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Exploratory mixed methods study of respiratory physiotherapy for patients with lower respiratory tract infections

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Abstract

Objectives To assess the outcomes of respiratory physiotherapy for patients with lower respiratory tract infections (LRTI).
Design Parallel group mixed-methods study.
Setting Patients were recruited from a general hospital. Respiratory physiotherapy took place in a community setting.
Participants Fifty-four patients aged ≥18 years and diagnosed with LRTI completed the study. Twenty-seven patients were allocated to the control group {CG: 10 male, mean age 53.3 [standard deviation (SD) 17.4] years} and 27 patients were allocated to the experimental group [EG: 10 male, mean age 58.6 (SD 17.2) years].
Intervention The CG received conventional medical treatment and the EG received conventional medical treatment plus respiratory physiotherapy for 3 weeks.
Outcome measures Patients in both groups undertook the 6-minute walk test (6MWT), modified Borg scale (MBS), modified Medical Research Council questionnaire (mMRC), and Breathlessness, Cough and Sputum scale (BCSS) before and after the intervention. A telephone follow-up survey was performed 3 months after the first hospital visit. Interviews were conducted immediately after the intervention in the EG.
Results In the EG, the distance walked in the 6MWT increased by more than the minimally important difference ($P = 0.001$), and significantly more than the CG {EG: mean change 76 m [standard deviation (SD) 63], 95% confidence interval (CI) 51 to 101; CG: mean change 27 m (SD 56), 95% CI 5 to 49; mean difference between groups: 49 m 95% CI 16 to 82; partial $\eta^2 = 0.15$}. No differences in the MBS, mMRC and BCSS were found between the two groups. The EG reported high levels of satisfaction with the intervention (27/27; 100%) and with the physiotherapist (20/27; 74%). The intervention improved patients' symptoms (19/27; 70%) and their self-management skills to control/prevent future LRTI (19/27; 70%). Health service use was significantly less in the EG ($P = 0.04$).
Conclusions Respiratory physiotherapy appears to be effective for the management of patients with LRTI.
ClinicalTrial.gov Registration Number NCT02053870.

Keywords: Respiratory tract infections; Physical therapy; Personal satisfaction; Self-care

Introduction

Lower respiratory tract infections (LRTI) are among the most common infectious diseases worldwide [1], affecting 429 million people each year [2]. This persistent and prevalent health problem is accompanied by several respiratory symptoms, such as dyspnoea, cough and sputum [3], and significantly compromises patients' functioning and quality of life [4]. As a result, LRTI are considered to be a global health problem, responsible for the loss of approximately 3.08 working days due to disability per patient/per incident, and a cost of 23.88–116.47€ per hospital visit [5,6].

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Pulmonary rehabilitation programmes, including respiratory physiotherapy, are known to be effective for chronic respiratory diseases, improving patients' independence and function [7], as well as their individual strategies to cope with the disease [8]. These improvements result in fewer days of hospitalisation and decreased use of healthcare services [9]. However, the implementation of respiratory physiotherapy is controversial for the treatment of acute respiratory diseases. The guidelines of the British Thoracic Society suggest that spontaneously breathing patients with dyspnoea, cough and sputum benefit from physiotherapy [10]. However, a recent systematic review in inpatients with pneumonia reported that respiratory physiotherapy does not improve patients' status, and thus should not be implemented [11]. This review only addressed inpatients, and thus the content and structure of the intervention (e.g. techniques, duration and frequency) may not serve the needs of patients in community settings. Moreover, most patients with LRTI are treated on an outpatient basis [12]; as such, studies focused on the management of these patients are needed.

Preliminary studies in outpatients with LRTI identified improvements in lung and overall function after respiratory physiotherapy [13]. However, only quantitative measures were used and patients' perspectives about the outcomes achieved, implications for their future and use of healthcare services after the intervention were not evaluated. It is known that quantitative outcomes may not accord with patient satisfaction and healthcare needs [14], and are therefore insufficient for comprehensive understanding about how much an intervention affect the lives of patients.

The lack of integrated knowledge limits the conclusions that can be drawn about the effectiveness of respiratory physiotherapy for the management of LRTI. As such, this study aimed to assess the short-term (exercise tolerance, dyspnoea, cough, sputum and patients' perspectives) and mid-term (use of healthcare services) outcomes of a respiratory physiotherapy intervention for community-dwelling patients with LRTI.

Methods

Design

A parallel group mixed-methods study, part of a larger randomised control trial (NCT02053870), was undertaken in a sample of patients with LRTI living in the community. The study received full approval from the Ethics Committee of Hospital Infante D. Pedro.

Participants

Consecutive patients were recruited from the emergency department of a general hospital. Eligibility criteria were: age ≥18 years and diagnosed with LRTI by a physician, in accordance with current guidelines [3]. Exclusion criteria were: (a) hospital admission (following examination by a physician); (b) discrepancies in speech and/or disorientation at the initial examination; (c) bedridden or dependence on a wheelchair; (d) score >2 on the CURB criteria [15]; and (e) the presence of comorbidities that could interfere with the tests performed (e.g. past history of pulmonary lobectomy and current history of neoplasia, tuberculosis or other infectious disease).

Patients were assigned at random to respiratory physiotherapy plus conventional medical treatment [experimental group (EG)] or conventional medical treatment alone [control group (CG)]. A simple randomisation process was performed using Matlab 2009 (MathWorks, Inc., Natick, MA, USA). The allocation sequence was kept in sealed opaque envelopes by a researcher, who was not involved in data collection, and provided to the consultants at the emergency department.

Physicians informed eligible patients about the study and asked about their willingness to participate. Interested patients were telephoned by a researcher to schedule an appointment, where more detailed information was provided and written informed consent was obtained.

Sample size calculations

A sample size estimation with 85% power at 5% significance determined that a clinically significant difference in the distance walked in the 6-minute walk test (6MWD) (30.5 m) [16] would be detected with a minimum of 18 subjects in each group. In respiratory interventions, dropout rates are approximately 43% to 50% [17]. As such, 62 participants were recruited.

Intervention

The intervention consisted of conventional medical treatment (i.e. antibiotherapy, bronchodilators and rest) [3] for the CG, and conventional medical treatment plus respiratory physiotherapy for the EG. Respiratory physiotherapy was performed three times per week for 3 weeks (nine sessions) [3]. The mean duration of each session was 60 minutes [standard deviation (SD) 15], and each session included three main components: breathing techniques, exercise training and education. Sessions were held in a well-equipped room in a community setting by one physiotherapist with experience in respiratory interventions. A detailed description of the protocol can be found in the online supplementary material.

Outcome measures

Sociodemographic data (sex, age and educational level), general clinical data, smoking habits and lung function, assessed using a portable spirometer (MicroLab 3500, CareFusion, Kent, UK) [18], were collected up to 48 hours after the hospital visit. Data on dyspnoea, sputum and exercise tolerance were collected at baseline and repeated in both groups three weeks later. Data were collected by a trained researcher