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► To cite this version:

Pierre Louis Bernard, Gregory Ninot, Nathalie Raffort, B. Aliaga, Lucie Gamon, et al.. Benefits of a 3-week outpatient balneotherapy programme on patient-reported outcomes. *Aging Clinical and Experimental Research*, 2021, 33 (5), pp.1389 - 1392. 10.1007/s40520-020-01634-9 . hal-03471266

HAL Id: hal-03471266

<https://hal.science/hal-03471266>

Submitted on 8 Dec 2021

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**Aging Clinical and Experimental
Research**

e-ISSN 1720-8319

Aging Clin Exp Res
DOI 10.1007/s40520-020-01634-9



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Benefits of a 3-week outpatient balneotherapy programme on patient-reported outcomes

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Received: 13 May 2020 / Accepted: 12 June 2020
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Abstract

Background Analysis of the health profile of participants aged over 65 has been initiated in balneotherapy.

Aims To determine the benefits of a 3-week outpatient balneotherapy program on patient-reported outcomes.

Methods Our sample consisted of 1471 people. The average age of the study population was 72.5 years (± 5.1) and 67% of the participants were females. Symptoms intensity was measured by visual analogue scale, and health-related quality of life (HRQL) with the EQ5D questionnaire before and after the program. Changes of perceived functional status were rated using a 3-point Likert scale.

Results The results indicated a significant increase in the fear of falling and a decrease in fatigue. EQ5D reveals a significant improvement after the program. The perceived change scores remained stable, except for anxiety/depression.

Conclusions The study indicated significant improvements of HRQL and a decrease of perception of fatigue and anxiety in elderly people participants in a 3-week balneological programme.

Keywords Balneotherapy programme · Quality of life · Patient-reported outcomes · Perceived change · Intervention study

Introduction

Certain intervention studies have shown an efficacy of comprehensive balneological programmes on functional status and chronic disease symptoms. Several trials have shown that balneotherapy programmes relieve musculoskeletal pain [1, 2]. Some trials have shown benefits on related rheumatoid arthritis and osteoarthritis symptoms, as well as on venous and arterial insufficiency [3–5]. In addition, beyond management of the primary illness taken care of, the analysis is made of the benefits of the thermal environment regarding dimensions such as autonomy and quality of life [6].

The elderly regularly attend the thermal environment for various indications and the physiological and psychological effects of the treatments are quantified. To respond to the urgent request of healthy ageing for all nations [7], the influence of therapeutic programmes is also questioned on global and specific health perceptions [8, 9]. Although biomedical and public health outcomes are necessary, they are insufficient for comprehensive outcome assessment. Patient-reported outcomes (PROs) and quality-of-life assessment are fundamental in this regard, because

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treatment interventions should satisfy physical and psychosocial aspects associated with the disease process. The importance of patients' perspectives on their disease status and health-related quality of life (HRQL) is well recognized as an essential part of research studies and practice [10]. PROs can measure symptom intensity such as general fatigue, pain or fear of fall. The perceptions of change can also be assessed by specific questionnaire to determine the real impact of the programme on daily life.

The main objective of this before-after study was to determine the impact of balneotherapy treatments on symptom intensity, HRQL and perceived change in patients of over 65 years.

Method

Design

The trial assessed consecutive patients included between May and September 2016 in a French thermal spa. Symptom intensity and HRQL were measured before (admission) and after (discharge) the balneotherapy programme. The change of perceived functional status was rated via a 3-point Likert scale at the end of the programme. Change of perceived activity, daily living and psychological status were also all rated using the 3-point Likert Scale 7 days after the programme. This exploratory study was carried out within the Reference Site of the European Innovation Partnership on Active and Healthy Ageing—MACVIA. It was validated by the Internal Review Board (No. 16–04–05) of the University Hospital of Nimes (France). It was registered on Clinical trials.gov NCT04277000. More details have been published previously [11].

Participants

Among the 1707 patients recruited, we excluded 2 participants for case-stop, 25 for age under 65, 1 for voluntary discontinuation and 198 for lack of complete assessments. A total of 1471 participants were, therefore, included in the trial. The average age of the study population was 72.5 years (± 5.10) and 67% of the subjects were females. 10.3% were considered fragile based on the criteria of Fried but no one presented the five criteria of fragility. 485 people had fallen (33%) in the past 12 months [11]. Using the short version of the IPAQ questionnaire, the quantified level of physical activity revealed an average score of 7506.6 at the admission.

Intervention

The programme lasted 18 days at the thermal spa of Bal-aruc-les-Bains (France). There were 1.5 to 2 h of medically prescribed treatments per day, with reimbursement ranging between 65 and 100%. A medical consultation with a general practitioner familiar with thermal medicine took place at the start, middle and end of the treatment. The phlebology programme included an aquatic walkway, a spray shower, a high-pressure shower, a leg bath, thermal water compresses and underwater massages. The rheumatology programme included a mud treatment, a jet shower, a back shower, a mud bath, an aerobics bath, an underwater massage and a mobilization pool.

Outcome measures

Symptom intensity

- Level of fear of falling by a visual analogue scale (VAS) rated from 0 (absent) to 10 (maximal)
- Level of general fatigue over the past month by VAS rated from 0 (absent) to 10 (maximal)

HRQL:

- EQ-5D-3L questionnaire.

Perceived change

- Change of perceived functional status regarding weakness, walking speed, level of activity, fragility and balance was rated using a 3-point Likert Scale (better, worse or equivalent to the beginning of the programme) at the end of the programme,
- Change of perceived activity daily living and psychological status regarding mobility, autonomy, current activities, pain/discomfort, anxiety/depression was rated with a 3-point Likert Scale (better, worse or equivalent to the beginning of the programme) 7 days after the end of the programme with a questionnaire to return by postal system.

Statistical analysis

Fear of falling, fatigue and EQ5D questionnaire score were all described by mean and standard deviation. Wilcoxon

Table 1 Symptom intensity (fear of falling and fatigue) and the health-related quality of life questionnaire EQ5D-3L

| | Pre-cure mean (\pm sd) | Post-cure mean (\pm sd) | Difference | <i>p</i> |
|-----------------|------------------------------------|------------------------------------|----------------------|----------|
| Fear of falling | <i>n</i> = 1467 3.47 (\pm 2.89) | <i>n</i> = 1467 3.76 (\pm 2.83) | 0.29 (0.16;0.42) | < 0.0001 |
| Fatigue | <i>n</i> = 1462 4.87 (\pm 2.56) | <i>n</i> = 1462 4.68 (\pm 2.52) | -0.19 (-0.32; -0.07) | 0.0012 |
| EQ5D-3L | <i>n</i> = 1298 0.71 (\pm 0.22) | <i>n</i> = 1298 0.80 (\pm 0.18) | 0.09 (0.08;0.10) | < 0.0001 |

Table 2 Change of perceived functional status after the balneological programme

| | Better (%) | Equivalent (%) | Worse (%) |
|-------------------|------------|----------------|-----------|
| Weakness | 15.02 | 61.87 | 23.11 |
| Level of activity | 22.69 | 50.99 | 26.32 |
| Fragility | 14.17 | 59.60 | 26.23 |
| Balance | 18.19 | 70.84 | 10.97 |
| Walking speed | 22.53 | 58.27 | 19.20 |

Table 3 Change of perceived activity daily living and psychological status 7 days after the balneological programme

| | Better (%) | Equivalent (%) | Worse (%) |
|--------------------|------------|----------------|-----------|
| Mobility | 35.7 | 62.3 | 2 |
| Autonomy | 18.5 | 80.5 | 1 |
| Current activity | 2.5 | 75.2 | 22.3 |
| Pain/discomfort | 7.8 | 47.8 | 44.4 |
| Anxiety/depression | 1.7 | 37.8 | 60.5 |

tests were used to determine change. The perceived change scores were described as percentages.

Results

Symptoms intensity and HRQL

The results show a significant increase in the participant's fear of falling and a decrease in fatigue (Table 1). EQ5D reveals a significant HRQL improvement for the entire population following treatment (Table 1).

Perceived change

The results remained stable for all variables, except for one which showed a perceived improvement for anxiety and depression (Tables 2 and 3).

Discussion

The main result paradoxically indicates a significant increase in the fear of falling measured by VAS in balneotherapy participants aged over 65. This increase suggests the activation

of an awareness process of the risk of falling. The programme plays a revealing role in a population with an average age of 72.5 years and known to be exposed to falling [12, 13]. The programme offers exercise with musculoarticular mobilization and walking course in swimming pools. The increase in this fear of falling is not very significant (+0.3 on a VAS of 10 cm) and is accompanied by a substantial improvement in general fatigue and in the quality of life conventionally observed in this kind of programme. The findings support previous results; for example, fatigue in 305 elderly patients with knee osteoarthritis [6] and for HRQL in patients with neuromuscular or respiratory deficiency [14]. The cure is thus an indicator of this risk of falling and would benefit from educational workshops during the programme to prevent the risk of falling and to consolidate knowledge and behavioural strategies to remedy a fall.

The second result is the confirmation of the benefits of the balneotherapy programme on anxiety-depression. The large number of participants (60%) feeling better 7 days after the programme with regards to anxiety and depression supported consistent results in the exercise programme [15].

The third result is the surprising maintenance of 9 of 10 scores of perceived change. Collected at the end of the balneological programme (weakness, fragility, level of activity, balance, walking speed) or 7 days later at home (mobility, autonomy, current activities, pain/discomfort), the participants perceived no change. We can assume that the participants waited water and massage effect without be active. It will be interesting in future research to determine whether a more active (e.g., higher proportion of active exercise), longer (e.g., 3 h a day) and a more intensive balneological (e.g., using heart rate feedback, energy expenditure with digital health tools) programme will produce a better impact on the perceived change of health indicators. This result questions the proposition of a programme for pure relaxation and retreat from daily life. Impacting further health perceptions needs to be more proactive to obtaining benefits. It will be important to train practitioners to negotiate individually with each participant and, therefore, obtain higher health improvements with a higher implication.

This before-after intervention study has several limits. Without a control group and randomization, we cannot conclude an efficacy or effectiveness of the balneological programme on self-rated health outcome. Moreover, the small differences (effect size) need to be confirmed with validated tools such as the Beck Depression Inventory for depression,

but at the same time limiting the apprehension of whole effects on health.

Conclusion

The study results indicated significant improvements of HRQL and fatigue in over the 65-year-olds participating in a 3-week medically prescribed balneological programme. Interestingly, the study highlighted a paradoxical increase in the fear of falling without a perception of change in several health indicators. There is a the need to improve these kinds of outpatient programme with a higher active dose of energy expenditure, a more comprehensive session on health effects and with more frequently tested feedbacks.

Acknowledgements The authors would like to thank AFRETH for its collaboration in this research. The authors are very grateful to Anna Bedbrook for her editorial assistance.

Compliance with ethical standards

Conflict of interest None.

Ethical approval The study was validated by the Internal Review Board (No. 16–04–05) of the University Hospital of Nimes (France).

Statement of human and animal rights All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed consent Informed consent was obtained from all individual participants included in the study.

References

1. Cozzi F, Ciprian L, Carrara M et al (2018) Balneotherapy in chronic inflammatory rheumatic diseases—a narrative review. *Int J Biometeorol* 62:2065–2071. <https://doi.org/10.1007/s00484-018-1618-z>
2. Liang Z, Fu C, Zhang Q et al (2019) Effects of water therapy on disease activity, functional capacity, spinal mobility and severity of pain in patients with ankylosing spondylitis: a systematic review and meta-analysis. *Disabil Rehabil* 29:1–8. <https://doi.org/10.1080/09638288.2019.1645218>
3. Fraioli A, Mennuni G, Fontana M et al (2018) Efficacy of spa therapy, mud-pack therapy, balneotherapy, and mud-bath therapy in the management of knee osteoarthritis A systematic review. *Biomed Res Int* 25:1042576. <https://doi.org/10.1155/2018/1042576>
4. Verhagen AP, Bierma-Zeinstra SM, Boers M et al (2015) Balneotherapy (or spa therapy) for rheumatoid arthritis. *Cochrane Database Syst Rev* 11:CD000518. <https://doi.org/10.1002/14651858.CD000518>
5. de Moraes Silva MA, Nakano LC, Cisneros LL et al (2019) Balneotherapy for chronic venous insufficiency. *Cochrane Database Syst Rev* 26:CD013085. <https://doi.org/10.1002/14651858.CD013085>
6. Dilekçi E, Özkük K, Kaki B (2019) Effect of balneotherapy on pain and fatigue in elderly with knee osteoarthritis receiving physical therapy: a randomized trial. *Int J Biometeorol* 63:1555–1568. <https://doi.org/10.1007/s00484-019-01768-0>
7. WHO (2017) Global strategy and action plan on ageing and health. WHO, Geneva
8. Latorre-Román PÁ, Rentero-Blanco M, Laredo-Aguilera JA et al (2015) Effect of a 12-day balneotherapy programme on pain, mood, sleep, and depression in healthy elderly people. *Psychogeriatrics* 15:14–19. <https://doi.org/10.1111/psyg.12068>
9. Ono J, Hashiguchi N, Sawatari H et al (2017) Effect of water bath temperature on physiological parameters and subjective sensation in older people. *Geriatr Gerontol Int* 17:2164–2170. <https://doi.org/10.1111/ggi.13053>
10. The Lancet Neurology (2019) Patient-reported outcomes in the spotlight. *Lancet Neurol* 18:981. [https://doi.org/10.1016/S1474-4422\(19\)30357-6](https://doi.org/10.1016/S1474-4422(19)30357-6)
11. Bernard PL, Raffort N, Aliaga B et al (2019) Analysis of the health profiles and prevalence of falls for patients over 65 years of age in a thermal environment. *Aging Clin Exp Res*. <https://doi.org/10.1007/S40520-019-01381.6>
12. Henstra MJ, Rhebergen D, Stek ML et al (2019) The association between apathy, decline in physical performance, and falls in older persons. *Aging Clin Exp Res* 31:1491–1499. <https://doi.org/10.1007/s40520-018-1096-5>
13. Lauretani F, Ticinesi A, Gionti L et al (2019) Short-Physical Performance Battery (SPPB) score is associated with falls in older outpatients. *Aging Clin Exp Res* 31:1435–1442. <https://doi.org/10.1007/s40520-018-1082-y>
14. Barassi G, Obrero-Gaitan E, Irace G et al (2020) Integrated thermal rehabilitation: a new therapeutic approach for disabilities. *Adv Exp Med Biol* 1251:29–38. <https://doi.org/10.1007/5584-2019-465>
15. Bernard P, Ninot G, Bernard PL et al (2015) Effects of a 6-month walking intervention on depression in inactive postmenopausal women: a randomized controlled trial. *Aging Mental Health* 19:485–492. <https://doi.org/10.1080/13607863.2014.948806>

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