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SOCIAL SCIENCIES

HEALTH PREVENTION IN AQUATIC ENVIRONMENT

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Abstract

Aquatic environments and hydrotherapy represent evidence-based natural resources that contribute to disease prevention, functional recovery, and health promotion. This study investigated the preventive effects of standardized aquatic interventions in 108 elite athletes treated at the Center for the Recovery of Bulgarian Olympic Athletes. The intervention protocol comprised therapeutic showers, underwater massage, jacuzzi, pearl baths, mineral water therapies, and structured aquatic exercise. Statistical analyses were performed using Microsoft Excel Professional Plus 2010 and XLSTAT 2015, with data normality verified by the Shapiro–Wilk test ($\alpha = 0.05$). The findings demonstrate that regular aquatic therapy enhances physiological adaptation, supports immune function, accelerates recovery, and promotes healthy aging. Furthermore, Bulgaria's abundant mineral springs and therapeutic peloids provide scientifically validated resources for preventive healthcare, rehabilitation, sustainable wellness tourism, and evidence-based public health strategies.

Keywords: aquatic environment; hydrotherapy; recreation; mineral waters; Spa culture.

Introduction

The physical and psychological health of people reflects on the whole society, but it is a matter of personal choice and culture to achieve a healthy balance (6, 13). Citizens with balanced health are able to work, which helps them become better professionals and be more intellectually innovative than others suffering from chronic health issues. (7, 15, 20). Personal self-esteem and cheerfulness emotionally affect the connection with nature and the ecological balance of the planet (1, 2, 16). The recreational industry around the world needs specialized staff with degrees in accredited programs (5, 9, 17). The dynamics of the global wellness economy are maintained by 180,000 staff per year with interdisciplinary professional competencies (8, 11, 12). These causal relationships are fundamental to the modern world and do not require arguments other than statistical information (14, 18). Within the EU alone, more than 350-400 million people of all ages practice recreational motor and modeling products / practices through a variety of Wellness & SPA methods (3, 19). Water treatments are a major tool for hydrotherapy. In this paper we propose them as a health-preventive or cosmetic procedure. In this sense, they improve the quality of life when applied in everyday life and the quality of leisure when offered in travel packages (13). Bulgaria is rich in mineral springs, which are a natural and ecological source of enriched chemical waters. Thermal treatment is a field in tourism that is yet to be developed and has a proven health-preventive and recreational effect. Another wet procedure typical of our country is mud therapy or mud treatment. A mud mixture called humus or sedimentary mud from mineral springs is usually used. In Europe, this type of recreation with warm or indifferent temperature of the mud is little known and is of interest for tourist activities.

Methods

Participants. One hundred and eight elite athletes, men and women, with respective mean ages of 24.4 and 23.2 years were studied. All were subjected to the same experimental task applying water influences. The primary data are collected at the Center for the Recovery of Bulgarian Olympic Athletes, and we publish details with the permission of the Director (signed declaration of informed consent). For our statistical analysis, we used the EXCEL program of Microsoft Office Professional Plus 2010, with statistical program XLSTAT 2015. We checked the normality of the distribution of our data using the Shapiro-Wilk normality statistical method to test our working hypothesis. It assumes that the inclusion in the daily schedule of water effects (hydro therapies, jets, tangentor, jacuzzi, pearl bath, enriched water, water motor programs with and without device) will activate the body's immune and tempering mechanism, thus achieving a healthy lifestyle. In this study, the calculated p-value is greater than the significance level alpha ($\alpha = 0.05$), Therefore, the null hypothesis (H0) for the health impact of the aquatic environment was approved.

Results

Bulgaria has diverse in content and healing properties mineral springs, peloids (mud therapy or mud treatment with clay or sedimentary mud from mineral springs), peloides, which are natural and ecological source of health from nature. Thermal treatment is a field in Recreation (health prevention) and tourism, which is to be developed and has a proven health-preventive and antiaging effect. The general classification of the most common types is determined by the temperature of the water, its chemical composition and the mechanical force of impact when using specialized equipment. The mechanism of the physiological impact of the aquatic environment is determined mainly by its physical properties. The density and thermal conductivity of water make it an effective environment for health prevention, recreation and a positive cosmetic effect (Fig. 1).

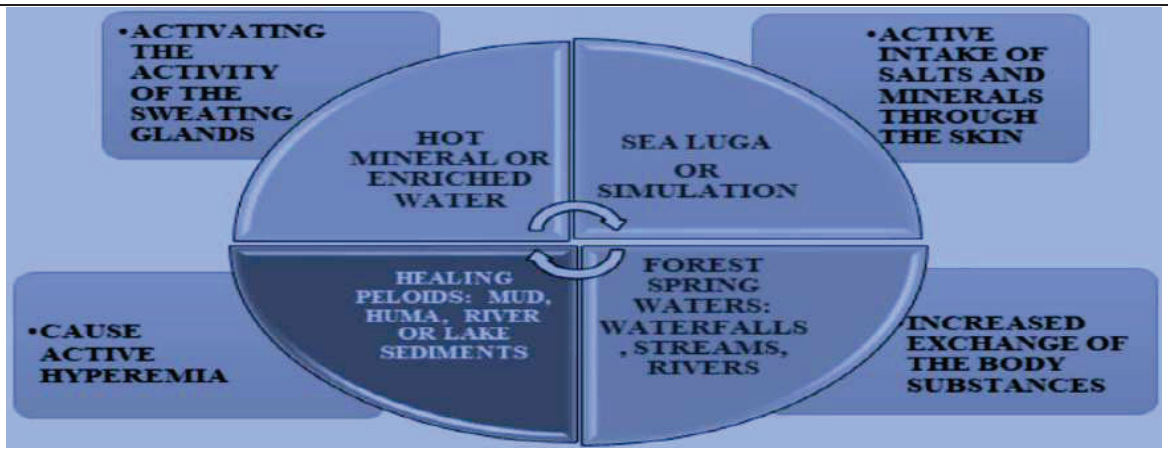


Figure 1. *Recreational and cosmetic function of the water procedures impact (with hot water).*

The body's ability to give off and receive heat is activated as a result of the temperature contrast between body temperature and that of the aquatic environment. Under the influence of water procedures, enzyme systems are activated in the skin that directly affect vascular tone and blood circulation. This complex mechanism is realized by the emergence of nerve impulses passing through the spine and reaching the thermoregulatory centers in the cerebral cortex. Depending on the nature and strength of the stimulus, excitatory or retention impulses are transmitted to the body's organs and systems. Therefore, water procedures (hot or cold) cause complex reactions, but the perfect system of thermoregulation of the body always keeps the body temperature constant and is one of the most important vital functions of the human body (37°C). The impact of water treatments with warm water leads to the following main physiological results: Active hyperemia (abundant blood flow) to the skin; Active functions of the sweat glands; Activation of metabolism. Regular application of various influences in the aquatic environment contributes to the efficiency of the body's thermo-regulatory systems. Improving thermoregulation means increasing resistance to colds and boosting performance. Thermal regulation is carried out by the processes of heat exchange, expressed by heat reception and heat transfer. These balancing processes maintain the temperature conditions in the body at a constant level. When cooling procedures are applied, the body temperature returns to its original level much faster. When the Spa therapist offers tourists to use water treatments (passive) or physical activity in water (dynamic), it is important to comply with two main categories of rules: psychological and functional. The inclusion of water impacts in tourist packages satisfies two requirements. Firstly, it makes the packages offered more marketable and secondly, along with the functional one, it also has a cosmetic effect. The exact dosage of the effects would lead to a sense of customer satisfaction as a result of which the service will be sought after repeatedly (Table 1).

PSYCHOLOGICAL RULES			
The situation	***Side irritants***	***Positive arguments***	***Price***
Luxurious environment and smart hardware	Music background, individual use of the service, Aroma therapy	Physiological argumentation and examples from the lives of celebrities	High
Hardware equipped middle class	Silence and partitioned perimeter	Tip for the effect of a separate device	Medium/Average
Standard bathtubs and swimming pools	Group use of the procedure	Example with the practice in other countries	Low

Table 1. *Psychological rules for compliance with exposure to water procedures.*

In addition to temperature contrasts, water treatments have a powerful recreational effect through mechanical irritation, which activates the peripheral nervous system. According to the Bulgarian edition of the medical encyclopedia, the skin is an important sensory organ. It contains various mechanoreceptors. They perform tactile sensations, which includes sensations of touch, pressure and vibration. Tactile sensations also include the sensations of stretching the skin, tickling, itching and the movement of an object on the surface of the skin. In addition to tactile sensory, mechanoreceptors can receive information about deep sensory perception (Fig. 2).

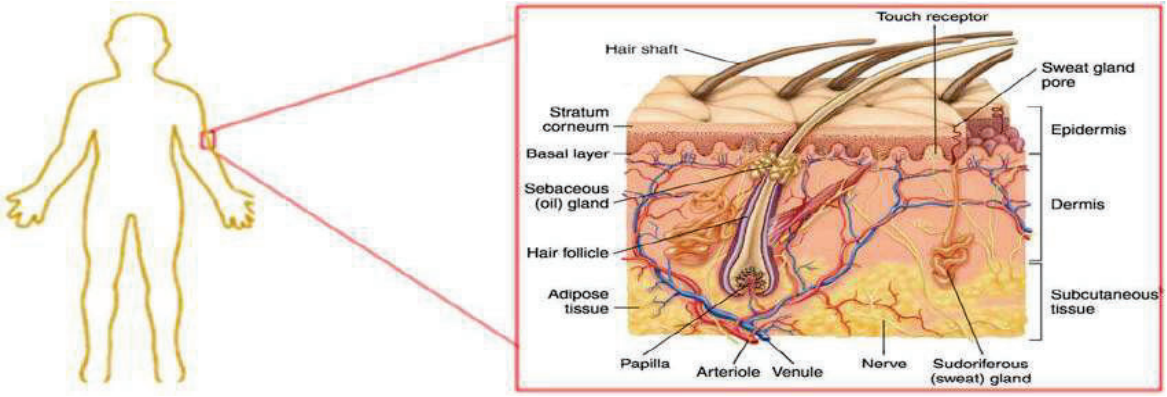


Figure 2. *Three layered skin structures: epidermis, dermis and subcutis (source Eucerin.bg)*

It includes the sensations of movement, strength and direction of movement, muscle tone, position of the body and the movement of its parts in space. In conclusion, the common name mechanoreceptors include touch, pressure and vibration receptors (tactile receptors) and proprioceptors. An important effect is the hydrostatic pressure, which is expressed in a light, evenly distributed massage in the direction of lymphatic and venous outflow from the entire periphery The dosage is determined according to the desired end result of agitation or relaxation. In this regard, the Wellness & Spa consultant needs to consider the body's reactions to exposure to water treatments (Table 2).

Table 2.

Psychological rules for compliance with exposure to water procedures.

PSYCHOLOGICAL RULES			
The situation	***Side irritants***	***Positive arguments***	***Price***
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Recreational water procedures: Water procedures that determine the recreational and cosmetic impact, both during recreation and tourism, and in the daily routine (Fig. 3):



Figure 3. Classification of water procedures with health-preventive or cosmetic applicability.

Water treatments cause reactions to the part of the nervous system. The activity of all other bodily systems is determined by these reactions (Table 3).

Table 3.

System nervous Reactions inside the body during the water procedures.

Nervous system reactions			
T° of water	**Timing**	**Nervous system reaction**	**Muscular tone**
Cold / Warm	1-2 min	Exciting action	Toning effect
Indifferent	20 min	Laxative effect	Eliminates fatigue
Warm / Cool	10 min	Laxative effect	Improves functional capacity
Hot	10 min	Laxative effect	Deeply restores

Warm water, applied for a short time, excites the nervous system, and when applied for a long time, reduces excitatory processes and has a calming effect. Water treatments with indifferent temperature have an optimal effect on the Central Nervous System (CNS). Contrasting intense temperature effects (with hot and cold water) have a pronounced arousing effect on the body of a healthy person

Discussion

We discuss the content and features of basic water procedures that we have applied in practice. The publication describes specific hydrotherapies, while explaining the specifics of their health effects, regarding: Tangentor; Pearl bath; Jet shower; Jacuzzi; Chemically enriched water procedures (drug baths).

Tangentor: The procedure is carried out with the help of a special device (tangentor), which sucks water from the bath by means of a suction pump and returns it back to it under pressure. Underwater massage device is built into the bath, which also has a mounted headrest.

What is the reason for the beneficial effect of underwater shower massage?

The indifferent temperature of the water reduces the tone of the smooth and transversely striated muscles, promotes relaxation, increases the volume of joint movements in their maximum physiological limits. The stimulating effect of the mechanical factor - the water jet, is expressed in elastic vibrations, affecting the tissues in depth. Mechanical irritation caused by relatively high pressure has a pronounced tonic effect - hyperemia occurs quickly.

Pearl bath: The pearl bath is a wonderful water procedure combined with the effect of air bubbles. Pearl baths have a calming effect due to the gentle tactile irritations of the nerve endings eliminate the accumulated nervous fatigue.

Jet shower: This water procedure is a modification of Charko (Шарко). It was introduced for the first time in Bulgaria to Olympic athletes by Dr. V. Mihailova (Olympic finalist).

Jacuzzi The jacuzzi is an integral part of the modern construction of swimming pools in hotel chains. It belongs to the multi-jet baths, but the strength of the underwater jets is significantly weaker than that of the tangentor.

Chemically enriched water treatments (drug baths): To enhance the impact of the water factor, additional chemicals are used - drugs and herbal extracts, essential oils, salts and other chemical mixtures or standard cosmetic additives. They are used in individual water treatments in the bath.

Conclusion

Based on the above analysis of the results and the discussion, we draw the following conclusions: Various water effects have a positive effect on the body's thermo-regulatory abilities; Improving thermoregulation is expressed in increasing resistance to colds; The correct dosage of the effects leads to an emotional feeling of satisfaction on the part of the customers, because of which the service is repeatedly sought; The impact of water treatments with hot water leads to the following main physiological results: active hyperemia (abundant blood flow) to the skin; active functions of the sweat glands; activating metabolism.

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