



Research

Inpatient rehabilitation improves functional capacity, peripheral muscle strength and quality of life in patients with community-acquired pneumonia: a randomised trial

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KEY WORDS

Randomised
controlled trial
Physical therapy (specialty)
Pneumonia
Exercise
Quality of life



ABSTRACT

Question: Among people who are hospitalised for community-acquired pneumonia, does an inpatient exercise-based rehabilitation program improve functional outcomes, symptoms, quality of life and length of hospital stay more than a respiratory physiotherapy regimen? **Design:** Randomised trial with concealed allocation, intention-to-treat analysis and blinding of some outcomes. **Participants:** Forty-nine adults hospitalised for community-acquired pneumonia. **Intervention:** The experimental group (n = 32) underwent a physical training program that included warm-up, stretching, peripheral muscle strength training and walking at a controlled speed for 15 minutes. The control group (n = 17) underwent a respiratory physiotherapy regimen that included percussion, vibrocompression, respiratory exercises and free walking. The intervention regimens lasted 8 days. **Outcome measures:** The primary outcome was the Glittre Activities of Daily Living test, which assesses the time taken to complete a series of functional tasks (eg, rising from a chair, walking, stairs, lifting and bending). Secondary outcomes were distance walked in the incremental shuttle walk test, peripheral muscle strength, quality of life, dyspnoea, lung function, C-reactive protein and length of hospital stay. Measures were taken 1 day before and 1 day after the intervention period. **Results:** There was greater improvement in the experimental group than in the control group on the Glittre Activities of Daily Living test (mean between-group difference 39 seconds, 95% CI 20 to 59) and the incremental shuttle walk test (mean between-group difference 130 m, 95% CI 77 to 182). There were also significantly greater improvements in quality of life, dyspnoea and peripheral muscle strength in the experimental group than in the control group. There were no between-group differences in lung function, C-reactive protein or length of hospital stay. **Conclusion:** The improvement in functional outcomes after an inpatient rehabilitation program was greater than the improvement after standard respiratory physiotherapy. The exercise training program led to greater benefits in functional capacity, peripheral muscle strength, dyspnoea and quality of life. **Registration:** ClinicalTrials.gov, NCT02103400 [José A, Dal Corso S (2016) **Inpatient rehabilitation improves functional capacity, peripheral muscle strength and quality of life in patients with community-acquired pneumonia: a randomised trial.** *Journal of Physiotherapy* 62: 96–102]

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Introduction

Community-acquired pneumonia is a highly prevalent adverse health condition with a high mortality rate. It involves substantial treatment costs and has significant social impact worldwide.¹ Patients who are hospitalised for community-acquired pneumonia experience a decline in functional capacity,^{2–4} which is associated with higher rates of re-hospitalisation and death,^{3,4} as well as reductions in both peripheral muscle strength and quality of life.² Moreover, such patients can endure a long period before the complete remission of symptoms and the return to previous activities of daily living.⁵

Although widely employed in clinical practice,⁶ the current physiotherapeutic approach for patients with community-acquired pneumonia, which focuses on airway clearance, is not

supported by evidence^{7–10} and the main guidelines for the management of this condition do not recommend it.¹ In patients who are hospitalised for acute exacerbations of chronic obstructive pulmonary disease (COPD), an inpatient rehabilitation program leads to some immediate improvements in functional capacity, quality of life, peripheral muscle strength, exercise tolerance,^{11,12} anxiety and depression.¹³ However, the recent publication of a major study by Greening and colleagues has indicated that very early exercise-based rehabilitation commenced during hospitalisation may reduce uptake of pulmonary rehabilitation and increase mortality after discharge.¹⁴ Interpreting this study in the light of the existing evidence suggests that for patients who are hospitalised for acute exacerbations of COPD, pulmonary rehabilitation immediately after discharge may be more beneficial overall than commencing the exercise-based rehabilitation during hospitalisation.¹⁵

In patients who are hospitalised for community-acquired pneumonia, early mobilisation has been applied only in one large study, but it was poorly described.¹⁶ Therefore, in these patients, the effects of aerobic and resistance training on functional capacity, peripheral muscle strength and quality of life require thorough investigation during hospitalisation. Considering the high prevalence and treatment costs of community-acquired pneumonia, its social impact and the scarcity of evidence to support standard respiratory physiotherapy for such patients, it is crucial to investigate whether a physical training program can lead to better recovery of functional capacity at discharge from the hospital.

Therefore, the research question for this randomised trial was:

Among people who are hospitalised for community-acquired pneumonia, does an inpatient exercise-based rehabilitation program improve functional outcomes, symptoms, quality of life and length of hospital stay more than a respiratory physiotherapy regimen?

Method

Design

This study was a randomised trial, with concealed allocation, blinding of assessors of some outcomes and intention-to-treat analysis. Patients who were hospitalised for community-acquired pneumonia were randomly assigned to receive either physical exercise training (experimental group) or respiratory physiotherapy (control group). After eligible patients were advised regarding the study and consented to participate, they were randomly allocated to one of the two groups. Upcoming random allocations

were concealed in opaque, sealed envelopes that had been prepared by a researcher who was not involved in the recruitment or assessment of the participants. Data were obtained before randomisation and 1 day after the 8-day intervention period. The length of the hospital stay was also recorded for all participants (Figure 1).

Participants, therapists and centre

The inclusion criteria for participation in the study were: being aged > 18 years, having a diagnosis of community-acquired pneumonia,¹ being hospitalised for < 48 hours, and having adequate awareness and independent ambulation. The exclusion criteria were: being unwilling to participate, having cognitive impairment, having osteoarticular disorders, and having other acute or chronic respiratory diseases. The researchers in the study applied the interventions. This study was conducted at Mandaqui Hospital, which is a tertiary hospital in São Paulo, Brazil.

Interventions

Control group

Participants allocated to the control group received standard respiratory physiotherapy in daily 50-minute sessions for 8 days; this involved secretion removal, breathing exercises and walking. The secretion removal techniques were percussion and vibrocompression in side lying for 10 minutes on each side, during and after which the participant was instructed to perform voluntary coughing and huffing to expectorate secretions until achieving a dry cough.¹⁷

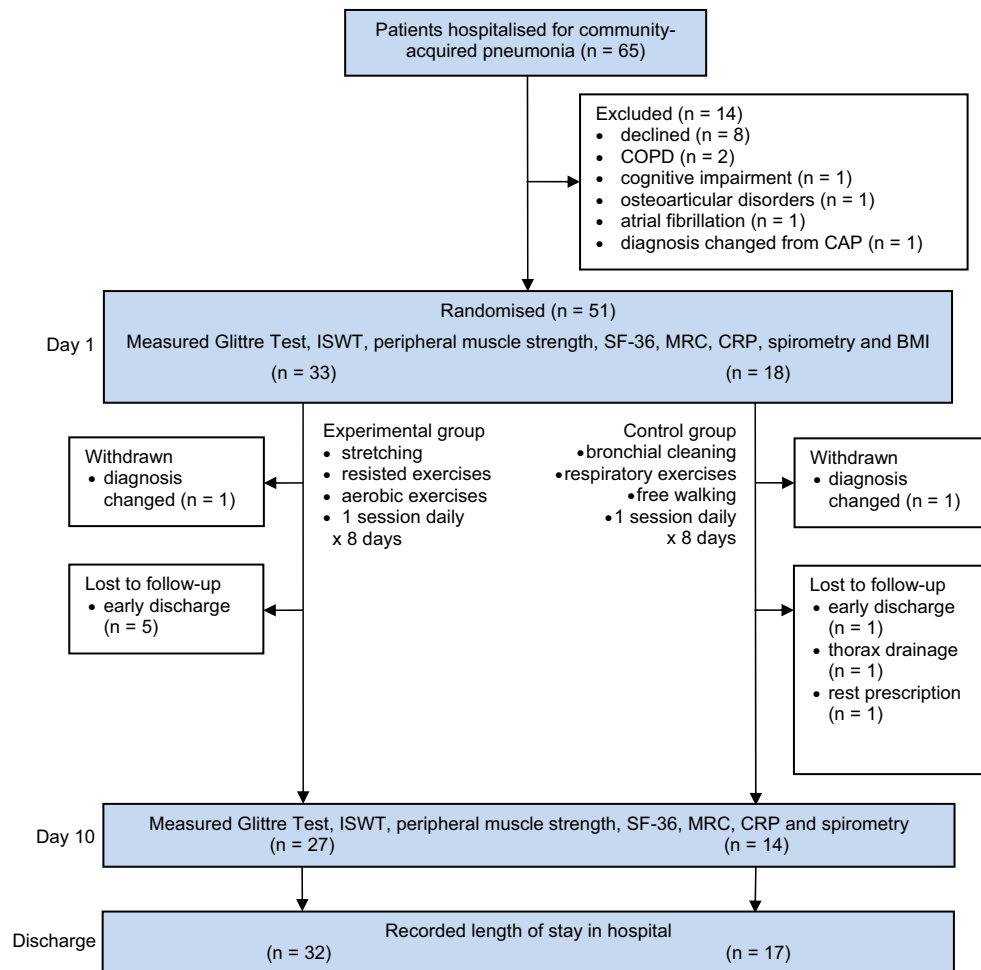


Figure 1. Design and flow of participants through the trial.

BMI = body mass index, COPD = chronic obstructive pulmonary disease, CRP = C-reactive protein, ISWT = incremental shuttle walk test, MRC = Medical Research Council Dyspnoea Scale, SF-36 = Short Form 36 questionnaire.

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