

ORIGINAL RESEARCH

Swimming pool-based exercise as pulmonary rehabilitation for COPD patients in primary care: feasibility and acceptability

*Susan Rae^a, Patrick White^b

^a Community Specialist Practitioner, Sydenham Green Group Practice, Sydenham, London, UK

^b Senior Lecturer, Department of General Practice and Primary Care, King's College London School of Medicine, London, UK

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Abstract

Aim: To assess the feasibility and acceptability of swimming pool-based exercise as pulmonary rehabilitation (PR) for COPD sufferers.

Method: 101 patients with mild or moderate COPD registered with a South London general practice were invited to a swimming pool-based PR programme. Participants completed spirometry, the Chronic Respiratory Questionnaire (CRQ-SR), and the Incremental Shuttle Walk Test (ISWT) before and after the programme. A qualitative interview was used to assess participants' views.

Results: 24 patients (24%) expressed interest; 18 were recruited and 16 (16%) completed the PR programme. Their mean age was 69 yrs, seven were female, and mean % predicted FEV1 was 59%. The mean number of sessions attended was 10.6 out of 12. Significant improvements in dyspnoea score (difference 4.9; 95% CI -8.27 to -1.48) and walking distance (difference 32 metres; 95% CI -52.63 to -11.36) were observed, and all other findings were in the direction of improvement. Most patients enjoyed being in the water, were happy to expose themselves in swimsuits, overcame their fears, valued learning about COPD and socialising with fellow sufferers, and were positive about their physical improvement.

Conclusion: The swimming pool is a feasible and positive alternative venue for PR for COPD patients in primary care.

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Introduction

Pulmonary rehabilitation (PR) is one of the most effective interventions in improving quality of life in established chronic obstructive pulmonary disease (COPD).^{1,2} PR exercise usually consists of walking, cycling, gym work, or using weights to increase muscle mass. Gym-based exercises may be difficult for some patients with COPD – who tend to be mainly elderly and who may have other co-morbidities such as severe arthritis which may impair their ability to exercise at a high enough intensity. Experience in rheumatoid arthritis, heart failure, and fibromyalgia suggests that using water as the medium for exercise in PR may broaden its appeal, acceptability, and effectiveness.³⁻⁵ In Sweden, exercise in

water has been shown to induce a lower heart rate compared to the same exercise intensity on land.⁶ In a number of studies of hydro-therapy in a hospital setting, Kurabayashi and colleagues concluded that exercise in a hot spring-water pool may be useful in COPD.⁷⁻¹⁰ Exercise in water has characteristics that may make it beneficial in the elderly.^{11,12} These observations suggest that people with COPD may find exercise in water more suitable. Furthermore, in the UK, swimming pools may be more accessible venues for PR than gyms since they are open to the community.

In this study, therefore, we have assessed the feasibility and acceptability of using a swimming pool as the venue for PR exercise for COPD sufferers.

* Corresponding author: Sydenham Green Group Practice, 26 Holmshaw Close, Sydenham, London, SE26 4TH, UK.
Tel: +44 (0)7870 433256 E-mail: sneeda@hotmail.com.

Method

This was an observational study carried out in two separate groups run concurrently between January and March 2006. We used a mixed qualitative and quantitative approach. Response and participation rates were assessed, and changes were sought in lung function, exercise capacity, and quality of life. Interviews were conducted with participants to assess their views of the swimming pool-based programme.

Setting

One-hundred-and-one patients with mild to moderate COPD (NICE Guidelines criteria) were identified from the practice computer disease register; they were invited by letter to attend for interview, to learn about the project, and to be assessed for their suitability to take part – including suitability for spirometry assessment.¹³ A stamped addressed reply envelope was provided. Respondents were offered an appointment by telephone. There was no upper age limit but patients were excluded if: they had severe COPD or were on long term oxygen therapy; had cardiac or neurological problems that would interfere with their ability to exercise; or suffered oxygen desaturation to the level of 85% or lower whilst participating in the baseline exercise capacity test. At interview eligible patients who were willing to participate gave informed consent and were offered a second appointment at which baseline assessment was carried out including: self-reported respiratory specific quality of life (CRQ-SR); oxygen saturation measurement (Nonin Onyx, Nonin Medical, model 9500); and Incremental Shuttle Walk Test (ISWT).^{14,15}

Swimming pool-based exercise programme

This was a pulmonary rehabilitation programme of 12 sessions of exercise over six weeks (two sessions per week), which included education and social interaction. Participants were divided into two groups of nine and the two groups ran concurrently. A warm-up session was provided on land at the beginning of each exercise programme based on the British Lung Foundation (BLF) exercise diary.¹⁶ Participants then changed into swimming costumes and entered the pool to complete a half-hour exercise session. The pool temperature was 29° centigrade, the standard leisure use temperature. After a further warm-up in the pool, exercises were adapted to individual participants' capacities and included upper and lower limb exercises, resistance exercises using elevation and movement against water, and endurance. A cool-down exercise was undertaken at the end. An education session covering a range of topics including disease pathology, self-management, treatment, diet, breathing techniques, energy conservation, and relaxation, was given after each exercise session. Education was provided by a multidisciplinary team including a physiotherapist, doctor, specialist nurses and exercise instructor. Participants were encouraged to exercise

at home in line with their individual capacities. The BLF diary was used to record their activities at home.

At the end of the final exercise session a group evaluation was conducted for each group. The group discussions were audio taped. Three questions were asked: What were the best things about the course? What was liked least about the course? What could be done differently? The interview was semi-structured with questions on perception of value of the course, swimming as exercise, participation in group activity in a swimming costume, role of education, and role of social interaction. Participants were given an appointment to attend the surgery within two weeks to repeat the shuttle walk test, the CRQ-SR, spirometry, and to complete an individual taped evaluation interview.

Analysis

The feasibility of swimming as the exercise part of the PR was assessed from the recruitment rates, participation throughout the PR programme, and from the views of the participants before and after the programme. Participants' suitability was assessed from their lung function (electronic spirometry) and respiratory specific quality of life questionnaire responses. The questionnaire assessed four domains – dyspnoea, fatigue, emotion and mastery. The results are presented as mean scores per question in each dimension. The threshold for a clinically significant change for each dimension has been previously identified as 0.5.¹⁷ Qualitative interviews conducted after the programme were audio taped, transcribed and analysed using the Framework Approach.¹⁸ Initial thematic analysis was conducted by SR. Transcripts were then read independently by PW and the themes verified.

Results

Twenty-four patients (24%) expressed an interest in taking part. Twenty-six (26%) did not wish to take part. Replies were not received from the remainder (50%). Six of the 24 were excluded. Four did not meet the criteria for inclusion, one dropped out at first interview, and one was admitted to hospital. Eighteen subjects started the project, but two dropped out after the interview and assessments, leaving 16 participants (7 female) to start the PR program. The process of recruiting is shown in Figure 1. Mean age was 68.9 years (57-85). Mean forced expiratory volume in the first second (FEV₁)% predicted was 58.5% (range 41-74; standard deviation 11.6). Mean FEV₁/forced vital capacity (FEV₁/FVC) was 0.57 (0.44-0.70; 8.7). The mean number of sessions attended was 10.6 (4-13; 2.6). The participants were randomly assigned to two groups; the first group consisted of 3 females and 5 males (mean age 67.5 years) and the second 4 females and 4 males (mean age 71.6 years).

There were significant improvements in dyspnoea scores and walking distance between the beginning and end of the

