



International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Operating Publisher
SciFormat Publishing Inc.
ISNI: 0000 0005 1449 8214

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Calgary, Alberta, T3E0A7,
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ARTICLE TITLE

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DOI

[https://doi.org/10.31435/ijitss.2\(50\).2026.5479](https://doi.org/10.31435/ijitss.2(50).2026.5479)

RECEIVED

19 March 2026

ACCEPTED

15 June 2026

PUBLISHED

24 June 2026

LICENSE



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DIFFERENT ASPECTS OF HYDROTHERAPY IN DEPRESSION TREATMENT: A NARRATIVE REVIEW

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ABSTRACT

Therapeutic aspects of water have been recognized since ancient times, with varying levels of interest across historical periods. Its diverse applications are based on the chemical, mechanical, and physical properties of water. While traditionally used for somatic conditions, water-based therapies may also offer benefits for mental health, particularly depression, which is an increasing global concern.

The aim of this article is to review the existing literature on the potential benefits of hydrotherapy (focused on the external use of water in its liquid state) in the context of depression. A narrative review of relevant studies was conducted, focusing on the physiological, neuroendocrine, and psychosocial effects of hydrotherapy.

The findings suggest that hydrotherapy may improve physical health, which is closely linked to mental well-being. It may exert neurophysiological effects, including modulation of the autonomic nervous system, reduction of stress and anxiety, and hormonal regulation. Additionally, hydrotherapy may alleviate comorbid conditions associated with depression, such as chronic pain and sleep disturbances. Environmental and social factors, including group participation and exposure to natural settings, may further enhance mental health outcomes.

In conclusion, hydrotherapy appears to be a promising complementary, non-pharmacological approach in the management of depression; however, further high-quality research is needed to confirm its effectiveness.

KEYWORDS

Hydrotherapy, Balneotherapy, Spa, Depression, Mental Disorders

CITATION

Aleksandra Lewczuk, Maciej Krzysztof Jakubiec, Anna Wawrzeczko, Angelika Jankowska, Magdalena Gostół, Natalia Górską, Katarzyna Wójtowicz, Gabriela Deska, Emilia Gąsiorowska. (2026) Different Aspects of Hydrotherapy in Depression Treatment: a Narrative Review. *International Journal of Innovative Technologies in Social Science*. 2(50). doi: 10.31435/ijitss.2(50).2026.5479

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Introduction**1.1 Hydrotherapy and Its Historical Development**

Hydrotherapy refers to the therapeutic use of water in its various physical states, including liquid, solid (ice), gaseous (steam), or combined states [19, 20]. Its effects are primarily associated with the action of physical factors, such as temperature, pressure, buoyancy, and mechanical forces, as well as, in the case of mineral waters, their specific chemical composition [5].

Depending on the therapeutic purpose, water may be used internally and externally, with methods varying in intensity, duration, and form [19], and may be beneficial in therapy, rehabilitation, and disease prevention [20], in both somatic and mental disorders [3].

The concept of hydrotherapy encompasses a broad spectrum of practices, including water therapy, aquatic therapy, pool therapy, balneotherapy, therapeutic drinks, and inhalation therapy [5, 20]. In this article we will focus exclusively on the external use of water in its liquid state.

Water-based therapies represent one of the oldest therapeutic approaches, as humans have sought relief in water [5] and utilized its various properties [20], with origins dating back to ancient civilizations. In ancient Greece, natural springs were recognized for their therapeutic properties, particularly in treating skin conditions and musculoskeletal disorders [7], and this use was further developed by the Romans, who incorporated bathing into daily health practices and recreational activities. They constructed balnea - complex thermal facilities that included spaces for physical activity, relaxation, and social interaction [7, 9]. The concept of “spa” (*salus per aquam*, meaning “health through water”) also emerged, later evolving into communal environments equipped with gardens, shops, libraries, gyms, and massage areas [9].

Over time, the therapeutic role of water expanded across cultures until the Middle Ages, when bathing declined and public baths were banned in favor of prayer-based healing; however, its importance was later regained during the Ottoman period [12].

In the twentieth century, spa culture reached its peak during the Belle Époque, when such establishments formed an integral part of larger resort complexes featuring grand hotels and casinos. This trend declined during and shortly after World War II, when this form of therapy temporarily lost popularity. However, this decrease was not permanent, and interest in water-based therapeutic methods was regained [7].

In today's world, visiting hot springs is part of medical tourism [12], and balneotherapy is a branch of medicine emphasizing a holistic approach to health [9]. It involves therapeutic immersion in mineral-rich water in various types of facilities, including tubs, basins, or specially designed pools, and may also incorporate additional modalities, such as mud applications, massage techniques, and water-based physiotherapy [3,5]. For water to be classified as therapeutic, specific criteria should be met: it should be thermal water used for curative purposes, with a temperature of at least 20°C and a mineral content of no less than 1 g/L [3]. Although balneotherapy focuses primarily on warm water therapy, cold water should also be considered within hydrotherapy, as it has beneficial effects on health [20].

1.2 Use of Water in Mental Disorders

The application of water-based therapies has traditionally been focused primarily on somatic diseases, particularly skin and musculoskeletal disorders [7]. However, it is important to evaluate how these methods could be beneficial in addressing emerging challenges in modern societies: mental disorders. These conditions significantly reduce quality of life, may negatively affect physical health, and in severe cases can lead to suicide [3]. According to the World Health Organization, more than one billion people worldwide suffer from mental disorders [13]. Among them, depression is one of the most disabling conditions and represents a major challenge for contemporary healthcare systems [2,13].

2. Methodology

This study was conducted as a narrative literature review focusing on the historical background and current knowledge of hydrotherapy, as well as its potential use in the treatment of depression. The aim of the review was to summarize available evidence and assess the possible impact of hydrotherapy on mental health.

The literature search was conducted primarily in the PubMed database, focusing on the following keywords: “hydrotherapy”, “balneotherapy”, “spa”, “depression” and “mental disorders”.

The inclusion criteria comprised peer-reviewed articles, mainly review papers and meta-analyses, published in English. The selected sources were published between 2005 and 2024, with most originating from the last 10 years.

Studies were screened based on their relevance, and the extracted data focused on the effects of hydrotherapy on depressive symptoms and mental well-being.

3. Discussion

3.1 Methods of Treating Depressive Disorders

The treatment of depression typically involves pharmacotherapy, psychotherapy, or a combination of both approaches. Pharmacological treatment, although effective in alleviating symptoms in many patients, is associated with a number of limitations. It is not free from side effects, such as metabolic, gastrointestinal, sexual, and sleep-related disturbances, as well as headaches and drowsiness [3], all of which may negatively influence patient adherence to treatment. In contrast, hydrotherapy has almost no side effects [11].

Additionally, a proportion of patients do not respond adequately to pharmacotherapy [2], which constitutes a significant clinical challenge and necessitates the search for alternative treatment approaches.

Another important issue relates to the needs of aging societies. Approximately 10% of elderly individuals worldwide suffer from depression; however, this number may be underestimated [8]. Elderly patients are often affected by multiple comorbidities, which further complicates the management of depressive disorders. Pharmacological treatment in this population is frequently associated with polypharmacy, increasing the risk of adverse drug interactions and side effects. Moreover, beyond the treatment of existing diseases, it is essential to create conditions that support healthy aging, in which mental health - alongside physical health and social engagement - plays a crucial role [1]. These considerations highlight the importance of investigating complementary therapies to potentially improve overall treatment outcomes.

3.2 Physical activity and its benefits for mental health

With regard to non-pharmacological interventions, psychotherapy remains the primary and most established method of treatment [8]. Nevertheless, increasing attention has been directed toward additional strategies that may support or complement traditional approaches. One such strategy is physical exercise. Regular physical activity contributes not only to improvements in mood and cognitive function but also to beneficial physical health outcomes [2]. This is particularly important, as depression may negatively affect physical health [3], and reversing this process is an important component of treatment.

It has also been demonstrated that combining exercise with antidepressant treatment, particularly selective serotonin reuptake inhibitors (SSRIs), may increase the effectiveness of pharmacotherapy [2]. As a general intervention, physical activity may also help mitigate certain side effects of antidepressant treatment, such as weight gain.

Physical activity performed in an aquatic environment, although less extensively studied than land-based forms, has also been analyzed. In the article “Effects of aquatic exercise on mood and anxiety symptoms: A systematic review and meta-analysis,” findings indicate that water-based exercise may lead to improvements in mental health, including reductions in anxiety and improvements in mood [4]. Furthermore, another analysis presented in “Aquatic exercise and mental health: A scoping review” demonstrated that various forms of aquatic activity, such as aquatic aerobics and swimming, including structured swimming classes, are associated with mild to significant improvements in depressive symptoms. It was also found that light aquatic aerobics may have a beneficial effect on mood and anxiety symptoms [14].

When considering performing sport activities in water, it is worth remembering that reduced gravitational load in water decreases joint stress, so “prescribing” water activities can be beneficial for patients with reduced mobility and musculoskeletal diseases [4].

3.3 Neurophysiological Effects of Hydrotherapy

The reduction of gravity, which facilitates physical activity, is only one of the many properties of water that may benefit patients with depression. Being in water provides sensory stimulation through skin contact, which may contribute to stress reduction and mood enhancement [4].

Immersion in warm water has been shown to influence the autonomic nervous system. Specifically, it reduces activation of the sympathetic nervous system while simultaneously enhancing parasympathetic activity, which may contribute to a reduction in anxiety levels. This autonomic shift induces a relaxation response that may underlie reductions in stress [3].

Additionally, it has been reported that balneotherapy may influence cortisol levels in patients [15]. Cold water exposure also has endocrinological effects. Swimming in cold water activates the sympathetic nervous system and results in an increase in norepinephrine, serotonin, dopamine, and β -endorphins. It is also suggested that the higher density of cold receptors in the skin may provide strong stimulation to the brain, potentially contributing to therapeutic effects comparable to electroconvulsive therapy [6].

3.4 Pain and Depression

Depression often co-occurs with pain and insomnia [21]. There is a triad called the Pain - Insomnia - Depression Syndrome (IDS), and it significantly affects patients' quality of life [22]. Addressing these comorbidities is essential in the treatment of depressive disorders.

Being immersed in water reduces the weight load on different parts of the body, which may lead to pain reduction [20]. This is one of the most common applications of balneotherapy, particularly in the treatment of chronic musculoskeletal pain. According to the authors of “Balneotherapy using thermal mineral water baths and dermatological diseases: a systematic review”, water in hot springs may provide mild stimulation to peripheral nerves, lowering their excitability and producing analgesic effects. [17].

Immersion in cold water may raise the pain threshold [6], potentially through a decrease in nerve conduction velocity [20].

Mineral waters also play an important role in pain relief - radon springs may reduce neuralgia, magnesium helps with relaxing muscles, and sulphur springs have anti-inflammatory properties that can also help with reducing pain [10].

3.5 Sleep and Depression

The treatment of insomnia, similarly to the treatment of depression, is divided into pharmacological and non-pharmacological approaches [17]. Spa treatments and water-based activities may provide a non-pharmacological approach to alleviating sleep disturbances [5].

Although hydrotherapy includes different water temperatures, warm water appears to be particularly important in the management of insomnia. It reduces sympathetic nervous system activity and increases parasympathetic activity [3].

Warm water immersion may induce vasodilation, improve circulation, and enhance oxygenation, contributing to overall physiological relaxation [20]. Studies indicate that bathing in hot springs may improve sleep quality, reduce pre-sleep cognitive activity, and shorten sleep onset latency [17]. Additionally, spa treatments have been associated with reductions in anxiety [15], which may also lead to reduced sleep disorders.

3.6 Environmental and Social Aspects

Hydrotherapy may improve patients' mood by placing them in an environment that positively influences mental health. Historically, Roman balnea provided not only therapeutic but also social experiences for citizens [7]. Over time, spa facilities evolved to include spaces for social interaction, such as gyms and recreational areas.

Similarly, modern water-based activities, such as aquatic exercise, provide opportunities for group participation and social engagement.

Going to a spa in today's world is a branch of the tourism industry [12], and it also boosts social interactions. Also, spa resorts create an environment focused on rest, allowing their guests to take a breath and distance themselves from potential stressors in their daily lives [16].

On the other hand, hydrotherapy may also involve contact with nature. Activities such as swimming in open water allow individuals to engage with natural environments such as oceans and may further enhance psychological well-being [20]. Also, spas are located within seaside and mountain areas [16], which, apart from water-related benefits, also give an opportunity to enjoy nature.

Conclusions

Hydrotherapy, with its specific aspects, can play an important role in depression treatment. Although we did not find specific guidelines that would suggest using hydrotherapy as the main therapy for depression, this type of treatment can play a crucial role as a supportive treatment of this mental disorder.

Taking part in sport activities in water, thanks to its gravity-defying properties, can be easier than on land. Sports can boost mood, reduce anxiety, serve as a form of social interaction, and also mitigate a side effect of depression, which is weight gain. It also improves physical health in general, which can also be important for the individual's mental health.

Immersion in water can also positively influence hormones and neurotransmitters that are crucial in fighting depression. Being in water reduces cortisol and increases norepinephrine, serotonin, dopamine, and β -endorphins. By decreasing sympathetic activity and increasing parasympathetic activity, water reduces anxiety.

Water can also be useful in reducing two important comorbidities co-existing with depression - chronic pain and sleep disorders. For the first issue, both cold and warm water bring positive effects through different mechanisms. Also, in balneotherapy, water consists of specific minerals that can also bring pain relief. For sleep disorders, the analyzed sources indicated benefits from warm water that not only improve sleep quality but also reduce sleep onset latency.

Undergoing balneotherapy or visiting a spa is also a great opportunity for social interaction, which is so crucial in depression that often leads to patients' isolation. This aspect of hydrotherapy, which also lies at the roots of this therapy, is gaining an increasingly important role nowadays, highlighting the importance of social interaction. As suggested by the analyzed sources, the natural environment that plays a role in water activities can also contribute to the positive effects of this therapy.

However, although we presented multiple examples of how hydrotherapy could be beneficial for depression treatment, we understand that further research is required to better define its role, establish standardized protocols, and determine its long-term effectiveness in the treatment of depression.

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