disease, the second is the place of its diagnosis, and the third is the geography of the treatment itself.

We are aware that administrative zoning has a serious advantage, such as statistics. As it is created by administrative territorial units, and we are dealing with the unclear territoriality of the occurrence of certain diseases, our desire is to "lower" to the maximum possible territorial levels of the received information. Therefore, the priority levels for medical geography are: settlement - municipality - administrative district - statistical region - country, which can be described by the territorial statistical system of the EU - NUTS.

The state with its ministries and other bodies of the sub-state territorial (geographical) level should strive to adapt its policies to scientific medical-geographical zoning, but this cannot be achieved at the moment. In fact, geographical science is forced not only by statistics, but also by the geographical organization of medical practices, to adapt to their administrative geography.

1.3. Climatology in the process of diversification and unity with balneology and alternative medicine

The main reason why the categories "climatology" and "balneoclimatology" are studied is that they are divided[1] into several areas, some of which correspond to the topic of the dissertation. These are **balneology, medical hydrology and resort medicine**, which are not yet recognized as separate scientific centers at the global and international level, but have a significant contribution to the completeness of the field covering them.

Climatology depends on both the performance of the tasks of ecological science and the performance of the tasks of the environment. As tasks of ecological science, we define:

- parametric establishment of the anthropogenic factor on the habitat and organisms;
- rationalization of human activities in order to protect biological resources
- the development of methods and strategies for achieving the above two goals.

and as tasks of ecology:

- the study of environmental factors and their impact on organisms;
- study of the adaptive capabilities of organisms to the constantly changing environment;
- establishing the degree and level of interdependence between the different species of the same species and the interspecific contiguity at the same time;

1 And more specifically the subdivision is of climatology.

And because climatology works over longer periods of time - usually over 30 years, we can judge indirectly how well these tasks are accomplished.

In one part, climatology has a descriptive character, providing us with the current state of atmospheric pressure, temperature, rainfall and other elements, and in another - analytical and descriptive nature of the probed data (Msabila, 2001). Other authors enrich this definition by pointing out that climatology studies the exchange of energy and mass in the space between the atmosphere and the earth's surface, and the main components involved in this exchange are temperature, humidity and atmospheric air movement as its main characteristics (Rajaram, 2011).

H. Goosse, P.Y. Barriat, W. Lefebvre (2010) report that the classical climate conjugation is the aggregation of variations in values, indicators for temperature, precipitation and winds. Therefore, almost everywhere, climate and water, as well as the listed components - precipitation, wind and temperature - are considered together.

The climate, along with the factors influencing it, its origin, spatio-temporal characteristics, etc. are the main goal determining the existence of the multilayered climatological area.

That is why we find medical and ecological features in the genesis and characteristics of climatology, which determine its division into subspheres and areas. Such are **balneology, medical hydrology and resort medicine**, as well as their similar, which cannot be treated as independent sciences because:

1) the targeted units are not used everywhere in the world, i.e., they have limited usability.

2) the indicated directions resort to specific methods of treatment and do not have a detailed and profiled concept;

3) the limited understanding of the benefits of their application leads to a lack of trust in them;

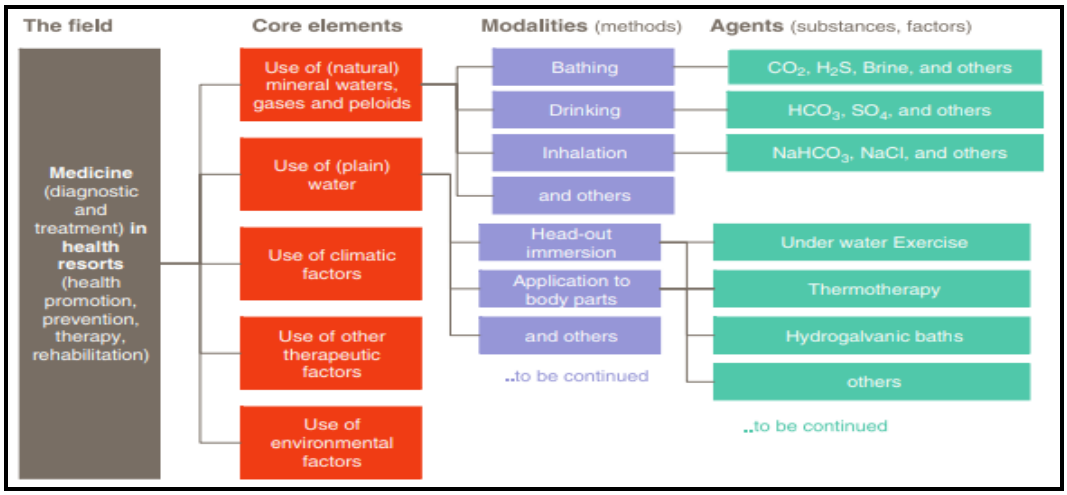
It should be noted that these are increasingly gaining popularity among non-conformists, for whom holism and achieving a healthy mind in a healthy and beautiful body is achievable without the intervention of conventional medications and procedures with various side effects.

1.5. Balneotherapy and its derivatives: in support of conventional health care in the XXI century.

The root of the term "balneology" has Latin origins and is interpreted as "showering", "bathing". Its more specific translation refers to warm baths in order to restore the general health status, renew the mind and body with the help of thermal water with different temperature, composition and viscosity (Popovski, Vassilevska, 2008). In turn, balneotherapy uses the powerful beneficial effects of natural mineral water (through drinking, inhalations and baths), gases and healing mineral mud. The use of ordinary water (tap water) for medicinal purposes is called hydrotherapy, and the combined application of climatic factors - climatotherapy (Gutenbrunnen & Bender, 2010). Climatotherapy is applied and developed in specific climatic conditions - high altitude, sea climate and others. In addition, we can also list: ultraviolet light, infrared light, wind energy, aerocomposition and content of therapeutic aerosols, pod$_2$ and others. (Cohen et al., 2005; Kovlen et al. 2008; Uosif et al., 2008; Hodak et al., 2003).

Figure 1 presents a diagram that represents the "medical" in resort medicine and recreation.

Fig. 1: The medical element in resort medicine



We can ascertain that the core of resort medicine is the use of natural mineral waters, gases and healing mud (balneotherapy), ordinary tap water (hydrotherapy), the beneficial effects of climatic factors (climatotherapy), developed therapeutic procedures (physical therapy, physiotherapy) based on appropriate circumstances and environmental factors. A number of authors prove its indisputable influence and value (Strauss-Blascheetal., 2000a; Leaute-Labrezeetal., 2001; Codishetal. 2005; Devereuxetal., 2007), but ***not as an alternative to the traditional one, but as its complement and help***.

Balneotherapy (health tourism) is subordinated to medical activities and exercises, relying on scientific evidence, but adapted to rehabilitation and therapy (hydro-, physio-, climate-, balneotherapy) (Gutenbrunnerand Schuh, 2002). It is the intersection of tourism and resort medicine, but there is a discrepancy between the two categories (health tourism and resort medicine). Spa medicine is based on the three pillars of prevention, treatment and rehabilitation, while health tourism provides for the application of care for the soul and body by performing procedures with healing and beneficial effects (exfoliation, herbal medicine, water baths, sunbathing, detox regimens, training, etc.) (Kirilov, 2014). After Iceland, today the Republic of Bulgaria is in second place among the countries in Europe in terms of hydrothermal provision and opportunities for spa and bioclimatic treatment (and Velingrad is a leader in mineral deposits in the country). This is due to the temperate-continental climate, the

Mediterranean influence in the southernmost parts, the preserved flora and fauna, the diversity of mineral waters and healing mud.

The importance of **bioclimatology** in the context of its multilayeredness, specificity and multifacetedness is indisputable. It is expressed in the interaction of the human body with the surrounding meteorological environment, as well as the influence of one relative to the other (Sofia, 1971).

Studies have been performed on patients with diseases of the respiratory system, bronchial asthma, neurosis, diabetes, urticaria, diseases of the musculoskeletal and peripheral nervous systems, etc. The organism is presented at all its hierarchical levels - from the structure of the cell to the whole organism - and part of its constituent elements, performed activities and processes, influenced by the climatic factors air, temperature, heat loss, etc.

As a result of the research conducted by V. Marinov et al, the following **conclusions** are reached:

- thermal balancing determines the fluctuation of the human body between two main states: overheating and cooling;
- opposite states (overheating and cooling) are stressful and create an inability for the body to be in any of the two for a long time, otherwise it leads to its dysfunction and destruction as a biological system;
- along with clothing, proper nutrition, intake of sufficient fluids, other factors on which the degree of heat balance depends are solar radiation, temperature and humidity, wind speed, as well as physical activity, etc.
- variations and combinations of the above factors could lead to the same thermal state of the organism;
- the dynamics of the biological parameters in the thermal rhythm of the organism and its thorough study are the basis of scientifically-based climate prevention and treatment;
- performing motor activity increases the value of indicators, stimulates the individual to increase the volume of movements, incl. lung volume, heart rate, metabolism

Bioclimatology and recreational activities go hand in hand (Chuchma, 2018). Their application is limited due to the specifics of the conditions in which the recovery processes take place, but this is what makes them so valuable and impressive wellness and SPA.

SPA and WELLNESS services.

Sanus Per Aquam comes from Latin and means "health through water". According to other authors (Linden and Tubergen, 2002) SPA originates from the Belgian "espa", which literally means "fountain", "gushing spring".

Both wellness and spa therapies contribute to the overall improvement of the body's condition (well-being), but the effect is achieved in different ways. The concepts of “well-being” and “wellness” are often defined as identical, as both refer to the balance of physical, psychological, mental and social well-being of individuals (Björketal., 2011), but in the interpretation of the two concepts there is a nuancing (Konuetal, 2010; Messerli & Oyama; 2004).

To this day, the spas are the business card of the respective settlement and hotel in which they are housed. Spa centers should offer various and varied water and cosmetic procedures (against acne, peeling, pore tightening, skin whitening, facial, neck and neckline massages; treatment for cellulite and stretch marks, aromatherapy, oxygen therapy, hairdressing, decorative make-up , facial cleansing, brush, enzyme, chemical peeling, vitalization of mature skin, shaping the oval face, D'Arsonval - anti-inflammatory and antiseptic action, vacuum facial massage, iontophoresis, manicure and pedicure, hydrotherapy, face and body masks, reflexology and many others). Currently, entrepreneurs in the

field of spa tourism face difficulties in accurately identifying their product and its presentation on the national and international market. Wellness and SPA are used as a new understanding of health, health behavior, health culture.

Conclusions:

- The spheres of balneoclimatology, resort medicine and the included SPA-procedures and wellness tourism are not only a springboard for improving the general healthy human status, but also a golden opportunity for economic and socially responsible development of tourism.
- Balneotherapy and wellness derivatives, SPA, resort medicine and other restorative and healing procedures depend on the condition and quantity of the mineral deposits, as well as on their adequate adoption.
- Over the past decades, the tertiary sector has the largest share in the overall distribution of revenues by categories of activities, as restaurants and hotels stand out clearly against other areas. The development of the tourism sector and the increase of the share of GVA of the tertiary sector depend on this.
- Research shows that travel for health, wellness and recreation is increasing. The main stimuli are health, beauty and preservation of youth and vitality, and the main factors for attendance remain natural resources - hot mineral springs, climate, sunshine, ecological environment.
- This leads us to think that the complex nature of the wellness industry leads to much higher revenues worldwide than SPA-tourism. Indeed, this is the case - spa services generate $ 3.7 trillion a year, and wellness - $ 98.72 trillion for both (Yurcu, 2017).

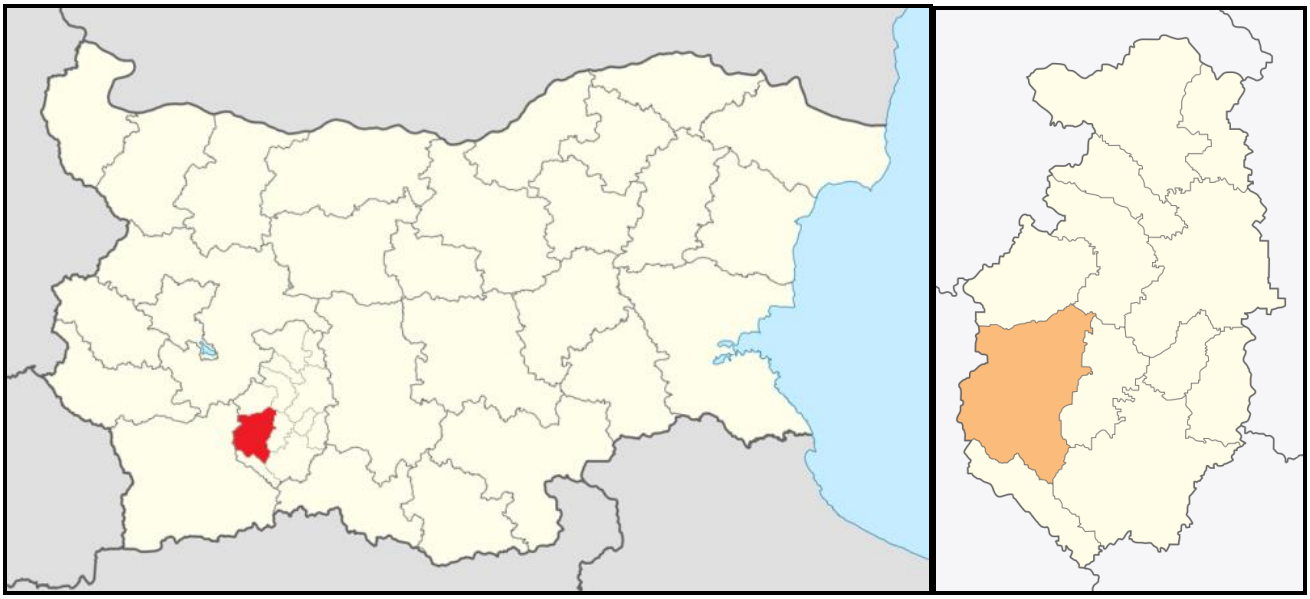
II. Medico-geographical analysis of the resource potential in the region of Velingrad municipality

2.1. Analysis and assessment of the geographical location.

Velingrad Municipality, as part of the Chepino region, is located in southwestern Bulgaria and the South-Central region (NUTS-2). The region is of exceptional socio-economic and political importance for our country, as transport corridors № 8 and 10 pass through it. To date, on Bulgarian territory, these corridors mediate international transit flows of people, goods and capital between Europe and Asia along the Sofia - Plovdiv - Svilengrad - Kapitan Andreevo border checkpoint.

From the point of view of balneotherapy and recreation, they provide a year-round influx of guests from all over the world, which allows the region to gain international popularity with its over 708 deposits of balneological resources with a total flow of over 390 l/sec. Geographically important transport routes from continental, regional and transcontinental levels intersect here.

Fig. 2. Geographical location of Velingrad municipality



The limitations of the geographical position in the mountainous regions regarding the construction and operation of the different types of infrastructure are serious, due to the specifics of the climatic conditions - the altitude and the large vertical drop; due to strongly rugged terrain, the presence of steep slopes and deep river valleys.

The relief profiling and characterization of the studied area as a geographical location is relevant to the topic of its positioning in the European thermal recreation cluster, because the significant share of mountain areas is a serious prerequisite for the availability of many resources that contribute to spa and wellness industry, and hence - to increase the economic well-being of the population in the region.

Two other questions arise, corresponding to the topic: what is the current state of these natural resources and what policy has been taken for their efficient and sustainable use and conservation.

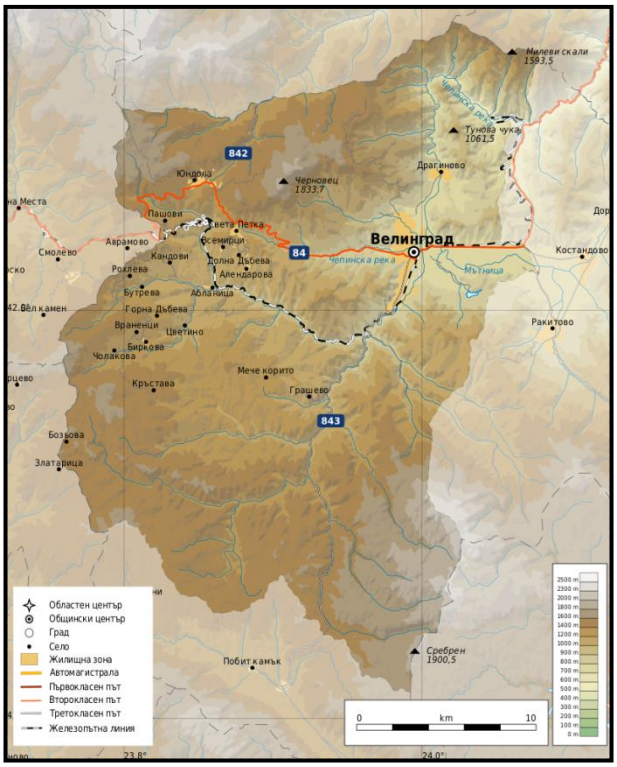
Even a brief historical-geographical overview of the development of the study area clearly shows the assessment that its inhabitants have given to its geographical location and the resources that are a natural result of it.

Today Velingrad is the third largest municipality (604,471 sq. km) in Pazardzhik region, occupying 13.49% of its territory and 0.55% of the country's territory. The municipal center of Velingrad is located in an extremely strategic place - 130 km from the capital Sofia, 47 km - from the regional center and 180 km from our southern neighbor Greece.

The diverse high and medium mountain relief is a prerequisite for the development of many seasonal and year-round activities. The altitude varies between 535 and 2186 m, and the forest areas are predominant - over 60%. With the exception of the Chepino valley, the relief is strongly dissected and is composed of mountain ridges of different size and direction (see Fig. 3).

The Velingrad region can serve as an excellent example of how anthropogenic factors, together with abiotic (the complexity of the conditions of the inorganic environment - temperature, humidity, atmospheric pressure, wind, altitude, chemical composition of water, soil, air, etc.) and biotic (interactions of organisms at different hierarchical levels - gene-cell-tissue-system of tissues-organ-system of organs-whole organism-population-community-ecosystem-biocenosis-biosphere (National Institute of Open Schooling) have a strong impact on the other economically significant activity that is gaining more and more popularity in the region - tourism.

Fig. 3. Velingrad municipality - relief, water, settlements, roads



2.2. Climatic conditions and specific features[2]

The climatic conditions and resources of the region derive from its relief and positioning on the geographical map of the Republic of Bulgaria. The possibility for the development of medical tourism, balneoclimatotherapy and balneoclimatoprophylaxis stems from the available resources of the considered "areal", which automatically **welcome the idea of its establishment as a future European, Thermal and Climate Therapy cluster.**

The climate is transitional-continental with a weak Mediterranean influence. This supports the activity of the heart (its pumping function, overload) and the respiratory system. The emblem of the town and partly - of South Bulgaria - is the largest geothermal deposit, which until a few years ago was characterized by a total flow rate of 160 l/s and radon emanation (only Chepino mineral springs), equal to 68 Bq/l (eman)[3].

The amount of precipitation (average value) is 954 mm, with the least precipitation in September - 36 mm, and the most - in May (73 mm). The winter season is characterized as humid, as the amount of precipitation reaches 150-210 mm average values, but most precipitation falls in May - an average of 160 and 240 mm.

Sunshine is significant in terms of its duration and its effect on air temperature, as well as radiation and the transparency of air masses. The radiation characteristic is good and does not stimulate secondary chemical reactions to increase the level of air pollution. The sunniest days are in summer (August-304 h), and the least - in winter (December - 91 h).

The winds (mountain-valley: gornyak and dolnyak) are the root cause of the mild and cool climate in the municipality. The direction of the predominant part of the winds is northeast, as in 59.80% of the time there is no wind. The average annual wind speed is 1.5 m/sec, and the local wind is the "evening wind", bringing coolness in summer to the valley. The presence of photocides, thermal and biologically active components of the air, characteristic for between 100 and 250 m average vertical height, is also a fact. These ingredients are a consequence of the lack of anthropogenic activity and the physiological cycle of coniferous vegetation.

2.3. Hydro-thermal resources - social and environmental aspects.

Due to their susceptibility to changes, quality, condition and renewability, natural resources are extremely diverse. According to their renewability they are differentiated into exhaustible renewable, exhaustible non-renewable and non-exhaustible. The condition and protection of hydro-mineral resources is of paramount importance and urgent given their nature, namely - as an exhaustible and renewable resource over time.

Hydro-mineral resources are one of the most serious natural prerequisites for the zoning and balneological infrastructure of the town of Velingrad. The regional-genetic regularities in the distribution of the waters, as well as the territorial localization of the zones, in which their exploitation is technically possible and economically expedient, determine the need for their classification.

The region is characterized by 15,366 decares of water areas, 1,844 decares of which are rivers. 13,408 decares are occupied by dams, reservoirs and canals, 96 decares are the share of lakes, 1 decare - swamps and marshes and 17 decares - fishponds. **In other words, the hydrographic network is characterized by high density, its quality indicators are stable, with naturally guaranteed conditions for long-term reproduction and relatively constant water regime, which is facilitated by abundant snowfall and saturation of climatic and relief features.**

There are 59 natural thermal mineral springs, combined in 6 hydrological deposits: 1 each in the quarters of the town - Chepino and Kamenitsa, 2 in the Ladzhene, 2 springs in the village of Draginovo.

According to their properties, with the exception of the sources from the Chepino thermal zone, where a low hydrogen content (10 nC/l) was reported, they are hyperthermal, weakly mineralized[4], hydrocarbonate-sulphate, rich in sodium, calcium, potassium, silicon and fluorine.

Before 1957 in the Chepino quarter there were 9 capped and 3 uncapped springs with a temperature between 43^0 and 48^0 C and a total flow rate of 3180 l/s. After borehole studies, the latter rose to 3615 l/s, and in the course of the research the properties of the resource were proved - hyperthermal, weakly mineralized, hydro-carbonate-sulphate-sodium, radon, silicon.

The diversification of the springs in Ladzhene is based on the mineral baths located in close proximity to them. Their grouping is as follows:

- The westernmost group at Velyova banya, consisting of 18 mineral springs;
- 11 springs - at the Men's and Women's Baths
- 7 springs - at the "topila" (places for soaking in water) of the town

The emblem of Kamenitsa quarter in the context of the water resources of the region are Syarna banya and Vlasa. The springs, 8 in number, are hyperthermal, weakly mineralized, fluorine, silicon and sulphate-hydrocarbonate-sodium.

It should be noted that the classification of springs is carried out not only on the basis of their location, but also on the basis of their physico-chemical properties and composition and useful properties for the organism. The analysis shows that the criteria temperature, mineralization and mineral composition mark an upward trajectory of change, while the gas component decreases. All of them have been studied in the direction of Chepino-Ladzhene-Kamenitsa.

Of all the deposits, only those in the Chepino quarter are characterized by the presence of radon (between 5 and 10 nC/l). This classifies it as a type of gaseous mineral water that has proven its beneficial effects on the human body (production of vitamins, anti-inflammatory effect, etc.). The water is also characterized by the presence of fluorine and metasilicic acid in amounts of 4.2 mg/l, respectively, and 48. Radon, which results from the decay of radium, defines water as weakly radioactive, with a pH of 9.2 and a temperature of 42° C. The properties and structure of the resource make it suitable for both drinking treatment and daily use.

The water in the middle quarter of the town is suitable for drinking treatment, but not for daily consumption due to the exceeding the norm fluoride concentration (5.5 mg / l), while in Kamenitsa the measurements show that the hydro deposits are suitable only for bathing treatment and fluoride. - prophylaxis at special dosages (fluorine is 8.6 mg/l).

We can conclude that not all sources of water are suitable for drinking. The water from the Chepino deposit can be used without restriction due to the easy and fast release of radon into the atmosphere. The water from the Ladzhene deposit can be drunk under certain conditions, after a doctor's recommendation and at fixed intervals, while the Kamenitsa mineral water cannot be treated as table water, because the levels of fluoride in it are toxic and instead of healing, they could have the opposite effect, and hydrogen sulfide gives it an unpleasant taste and odor.

2.4. Status and exploitation of mineral waters - composition and properties in boreholes and catchments.

Pursuant to Art. 13. para 4 of the Water Act, Public state property are the water land facilities for mineral waters - exclusive state property, as well as the observation boreholes, constructed with state funds[5].

On the territory of Velingrad region active borehole activity is carried out, thanks to which we can establish the state of the main physical and chemical properties, radioactivity and content of micro-components, etc.

Borehole №1 was built in 1959 and is located on the right bank of the Chepinska river, with a depth of 168.50 m. It's balneological assessment is with ent. №: 34 dated 07.05.2015

Water from borehole No. 1 is suitable for inhalation treatment of diseases of the upper and lower respiratory tract, but it is not recommended for use it for external balneotherapy (infections, advanced diseases, oncological diseases, epileptic seizures, etc.).

The balneological assessment of **borehole № 2** is with entry № 35 dated 07.05.2015. It is located south of borehole №1, on the right bank of the Chepinska river. It was built in 1959, with a depth of 540 m, at an elevation of 729.73 m. The total mineralization of the water from borehole 2 is 648 mg/l, and the oral treatment is very limited due to the presence of fluorine - 9.38 mg/l. It is suitable for inhalation treatment of specific diseases of the upper and lower respiratory tract.

Contraindications are mostly related to external spa treatment: infections, diseases in the active/advanced stage, cancer, epilepsy and others.

The balneological assessment of **Borehole № 5** is with entry №: 36 dated 07.05.2015. It is located on the right bank of the Chepinska river. The borehole was constructed in 1959 and is at a depth of 596.80 m, at an elevation of 728, 50 m.

The total mineralization is 638 mg / l, and the water from the deposit is characterized by stable physico-chemical composition and properties. Due to the presence of fluoride, similar to boreholes 1 and 2, this one is used for drinking treatment only under certain conditions and according to prescriptions - two or three times a year for 20 days and a dosage not exceeding 3x150 ml per day Affects the following complaints extremely well: slow metabolism, gastritis, hepatitis, chronic cholecystitis, obesity, diabetes, gout and others. When used for external balneotherapy, it affects degenerative and inflammatory joint diseases, radiculitis, plexitis, gynecological diseases, psoriasis, post-traumatic and postoperative conditions. Water is contraindicated in epileptics and cancer patients.

The balneological assessment of **borehole № 13** is with entry №: 37 dated 07.05.2015. The locality is located in the northernmost part of the depression, on the terrace of the Chepinska river, about 1.5 km from the village of Draginovo. It dates from 1959 and its depth is 865 m.

The water is of infiltrative origin and is fed mainly by atmospheric precipitation.

As in previous results, drinking treatment is severely limited due to the presence of fluoride.

When used for external balneotherapy, the following diseases are favored: diseases of the peripheral nervous system, orthopedic, gynecological, dermatological. Contraindications: infections, epilepsy, cancer.

The balneological assessment of **Borehole № 3 "Mizinka"** has entry № 20 dated 26.09.2014, mineral water deposit "Velingrad-Kamenitsa", town of Velingrad. The water sources of mineral water in the Velingrad-Ladzhene deposit are: KEI "Vlasa", borehole № 4 "Vlasa", spring "Mizinka", borehole № 3 "Mizinka", KEI № 7 „Syarna banya ", and borehole № 5 "Sulfur bath".

The deposit is located approximately in the central part of the quarter Kamenitsa.

Borehole № 3 "Mizinka" was constructed in 1960 and has a depth of 271 m.

The water is characterized by a mostly stable physico-chemical composition, and the radioactivity is within the permissible limits and does not endanger human life.

The total mineralization of the water from the deposit is 669.53 mg/l, and the high content of metasilicic acid (> 100 mg/l) makes the resource detoxifying, with anti-inflammatory effect, having a beneficial effect on a number of liver diseases, hepatitis, metabolic diseases, urological diseases, cystitis, etc.

Water has an extremely beneficial effect in the treatment of caries and other dental complaints.

The content of fluorine (10.58 mg/l) determines the need for prior consultation with a doctor and compliance with the dosage of the optimal daily intake - 15-20 days, two or three times a year, not more than 3x150 ml per day.

When using the water for external balneotherapy, improvements were observed in the following complaints: degenerative and inflammatory (in remission) joint diseases - coxarthrosis, arthrosis; PNS diseases, orthopedic diseases, skin diseases, gynecological, etc.

Water is contraindicated in epilepsy, cancer, infections and more.

The balneological assessment of **borehole № 4 "Vlasa"** mineral water deposit "Velingrad-Kamenitsa", Velingrad has entry №: 23 dated 26.09.014. The borehole was constructed in 1964 and has a depth of 450 m, as the deposit was located almost in the central part of Kamenitsa - the northernmost part of the town and in the northwestern part of the Chepino valley.

The forming environment of the mineral water is the fractured-vein water pressure system in the Rila-Western Rhodope granite massif Bogutevska plagio-gneiss formation (bogPsD), and the feeding of the repository is mainly precipitation.

The water sources of mineral water in the Velingrad-Kamenitsa deposit are KEI "Vlasa", borehole № 4 "Vlasa", spring "Mizinka", borehole № 3 "Mizinka", KEI № 7 „Syarna banya“ and borehole № 5 "Sulfur bath".

It is evident that the water has a relatively stable physico-chemical composition, and the radioactivity is within acceptable limits and does not endanger human life.

The total mineralization of the water from the deposit is 519.07 mg/l. The high content of metasilicic acid - 91.65 mg/l - makes the water with anti-inflammatory effect, having a beneficial effect on a number of liver diseases, hepatitis, metabolic diseases, urological diseases, urolithiasis and others.

The dosage of intake is not more than 3x200 ml per day, within 15-20 days, two-month or three-month treatment during the year.

When using the water for external balneotherapy, improvements are observed in the following complaints: degenerative and inflammatory (in remission) joint diseases - coxarthrosis, arthrosis; PNS diseases, orthopedic diseases, skin diseases, gynecological, etc. Water is contraindicated in epilepsy, cancer, infections and more.

The balneological assessment of **borehole № 5 „Syarna banya“-** mineral water deposit "Velingrad-Kamenitsa", Velingrad, Velingrad municipality, region Pazardzhik is under number № 19 dated 26.09.2014 and was formed almost in the central part of "Kamenitsa" - the northernmost quarter of the town.

The total mineralization of the water from the deposit "Sulfur bath", borehole № 5 is 647.24 mg/l. The water has a relatively stable physico-chemical composition, and the radioactivity is within acceptable limits and does not endanger human life.

Compared to the boreholes already discussed above, the fluoride in the water from well № 5 is the most concentrated - 10.20 mg/l, thus limiting drinking treatment. The high content of metasilicic acid - 92 mg/l - makes the water anti-inflammatory, having a beneficial effect on a number of liver diseases, hepatitis, metabolic diseases, urological diseases, urolithiasis and others.

The dosage of intake is not more than 3x150 ml per day, within 15-20 days, two-month or three-month treatment during the year.

When using the water for external balneotherapy, improvements were observed in the following complaints: degenerative and inflammatory (in remission) joint diseases - coxarthrosis, arthrosis; PNS diseases, orthopedic diseases, skin diseases, gynecological, etc.

Water is contraindicated in epilepsy, cancer, infections and more.

The balneological assessment of **borehole № 2VKP "Velyova banya"** is with entry № 16 dated 10.09.2014, Velingrad-Ladzhene deposit, town of Velingrad. The water sources of mineral water in the Velingrad-Ladzhene deposit are: KEI № K-6, K-7, K-9, K-11, K-14, K-15, K-16, K-18, K-19, K-21, K-28, borehole № 1 VKP + KEI № K-8 "Velyova banya" (total), borehole № 2 VKP "Velyova banya", borehole № 7 KG "Velyova banya", borehole № 6 VKP "Velyova banya", borehole № 7 VKP "Flint Bath", borehole № 8 KG and borehole № 9 "Centaur"

The borehole was constructed in 1959 and has a depth of 178 m. It is located about 300 m east of borehole № 1 VKP "Velyova banya ", on the left bank of the Lukovitsa river.

The total mineralization of the water from the deposit is 288.88 mg/l.

The resource has an anti-inflammatory effect, having a beneficial effect on a number of liver diseases, hepatitis, metabolic diseases, urological diseases, cystitis and others. Water has an extremely beneficial effect in the treatment of caries and other dental complaints.

When using the water for external balneotherapy, improvements were observed in the following complaints: degenerative and inflammatory (in remission) joint diseases - coxarthrosis, arthrosis; PNS diseases, orthopedic diseases, skin diseases, gynecological, etc.

Water is contraindicated in epilepsy, cancer, infections and more.

The balneological assessment of **borehole № 7 KG "Velyova banya"** is with entry № 17 dated 10.09.2014 Velingrad-Ladzhene deposit, town of Velingrad. The water sources of mineral water in the Velingrad-Ladzhene deposit are: KEI № K-6, K-7, K-9, K-11, K-14, K-15, K-16, K-18, K-19, K-21, K-28, boreholes №1 VKP + KEI № K-8 "Velyova banya" (total), borehole № 2VKP "Velyova banya", borehole № 7 KG "Velyova banya", borehole № 6 VKP "Velyova banya", borehole № 7 VKP "Kremachna banya" borehole № 8 KG and borehole № 9 "Centaur".

The borehole was built in 1970 and has a depth of 501.40 m. It is located about 15.0 m northeast of the bathroom building, on the right bank of the Lukovitsa river.

The water is characterized by a relatively stable physico-chemical composition, and the radioactivity is within acceptable limits and does not endanger human life.

The total mineralization of the water from the deposit is 221.61 mg/l.

The metasicilic acid content is in a colloidal state, and the intake of water is free and not as strict as in the previous cases. The resource has an anti-inflammatory effect, having a beneficial effect on a number of liver diseases, hepatitis, metabolic diseases, urological diseases, cystitis and others.

When using the water for external balneotherapy, improvements were observed in the following complaints: degenerative and inflammatory (in remission) joint diseases - coxarthrosis, arthrosis; PNS diseases, orthopedic diseases, skin diseases, gynecological, etc. Water is contraindicated in epilepsy, cancer, infections and more.

The balneological assessment of **KEI № 7** is with entry № 18 dated 18.09.2014, Velingrad-Ladzhene deposit, town of Velingrad. The water sources of mineral water in the Velingrad-Ladzhene deposit are: KEI № K-6, K-7, K-9, K-11, K-14, K-15, K-16, K-18, K-19, K-21, K-28, boreholes № 1 VKP + KEI № K-8 "Velyova banya" (total), borehole № 2VKP "Velyova banya", borehole № 7KG "Velyova banya", borehole № 6 VKP "Velyova banya", borehole № 7 VKP "Kremachna banya" borehole № 8 KG and borehole № 9 "Centaur".

The water is characterized by a relatively stable physico-chemical composition, with a constant composition and properties, and the radioactivity is within acceptable limits and does not endanger human life.

The total mineralization of the water from the deposit is 219.40 mg/l.

The resource has an anti-inflammatory effect, having a beneficial effect on a number of liver diseases, hepatitis, metabolic diseases, urological diseases, cystitis and others. Water has an extremely beneficial effect in the treatment of caries and other dental complaints.

When using the water for external balneotherapy, improvements were observed in the following complaints: degenerative and inflammatory (in remission) joint diseases - coxarthrosis, arthrosis; PNS diseases, orthopedic diseases, skin diseases, gynecological, etc.

Water is contraindicated in epilepsy, cancer, infections and more.

The balneological assessment of **KEI "Vlasa"** is with entry № 21 dated 26.09.2014, Velingrad-Ladzhene deposit, town of Velingrad. The deposit is located in the almost central part of Kamenitsa quarter, in the northwestern part of the Chepino valley. The water sources of mineral water in the Velingrad-Kamenitsa deposit are: KEI "Vlasa", borehole № 4 "Vlasa", spring "Mizinka", borehole № 3 "Mizinka", KEI № 7 „Syarna banya ", and borehole № 5 „Syarna banya "

The water is characterized by a relatively stable physico-chemical composition, with a constant composition and properties, and the radioactivity is within acceptable limits and does not endanger human life.

The total mineralization of the water from the deposit is 651.35 mg/l.

The resource has an anti-inflammatory effect, having a beneficial effect on a number of liver diseases, hepatitis, metabolic diseases, urological diseases, cystitis and others.

Water has an extremely beneficial effect in the treatment of metabolic disorders, biliary and liver diseases, but its reception is only with a prescription from a doctor and in accordance with the presence of fluoride - 8.39 mg/l.

The courses of administration are as follows: 15-20 days a year, two or three times, with dosages not exceeding 3x200 ml per day.

When using the water for external balneotherapy, improvements were observed in the following complaints: degenerative and inflammatory (in remission) joint diseases - coxarthrosis, arthrosis; PNS diseases, orthopedic diseases, skin diseases, gynecological, etc.

Water is contraindicated in epilepsy, cancer, infections and more.

The balneological assessment of **KEI № 7 „Syarna banya"** is with entry № 22 dated 26.09.2014 Velingrad-Kamenitsa mineral water deposit, town of Velingrad. The water sources of mineral water in the Velingrad-Ladzhene deposit are: KEI "Vlasa", borehole № 4 "Vlasa", spring "Mizinka", borehole № 3 "Mizinka", KEI № 7 „Syarna banya", and borehole № 5 „Syarna banya ".

The deposit is located approximately in the central part of Kamenitsa quarter.

The water is characterized by a predominantly stable physico-chemical composition, with a constant composition and properties, and the radioactivity is within the permissible limits and does not endanger human life.

The total mineralization of the water from the deposit is 743.28 mg/l, and the high content of metasilicic acid (115.80 mg/l) makes the resource detoxifying, with anti-inflammatory effect, having a beneficial effect on a number of liver diseases, hepatitis, metabolic diseases, urological diseases, cystitis, etc. Water has an extremely beneficial effect in the treatment of caries and other dental complaints.

The content of fluorine (10.20 mg / l) determines the need for prior consultation with a doctor and compliance with the dosage of the optimal daily intake - 15-20 days, two or three times a year, not more than 3x150 ml per day.

When using the water for external balneotherapy, improvements are observed in the following complaints: degenerative and inflammatory (in remission) joint diseases - coxarthrosis, arthrosis; PNS diseases, orthopedic diseases, skin diseases, gynecological, etc.

Water is contraindicated in epilepsy, cancer, infections and more.

Of particular importance for the present dissertation are two groundwater facilities, which respectively in 2009 and 2012 received Certificates for their environmental, social, economic utility, affecting both the town's branch and the health status not only of residents but also of visitors to the town.

The purpose for which the Certificates are mentioned (Annexes № 1 and Annex № 2) is to emphasize the change in the general composition and properties of the hydro-mineral resource and the destructive way in which they have been exploited.

On 30.12.2009 Borehole № 5 "Forest point" Velingrad-Chepino deposit received Certificate № 9 from the Ministry of Health, which proves its healing properties and beneficial effects on the human body. Water sources for the deposit are borehole № 4, borehole № 3, borehole № 2, borehole № 1 and KEI K-1 and K-2.

The water is of infiltrative origin and at the expense of atmospheric precipitation.

The total mineralization of the water is 0.195 g/l. When drinking treatment previously prescribed by an attending physician, water is suitable for the treatment of caries and other dental complaints. It helps in the treatment of renal, urological, gastrointestinal, biliary-hepatic, metabolic, joint and others. diseases such as osteoporosis.

In external balneotherapy and prevention it has a beneficial effect on the musculoskeletal system, PNS, increasing the volume of body movements and improving its overall health status.

With Certificate № 53 dated 28.08.2012 and 5 years from the date of issue, the Borehole № 2, mineral water deposit "Velingrad-Chepino", town of Velingrad, district of Pazardzhik. The natural springs spread over an area with a length of 70 and a width of 30-40 m. They are located on the right bank of the Chepinska river, fed at the expense of atmospheric precipitation, and the water is of infiltrative origin.

External balneotherapy affects the musculoskeletal system, PNS, joint diseases, diseases of the upper and lower respiratory tract and others.

Conclusion: The Velingrad thermo-mineral aquifer is of a strong type. The total flow of the mineral springs is 130-140 l/sec. The fault-drainage zone of the basin is traced to the western shore of the Chepinska valley, the valley of the Chepinska river and the northern edge of the Rhodope massif. Within the boundaries of this zone there are 6 thermo-mineral deposits: Chepino, Ladzhene-1, Ladzhene-2, Kamenitsa, Draginovo and Varvarski Bani. The waters of the first two deposits are newer. The basin has a classic and unique character. Classical because it manifests almost the entire natural hydro-geo-chemical range of silitic acrothermies and unique because of its huge resources and their unusual concentration in a small area. Half of the waters are grouped in the Chepino deposit, as they have relatively low radioactivity.

2.5. Karst spring and lake Kleptuza and the space axis "Axis Mundi"

Although perceived more as a tourist attraction, **Kleptuza lake** seems to remain aloof from curative medicine and issues of balneotherapy and recreation. For the majority of the population, the Kleptuza karst spring is synonymous with the place where 42 parallel and 24 meridian intersect. The intersection is a fact initiated by Prof. G. Puhalev (1935 - 2008) from the University of Forestry - Sofia. The cosmic axis, as it is called (Axis Mundi), world axis, center of the world, etc. is another bonus phenomenon to the large list of sights and merits of the region (Prodanov, 2018).

The karst spring is located at the beginning of the Chepino quarter and is characterized by a flow rate of 580-600 l/s, which until two years ago was double. According to Permit № 1494 of 2003, the spring is a water source with a permitted flow rate of 50 l/s, along with the Mokrata Peshtera spring - 30 l/s, the Legorinets spring - 40 l/s and the Suha Laka spring - 30 l/s. Kleptuza feeds the gravity-water supply network in the lowest parts of the town.

Apart from being a valuable source of wood and heating for the households in the municipality, the communities and territories under consideration are a kind of natural filter, purifying the air polluted as a result of the anthropogenic activity. This can be proved by the so-called. "Asclepius ellipsoid" - fig. 5.

The ellipsoid unites the natural resources of the region and explains why it allows the development of tourism, spa treatment, recreation, resort medicine and more. As a result of the available thermal zones, water sources, rich and diverse forest area, our town is characterized by extremely clean air, suitable for **its establishment as part of the European, Thermal and Climate Treatment Cluster.**

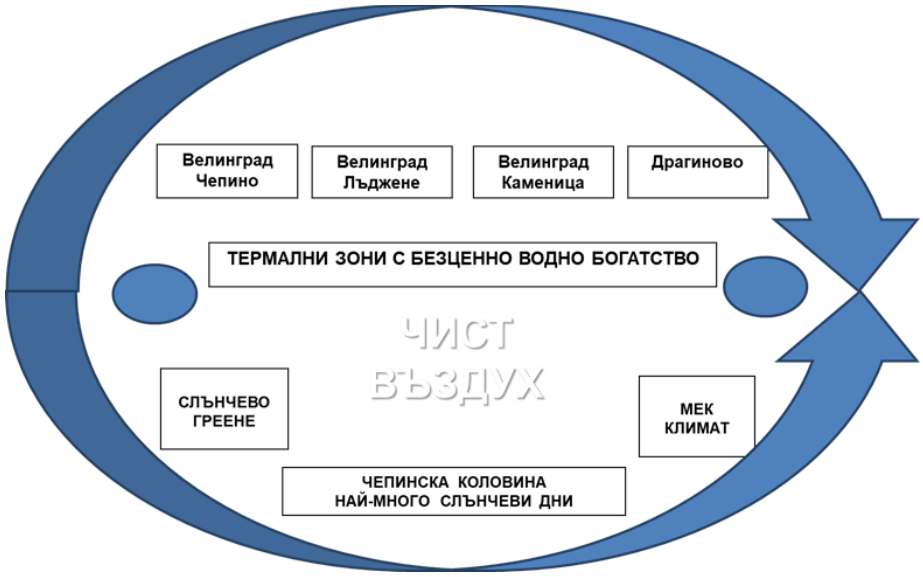
Conclusions: - the water from all deposits is hyperthermal, mineralized, sulphate-hydrocarbonate, sodium and silicon, containing fluoride, without sanitary-chemical and microbiological signs of pollution, and the value of radiological indicators is within the norms for mineral waters.

- the content of microelements and the values of the radiological indicators are within the permissible limits. The water meets the requirements of Ordinance № 14 for the resort resources, the resort areas and the resorts.

- almost all deposits are suitable for the treatment of diseases of the PNS, musculoskeletal system, lung and joint diseases, etc.

For this reason, a study was conducted on 1037 people, long-time guests of the Balneological center "Kamena" in Velingrad. It will strengthen the author's thesis that the protection of natural resources in the area are not just recommended, but mandatory if society wants to continue to consult natural and environmentally friendly ways and methods of treatment.

Fig. 4: Ellipsoid of Asclepius



III. Analysis of balneotherapy in Velingrad

3.1. Rehabilitation of patients

Given the fact that balneological tourism is one of the most profitable products in the sector, balneoclimatological zoning is a necessary condition for establishing the advantages and disadvantages that characterize a settlement. Hydrothermal resources, along with climate, forests, fresh air, etc., are a priority classifier of "natural" treatment centers and other factors.

The climate of the region is defined as transitional-continental, with a noticeable Mediterranean influence. It has been scientifically established that visitors to the city come to treat a number of their ailments:

 diseases and disorders of the musculoskeletal system (traumatic and orthopedic diseases of different nature);
 diseases and disorders of the PNS;
 functional disorders of the CNS (disadaptosis, burn-out, neurosis, discoordination);
 diseases and dysfunctions of the urinary system (kidney stones, pyelonephritis, diseases of the ureters and bladder);
 diseases and dysfunctions of the digestive system and metabolism;
 diseases of the cardiovascular system (arterial hypertension 1st and 2nd degree, metabolic syndrome with hypertension);
 diseases of the respiratory system (asthma, bronchitis, bronchiectasis);
 skin diseases (atopic dermatitis, neurodermatitis, itchy dermatoses, eczema, allergic dermatitis, psoriasis);
 diseases of the female and male reproductive systems (acute chronic conditions, inflammation, functional disorders, etc.);
 pediatric diseases;
 occupational diseases.

The study was carried out on 1037 patients who are treated at the Medical Center "Kamena Medical" – town of Velingrad under the program of the National Social Security Institute. The patients underwent prophylaxis, treatment and rehabilitation with a medical referral from their GP and a decision of the National Social Security Institute.

The age group covered is in the range of 25-65.

All patients underwent initial and final examinations in two interims, and the author examines the difference in their health status "before" and "after" the applied procedures.

According to the diseases with which they were admitted and treated; the patients were divided into following groups:

1) First group - patients with joint diseases: arthritis and arthrosis, conditions after hip arthroplasty, osteoporosis, Bechterev's disease.

2) Second group - patients with diseases of the peripheral nervous system (PNS) - discopathy, radiculitis, plexitis, periarthritis.

3) Third group - patients with diseases of the upper and lower respiratory tract: conditions after pneumonia, bronchial asthma, bronchitis, sinusitis and others.

4) Fourth group - patients with post-fracture conditions of the limbs

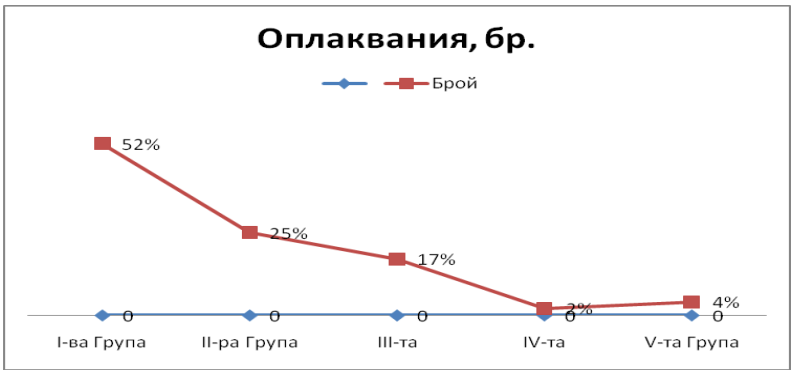
5) Fifth group - oncological diseases; contraindicated for treatment with radon mineral water and physical therapy

38 people were examined from the fifth group of cancer patients. 175 people were registered with respiratory diseases, 27 had post-fracture conditions of the limbs. The first group included 536 people. There was a total of 261 patients with PNS diseases.

Table 1: Distribution of patients by groups

Type of complaint	1st group	2nd group	3rd group	4th group	5th group
Number	52%	25%	17%	2%	4%

Fig. 5: Number of patients by group



It should be noted that the sample represents the usual attendance of patients, as well as their share and number according to the complaints they have, in the total number of patients.

3.1.1.Characteristics of the treatment of patients with joint diseases - arthritis and arthrosis

536 patients with degenerative joint diseases took part in this group: arthritis, arthrosis, Bechterev's disease, condition after endoprosthesis.

According to the nosologies, the distribution is as follows:

Table 2: Distribution of joint diseases by nosology

Type of illness	Arthritis and arthrosis	Endoprosthesis	Neck osteochondrosis	Bechterev's disease
Number	402	10	120	4

Fig.6: Joint diseases, distribution

Analysis and evaluation of the results obtained after 10 days of treatment and rehabilitation of patients with arthritis and osteoarthritis.

The indicators by which we made an assessment were anamnestic and objective. These included pain syndrome - examination on the visual analog scale for pain 0 - 10 degrees, measurement of functional volumes /active and passive in %/, swelling, deformities, gait disturbances, use of aids - cane.

After the treatment and rehabilitation, we got the following results:

1. All patients responded favorably to the treatment.
2. Pain syndrome

Conclusions: The conducted complex treatment and rehabilitation including: baths, tangents, underwater exercise with radon water, individual therapeutic exercises, physiotherapy, massages, had an extremely beneficial effect and significantly improved the condition of patients with arthritis and osteoarthritis.

The complex treatment of **patients with Bechterev's disease**, including baths, tangents, underwater exercise therapy with radon mineral water, individual exercise therapy, massages, physiotherapy had an extremely beneficial effect on patients with Bechterev's disease and significantly improved their condition.

Conclusions: - complex treatment and rehabilitation of patients with endoprosthetics of one or two hip joints including baths, tangents, ILC with radon mineral water, individual therapeutic exercises, massages, physical therapy, had an extremely beneficial effect and significantly improved the condition of patients with endoprostheses of the pelvic joints;

- the complex treatment and rehabilitation of **patients with neck osteochondrosis**, including baths, tangents, underwater exercise therapy with radon mineral water, individual therapeutic exercises, massages, physical therapy, had an extremely beneficial effect and significantly improved the condition of patients with neck osteochondrosis.

3.1.1.1. Characteristics of the treatment of patients with Bechterev's disease

In this group we placed patients with Bechterev's disease.

All underwent a primary examination, including:

- General status;
- Respiratory system;
- Cardiovascular system;
- Neurological status;
- Presence of spinal deformities and their measurement in cm
- Deficiency in the volume of functional movements.

The treatment complex included:

- underwater jet massage - 10 times., temperature - 36.5° 20`, 1.5 atm - 10 times with mineral radon water
- underwater therapeutic exercise in a mineral pool with radon water 30 min, 32-33° C
- Physical therapy - one of the following according to the general status and the measurements taken:
  - Ultrasound, 10 pcs., 0.2÷0.4 W/cm3
  - Interference current - 10 min (90-100 Hz)
  - Magnetotherapy - 10 min, 0.2 imp., 240 Oë
  - Electrophoresis with aux. lye - 8-10 mA, 10-20 min
  - Trebert currents - 10 min
  - Therapeutic massage - 20 min
  - Individual therapeutic exercise - 20 min

Analysis and evaluation of the results of the treatment and rehabilitation.

After 10 days of treatment and rehabilitation we reported the following results:

1. All patients, 4 in total, responded favorably to the applied treatment measures.
2. Pain syndrome - we reported on the visual analog scale for pain 0-10 degree
3. All 4 patients with deformities improved their condition and straightened the spine by 4-6 cm.
4. Spinal mobility improved
5. The deficit of functional movements was studied in the following directions: flexion, extension, lateral flexion dex and sin, rotation dex and rotation sin. It was improved between 10 % - 20 %.

Conclusions: The complex treatment including baths, tangents, underwater exercise therapy with radon mineral water, individual therapeutic exercises, massages, physiotherapy had an extremely beneficial effect on patients with Bechterev's disease and significantly improved their condition.

3.1.1.2. Characteristics of the treatment of patients with endoprosthetics of one or two hip joints

The group included 10 patients who underwent endoprosthesis of one or both hip joints.

4 of the patients assisted themselves with aids – "lofstrand crutch".

All patients were assigned a 10-day treatment complex:

- Underwater jet massage with radon mineral water - 10 times, T = 36.5° C; 1.5 atm for 20 min;
- Underwater healing gymnastics in a radon mineral pool - 30 min, T = 32-33° C
- Individual therapeutic exercise - 30 min
- Therapeutic massage - 20 min
- Physical therapy

Analysis and evaluation of the results obtained after 10 days of treatment and rehabilitation of patients with endoprosthesis of 1 or 2 hip joints.

Evaluation of the results by examining the pain syndrome according to the Visual analog scale for pain 0-10 degree. Measuring the deficit of the functional movements of the TB in %, change in gait and use of aids /lofstrand crutch, cane/.

Results:

1. All patients responded favorably to the treatment and rehabilitation.
2. The pain system (reported by the SAC for pain) disappeared in 7 patients, and in 3 it greatly decreased.
3. Four patients using aids significantly improved their condition, assistance was unnecessary.
4. Gait improvement was reported in all.
5. Functional volumes were measured before and after treatment and rehabilitation and reported deficits in % of active and passive movements.

	Active movements before treatment	Active movements after treatment	Passive movements before treatment	Passive movements after treatment
0-10%		9		8
10-20%	1	1	2	2
20-30%	3		3	
30-40%	2		3	

40-50%	4		2	

As can be seen from the table, active and passive movements increased significantly.

Conclusions: the complex treatment and rehabilitation including baths, tangents, IFC with radon mineral water, individual therapeutic exercises, massages, physical therapy, had an extremely beneficial effect and significantly improved the condition of patients with hip arthroplasty.

3.1.1.3. Characteristics of the treatment of patients with neck osteochondrosis

After the initial examination of all patients, an individual treatment complex was assigned, including:

 Underwater jet massage - 10 pcs. with radon water, t = 36.5° C, 1.5 atm for 20 min.

 Underwater therapeutic gymnastics in a pool with radon mineral water - t = 32-34° C, 30 min.

 Physical therapy - one of the following, appointed according to the general condition and the current objective status, as well as concomitant diseases

o Ultrasound - 10 times 10 min, 0.4 w/0.3 cm2

o Interference current - 10 min, 90-100 Hz

o Electrophoresis with lye from the town of Pomorie - 10 min, 8-10 mA;

o Magnetotherapy - 10 times, 240 Oë, 0.2 imp, 10 min;

o Therapeutic massage - 20 min

Analysis and evaluation of the results obtained after 10 days of treatment and rehabilitation of patients with neck osteochondrosis. Total number 120.

Evaluation of the results was made on the basis of anamnestic data for: back pain, tingling in the hands, headache, dizziness and "sinking", tinnitus, dropping objects, volume of functional movements in the neck, active and passive in %, deformation.

We objectified the pain syndrome according to the Visual analog scale for pain of 0-10 degree.

After the treatment activities:

1. The pain syndrome disappeared in 195 patients and greatly decreased in 5.
2. The numbness of the fingers disappeared in 112 patients, decreased in 8.
3. The flexion strength of the fingers increased in all 120 patients.
4. Headache and tinnitus disappeared in 116 and decreased sharply in 4 patients.
5. Dizziness and a feeling of "sinking" remained only at 1 patient.

Conclusions: The complex treatment and rehabilitation including baths, tangents, underwater exercise therapy with radon mineral water, individual therapeutic exercise, massages, physical therapy, had an extremely beneficial effect and significantly improved the condition of patients with neck osteochondrosis

3.1.2. Characteristics of the treatment of patients with PNS diseases

This group includes patients suffering from diseases or disorders of the PNS: discopathies, radiculitis, plexitis and periarthritis, the distribution of which is as follows:

Table 13: PNS - Disease distribution by groups

Type of complaint	Discopathies	Radiculitis	Plexitis	Periarthritis
Total	118	56	42	45

Fig. 7: PNS - diseases by group, distribution

After the initial examination, individual treatment complexes were prescribed according to the diagnosis and condition of the patients, including:

 Physical therapy: (one of the following)

o Ultrasound - 10 pcs.; 0.4 W/0.3 cm^2, 10 min

o Interference current - 10 pcs., 90-100 Hz

o Electrophoresis with lye from the town of Pomorie -10 pcs. 10-20 min, 8-10 am

o Laser therapy according to the scheme, magnetic therapy, Trebert currents

 Underwater jet massage with mineral water - 1,5 atm. 20 min at t = 35-36° C

 Underwater therapeutic recreational gymnastics in a pool with mineral radon water – t = 33° C, 30 min, 10 pcs.

 Therapeutic massage - 20 min, 10 pcs.

 Individual exercise - 30 min.

 Cryotherapy for periarthritis.

Analysis and evaluation of the results obtained after 10 days of treatment and rehabilitation of PNS diseases.

The indicators on which we made the assessment are anamnestic and objective: pain syndrome with or without tingling, paresthesias and paresis, cramps, tingling, impaired gait, use of aids, musculature hypotrophy, reduced volume of functional movements.

Results: After the complex treatment and rehabilitation of 261 patients the following results were obtained:

1. Patients from all subgroups responded favorably.

2. The pain syndrome of the patients was objectified before and after the treatment with the Visual analog scale for pain 0-10 degrees

As can be seen from the scale, the pain syndrome was affected very well by the treatment and rehabilitation measures.

3. Gait improved in all patients.

4. Six patients using aids /cane/ improved their condition and assistance proved unnecessary after treatment and rehabilitation.

5. Functional movements (active and passive) have improved significantly.

	Active movements before treatment	Active movements after treatment	Passive movements before treatment	Passive movements after treatment
0-10%	27	202	5	205

10-20%	104	48	77	55
20-30%	48	1	158	1
30-40%	44	-	21	
40-50%	36	-		
50-60%	2	-		

As can be seen from the table, the functional movements (active and passive) responded very well to the applied treatment and rehabilitation measures.

6. Impaired gait improved in everyone.

7. 2 patients used aids, which became redundant after the treatment.

8. In 6 patients we registered muscular hypertrophy and in addition to 10 days of treatment, continuation of the exercises at home was appointed.

9. In 5 patients there was paresis /n.fibularis/ on which we performed MMG before and after treatment and rehabilitation.

As can be seen from the MMG table with rehabilitation measures and treatment, the patients improved their condition.

Conclusions: The balneotherapeutic factors of the resort Velingrad /in particular radon mineral water - Chepino/, in the form of underwater therapeutic exercise, baths, tangents, proper combination with individual therapeutic exercises, mechanotherapy, physical therapy had a significant effect on the full recovery of patients with diseases of the PNS.

1.1.1. Characteristics of the treatment of patients with diseases of the upper and lower respiratory tract

Subject of treatment were the following diseases:

Table. 10: Grouping of patients suffering from diseases of the upper and lower respiratory tract

Type of disease	Sinusitis	Allergies	After bronchitis	After pneumonia	Bronchial asthma
Total	13	12	27	74	49

Fig. 5: Percentage distribution of patients with respiratory diseases by disease group

All patients in the group underwent primary, final and two intermediate examinations. They are assigned an individual treatment complex of:

• Inhalation with mineral water - 10 pcs. for 10 minutes

• Physical therapy according to the nosology:

- Solux - 5-10 min red or blue filter
- US of the paranasal sinuses or paravertebral and subscapular 0.1÷ 0.4 W/cm2
- UHF of the paranasal sinuses or chest in oligobermic doses

• Magnetic therapy of the chest - 0.2 imp. 10 min, 240 Oe

• 10 procedures were appointed to each patient

• group breathing exercises on the terrace, next to a pine forest. Air: pine, with negative air ionization, 30 min.

• walk to the Kleptuza lake

Patients with diseases of the upper and lower respiratory tract: conditions after pneumonia, bronchitis, bronchial asthma, sinusitis, allergic rhinitis.

Analysis and evaluation of the effect of treatment of patients with diseases of the upper and lower respiratory tract.

The assessment was reported on the basis of anamnestic and objective signs: general condition, cough, nasal secretions, asthma attacks, shortness of breath, use of inhalation pumps and drug therapy, objective lung findings, changes in breathing, wheezing and others.

Results:

1. All 175 patients in the group responded favorably
2. The cough in 168 patients completely disappeared, in 7 of them it greatly decreased.
3. Of the 49 subgroups of asthmatics, none had an asthma attack.
4. Out of 49, only 9 remained for inhalation treatment /pumps/. All the other 40 stopped the drug treatment.
5. At the final examination no one had shortness of breath as a complaint, on the contrary, everyone shared that they breathe lightly "with full breast"
6. No patient was found to have respiratory changes or wheezing at the final examination.
7. From the other subgroups the secretions in the nose disappeared completely.

8. In allergic rhinitis, only one patient had scanty secretions

82% of patients had undergone physical therapy and inhalations at home, but this had not led to improvements in health status.

Conclusions: The climatic factors of Velingrad - clean air, negative ionization, mineral water and appropriate physical therapy, respiratory gymnastics, inhalations with mineral water are the reason for significant improvement and cure of patients with diseases of the upper and lower respiratory tract.

The main lesions and complications of KOVID 19 are the respiratory system, so it would be appropriate **after healing** to further restore the respiratory system with climatic and balneotherapeutic factors of the resort of Velingrad.

3.1.4. Characteristics of the treatment and rehabilitation of patients with post-fracture conditions of the limbs

The group includes people aged 32 to 63.

Plaster immobilization was removed for all of them.

According to the place of fracture they were grouped as follows:

Table. 11: Grouping of patients according to individual complaint

Place of fracture	Upper limb fracture	Lower limb fracture	Ankle joint fracture	Achilles' tendon rupture
Total:	8	9	7	1

Each patient underwent a primary medical examination, including: general status; respiratory system, cardiovascular system; measurement of functional volumes of movement, pain syndrome, gait disorders, use of aids (cane, crutches, lofstrand crutch), edema.

Individual treatment complexes were prescribed according to the diagnosis and current status. We mainly relied on the healing properties of radon mineral water

The complexes included:

- Underwater massage (20 min, 0.5-1.5 atm.)
- Underwater therapeutic gymnastics - 30 min at t° = 32-34° C
- Individual physical exercises - 30 min
- Mechanotherapy - 30 min
- Healing massage with special techniques
- Physiotherapy - a procedure according to the diagnosis
- Magnetotherapy - 0.2 imp for 10 min or
- Interference current - 90-100 Hz or
- Ultrasound - 0.3- 0.4 W/cm^2

Analysis and evaluation of the results obtained after 10 days of treatment and rehabilitation.

The assessment was reported on the basis of objective anamnestic data: general status, pain syndrome, objectified before and after treatment with a visual analog scale for pain 0–10-degree, measurement of functional volumes passive and active in %, resorption in the presence of edema, gait disorders, use of aids /cane, crutches, lofstrand crutch/

All 27 patients responded favorably.

Active movements				Passive movements		
Deficit %	before	after		Deficit %	before	after

0 – 10	1	24		0 – 10	2	2
10 – 20	7	2		10 – 20	5	1
20 – 30	7	1		20 – 30	7	1
30 – 40	9	-		30 – 40	9	-
40 – 50	3	-		40 - 50	4	-

The swelling that was present in 8 patients was absorbed. The gait of all but one recovered completely. Aids became redundant in all 26 patients, and only one with a torn Achilles tendon remained on only one crutch.

The pain syndrome in 20 patients disappeared, in 7 it greatly decreased - visually VAS. The volume of all active and passive movements improved significantly and the deficit in % decreased. Two patients with fracture of the knee cap and rupture of the Achilles tendon failed to fully restore functional movements, but improved significantly.

The balneological factors of the Velingrad resort, in particular the radon mineral water in Chepino, in the form of underwater therapeutic gymnastics, baths, tangents, properly combined with individual therapeutic exercises, magnetotherapy, physical therapy had a significant effect on the full recovery of patients with post-fracture of the limbs.

3.1.5. Characteristics of the treatment of patients with oncological diseases

Due to the impossibility to be treated with reformed and physical factors and radon mineral water, cancer patients were assigned treatment:

- Individual therapeutic exercise;
- Field treatment;
- Special group breathing gymnastics;

What we relied on:

- The beneficial effects of clean pine air
- Negative air ionization
- Appropriate diet with alkalizing foods and mineral water
- Psychoanalysis
- Group mutual assistance

Patients underwent treatment after previous chemotherapy and radiation therapy, and additional immunostimulants were provided. Among the main products used in the procedures was **bee pollen**. The second product that increases the body's immune system is **black elderberry**, prepared in a special way.

According to the folk healer Petar Dimkov, this is the strongest Bulgarian herb in its effect.

Analysis, results and evaluation of treated patients with cancer.

The assessment was based on the following signs: general condition, cardiovascular system, respiratory system, neurological status, lack of appetite, easy fatigue, pain, swelling, improved mood and desire to live.

Results:

1. All patients confirmed their overall improvement
2. The breathing was easier, calmer
3. Normal heart rhythm and blood pressure
4. Improved mood, desire for life.

Conclusions: The climatic factors of the Velingrad resort - clean pine air, terrain trails, negative ionization, collective breathing exercises, immunostimulants are factors for significant improvement of patients treated with chemotherapy and radiation therapy due to cancer.

Summary:

The conclusions reached by the author, the complex treatment and rehabilitation, including baths, tangents, underwater therapeutic exercises with radon mineral water, individual therapeutic gymnastics, physical therapy, massages, had a very beneficial effect and significantly improved the condition of patients.

Out of 1037 people, insignificant or no improvements were observed in nine patients - cancer patients, and this non-response to the symptoms was due to reluctance to actively participate in rehabilitation activities.

Climatotherapy, radon mineral water in various forms has an extremely beneficial effect in the prevention, treatment and rehabilitation of diseases of the musculoskeletal system, peripheral nervous system, post-fracture conditions, diseases of the respiratory system and others.

IV. Conceptual model for inclusion of Velingrad in the European thermal cluster

The tendency to reward the body in relaxing warm mineral water is becoming global. The new approach focuses not so much on treatment and rehabilitation as on prevention and prophylaxis, although all are placed under a common denominator of importance. In recent decades, the holistic approach, which is based on the concept of harmony between spirit, soul and body, has prevailed.

The work done in the preparation of the dissertation supported the statement that Velingrad is ready to join the European thermal and climatic treatment cluster. It is proposed as a supplement and a complex MULTI-METHOD and a model for assessment of hot mineral springs for health, prevention, recreation, wellness and spa role and importance.

The method is presented in Annex 4 and includes:

Interpretive social approach, also known as **constructivist paradigm**. It explores a series of interrelationships between different aspects of the use of hot mineral springs, healing, spa and wellness, and recreation. This approach is based on Max Weber's understanding of **empathic understanding** and includes: localization of the studied topics, characterization of mineral springs, baths and waters in the Velingrad region, as well as emphasizing their individual features and healing properties, illustrated with many examples; contextualizing this phenomenon.

The model incorporates 3 sectors:

1) rehabilitation and treatment - rehabilitation and treatment of diseases; health improvement and prevention; relaxation and visual attraction from natural phenomena;

2) spa and wellness - medical health tourism; Wellness; Recreation;

3) prevention and recreation - common elements of natural hot mineral springs; natural hot mineral springs; geothermal tourism, each of which takes into account the role of mineral waters in restoring and improving overall human health and well-being.

Although, as already shown, the three sectors differ from each other and often exist and operate independently, in many cases, due to the multi-dimensional structure of geothermal resources, they complement each other quite successfully. The model establishes a correlation between many integrated elements that are related to the environment, ecology, natural resources, recreation, medical reputation and infrastructure. For example, tourists visiting Velingrad as a spa destination to use the opportunities of balneological treatment and recreation, etc.

The applied methods are based on **ontological presumptions.**

Another method used is the philosophical branch **epistemology (ancient Greek ἐπιστήμη, "knowledge" and λόγος - "word, doctrine")**, focused on the relationship between the limits of individual knowledge and the way this knowledge makes us know things from objective reality. A basic approach in epistemology is the argumentation of what we know and claim to know through a solid evidence base. The dissertation abstract posteriori proves the importance of mineral waters for health, recreation and prevention exclusively in the region of Velingrad.

Precise determination of the typical characteristics of the recreational product is impossible to be given (Sarancha, 2009). Among researchers engaged in recreation, two positions stand out. On the one hand, we have a certain focus on rest and recovery, and not so much on various activities (such as sports or tours) (Oborin, 2011). The other point of view focuses on sports and other activities that take place outdoors, most often in nature, in order to get out of the usual environment and activities (Gratton, & Taylor, 2000). In both cases, the end result aims at the physical and spiritual recovery of tourists.

If we draw a parallel with other SPA destinations and Bulgaria, we can mark a number of merits that give us an advantage in the "competition". The town is a leader in the abundance and diversity of mineral waters in Bulgaria. There are 80 springs, whose flow, volume and composition provide a unique chance for the treatment of lung, joint, motor, cancer, nervous diseases, kidney failure, diseases of the liver and urinary system and many others. There are very good results for recreation of patients with problems in the musculoskeletal system and neurological diseases, and gynecological diseases are a special priority in the balneotherapy list of this region.

The largest karst spring in Bulgaria - Kleptuza - is located within the town limits. The 570 l/s of ice-cold water gushing on the surface have no equivalent in the country and form two lakes.

Kinesitherapy and hydrotherapy are widely used in the spa capital. They are equivalent to treatment through the movement of water and are the most important part of the program for recreation and rehabilitation of various diseases, especially in patients with musculoskeletal disorders. As for thermotherapy and cryotherapy, they have a field for development in Velingrad, as its water is proven hydrocarbonate-sulphate-sodium of fluoride-silicon dioxide type and is not polluted according to sanitary and chemical criteria.

Climate and balneotherapy programs also have good ground for development. It has been proven that a number of pathological conditions are treated or alleviated in the town. The reason for this is the waters with a high content of:

 Radon and magnesium, which regulate metabolic processes and improve immune reactivity and vitality;

 Calcium and sulfide elements, recreation for diseases of the bones and joints, skin diseases, sterility;

 Fluoride - highly effective in the prevention of dental caries and osteoporosis;

 Iodine and bromine, effective for regulating the decreased function of the thyroid gland and for limiting the development of arteriosclerosis;

 Carbonic acid to strengthen the cardiovascular system;

 Metacyclic acid with its anti-aging effect;

 Healing of iron and arsenic for anemia and strengthening the body;

 Sodium bicarbonate-sulphate composition with a strong effect on diseases of the digestive and secretory system, prevention and recreation of diseases of the respiratory system.

All the data and facts presented above testify that Velingrad has the necessary diversity and abundance of hydrothermal, bioclimatic and a wide range of health resources to rank among the first in the European thermal and recreational cluster. The aspiration for its inclusion is rooted in the proven usefulness of the implementation of the cluster policy in a global perspective aimed at increasing efficiency, competitiveness, internationalization and smart specialization in Bulgaria.

In Velingrad there are 43 recreational facilities and sanatoriums, over 20 hotels with over 1400 beds. Every year the destination is preferred by 200,000 tourists from the country and abroad. We can safely say that the lack of thermal springs would modify these statistics in an unfavourable way. The water temperature varies between 28^0 and 86^0 C, and the mineralization - from 510 mg/l to 670 mg/l and allows underwater massages and gymnastics, hot bathing, health procedures and more.

The waters under study in the town of Velingrad are groundwater and less frequently surface water, with a complex composition (anions, cations), with specific mineralization (aluminum, arsenic, zinc, copper, mercury, cadmium, etc.), with different radiation. (α, β, uranium). According to their temperature, they are divided into cold (20^0 C), sub-thermal ($20\text{-}37^0$ C), thermal ($37\text{-}42^0$ C) and hyperthermal (above 42^0 C). For example, **the mineral spring in Chepino** has a beneficial, healing effect on the genitourinary system, joint and muscle diseases, cleansing toxins; supports the treatment of the lungs, stomach and abdomen; treats skin problems and neuralgia. The water is slightly mineralized, but rich in radon. The places where medical procedures can be performed in Ladzhene quarter are the balneocomplex "Velina", located in the immediate vicinity of the Kleptuza lake; men's and women's radon baths.

Men's and women's radon baths are the oldest in Bulgaria. They are two separate buildings, whose foundations and pools are remnants of the construction of the ancients, which were renewed and restored in 1923-1926. The temperature is about 42^0 C, which means that the water is hyperthermal. PH is about 9.2, contains silicon; fluorocarbon, sulfate, sodium, calcium and potassium.

The mineral spring in Ladzhene is an indispensable "helper" in dealing with joint, rheumatic, muscular diseases; it has proven effectiveness in otherwise incurable eczema and skin rashes. The places where outdoor baths and showers can be applied are "Velyova banya", "Kremachna Banya", Resort Polyclinic. When used internally, water cures kidney and urological diseases, improves the gastrointestinal tract, cures endocrine diseases. The water here varies with a temperature between 25^0 and 63^0 C, and is defined as hyperthermic, less mineralized than Chepino with hydrocarbonate, sulfate, sodium, silicon and fluorine.

The construction of Kremachna Banya began in the middle of the 18th century. Like "Zhenska banya", it also has a hexagonal vault. The present building was designed by Ivan Goturanov in 1925 and a rehabilitation section was built in 1977. The water contains sodium, hydrocarbon, fluorosulfate and silicon, its pH is 9.18 and its temperature is $35\text{-}36^0$ C.

Visitors to Kremachna Banya usually have diseases of the nervous system, delayed or hyperfunction of the endocrine glands, poor or too fast metabolism; they have second-degree hypertension; neurodermatitis, etc.

Velyova Banya has been proven to cure neurosis, hypertension, menopause, endocrine diseases. Velyova Banya is one of the cultural monuments not only of the municipality, but of Bulgaria as a whole. The water temperature in Velyova banya is 43^0 C, while the water in Kremachna Banya is cooled and can drop from 65^0C to 36^0 C.

On the border between the quarters Ladzhene and Kamenitsa is Kalna banya, and a few meters from Kremachna Banya is **Zhenska banya.** The second one was built in the period 1918-1948. It is especially curative for diseases of the urinary system, gynecological diseases, diseases of the gastrointestinal tract. PNS is also actively affected and treated by drinking and bathing. The water temperature is around 39^0 C, and treatment courses usually include 10 to 15 procedures

The water temperature in **Kalna banya** reaches 84^0 C, which after cooling drops to 39^0 C. Joint diseases, gynecological and neurological are treated by bathing and by drinking - sick kidneys and other urological problems. Cases have been reported in which the intake of large quantities – 30 ml/kg per body weight, the disposal of stones took place without surgical intervention.

The mineral spring in Kamenitsa quarter is extremely specific in terms of properties and healing power. The water in the area is collected from two springs and three wells, the most important of which are Syarna banya and Vlasa, and its temperature varies from 62^{0} C to 88.5^{0} C.

The water of **Syarna banya** is characterized as hyperthermal, slightly mineralized with sulfate, bicarbonate, sodium, fluorine and silicon. Comparable to other deposits, the water from the deposit in the Kamenitsa quarter has the highest hydrogen sulfide content. This makes it extremely suitable for the treatment of arthritis, neuritis, plexitis, spurs, diseases of the brain and spine, skin eczema, gynecological diseases, psoriasis and even baldness.

We can conclude that geothermal springs are used in almost all tourist sectors: SPA and wellness; balneology and hydrotherapy; geotourism and ecotourism; nature-friendly tourism. Given the fact that the hot springs are presumably located in close proximity to an active volcanic environment, and Velingrad is just such a place, it is successfully developing extreme tourism. Therefore, all the above criteria and components are valid for the town of Velingrad, which boldly ranks it to destinations such as Iceland, Japan, USA, Germany, France, Italy, Hungary.

It should be noted that the sources are indicated as renewable sources in case they are not overexploited.

Another anticipated trend is the growing consumer focus globally on healthcare, preaching a "back to nature" approach. But such trends are possible if:

 the state intervenes in the appropriate way - through laws, funding, interaction with European and international organizations for recreation, treatment and environmental protection;

 the municipality takes measures for renewal, refreshment and reduction of the exploitation of the mineral springs;

 the tourism sector and its "players" act conscientiously and take action not only for financial gain but to care for future generations;

 the standards and requirements for the care of natural habitats are increased.

In order not to ignore the history of the SPA and Wellness industry, a brief overview of the countries in which it is developing to date has been made. The leader in the field of its rapid development and maintenance is Japan, which has 130 million beds, followed by the United States with 110 million. The countries in Europe share a total of 180 million. The potential users of spa services and products is about 300 million, and the European Spa Association conducted a study, according to which 39 per 100 of tourists are attracted mainly by the undisturbed habitats, preserved flora and fauna; 37 % prefer urban tourism, and 22-23 % are attracted by the opportunities for relaxation and recreation[1].

WASH offers an updated intervention and contribution to improving health by using thermal springs in the right way. To this end, the following principles are to be adhered to:

 Prioritize actions of the greatest importance for public health in areas where WHO intervention will be able to generate universal benefits;

 Strengthening the capacity of the “Health” sector in order to promote the implementation of the Strategy and the supervision of public health measures;

 Align WASH goals with health, climate change, nutrition, and human rights principles;

 Using science and its highest achievements to explain and prove the impact of WASH on health, as well as providing a full range of proven practices in developing new ones;

 Encouraging the contextual improvement approach and encouraging countries to align their national policies with WASH as a shortened path to achieving their goals;

 Using the existing regional policy frameworks as a springboard for the development of WASH;

 Promoting sustainable change by strengthening state institutions involved in the oversight and regulation of the WASH strategy;

 Attracting new and engaging already established WHO partners in improving the health of the world's citizens, as well as addressing current issues in the sector as a prerequisite for providing higher quality care.

Specifically for the services offered in Velingrad, they have a proven higher level of quality compared to other SPA centers in Bulgaria and neighboring countries. This is due to the abundance and variety of healing waters in terms of their mineral composition and the presence of radon in some of them.

Conclusion: thanks to its relief and climatic features the town has the opportunity and develops all types of balneo-, recreational, SPA and wellness services, as well as medical health tourism. This means that in the future it will affect the socio-economic and spatial-territorial situation in the municipality and the region.

V. Balneo and climatotherapy and spa tourism as a factor in the local development of Velingrad municipality

If we accept the following statistics:

 25.7 % of tourists have at least once tasted the pleasure called "spa treatment";

 37.2 % of the foreign flow prefers balneological tourism to other forms of it;

 20.4 % of the tourists are engaged in cultural and historical tourism;

 16.6 % of tourists have practiced mountain summer tourism at least once; (Marketing Research Agency, 2014);

we can predict that the municipality of Velingrad ranks among the top destinations in all three areas. This means that the targeted activities will have a favorable impact on the socio-economic profile of the municipality, on the one hand, and its spatial and territorial relations, on the other.

The impacts of balneotherapy and SPA tourism on the local development of Velingrad municipality should be interpreted from several perspectives. First of all, from the fact that the municipality is entirely mountainous; secondly, that it is located in the most extensive mountain in Bulgaria and the Chepino riverbed; thirdly - that it is part of region Pazardzhik and last but not least - for the sustainable development of tourism.

In Appendix №: 2 to Art.3. para 1 of Ordinance № 14 of April 1, 2003 for determination of the settlements in rural and mountainous regions in Bulgaria the municipalities, categorized as mountainous, are 138, among which 2172 settlements are distributed. Of these, 568 are classified as disadvantaged, and below № 912 is the town of Velingrad (Art. 3, para 3 of Annex 1 to the Transitional and Final Provisions of the Ordinance for determining the criteria for disadvantaged areas and their territorial scope (Patarchanov, 2012). This means that the town of Velingrad and the settlements in the municipality of Velingrad should meet any of the following conditions:

 Average altitude - minimum 700 m;

 Average slope of the terrain - minimum 20 %;

 Average altitude - minimum 500 m in combination with average slope of the terrain - minimum 15 %

 Lands and a group of lands adjacent to the mountain lands, which have at least 90 % common border with mountain lands.

5.1. Socio-economic impacts.

Analysis of the current demographic and social situation.

The economic crisis is also reflected in the deepening of the demographic problems related to the processes of births, deaths, migration of the population and last but not least the deepening of the disproportions in the territorial distribution of the population in the country. The indicators for general

demographic development of Velingrad municipality put it in a relatively more favorable position compared to other municipalities in region Pazardzhik.

Velingrad municipality is on the 2nd place at the level of LAU 1 in region Pazardzhik (NUTS 3) in terms of population - 33,787 people as of 31.12.2018, which represents about 14.8 % of the population of the region. In the distribution of the population at the municipal level there is a clear imbalance between the town of Velingrad and other settlements.

According to data from the Municipal administration (GRAO Directorate) Velingrad as of 15.12.2019 at a permanent and current address in the town of Velingrad live 23,260 people (65.3 % of the population of the municipality), and a total of 35,620 people for the municipality.

Table. 13. Settlements in the municipality Velingrad - population (2011), land area, name changes.

Settlements	Population (2011)	Land area km^2	Note (former name)
Ablanitsa	379	11,874	
Alendarova	272	-	Alendarovi, Shondrovi in the land area of the village of Sveta Petka
Birkova	421	3,677	
Bozyova	52	23,770	
Butreva	179	5,387	
Velingrad	22602	124,955	
Vranentsi	169	2,103	
Vsemietsi	311	-	Dzhihanovi in the land area of Sveta Petka
Gorna Birkova	212	-	in the land area of the village of Krastava
Gorna Dabeva	210	2,621	
Grashevo	1256	75,558	Grashovski
Dolna Dabeva	282	-	in the land area of Sveta Petka
Draginovo	4805	75,356	Korova, Kororvo
Kandyovi	211	-	in the land area of Pashovi
Ktastava	1058	159,748	
Pashovi	833	26,874	
Rohlevi	395	4,931	
Sveta Petka	1544	55,689	Lyutovo
Tsvetino	158	6,820	Florovo
Cholakova	210	11,221	
Yundola	201	13,887	
TOTAL	40707	604,471	5 settlements are without land area

The gender structure of the population of Velingrad municipality does not differ significantly from that for the country and for the individual regions. The number of women predominates over that of men, although the number of newborn boys is higher than that of newborn girls.

Regarding the **age structure** of the population in the municipality of Velingrad, there are more favorable trends in demographic development compared to most municipalities in the country. The relative share of the population under 15 is 17.4 %, which is very rare in other municipalities in the country.

Regarding the **educational structure**, one of the main goals of the pan-European strategy "Europe 2020" is to improve the educational level of the population, in particular to reduce the share of early school leavers and increase the share of the population with higher or equivalent higher education. As of 01.02.2011 the number of people with higher education in Velingrad municipality was 3,984 (12.0 %). The number of secondary school graduates at the time of the census was 12 212 (36.8 %).

The state of unemployment in the municipality in this period can be reported as very alarming, compared to the national average at the end of 2015. 10 % and 14.3 % in Pazardzhik region and 8 % in 2016 for the country and 11.4 % in the region, respectively.

During this period, the share of registered unemployed aged 29 – 15 % was very high and 56 % of the registered unemployed had been registered for more than one year.

The average level of unemployment in the area of DBL Velingrad in 2019 decreased and was 17.48 %, against 21.06 % in 2018.

Compared to 2018, in the analyzed 2019, the overall decrease in the number of unemployed in the area of LOD Velingrad affects both women and men. We observe a decrease in men by 16.35 % or 322 people (see Table 14).

Tab. 14. Number and relative share of unemployed by gender (2018-2019)

	I-XII.2018г.		I-XII.2019г.		Ръст:	
	number	%	number	%	number	%
Women	2688	57.72	2218	57.38	-470	-17.49
Men	1969	42.28	1647	42.62	-322	-16.35
Total	4 657	100	3 865	100	-792	-17.01

Tab. 15. Number and relative share of unemployed by age (2018-2019)

Age	I-XII.2018г.		I-XII.2019г.		**Growth**	
	number	%	number	%	number	%
under 19	39	0.83	26	0.67	-13	-33.33
20 - 24	198	4.24	170	4.40	-28	-14.14
25 - 29	416	8.94	321	8.30	-95	-22.84
30 – 34	533	11.45	432	11.17	-101	-18.95
35 – 39	550	11.82	485	12.55	-65	-11.82
40 – 44	507	10.89	431	11.14	-76	-14.99
45 – 49	571	12.27	450	11.64	-121	-21.19
50 – 54	631	13.55	504	13.04	-127	-20.13
Over 55	1 212	26.02	1 047	27.09	-165	-13.61
Total	4657	100	3865	100	-792	-17.01

In 2019 (Tab. 15), the average monthly number of unemployed people of all age groups showed a downward shift without exception, among young people under 19 by 33.33 %, from 25-29 by 22.84 % among people aged 45-49 by 21.19 % and in the group of 50-54 by 20.13 %. Most of all, the number of people over 55 has decreased with 165 people on average per month. The average age of the unemployed in the region during the analyzed period increased and was 43.38.

The total reduction of the unemployed in 2019 compared to the previous year affected all groups and a decrease is observed both in the groups of skilled workers and specialists and in the group of unskilled workers.

As a result, the vacancies announced by the employers (SRM) in DBL Velingrad in 2019 were 3425 and exceed those of the previous year by 77.

The requested jobs on the primary labor market include job vacancies requested outside the employment programs and the incentive measures under the EPA. In 2019 these places were 3 103 and compared to the previous year their number has increased by 482.

Tab. 16. Number and relative share of unemployed by education (2018-2019)

EDUCATION	I-XII.2018г.		I-XII.2019г.		**Growth**	
	number	%	number	%	number	%
Higher, semi-higher and college	157	3.4	141	3.6	-16	-10.19
Secondary	1 638	35.2	1 430	37.0	-208	-12.70
Primary prof., primary	1 859	39.9	1 516	39.2	-343	-18.45
Elementary and no education	1 003	21.5	778	20.1	-225	-22.43
TOTAL	4657	100.0	3865	100.0	-792	-17.01

Tab. 17. Vacancies in LOD - Velingrad (2018-2019)

	2018		2019		**Growth**	
	number	%	number	%	number	%
By employment programmes	727	21.7	322	9,4	-405	-55.71

and employment measures						
Other employment programmes	2 621	78.3	3 103	90,6	482	18.39
TOTAL	3 348	100	3 425	100	77	2.30

Occupied jobs in 2019 are a total of 3040. Of them on the primary market - 2 681 (through the mediation of DBL - 2678 jobs). 359 (11.81 %) are employed under programs and measures.
From the beginning of 2019 the implementation of the active policy on the labor market, as well as in 2018, was timely secured by NAPE (National Action Plan for Employment) 2019. As a result, the conclusion of contracts for measures started at the beginning of the year and continued until its very end. In addition, DBL Velingrad serviced contracts under programs and measures concluded in previous years, new contracts were concluded for projects for personal assistants under NP "APD", for people with disabilities under NP "Ensuring employment of the long-term unemployed", under NP "PP", under Project "Ensuring employment of the long-term unemployed" and under regional programs to the three municipalities. The efforts of the experts from DBL Velingrad were also focused on servicing the schemes under OP HRD, servicing contracts mainly under the scheme "Youth Employment", the scheme "Work" and the scheme "Parents in Employment".

In 2019, 111 new employers were covered, to whom electronic files were created. A total of 2,591 meetings were held with employers. The meetings were held with the key employers from the region and mainly with small and medium enterprises.

In 2019 The total number of announced vacancies was 3151, which is 110.5 % fulfillment of the planned indicator 2 850. 3103 jobs have been announced on the primary labor market, or fulfillment of 110% of the planned indicator 2821 jobs. The occupied jobs, announced in the Labor Office, all with accumulation for the period were 3162 /112 % fulfillment of the planned 2817/. Of these, the employed WP on the primary labor market were 3126 or 112% of the planned 2790.

Programmes and measures to promote employment

During the period January-December 2019, newly included in employment and training programs were 134 unemployed or 100.8 % implementation of the planned for new employment. The utilization of funds under employment and training programs at the end of the period amounted to 99.5 %. The following <u>employment programs and projects</u> have been implemented:

- National program "Assistants to people with disabilities".

- National program for employment and training of people with permanent disabilities.

- National program "Activation of inactive persons".

- Career Start Program.

- Training and employment program for the long-term unemployed. - Retirement Assistance Program. Since the beginning of the year, 17 contracts have been implemented for 18 people, of which 13 were transitional.

- Regional employment program.

- Project "Successful together - for a decent new education".

Implementation of schemes under OP HRD in 2019:

- Under the "Youth Employment" scheme, employment is provided for 99 people. 20 contracts have been serviced since the beginning of the year.

- Under the project "Vouchers for employees" 17 applications were accepted and evaluated, 5 vouchers were issued and one training with 5 people was conducted.

- Under the project "Parents in employment" the number of approved applications from parents was 19. During the period 32 contracts were serviced for 23 babysitters.

- Under the project "Job" were serviced 41 contracts with employers to provide employment to 313 people. The contracts in the real sector were37 for 183 people.

- The "Training and Employment Component II" project was aimed at providing employment to unemployed people over the age of 29, with a focus on people with permanent disabilities, the long-term unemployed, those with low professional qualifications and aged over 54. 30 framework contracts with employers for 137 jobs were serviced.

In analyzing the situation in 2020 - unemployment was emerging as an even more serious problem. To the other factors are added the epidemic of COVID 19 and the introduction of a state of emergency, due to which it stopped the activity of main activities for Velingrad in a number of branches related to the subject of the present study.

The information on the current level of unemployment (April 13, 2020) from DBL - Velingrad, which together with the adjacent branches Rakitovo and Sarnitsa served the municipalities of Velingrad, Rakitovo and Sarnitsa, is very worrying.

One month after the introduction of the emergency situation for the prevention of coronavirus infection, the state of registered unemployment in the bureau and branches is as follows:

- the total number of newly registered unemployed is 1060 people.

- 876 of them have stated that they have been released due to the pandemic crisis.

For comparison, in the same period in 2019, 173 unemployed people registered with the Labor Office.

Conclusions:

- In the municipality of Velingrad 85 % of the working population is employed in the hotel, restaurant and related activities sector. The prolonged closure of hotels, restaurants, guest houses, etc. led to unemployment and the risk of bankruptcies in the sector.

- The analysis of this information unequivocally proves the huge role that the economic and medical activities we study have in the general economic profile of the municipality, proving the serious social consequences of their current and especially future sustainable development.

Modern business profile

The largest share and with a perspective for development is that of the services and in particular of the activities directly related to tourism, for the development of which there is untapped potential in the municipality. The services sector is the most dynamically developing. It operates 75.0 % of the economic entities registered on the territory of the municipality, mainly micro enterprises.

In the municipality of Velingrad in the sector of industry leading are the following activities: - logging and wood processing - This is the leading sector of the municipal economy. The food industry employs mainly small and medium-sized enterprises. The largest among them are: "Marinelli" EOOD, "Bony oborot" and "Hlebozavod". The production of these enterprises satisfies the needs of the municipality for food products.

The extraction of marble and granite is very limited compared to the years before the country's transition to a market economy. The largest producer of marble and granite products is Minerali-M Ltd. Apart from production, it also deals with the design and delivery of these products.

Bottling of table mineral water has been established as a new production in this sector. It is well received on the market, both in the country and abroad. The extremely aggressive marketing campaign in recent months creates new opportunities to expand the market share of the products and shows good positions.

In recent years, due to the declining volume of construction, there has been a decline in this sector of the economy. The current analysis of the last two years showed a growth, which was related to the national program for energy efficiency of multifamily housing, projects of which were implemented in the municipality. In recent months, construction has been one of the few economic activities that did not stop working during the quarantine in connection with COVID 19.

The most essential and structural determinants in the municipal economy are balneotherapy, SPA and wellness tourism, together with the accompanying services. Although the fluctuations typical for the sector over the years, Velingrad demonstrates determination to use its resources for balneo and spa tourism and many alternative forms in a wide range from hunting and conference, to cycling and fishing tourism. The municipal resources for ecological and cultural tourism are insufficiently utilized.

For the seventh year in a row, the strategy of Velingrad municipality has been building the tourism sector of Velingrad for the realization of the generally accepted vision: "Tourism in Velingrad, the municipality and the adjacent tourist area develops on the basis of preserved natural and anthropogenic resources and natural landscape. Velingrad retains the brand of a leading thermal center in the country and the sign "Spa-capital of Bulgaria", and is rapidly developing as a first-class balneotherapeutic and spa resort.

Balneological tourism: It is a long tradition and a major tourist form, but served in the recent and distant past mainly the lower segments of the tourist market. Today the situation is changing significantly with the development of high-class tourist services in this segment.

Alternative tourism: It is believed that the municipality of Velingrad has the potential for development of ecological and rural tourism. The utilization of the financial resources of the RDP for this purpose should lead to the assembly of finished, marketable products, increasing the attractiveness of the area and diversifying the main offer in balneology.

Business/conference tourism: The development of conditions for team building and conference tourism are a very good step to combine with spa treatment, wellness and spa services, and upgrading the tourism product and especially its efficiency and sustainability over time.

Tourism for sports and recreation: Velingrad can become a great training and recreation center for professional sports. It is necessary to build a specialized sports infrastructure.

Cultural and historical tourism: Velingrad own cultural heritage, enriched by the strong cultural facts of neighboring municipalities, is a sufficient basis for at least a two-day program, enriched with relaxing spa treatments and events from the rich cultural calendar of the region.

Hunting, photo-hunting, fishing: The municipality has all the prerequisites for organized and individual practice of hobby tourism in these areas.

The number of enterprises in the hotel and restaurant industry is 170, which have generated BGN 40,791 and manufactured products amounting to BGN 34,150 (2015). This compares with agriculture, forestry and fisheries, where the total number of enterprises was 145, generating almost 6 times less revenue - BGN 7 919 and almost as much less output.

According to NSI data, the number of overnight stays in the municipality between 2014 and 2015 increased by 27 % (384,221 and 436,827 respectively), and the number of overnight stays increased from 147,251 to 168,889 people. The generated revenues jump from BGN 18,195,113 to BGN 20,625,956. From a short survey (Appendix 6), offered in 4 hotels in the city with 4- and 5-star categories - "Rich", "Royal", "Arte" and "Infinity, a total of 27 people aged 25-68 were interviewed. Data from it show that:

1) 13 out of 27 people reside for the purpose of rest, recreation and entertainment; 7 – for medical procedures, therapy and radon water; 3 on business, and 4 – to meet relatives and friends (Fig. 6)

Fig. 6. Structure of tourists by motive of visit

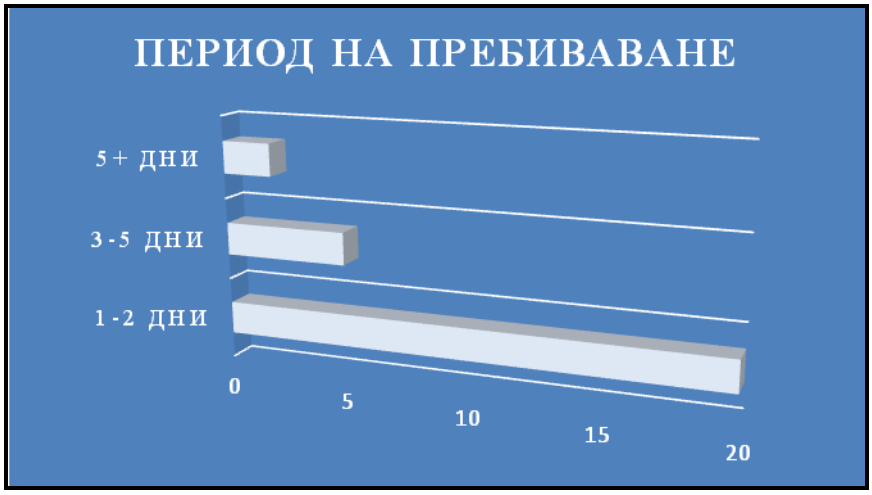
2) 20 out of 27 people will stay at the hotel for 1-2 days; 5 plan to stay for about 3-5 days; 2 will stay for more than 5 days (Fig. 7)

3) 18 of the 27 respondents will visit the clinics, SPA and wellness centers, 7 will walk in nature; 2 will visit the local tourist sites and restaurants

4) All 27 respondents were more than once guests of the municipality, and

5) 24 of them gave an assessment of their satisfaction “10” according to the ten-point system, the rest gave an assessment between 9 and 7.

FIG. 7. Structure of tourists by period of residence.



6) 3 of the visitors were aged 27 and under, 11 were aged between 28 and 38, 4 were in the 39-49 age group, 6 were aged between 50 and 60, and 3 were 60+ (Figure 8).

Fig. 8. Distribution of tourists by age

The results of the survey support the author's view that the municipality of Velingrad is seen as an attractive center of health and beauty of all ages, and hotels with the highest category are preferred because of the quality of the offered tourist product.

All this is possible in view of the strengths and opportunities identified through the SWOT-analysis of the municipality (Fig. 13). The importance for the application of this method for regional research is the main stage of the overall process of strategic planning of local development (Patarchanov, 2004).

Fig. 9. SWOT-analysis of tourism development potential of Velingrad municipality

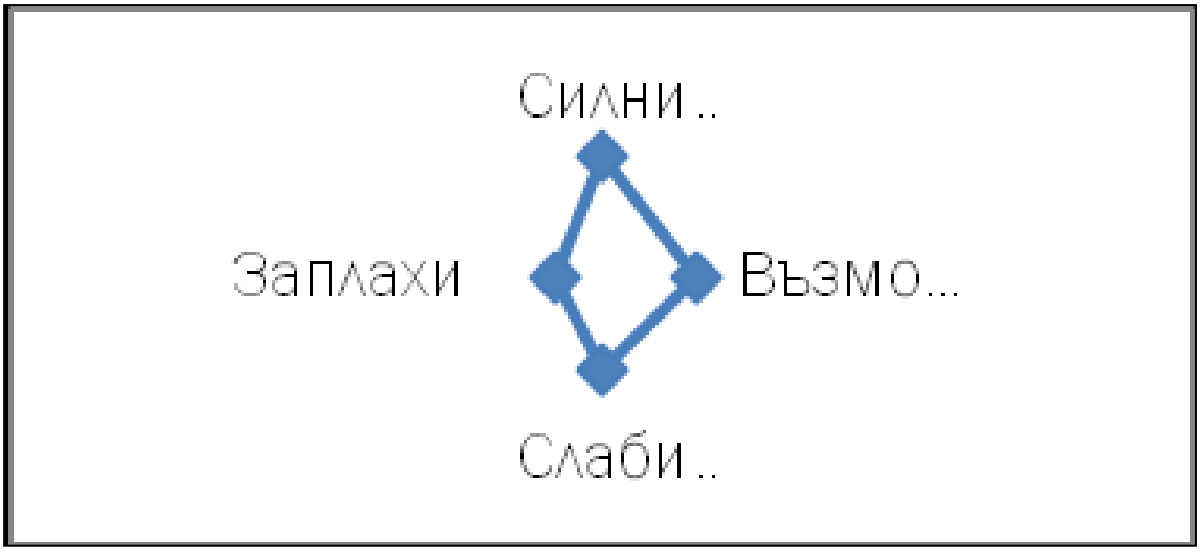
	Assessment					Weight	Rating
Strengths	1	2	3	4	5		
• Powerful geothermal resource					X	25	125
• Strong tourism resources					X	25	125
• Well-built infrastructure					X	25	125
• Variety of natural resources					X	25	125
TOTAL:						**100**	**500**
Weaknesses							
• Unequal consumption of mineral water between households and hotels					X	35	175
• Underutilized opportunities in relation to cultural and historical resources					X	40	200
• Insufficient interaction and partnerships with other institutions and NGOs				X		25	100
TOTAL:						**100**	**475**
Opportunities							
• Favourable environment for the development of thermal parks				X		10	40
• Extensive use of thermal water flow for tourism product					X	40	200

development							
• Completion of the transport and technical infrastructure				X		10	40
• Attracting European subsidies for environmental protection					X	20	100
• Attracting funds from private investors					X	20	100
TOTAL:						**100**	**480**
Threats							
• global climate change					X	30	150
• unregulated logging of coniferous and deciduous trees					X	40	175
• illegal exploitation of mineral waters					X	30	150
TOTAL:						**100**	**475**

	Rating
Strengths	500
Weaknesses	470
Opportunities	480
Threats	475

The analysis of the graph shows that, although with minor differences, the strengths of the local environment of the municipality and the opportunities of the external environment of the country, region and world prevail, which predetermines the implementation of an aggressive strategy for future development of the sector.

Fig. 10. SWOT-analysis graph



5.2. Analysis of the role and place of the material and technical base and the qualification of the staff in the realization of the activities in balneology and climatotherapy.

On the territory of Velingrad municipality there are several after-treatment hospitals, which focus on the greatest potential in the modern development of balneology and climatotherapy.

Specialized hospital for long-term treatment and rehabilitation of pneumophthisiatric diseases "St. Petka Bulgarska" Ltd. Velingrad, known to the local population as "Sanatoriuma" is the leading center for climate treatment in the municipality. The idea for its creation emerged during and after World War II, when the number of people affected by the TB pandemic increased in Europe and around the world. The massive yellow guest kills young people, and the number of dead is very high.

Donors donated a building plot located four km west of Velingrad, on which a hospital for the treatment of tuberculosis patients was built. The place is extremely suitable due to the active air circulation along the Lukovitsa river at its contact with the valley bottom, at the western end of the Chepino valley. For decades, they have been successfully treated with a variety of therapies in the conditions of fresh air and strong food. The results of the treatment in the years that were observed are very good and are characterized by stability and high efficiency of the medical and climatic procedures.

The modern development of the hospital continues the good traditions related to the admission of patients with diseases of the respiratory system: conditions after pneumonia, bronchitis, bronchial asthma for treatment, COPD (chronic obstructive pulmonary disease) and others.

The main medical services are divided into several areas: - *Mantoux;* - *BCG;* - *X-ray examinations*: radiography, tomograms; - Ultrasound diagnostics: cardioechography with Doppler sonography, ultrasound of abdominal organs; - Electrocardiograms: one and three-channel electrocardiograph, 12-channel ECG device with computer software, bicycle ergometer with computer software, blood pressure holter, rhythm activity holter; - *Functional examinations*: functional examination of respiration, bronchodilator test with drug or load, pef, pulse oximetry, electrotherapy with magnet, NTC, VTC - UHF radar, light therapy, with sea lye, humidifier, anti-allergy therapy with equipment; - *Inhalation therapy*: individual inhalation therapy: medicinal cocktail, inhalations with mineral water, inhalations with distilled water, inhalations with herbs, inhalations with aromatic oils, cold inhalations with 100 % essential oils; group inhalation therapy separated inhalation with group inhaler with 8 stools-sets; - *Oxygen therapy:* oxygen concentrator, central oxygen installation; - *Kinesitherapeutic services*: classic massage: massage collar, field massage, cryotherapy, suction massage, eastern special massage; reflexology; aromatherapy and music therapy; fitness; - *Breathing gymnastics:* group breathing exercises; individual exercises; therapeutic gymnastics in diseases of the ode; Tibetan exercises to improve the immune system; “triball” breathing exercises; breathing practice; nasal cleansing practice “zhela neti”; relaxation practice; - *Walking*: terrain trail №1; terrain trail №2; northern walking; - *Additional services:* anti-smoking office; telephone and postal services; medical and courier services; conference hall with internet and presentation equipment.

The hospital has a reception and consulting room. It has 136 beds, distributed in 2 wards and in a separate building - a unit for physical therapy and rehabilitation. The staff caring for the sick is 46 people: doctors - 7; health care specialists - 18. and other staff - 21.

The medical interest of the patients in the hospital has been increasing in recent years, which is clearly evident from the number of patients transferred for the period 2017 - 2019, respectively: - 2017 - 3248 patients; - 2018 - 3141 patients; - 2019 - 4184 patients; - 2020 - 2200 patients (own surveys).

The second center is "Specialized Hospital for Rehabilitation - VITA" EOOD, which is under the jurisdiction of the Ministry of Defense. It was established by order of the Minister of Defense in 1970 with the name "Voenen Sanatorium". Like many other departmental bases from the period of centralized economy, it emerged specializing in rehabilitation and prevention of diseases of the musculoskeletal system, peripheral nervous system and respiratory system of personnel of the

Bulgarian army. Designed and built as a medical institution, it is the newest in the system of the Bulgarian army.

Its suitable geographical location - high on the northern periphery of the valley at the southern foot of the Alabak ridge, guarantees a significant amount of solar radiation throughout the day with natural weathering.

The hydrotherapy procedures in the hospital are performed with mineral water from spring No. 19, which is hyperthermal (56° C), slightly mineralized, hydro-carbonate-sulphate-sodium with mineralization 257 mg/l, pH 9.1. The mineral water is suitable for drinking treatment, as well as for hydrotherapy of a number of medical conditions: - *diseases of the musculoskeletal system*: rheumatoid arthritis; inflammatory polyarthropathies; coxarthrosis; gonarthrosis; periarthritis; epicondylitis; vertebrogenic diseases (ankylosing spondylitis, spondylosis and inflammatory spondylopathies, damage to the intervertebral discs in all parts of the spine, postoperative conditions); consequences of injuries (fracture, dislocation, sprain and strain) of the upper and lower limb; consequences of injuries to muscles and tendons of the upper and lower limbs; condition after alloplasty of joints; polyarthrosis; crystalloid arthropathies and other specific arthropathies - gouty, psoriatic and others; joint contractures; congenital anomalies and deformities of the musculoskeletal system; conditions after injuries and fractures. - *diseases of the peripheral nervous system*: neuropathies of different nature; diabetic polyneuropathy; trigeminal neuralgia and facial nerve; damage to nerve roots and plexuses; disc disease; mononeuropathy of the lower limb - damage to the femoral, sciatic, fibular and tibial nerves; mononeuropathy of the upper limb - carpal tunnel syndrome, damage to the median, ulnar and radial nerves; multiple polyneuritis; consequences of injuries of the upper and lower limbs. - *diseases of the respiratory system* (chronic sinusitis, bronchitis, uncomplicated asthma), etc.

The treatment procedures are realized in several directions: - *Electrotherapy with low, medium and high frequency currents*: electrical stimulation of the neuromuscular system with low frequency currents; electrophoresis; lugophoresis; interference current treatment; SMT; VMS, TENS and Russian currents; vacuum massage; low-intensity pulsed magnetic field; ultrasound (phonophoresis); high frequency currents. - *Light therapy:* ultraviolet radiation (UV) with a quartz lamp; irradiation with sources of infrared and visible rays. - *Inhalation (aerosol) treatment*: inhalations. - *Kinesitherapy:* active, passive, assisted, suspension and polytherapy, reflex, analytical, therapeutic massage - classical and specialized: relaxing, stimulating (toning), anti-edema, lymphatic drainage, assisted kinesitherapy, respiratory gymnastics. Therapeutic massage has a positive effect on the disease process and leads to the normalization of pathologically altered functions, as well as helps to strengthen the general defenses of the body. - *Hydrotherapy:* underwater massage /tangentor/, air-vortex massage for therapeutic effect with mechanical and thermal effects in order to relax the rigid and spastic muscles with subsequent toning and normalization of neuromuscular processes.

A special hydrotherapy sector has been formed with baths, tangents, indoor and outdoor healing mineral pools, etc. Mineral water for drinking and bathing is provided in the hospital rooms of the patients.

Organizationally, the hospital includes a diagnostic-consultative unit with its internal structure. The hospital has 140 beds positioned in 2 wards - internal and neurological. The staff numbers 106 people: doctors - 5; nurses - 15; kinesitherapists and rehabilitators - 9; other staff - 77 (own surveys).

The sustained interest in the facility is confirmed by the number of patients passed over the period 2017 - 2019, which averages around 4500 patients, give or take 12-13 patients per year. In 2020 - they are around 2000 (own surveys).

With the largest capacity (accommodation and staff) is "Specialized Hospitals for Rehabilitation National Complex" EAD - Velingrad branch, known in the past as - a “Sanatorium for working peasants”. It also has a favorable geographical position - it is located a few hundred meters

southwest of VITA Hospital on the western outskirts of the town on the higher left bank of the Lukovitsa river.

Treatment is provided in the following specialties: - physical and rehabilitation medicine; - neurological diseases; - internal diseases; - nephrology. The variety of activities is related to the treatment of a range of medical conditions: - Diseases of the central and peripheral nervous system: conditions after stroke, multiple sclerosis, Parkinson's disease, cerebral palsy, traumatic brain injury, disc disease, mono- and polyneuritis, radiculitis, conditions after peripheral nerve and spinal cord injuries, functional nerve diseases; - Inflammatory and degenerative joint diseases: rheumatoid arthritis, ankylosing spondylitis, osteoarthritis and arthritis; - Orthopedic-traumatological diseases: conditions after fractures and their complications, conditions after surgical orthopedic interventions; - Inflammatory diseases of the URT and lungs: allergic conditions; - Cardiovascular diseases: ischemic heart disease, conditions after myocardial infarction, after heart surgery, hypertension, myocardiosclerosis; - Endocrine and metabolic diseases: osteoporosis, diabetes and its complications, thyrotoxicosis, gout, obesity; - Inflammatory gynecological diseases: infertility, hypoplasia, hypo ovarian syndrome, oligo - and dysmenorrhea; - Gastrointestinal and biliary-hepatic diseases: peptic ulcer of the stomach and duodenum, gastritis, colitis, cholecystitis; - Diseases of the urinary system: kidney stone disease with urate diathesis, cystitis, urethritis, pyelonephritis - chronic forms, outside the stages of exacerbation; - Some skin diseases: dermatitis, eczema, boils, panaritium, mycoses.

The treatment is carried out in clinical pathways № 263 and № 265 of patients under the NSSI program, as well as for a fee. The healing procedures in the base are well provided functionally and technically and are divided into several areas: - balneotherapy - through baths, indoor and outdoor mineral pool, jacuzzi, whirlpool baths, underwater massage, hand and foot whirlpool baths, therapeutic showers, inhalations, drinking application; - kinesitherapy - through active and passive therapeutic gymnastics, specialized techniques and methods, lymphatic drainage, manual therapy; - thermotherapy - sauna, steam bath, paraffin treatment, alkali treatment, cryotherapy; - full range of physiotherapy procedures; - walking; - laser therapy; - dietary nutrition.

Organizationally, the hospital includes a reception and consultation unit and an internal ward. The base has a total number of beds 140 + 60 for free admission. Total number of staff is 70: doctors - 7; nurses - 14; kinesitherapists and rehabilitators - 10; other staff 39.

There is a lasting trend of increasing the interest of patients, as well as well as treated patients: - 2017 - 6800 patients; - 2018 - 7006 patients; - 2019 - 8000 patients; in 2020the patients are 50% less (own surveys).

In addition to the three hospitals for aftercare on the territory of the Municipality of Velingrad, six more medical centers have been established and are functioning, which perform various activities, including and related to balneology and climatotherapy.

Kayel Medical Center - located on the territory of SPA Club "Bor" and SPA Hotel "St. Spas". It is equipped with modern equipment for physical therapy, rehabilitation and balneotherapy. Annually in this medical center are treated Bulgarian and foreign citizens - about 500 patients per year for the period 2017-2019. In 2020 the number of treated patients is ten times less than in previous years - about 50.

Kamena Medical Center - located on the territory of Kamena hotel. Equipped with modern equipment for physical therapy, rehabilitation and spa treatment. Every year patients are admitted and treated there under the NSSI program for prevention, treatment and rehabilitation. The number of patients was respectively: 2017 - 800, 2018 - 1037, 2019 - over 1000, 2020 - 650 (own surveys), significantly less due to the complicated situation.

Medical center in Grand Hotel Velingrad - structured on the hotel territory. Spa treatments are performed in this center as a priority.

Medical Center "Velingrad 2017" - located on the territory of MHAT - Velingrad. It provides treatment and rehabilitation of patients from the Municipality of Velingrad and the region with referrals from the GP and free admission - about 1000 people per year.

Medical Center "Elbrus - Medical" Ltd. It is located on the territory of Hotel Elbrus and Hotel Jura. Works with patients on free admission. In the last few years there have been admitted and treated respectively: 2017 - 1500, 2018 - 1600, 2019 - 1700, 2020 - about 1000 patients (own surveys).

Asclepius Medical Center - Velingrad. Located in the former resort clinic. It has a full range of equipment for physical therapy, rehabilitation and spa treatment. There are treated mainly patients from the municipality of Velingrad and the region, and in the summer months from all over the country with a referral from a GP. For the last few years, the patients who have been treated were: 2017 - 1500, 2018 - 1700, 2019 - 1800, 2020 - 900 (own surveys).

As a result of the scientific analysis, synthesis and correlation of a number of geographical facts, circumstances, processes and objects, some basic generalizations and conclusions can be defined:

- The complex of natural geographical factors - hydrothermal, climatic, meteorological, ecological and others of Velingrad municipality and the region are the reason for the cure or significant improvement of the participants undergoing treatment, rehabilitation and recreation, which confirms the place of the region as a spa and climatotherapeutic and recreational cluster.
- Mineral water in the deposits and springs of Velingrad and Draginovo with its characteristics and diversity (hyperthermal, low-mineralized, sulphate-hydrocarbonate, sodium and silicon, containing fluoride, without sanitary-chemical and microbiological signs of contamination in the radiological of the norms) meets the requirements for the resort resources, the resort areas and the resorts.
- The use of mineral water for external and internal balneotherapy has a very beneficial effect on patients and significant improvements have been observed in a number of medical complaints of most systems of the human body, but mainly on the musculoskeletal, excretory and genital, cardiovascular, endocrine and nervous systems.
- The complex of medical activities, using various climatic resources, create favorable conditions for the treatment of a number of diseases of the respiratory system and the restoration of the normal condition of the individual organs of it and the whole organism.

5.3. Spatial-territorial impacts

Velingrad municipality was established by Decree № 2295 /SG No 101/ 26.12.1978, which by law determines the settlements and the composition of the municipalities in the Republic of Bulgaria. In 1987, the settlement system (municipality) of Sarnitsa, after several years of existence, was closed by Decree № 3005 /SG, No 78/1987, and all three settlements included in its composition join the municipality of Velingrad. Again, by Decree 177 of 22.07.2014 of the President of the Republic of Bulgaria, new borders of the municipality of Velingrad were approved, as the town of Sarnitsa and the villages of Pobit Kamak and Medeni Polyani were re-established into an independent administrative-territorial unit. Sarnitsa municipality is the newest and last announced for now in Bulgaria.

The settlement network in the territory of the municipality has been formed depending on the natural and terrain conditions and in view of the development of the livelihood of the population. Most of the settlements are in the western part of the municipality. It consists of 21 settlements, 1 town and 20 villages. According to Ordinance № 7 of the Ministry of Regional Development and Public Works / 22.12. 2003 for rules and regulations for spatial development of individual types of territories and spatial zones, the settlements of Velingrad municipality fall into the following categories:

- in the category "small towns" - Velingrad, which is the main spatial and functional center of the whole region, which includes today's municipalities - Velingrad, Sarnitsa and Rakitovo
- large villages (with a population of 2000 to 5000 inhabitants) - the village of Draginovo;

- medium villages (with a population of 1000 to 2000 inhabitants) - 3 villages (the village of Grashevo, the village of Krastava and the village of Sveta Petka);

- small villages (with population from 250 to 1000 inhabitants) - 7 villages (village of Ablanitsa, village of Alendarova, village of Birkova, village of Vsemirtsi, village of Dolna Dabeva, village of Pashovi and village of Rohleva);

- very small villages (with population up to 250 inhabitants) - 9 villages (village Bozyova, village Butreva, village Vranentsi, Gorna Birkova, village Gorna Dabeva, village Kandyovi, village Tsvetino, village Cholakova, village Yundola).

According to the location of the settlements in the territory of the municipality, a network of settlements can be determined by a mosaic-dispersed structure. The average settlement density (3.5 settlements per 100 km 2) is slightly lower than in the country (about 4.8), but higher than Pazardzhik district (about 2.6).

The settlements are not evenly distributed on the territory of the municipality. The municipal center - Velingrad, is located rather in the northeastern parts of the municipality, near its eastern border. The largest settlements are concentrated in the valley bottom of the Chepino valley, which is the main spatial localization of the activities subject to our study. From the center of the municipality - Velingrad to the nearest settlement - the village of Draginovo (the other settlement with potential for development of these activities), the distance is only 4 km, which enhances the opportunities for the formation of thermal and climatic tourist cluster.

The degree of urbanization of Velingrad municipality is 62.9 %. The urban population is lower than the national average - 72.5 %, but slightly higher than the district average - 62.2 %.

In comparative terms, the municipal center of Velingrad stands out among the settlements in terms of the degree of development of its settlement functions. Its integrating capabilities are mainly in terms of administrative and some of its social services - education, health care and social activities. The structure of the primary social service is almost a mirror image of this category of settlements and the age profile of their population. Only in 7 out of 20 villages there are functioning schools. There are no medical practices in most villages. The center compensates with a full range of well-developed services at the village and municipal level.

In terms of the economic and other service functions and their impact on other settlements in the municipality, Velingrad has been an undisputed leader and center of attraction for settlement. In terms of the extent of some amenity features, the villages have similar characteristics - all have electricity and water supply and have substantial green areas.

Other elements of public works are not comparable, such as the sewerage, which is missing in some places, or the street network, where the once built permanent pavement of the streets is now seriously compromised. In this direction, the active attempts and the already implemented projects, some of which are currently being completed, deserve attention, to solve these problems through the various opportunities provided by some of the European programs.

As a spatial structure, the settlement network is well developed, but not sufficiently balanced on the whole territory of the municipality. The basis of the imbalance (polarity) is the specific natural geographical situation, but it is strongly influenced by the demographic and functional characteristics of individual settlements. The municipality needs the targeted creation of at least two secondary spatial centers - what role can be played by the village of Sveta Petka and the village of Grashevo.

In the Rhodopes there are meridional and submeriodional axes, among which is the axis Velingrad-Sarnitsa-Dospat. The municipality finds it difficult to maintain and even more difficult to develop the transport infrastructure due to the rugged mountainous terrain, but nevertheless manages to provide relatively good accessibility and service to the settlements in it. This is done through II and III class roads of the Republican Road network.

The role of the only in our country narrow-gauge railway line (with 760 mm track gauge) "Septemvri - Dobrinishte" is very important. The line passes through the territory of 6 municipalities - Septemvri (village of Varvara), Velingrad, Yakoruda, Belitsa, Razlog and Bansko (Dobrinishte). Its total length is 80 km, of which 50.2 are in the municipality of Velingrad and for some villages (Magerovo, Ablanitsa and Tsvetino) it is a vital opportunity for normal transport accessibility to the municipal center and urban environment. The importance of this unique transport infrastructure and the activities related to it is amplified in connection with the issues we have studied. Attraction trips, which have been a fact for several years, significantly and successfully upgrade the complex tourist product and its marketing brand.

The influx of tourists who visit the municipality for spa treatment can be from the north through Transport Corridors № 10 and № 8, which lead to the first class road I-8 "Sofia - Ihtiman - Belovo - Pazardzhik - Plovdiv" and the second class road II-84 "Zvanichevo - Vetren dol - Velingrad - Yundola - Yakoruda - Razlog", and from the west - through Transport Corridor № 4, which leads to the second class road II-19 "Gotse Delchev - Bansko - Razlog - Simitli" with branches south to the Kulata and north to Sofia (Kalotina) and Vidin on the first class road E-79. These road connections are extremely important for ensuring a direct influx of Greek, Macedonian, Serbian, Romanian and other foreign tourists.

In the established practice of the visitors of the municipality to be mainly of Bulgarian citizenship, in the last two decades a clear trend of change is evident, for which both the association of hoteliers and restaurateurs and representatives of the local government are working very seriously in good synchrony and constant communication. The common goals are to attract more foreign tourists, with a higher culture of behaviour and a better appreciation of the natural and anthropogenic tourist resources.

All developed plans and programs consider balneotourism and SPA services through the prism of the development of sustainable tourism and the promotion of the municipality of Velingrad on the international stage. In the spatial realization of this process will play an increasingly important role, located in the immediate vicinity of Velingrad the town of Rakitovo, the tourist location Tsigov Chark, Tsepino fortress (Dorkovo), Yundola, Starina tourist area, highland Belmeken sports base, Batak, Golyam Beglik dam, etc. They all have "regular" visits from people who have "checked" their reputation several times, but for others who have only heard of such destinations, spa treatment would be the initial motive to visit the municipality and then the surrounding area.

The example of Rakitovo is significant, which is located 14 km from the town of Velingrad and has long been developing in its shadow. It is a mountain climate resort (of regional and local importance), which is a suitable place for people suffering from asthma and other lung diseases, and the mineral “rakitovska” water has been proven to cure arthritis, gastrointestinal problems. The popularization of Velingrad has already actively contributed to the growth of the tourist flow to Rakitovo.

The settlements in the municipality, categorized socially and economically as disadvantaged areas, also benefit from the sustainable development of balneology and climatotherapy, spa services and wellness tourism and their spatial expansion with other upgrading and accompanying activities. They are a serious tool for solving the acute social issues related to employment on the one hand, through direct participation in the activities of medical and tourist bases, and on the other as creators and contractors of additional tourist and other services (attractions, hikes, etc.).

The effects of the implementation of these activities and especially the generated revenues can contribute to solving a number of important issues for the spatial development of the municipality, such as building transport (settlement and inter-settlement) connections, water supply, providing transport for students. in municipal schools, etc.

The practice of mountain biking, as one of the forms of specialized (alternative) tourism, in the areas around Velingrad and in the municipalities of the region already seriously contributes to the creation of new transport (road) and other types of infrastructure sites or service activities. A number of routes have been built, for example: - Yundola saddle - the ridge of Alabak - the town of Rakitovo - the village of Dorkovo - Tsepina peak - Tsepina station; - Lepenitsa cave - Kachakov Chark locality - Brezi locality, etc., where an exceptional number of archeological and historical sites of national and international importance can be seen.

Serious changes in the spatial development and the territorial organization would occur as a result of the use of the real opportunities for practicing active sports and development of upgrading ski tourism, through the approval, further development and implementation of the project for sports and technical complex "Syutka". It would turn the two neighboring municipalities into real partners to accelerate their local development, through complete and complex in nature and capabilities tourist packages.

The main advantage of turning Velingrad into a uniquely healing thermal center, without encroaching on natural resources, is that the resources currently available are not exploited efficiently enough, especially in terms of their social significance for improving the living conditions of the local community.

In support of the author's opinion, a number of individuals in responsible public positions can be cited, both at local and national level, according to which the municipality of Velingrad is among those territorial communities in the country that can decide in some part some household energy issues. The possibilities for heating through the use of geothermal energy of mineral hydro resources are not to be underestimated. Initially, this type of heating was realized in several bathrooms and stadiums, without large investments in the construction of generators. Existing projects in the past, for the construction of several small geothermal power plants, today could be realized only in sync with the development of tourism activities, as otherwise they would cause conflicts in connection with the use of thermal mineral resources. The implementation could start with the heating of public buildings (the three community centers, the municipality building, the Historical Museum, the municipal hospital and schools.

In this regard, on the initiative of the Ministry of Energy, funded by the Japanese Donor Fund, administered by the International Bank for Reconstruction and Development, a project was implemented by GOWI (Denmark), in cooperation with Ecoprojectconsult (Bulgaria) for the construction of geothermal heating systems in 10 municipalities, one of which was Velingrad.

In 2008, the idea managed to reach distant Norway, where it found its supporters and implementers. At a meeting held on 11 February, 2008 in Pamporovo between the former mayor of the municipality Ivan Lebanov, the members of the Association of Rhodope Municipalities, the Deputy Ambassador of Norway Mr. Tour Martin Moeller and the sales representative Ms. Anne Lise Rognindalen it was decided that the municipality would receive a grant of 41.5 million euro. 10 years later, the conceptual idea has not yet been realized, or at least to the extent that it was supposed to happen.

The impacts of the activities, subject of our research on the spatial organization of the inner territory of the lands of the settlements, in which they have been very actively developed, in the last few decades, are very significant. Some of the existing predominantly tourist areas have changed functionally and visually, and have evolved significantly spatially, which in turn has led to their further densification with buildings of varying functionality.

Thus, in Velingrad, in the area between the central district of Ladzhene and the southern district of Chepino, the territories with agricultural functions disappeared and became an area for social functions, with mainly residential buildings and for public services. In a number of parts of the periphery of the town were formed several brand-new tourist areas with a concentration of high-

category complexes - accommodation, spa and climatotherapy and recreation, campsites, horse base and more.

Territorially, they are concentrated mainly in the western and southwestern direction from the central district of Ladzhene in the area of the Lukovitsa river, the area "Zaiche blato", the area of and above the former restaurant "BOR", the southern entrance of the town in the area of Radonova banya and others. And in some of these areas began active processes of additional construction with residential buildings, which further changed the spatial structure of the town.

We observe a similar territorial expansion, although smaller in size, in the southern direction on the outskirts of the largest village of Draginovo, which also has the potential for development of the activities subject to our study.

5.4. The pandemic situation related to COVID 19 and its impact on the state of the activities and facilities of the spa and climatic treatment in the municipality of Velingrad.

Traditionally, unchanged for decades, the municipalities of Velingrad, Rakitovo and Sarnitsa are present in the list of municipalities reporting unemployment rates above the national average. The situation after March 2020, after the declaration of the state of emergency and the measures at national and local level, deepened the problem of unemployment even more.

To the other factors that have a negative impact on the labor market in the region has additionally added the impact of anti-epidemiological measures related to coronavirus infection and the closure of sites in the tertiary sector. In connection with this, the work of the main industries of Velingrad, along with their main service activities, came to a complete halt.

Only for the one-month period from March 13 to April 13, 2020, after the introduction of the state of emergency for the prevention of coronavirus infection, the state of registered unemployment in the Directorate of the Labor Office - Velingrad and its branches was alarming. The total number of newly registered unemployed was 1,060. 876 of them said they had been released due to the coronavirus crisis. For comparison, in the same period in 2019, only 173 unemployed people registered with the Labor Office. The increase in the average daily number of registered is six times for the period from March 13 to April 13, 2020 or 48 people, with 8 people on average per day before the introduction of the state of emergency. In the first two weeks of April alone (1-13.2020), the total number of newly registered was 770, with 618 claiming to have been released due to the coronavirus crisis.

The registered people were exempted mainly from the private sector, with the largest share being occupied by the companies in the sector of hotels and restaurants, tourism, followed by Manufacturing industry (food, textile, clothing, wood, paper, plastics), Trade, Agriculture and forestry, Transport, Culture, sports and entertainment and others.

At the same time, since the beginning of April, only 85 people have been employed, and for the period from the introduction of the state of emergency to the end of April, 188 have started working.

The period after the announcement of the first lockdown - March 2020, some of the large hotels: Maxi Park Hotel & Spa, Spa Hotel "Dvoretsa", Spa hotel "Infinity" and the medical centers in them, as well as other small hotels and restaurants began renovations. The employees in the field of spa tourism were laid off and sent to the labour market.

After the initial increase in unemployment in the first two months (April and May 2020), there has been a gradual decline in the total number of unemployed (see table). Fluctuations in the average monthly number of newly registered on the labour market was a result of the epidemiological situation and crisis management in connection with the loosening or tightening of measures.

Table 18. Unemployment rate for the period 04.2020 to 03.2021

Month Year	Total registered	Number of newly registered during the month
04.2020	3466	789
05.2020	3493	197
06.2020	3138	159
07.2020	3035	183
08.2020	2917	178
09.2020	2809	215
10.2020	2795	289
11.2020	2747	264
12.2020	2624	191
01.2021	2672	235
02.2021	2567	181
03.2021	2362	158

The severe second wave in the autumn of 2020 and the beginning of 2021 of a pandemic in our country seriously affected the activities subject to our study, which is clearly visible from the data, which are above the monthly values of 2019. During this period, large hospitals implementing spa services were also hard hit, more than doubling the number of patients through clinical pathways or on free admission.

In the second half of 2020 and the initial months of 2021, some of the high-star hotels made their facilities available to frontline medical workers to combat COVID 19 free of charge. This also contributed to the retention of, albeit a small proportion of staff.

Despite the difficult situation due to the pandemic, most of the hotels were operating, but with reduced capacity. As a result of the national policy for combating the consequences of the crisis and in order to "save" jobs, they applied for measures 60/40, 80/20, "employment for you", financed by working capital and others.

The restaurants and a number of other sites from the service of tourism and spa treatment, also had to adapt to the difficult situation and in order to save jobs, offered catering in offices and food at home.

It was only in the spring of 2021 that the change in the monthly number of newly registered people began to be felt, albeit slowly, and some of the levels from 2019 were reached.

After the lifting of the restrictive measures for COVID 19, almost all hotels, restaurants, holiday homes, vegetable farms, dairy and local products, flowers, started working and in the last two months are trying to reach their optimal regime.

In connection with the medico-geographical situation in the last year and all its consequences, these three specialized hospitals, as well as most medical centers without serious or almost minimal

additional investment in base and staff, can be admitted and treated by all COVID 19 survivors. would be the establishment of a new clinical pathway that would facilitate the process organizationally and financially.

For this purpose, it is necessary:

- development of a specific program and algorithm for balneotherapy, climatotherapy and physiotherapy;
- preparation of a reasoned proposal to the Ministry of Health and the Ministry of Tourism, to the government to settle the legal issues related to the admission of sick patients from COVID 19 to EU countries (especially from the most affected countries - Italy, Spain, France, Germany, Austria and etc.), as well as from Great Britain, Russia, etc.;
- active cooperation and partnership with tour operators and agencies for mediation in recruiting and organizing potential patients and logistical support;
- creation of normative and organizational conditions for facilitation of the financing of the medical services and activities from the respective health funds, donation funds, WHO, etc.

CONCLUSION

In recent years, the development of medical tourism, balneology and climate prevention and recreation are increasingly associated with ecological conservation and sustainable use of natural resources. The mentioned activities are among the priority directions for the establishment of the modern and future tourist product of Bulgaria. With the development of this study an attempt was made to identify all the benefits in the municipality of Velingrad and the region related to the state of thermal mineral water sources and climatic resources in terms of their potential to determine their impact on health status of people and to give a method and model for use, as well as to analyze the main socio-economic and spatial-territorial aspects of their influence.

The author, considering her many years of practice in the field of balneotherapy, recreation, SPA and wellness industry, in view of her extensive experience in the field of recreational practices, perceptibly notices the state of the examined resources in the study area and the impact of anthropogenic factor on their health, recreation and local development.

The direction is to work towards the inclusion of all potential resources of the region in one European thermal and recreational cluster, which will create conditions for sustainable development of the whole complex of activities of the local community. In the process of using the resources available in the study area, their medical characteristics and properties are preserved, but the organization of access to some of them, as well as certain quantities start to become more limited, which makes it necessary to consider them from different aspects - spatial, environmental, etc.

Natural hot mineral springs have been discovered and exploited for centuries in many countries, and represent an alternative health resource and have an exceptional recreational impact all year round - four seasons. Awareness of the therapeutic value of hot mineral springs due to their mineral composition is generally accepted and our research proves this. Its findings confirm the importance of hot healing mineral springs for recreation and tourism globally and present a new perspective for discussion in terms of health, wellness, spa and recreational tourism.

In many European countries, recreation based on hot mineral springs is integrated into the relevant health system and is supported by many professionals and has proven its effect. The government policies of countries such as Germany, Iceland, Japan, Taiwan, note the important place of hot mineral springs in health systems, which is indisputable proof of the recreational and wellness effect. The natural hot mineral springs are recognized as a unique natural resource by the tourism industry and are marketed alongside local cultural, historical and natural landmarks.

There are many examples of balneo, recreation and spa centers with a history of hundreds, even thousands of years, which have successfully upgraded and further developed their material and

technical base and thermal facilities, through which they manage to use their resources much more efficiently and sustainably. This type of responsible use of these resources makes them a renewable source for long-term development of the territory and the population that inhabits it.

The study attempts to apply a modern conceptual model of analysis regarding the necessary change in the use of hot mineral springs and climatic resources historically and the effective assessment of their role in health, recreation, ecology and local development.

Some of the presented in the study complement some areas of the scientific literature regarding the medical assessment of thermal mineral springs and climate, through a detailed review of various elements that together combine this natural wealth with specific examples from health practice. The study attempts to enrich some theoretical knowledge by using a model to assess the individual components in the use of hot mineral springs for treatment and recreation. It provides an in-depth analysis and assessment of the interaction between recreational tourism and the use of natural resources by increasing the importance of resources and their modern exploitation, in view of their future potential.

The results of this study are based on case studies and personal observations over two decades of the study area and monitoring the effect of applied practices. Studies and longitudinal follow-up (over 20 years old) have been performed on an extensive base of patients in the town of Velingrad and using various mineral sources for the treatment, prevention and recreation of socially significant diseases, their positive effect is strongly appreciated.

The proposed conceptual model on health, wellness and recreation is supported by numerous examples and studies from direct observations to improve health status. The findings are based on convergence of information from different sources and triangulation of results. The applied methodology and modeling have representativeness and sufficient comprehensiveness, the findings are an important addition to the theoretical knowledge in the field under study.

The research expands and deepens the knowledge about the contribution of natural thermal mineral springs and climatic resources, as an essential part of the natural and socio-economic territorial system of Velingrad municipality and the region, as a recreational resource and adds value to current understandings of their role and growing importance locally, regionally, nationally and internationally, as part of the long-term framework for management and development of the territory and establishment of the town of Velingrad as an important component in the European recreational and thermal cluster.

As a result of the scientific analysis, synthesis and correlation of a number of geographical facts, circumstances, processes and objects, some basic generalizations and conclusions can be defined:

1. The complex of natural geographical factors - hydrothermal, climatic, meteorological, ecological and others of Velingrad municipality and the region are the reason for the cure or significant improvement of the participants undergoing treatment, rehabilitation and recreation, which establishes the place of the region as balneological and climatotherapeutic and recreational.

2. The mineral water in the localities and springs of Velingrad and Draginovo with its characteristics and diversity (hyperthermal, weakly mineralized, sulphate-hydrocarbonate, sodium and silicon, containing fluoride, without sanitary-chemical and microbiological signs of pollution, radiological indicators within standards) meets the requirements of Ordinance № 14 for resort resources, resort areas and resorts.

3. Using mineral water for external and internal balneotherapy has a strong, extremely beneficial effect on the patients and there are significant improvements in a number of medical complaints of most systems of the human body, but mainly on the musculoskeletal system, urinary and genital, cardiovascular, endocrine and nervous systems.

4. The participants in the rehabilitation and recreational activities at the medical center "Kamena Medical" underwent balneotherapy in the towns where they live, but it has not produced the results

obtained in Velingrad, where medical thermalism, recreation, as part of the region's traditions, helps visitors to recover successfully and contributes to improve health.
5. The therapeutic effect of the mineral waters in the studied area and its climatic resources makes the location a major destination for medical tourism (balneology and climatotherapy, spa medicine, etc.) of national and international importance.
6. The heating of public facilities in the city based on mineral water creates conditions for maintaining the ecological balance in the town and the region. Geothermal heating in the municipality with mineral waters can be used as a measure to reduce air pollution from domestic heating, which is set in the projects of the municipality and the relevant ministry.
7. The position of the health specialists and the regulatory bodies in connection with the use of mineral waters for health and recreation in connection with the project for tungsten extraction on the territory of the municipality was confirmed - this project was rejected, which allows the municipality and the region to work for inclusion in the hydrotherapeutic, climatological, thermal and balneological and recreational cluster.
8. Our position has been strengthened that it is absolutely necessary to upgrade the main tourist activities with products and services from the specialized (alternative) forms of tourism - event, hunting and fishing, cycling, eco-, etc., the resources for which in the study area are sufficient and diverse to increase the local recreational potential and its current marketing brand.
9. The need for balneological and spa-therapeutic treatment to become an integral part of the public health insurance system has been unequivocally proven.
10. The assessment of the scale and nature of the development of the studied activities in the municipality of Velingrad, proved their decisive role in the main demographic, social, settlement and economic processes and their indicators, both in the past and today and especially in the future.
11. Significant spatial and territorial changes in the cultural landscape during the different periods and especially in recent years are a direct result of the development of medical tourism activities and services.
12. Once again, this study confirmed the exceptional role of the integrated approach and partnership in the implementation of all activities in the local development of each territory, in order to more effectively organize and manage the use of the potential of the local community.

At the end of our study, we declare our readiness to actively cooperate with all interested parties in the processes we have included in the subject of the study, clearly aware of the great responsibility of any such endeavor in scientific knowledge, which has a huge public effect.

REFERENCE ON THE CONTRIBUTIONS OF THE DISSERTATION WORK

• Scientific and theoretical contributions:

- The conducted complex research and research paradigm represents the influence of geothermal and ecological factors on the general profile of Velingrad and the European and world importance of the town, as well as the importance of this dissertation thesis and the ontological and epistemological assumptions which together define the approach, methodology, model and conclusions;
- The extensive study and assessment of the role of the beneficial recreational impact of available hydro-mineral resources, mineral water composition and health and therapeutic outcome, by triangulating the results of the study of the improvement of health status from real practice contributed to the thesis of including Velingrad in the European thermal and ecological cluster.

• Scientific and applied contributions:

- The application of the constructive paradigm - how the healing mineral water used for underwater gymnastics in pools with radon water improves the overall health status of patients suffering from various diseases, a model that encourages focusing on how a phenomenon, concepts and theories are related by studying the behavior and the recreational and healing result;

- The Ellipsoid of Asclepius developed by the author found that sunshine, combined with a mild climate, mineral springs and clean air have a healing effect on people suffering from lung, cardiovascular, joint and other diseases; The Ellipsoid unites the natural resources of the region and explains why it allows the development of tourism, prophylaxis, balneotherapy, spa medicine, spa and wellness and recreation.

- The ontological assumptions about the role of nature and the opportunities for recreation that bioclimatology provides in Velingrad, allow emphasizing the benefits and validation of current knowledge and the correlation between traditions and history in the use of hot springs, health effects on the body and future prospects and trends in development of balneal and spa tourism and expansion of the cluster.

- The complex medical-geographical research of the resources for balneological and climatic treatment actively contributes to the increase of the role of the regional researches in the border field of medical geography and confirms the need for their deepening.

- The studied socio-economic and spatial-territorial impacts of balneology and climatotherapy confirmed their importance for the local economy and the need for more effective organization and public administration in the interest of the local community.

• Applied contributions:

- Epistemology - or the knowledge generated by the practical participation of the author in the complex development and application of therapeutic and recreational programs with a combination of mineral water, inhalations, ultrasound, interference current, therapeutic gymnastics, radon water in Velingrad, which improve overall health status and support the prevention, recreation and treatment of the observed patient focus groups.

- The new knowledge generated from the present data, using a multidisciplinary approach derived from ecology, history, geology, geography to collect what is already known about the mineral springs and combine their application based on current data and facts, plus the applied research methods in the dissertation on the role of spa, wellness, health and recreational tourism.

- The trained specialized staff for the recreational and spa industry in the region, as an integral part of the study, prove the place of the author's conceptual views, as a significant applied aspect in the field of balneology and climatology, spa and wellness for the region and Bulgaria.

- A number of the conclusions in the study can find a real place in the updating of strategic and planning documents, both at municipal and local level - ODA, IURDP, Tourism Development Strategy and others.

LIST OF DISSERTATION PUBLICATIONS

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17. Belichenova, T., Dr. - SPA and Wellness expert. "The hidden treasures of Velingrad and its mineral waters revealed balneology." "Tourism & Recreation" № 7 - Bulgaria in four seasons, 2017.

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