Influence of Naphtalanotherapy (NT) Combined with Individually Tailored Physiotherapy in Patients with Psoriatic Disease: A Study Based on the Psoriatic Arthritis Cohort of the Special Hospital for Medical Rehabilitation – Naftalan, Croatia

Sanda Špoljarić Carević[1], Pero Hrabač[2], Lara Vasari[3], Lucija Tomić Babić[4], Jakov Ivković[3], Gordana Krnjević-Pezić[5], Goran Maričić[3], Melita Bahlen Kramar[3], Vlatka Matić[3], Pero Vržogić[6], Maja Baotić[3], Porin Perić[7], Nadica Laktašić Žerjavić[8]

[1]Special Hospital for Medical Rehabilitation Naftalan, Ivanić-Grad, Croatia; [2]Medical School University of Zagreb, Zagreb, Croatia; [3]Naftalan, Ivanić-Grad, Croatia; [4]Special Hospital for Medical Rehabilitation Naftalan, Ivanić-Grad, Croatia; [5]Naftalan - Special Hospital for Skin and Rheumatic Diseases, Ivanić-Grad, Croatia; [6]Special Hospital Naftalan, Ivanić-Grad, Croatia; [7]University Hospital Centre Zagreb, University of Zagreb School of Medicine, Zagreb, Croatia; [8]University of Zagreb, School of Medicine, Zagreb, Croatia

Corresponding author:
Lucija Tomić Babić, MD
Special Hospital for
Medical Rehabilitation Naftalan
Omladinska 23a
Ivanić-Grad, Croatia
lucijatomicbabic@gmail.com

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ABSTRACT

A study conducted at "Naftalan" Special Hospital in Croatia evaluated the impact of naphtalanotherapy (NT) combined with individually tailored physiotherapy (ITP) on 119 patients with psoriatic arthritis and psoriasis. Patients underwent treatments for either two or three weeks. Results indicated that both treatment durations significantly improved pain, stiffness, swelling, disease activity, skin condition, and quality of life, with the three-week program proving more effective. The findings support the inclusion of NT and ITP in the management psoriatic disease and suggest that extended rehabilitation could have long-term benefits, potentially influencing health insurance policies.

KEY WORDS: psoriatic disease, rehabilitation, naphtalanotherapy, quality of life

INTRODUCTION

Psoriatic arthritis (PsA) is a chronic and diverse form of inflammatory arthritis that is known to impair quality of life and functional capacity. It can manifest in two primary forms: axial psoriatic arthritis (axPsA), which affects the spine and sacroiliac joints, and peripheral joint disease (pPsA), often characterized by joint inflammation and pain (1). Distinctive features of PsA include periarticular manifestations such as dactylitis or enthesitis, which are considered hallmarks of the condition. A the same time, psoriasis (PsO) is an immune-mediated, chronic skin disease that can affect the skin, scalp, nails, intertriginous, and genital areas, leading to a diminished quality of life (2). In contemporary medicine, the concomitant occurrence of both arthritis and psoriasis is collectively referred to as psoriatic disease (PD). Kinesiotherapy,

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electrotherapy, and hydrotherapy are recommended for the non-pharmacological management of psoriatic arthritis (PsA) (3). Naphtalanotherapy (NT) is the use of mineral oil derived from petroleum in the treatment of PsA and psoriasis (PsO) (4). The study aimed to investigate the efficacy of NT combined with individually tailored physiotherapy (ITP) on rehabilitation outcomes in patients with psoriatic disease.

PATIENTS AND METHODS

The research cohort consisted of patients with psoriatic arthritis and psoriasis admitted to the Special Hospital Naftalan in Ivanić-Grad, Croatia, from January 2019 to January 2020. This group, known as the Psoriatic Arthritis and Psoriasis Special Hospital Naftalan Cohort (PsASHNIC), included individuals over 18 years of age diagnosed with psoriatic arthritis (PsA) according to the classification for psoriatic arthritis (CASPAR) criteria and with psoriasis (PsO) confirmed by a dermatologist (5-6). Informed consent was obtained from each participant, with the study conforming to the ethical standards of the 1964 Declaration of Helsinki and its subsequent amendments (7). Ethical approval was granted by the Ethical Committee of the Special Hospital "Naftalan". Inclusion criteria specified that the patients must have maintained stable, disease-specific medical therapy for at least six months before the commencement of the study. The study enrolled 119 patients, with an average age of 59.2 years and an equal female-to-male ratio. The mean duration of the rehabilitation program was 17.6 days and encompassed strengthening and range of motion exercises, thermal pool exercises, naphtalan baths, and electrotherapy. We evaluated objective parameters of disease activity for PsA and severity of PsO, in addition to patient-reported outcomes concerning pain, fatigue, functionality, and quality of life at admission and discharge.

The participants in the study were stratified into two groups based on the length of their rehabilitation program. In the first group, 58 patients, accounting for 48.7% of the total, underwent naphtalan therapy (NT) and individually tailored physiotherapy (ITP) for two weeks. The second group comprised 61 patients, representing 51.3% of the total, who participated in the same rehabilitation program that was extended to three weeks. The rehabilitation for both groups was conducted five days per week. At the start and conclusion of the rehabilitation program, all patients were asked to complete specific questionnaires designed for the self-evaluation of their condition., We used several PRO instruments to assess the efficacy of NT and ITP in both PsA and PsO:

The Health Assessment Questionnaire Disability Index (HAQ-DI) was used to assess functionality in pPsA. A score of 0 to 1 on the HAQ-DI instrument was considered to represent mild, 1 to 2 moderate, and 2 to 3 severe disabilities (8).

In cases with predominately axPsA, we used the Bath Ankylosing Spondylitis Functional Activity Index (BASFI) for the same purpose as HAQ in predominantly peripheral disease. BASFI score ranges from 0 (no functional impairment) to 10 (maximal impairment) (9).

The Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) was used to measure patient-reported disease activity. The score ranges from 0 (no disease activity) to 10 (maximal disease activity), with a cut-off of 4 indicating active disease (9).

Enthesitis was assessed using the Maastricht Ankylosing Spondylitis Enthesitis Score (MASES) (10).

We used the 66/68 joint count to count swollen and tender joints.

The level of pain, fatigue, and skin itching was assessed using a visual analogue scale (VAS), ranging from 0 to 100 mm.

Table 1. Basic parameters at inclusion

Parameter	
Sex; F; N (%)	59 (49.6%)
duration; days; N (%) 14 21	 58 (48.7%) 61 (51.3%)
Occurrence of diseases; N (%) Psoriasis first Arthritis first Simultaneous	 83 (71.6%) 17 (14.7%) 16 (13.8%)
Age; years; mean (SD)	59.2 (9.67)
Duration of psoriasis; months; mean (SD)	264 (151)
Duration of arthritis; months; mean (SD)	187 (122)

Patient fatigue and its effect on chronic diseases was assessed by the FACIT-F questionnaire. The score ranges from 0 to 52, with a higher score indicating better quality of life, i.e., less fatigue (11).

Quantitative scoring of skin severity was achieved by calculating the Psoriasis Area and Severity Index (PASI), which combines the level of severity of the affected lesions with the affected body surface area in a unique score ranging from 0 (no disease) to 72 (maximal disease activity).

Other measures included the body surface area (BSA), ranging from 0-100% and the

Dermatology Life Quality Index (DLQI) to assess quality of life in patients with PsO. DLQI score ranges from 0-30, with a cut-off value of 10 indicating poor QoL (12).

Statistical analysis

The level of statistical significance was set to 0.05. The normality of the distribution for each variable was tested with the Shapiro-Wilk test. All analyses were performed by non-parametric tests – Wilcoxon's test for paired samples, Mann-Whitney's test for comparing two groups, and Kruskall-Wallis ANOVA for comparing multiple groups. Correlation analysis was performed using Kendall's tau b test. All analyses were performed using non-parametric tests – Wilcoxon's test for paired samples, Mann-Whitney's test for comparing two groups, and Kruskall-Wallis ANOVA for comparing multiple groups. Correlation analysis was performed by Kendall's tau b test.

RESULTS

We examined the cohort of 119 subjects treated for psoriasis and arthritis at our clinic. The basic demographic properties of the population are shown in Table 1. By gender, there were 60 male (50.4%) and 59 female (49.6%) patients. The age of the subjects ranged from 27 to 89 years, with a mean of 59.2 years. Regarding diseases for which the treatment was sought, the mean duration of psoriasis was 264 months (22 years), while the mean duration of arthritis was 187 months (15.6 years). In most cases (N=83; 71.6%), psoriasis occurred first.

There was statistically significant improvement recorded in all measured parameters ($P<0.001$, the Wilcoxon test): pain intensity (VAS pain), duration of morning stiffness, number of painful and swollen joints, number of painful enthesis (MASES), patient-reported disease activity (BASDAI), chest mobility (breathing index), sagittal mobility of the lumbar spine (Schober index), functional performance (HAQ and BASFI indices), fatigue (FACIT-F), PsO severity (PASI), and quality of life related to PsO (DLQI).

Most of the subjects (84.3%) had spondylitis as well as the involvement of distal interphalangeal joints (74.3%), while the proportions of enthesitis and dactylitis were lower (Table 2). Although the number of subjects with complete data of involved fingers and toes for both study visits was small, there was a statistically significant reduction of affected fingers ($P=0.034$) but not toes ($P=0.174$; Wilcoxon test) between the two visits examined in the study.

All the analysed parameters showed statistically significant improvement ($P<0.001$ in all cases, Wilcoxon test; Table 3) between the initial visit and the end of the treatment period. The table also shows the percentages of change between the two visits examined in the study. The latter parameter allows for easier comparison between different demographic and disease parameters. The following between-group difference was found: significantly better results in the 21-day group for BASDAI ($P=0.006$) and marginally better results in the same group for VAS pain ($P=0.056$), DLQI ($P=0.069$), and BASFI ($P=0.076$).

DISCUSSION

While GRAPPA advocates for physiotherapy in managing various PsA symptoms, there is a recognized gap in robust evidence for non-drug treatments for PsA (13). Modern pharmacological options effectively manage inflammation and its related symptoms across the joints, the spine, and the skin. Nonetheless, 20% of patients still experience severe disease progression, particularly with the polyarticular type (14). There is an underappreciated need for nonpharmacological interventions such as physical therapy, which enhance joint function and muscle strength, alleviate pain, and improve mobility.

Table 2. Other disease-specific parameters

Parameter	
Spondylitis; N (%)	86 (84.3%)
Dactylitis; N (%)	30 (29.1%)
Enthesitis; N (%)	46 (45.1%)
Involvement of distal interphalangeal joints; N (%)	75 (74.3%)

Despite its longstanding role in treating inflammatory muscle diseases, the precise contribution of physical therapy to treatment outcomes remains challenging to quantify due to the lack of specific biomarkers for monitoring progress.

Although extensive research has been conducted on the effects of physiotherapy, hydrotherapy, and exercise independently, there appears to be a gap in the literature regarding the combined impact of these methods with naphtalan therapy on both psoriatic arthritis and skin conditions (15).

A study from Sweden highlighted the benefits of hydrotherapy for patients with psoriatic arthritis, improving physical function, energy levels, sleep quality, cognitive function, work performance, and daily life participation (16). An analysis of 107 studies by Ortolan et al. found that 63 examined non-pharmacological treatments such as education and exercise for axial spondylarthritis (aSpA). The impact of education was small-to-moderate in improving disease activity, function, and mobility, while exercise had a moderate-to-high effect. Consequently, the authors determined that both education and exercise are effective treatments for aSpA (17).

The present study was designed to assess the effectiveness of naphtalane therapy (NT) combined with individually tailored physiotherapy on disease activity, pain, fatigue, morning stiffness, physical function, and overall quality of life in patients with psoriatic disease (PD). Naphtalanotherapy, which has been applied for three decades at the Naftalan Special Hospital in Ivanić-Grad, Croatia, utilizes naphtalan for the treatment and rehabilitatation of psoriatic conditions. Naphtalan can be administered in various forms, such as baths, iontophoresis, or sonophoresis. It can also be used in combination with paraffin in mastic therapy or as an occlusive dressing. Additionally, a naphtalan cream can be used for direct skin application. The therapeutic effects of naphtalan oil, particularly for skin and joint diseases, were first documented in 1894 (18). Numerous studies have since highlighted its healing and anti-inflammatory benefits for psoriasis (PsO) and psoriatic arthritis (PsA) (19,20). Studies have also indicated that naphtalan is not carcinogenic or irritating to the skin (21,22).

Considering these factors, we designed the current study to assess the effects of naphtalan therapy (NT) combined with an individually tailored physiotherapy program (ITP) on disease activity, pain, fatigue, morning stiffness, physical function, and quality of life in patients with psoriatic disease (PD). Our study cohort was considered representative given that PsA affects both genders equally, psoriasis often precedes arthritis, and the disease presents in various forms – characteristics that were all reflected in our subject group.

Our study revealed that the combination of naphtalan therapy with individually tailored physiotherapy significantly enhanced a range of assessed outcomes including disease activity, functional and dermatological condition, disability, spinal mobility, fatigue, and quality of life, with all variables showing statistical significance ($P<0.001$). These findings are consistent with those from our preliminary study, which showed notable improvements in VAS-pain, VAS-fatigue, MS, HAQ, and FACIT-F following NT plus ITP treatment in a smaller group of 29 patients with PsA. However, it did not include psoriasis-specific outcomes (23). To strengthen the scientific evidence, we expanded our cohort size and collaborated with dermatologists to evaluate the effects of treatment across the dual spectrums of psoriatic disease – its cutaneous and articular manifestations. Furthermore, our current study also determined that treatment duration plays a crucial role in patient outcomes, with those undergoing a 3-week regimen exhibiting more pronounced benefits than those in a 2-week regimen. This was statistically significant for disease activity, pain, quality of life, and functioning, with marginal significance noted for VAS pain, DLQI, and BASFI ($0.05<P<0.10$), underscoring that rehabilitation treatment duration should extend beyond the standard 14 days often stipulated by health insurance guidelines.

Additionally, our results align with those reported by Ortolan et al., demonstrating that exercise incorporated into ITP is effective for managing psoriatic arthritis, as evidenced by similar impacts on patient-reported outcomes such as BASDAI.

Numerous studies over the last twenty years have shown that naphtalan oil as beneficial effects on psoriatic skin. Vržogić et al. found that NT alters angiogenic factors and reduces blood vessel formation in lesions (19,20). They also observed the potential NT to decrease the number of specific immune cells that could hinder the proliferation of psoriatic lesions. Thaci et al. noted that NT not only inhibits cell growth but also promotes the differentiation of skin cells in laboratory settings (24).

The data from our study reveal a remarkable efficacy of naphtalan therapy in the management of psoriatic skin lesions, as measured by established indices of disease severity such as the Psoriasis Area and Severity Index (PASI) and Body Surface Area (BSA). Throughout the study duration, we observed a decrease in PASI from an initial mean (± SD) of

6.40±6.36 to 2.08±2.30, paralleled by a BSA reduction from 7.29±9.39 to 4.49±5.38. These findings correspond with the outcomes of a study by Krnjević et al., which included 28 patients undergoing three weeks of naphtalan therapy and reported a PASI reduction from 23.10±7.50 to 7.95±4.08 (4). Consequently, these decreases in disease severity correlate with significant improvements in patient quality of life, as evidenced by the notable reduction in the Dermatology Life Quality Index (DLQI) from a mean (± SD) of 8.32±7.09 to 4.78±4.84, reflecting both symptomatic relief and meaningful enhancement in daily living and emotional well-being.

CONCLUSION

A treatment regimen combining individually tailored physiotherapy, naphtalanotherapy, and electrotherapy for 2 to 3 weeks was shown to be beneficial for skin conditions, pain relief, fatigue, disease activity, and mobility of the chest and spine in patients with psoriatic disease. This approach enhances patient quality of life and their ability to perform daily activities, playing a vital role in managing their condition. Such non-drug interventions are crucial in treating inflammatory rheumatic diseases and should be considered essential components of comprehensive care in psoriatic arthritis.

Evidence indicates that a three-week program is more effective than a two-week program, suggesting that longer rehabilitation may maximize long-term benefits by improving quality of life, reducing pain and disease activity, and enhancing physical capabilities and daily functioning of patients. The effectiveness of this treatment presents a case for conducting cost-benefit analyses by or for health insurers to demonstrate the potential for better health outcomes and reduced long-term costs associated with disease-induced disabilities.

Contribution of individual authors:

Sanda Špoljarić Carević: study design, data collection, first draft, approval of the final version.

Pero Hrabač: statistical analysis, first draft, approval of the final version.

Lucija Tomić Babić: data collection, approval of the final version.

Lara Vasari: study design, approval of the final version.

Jakov Ivković, Gordana Krnjević Pezić: study design, data collection.

Goran Maričić: approval of the final version.

Melita Bahlen Kramar, Vlatka Matić, Pero Vržogić, Maja Baotić, Denis Latinović: data collection.

Porin Perić: approval of the final version.

Nadica Laktašić Žerjavić: first draft, approval of the final version.

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