Physiotherapist advice to older inpatients about the importance of staying physically active during hospitalisation reduces sedentary time, increases daily steps and preserves mobi...

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Research

Physiotherapist advice to older inpatients about the importance of staying physically active during hospitalisation reduces sedentary time, increases daily steps and preserves mobility: a randomised trial

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KEY WORDS

Elderly
Hospitalisation
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ABSTRACT

Questions: Does advice from a physiotherapist about the importance of staying physically active during hospitalisation improve activity, mobility, strength, length of stay, and complications in older inpatients? What barriers to physical activity during hospitalisation do older inpatients perceive? **Design**: Randomised controlled trial with concealed allocation, intention-to-treat analysis, and blinded assessment. **Participants**: Sixty-eight people who were aged > 60 years and admitted to a university hospital ward. **Intervention**: In addition to usual hospital care, the experimental group received a booklet with content about the deleterious effects of hospitalisation and the importance of staying active during hospitalisation. The control group received usual hospital care only. **Outcome measures**: The amount of physical activity was measured via accelerometry during the hospital admission. Mobility was assessed using the de Morton Mobility Index (DEMMI), and muscle strength was assessed using a handgrip dynamometer. Length of stay and complications were extracted from hospital records. The barriers to staying active during hospitalisation were investigated via a questionnaire. **Results**: Accelerometry showed a mean between-group difference of 974 steps/day (95% CI 28 to 1919) in favour of the experimental group. The intervention also increased moderate-intensity physical activity and reduced sedentary time, although these effects might be trivially small. Experimental group participants were about one-fifth as likely to lose mobility during their hospital admission (two of 33) than control group participants (10 of 35), relative risk 0.21 (95% CI 0.05 to 0.90). Effects of the intervention were unclear regarding muscle strength, length of stay and incidence of complications between the groups. Patients reported that the main barriers to remaining active during hospitalisation were dyspnoea, lack of space, and fear of contracting infection. **Conclusion**: In older inpatients, the addition of advice from a physiotherapist about maintaining activity during hospitalisation increases the level of physical activity and prevents loss of mobility. **Registration**: ClinicalTrials.gov NCT03297567. **[Moreno NA, de Aquino BG, Garcia IF, Tavares LS, Costa LF, Giacomassi IWS, Lunardi AC (2019) Physiotherapist advice to older inpatients about the importance of staying physically active during hospitalisation reduces sedentary time, increases daily steps and preserves mobility: a randomised trial. *Journal of Physiotherapy* ■:■–■]**

Introduction

The level of physical activity decreases progressively with ageing. Older adults who are physically active have lower rates of morbidity and mortality than older adults with sedentary behaviour.[1] Physical activity is associated with 30% lower mortality rates in older adults without chronic diseases and 47% lower mortality rates in older patients with various comorbidities.[2]

During hospitalisation, sedentary behaviour is common, with inpatients spending long periods resting in bed, regardless of their primary reason for admission.[3] Low physical activity during hospitalisation can lead to impairment of independence,[4] with losses in muscle strength and functional performance.[5,6] Older adults have less capacity to fully recover from such losses than younger adults.[7] These losses are associated with important outcomes after hospital discharge, including disability and mortality.[8,9] Decreasing sedentary behaviour time as well as maintaining muscular strength and functional performance during hospitalisation can prevent loss of independence after hospital discharge.[10,11]

For the reasons outlined above, various strategies have been considered for the early incorporation of physical activity into the hospital environment. Among these, early mobilisation of inpatients

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has been increasingly promoted.[12] One example is stimulation of ambulation to reduce functional decline.[13] However, despite these initiatives, many patients still spend much of their hospitalisation lying in bed.[3]

The barriers to patient mobility during hospitalisation are complex and poorly studied.[14] The most common barriers that limit physical activity appear to include disease symptoms and health professional behaviour. One-third of older hospitalised patients are kept at rest or with low levels of physical activity for no reason.[15]

The overarching hypothesis for this study was that specific advice to maintain physical activity from a relevant healthcare professional would help to combat a lack of advice or unhelpful advice from other hospital-based healthcare professionals regarding physical activity. Therefore, the primary objective of this study was to evaluate the impact of an orientation program for older hospital inpatients about the importance of staying physically active during hospitalisation. The outcomes that were hypothesised to be affected by this intervention were the level of physical activity, mobility, muscle strength, length of hospital stay and incidence of complications. In addition, this study also sought to identify the main barriers to staying physically active during hospitalisation.

Therefore, the research questions for this randomised controlled trial were:

1. Does advice from a physiotherapist about the importance of staying physically active during hospitalisation improve activity, mobility, strength, length of stay, and complications in older inpatients?
2. What barriers to physical activity during hospitalisation do older inpatients perceive?

Method

Design

This was a randomised clinical trial with concealed allocation, blinding of assessors, and intention-to-treat analysis. After a detailed explanation of the study protocol, eligible and willing participants signed the informed consent form. The participants were then evaluated for clinical characteristics, including age, gender, limb dominance, educational level, anthropometric data, diagnosis, pre-existing diseases, current medications, use of oxygen therapy, smoking history, alcohol use, and previous physical activity. Participants were then allocated to an experimental group or a control group with a 1:1 allocation ratio, according to a random allocation schedule generated using a free randomisation website. The randomisation process was implemented by a researcher not involved in the selection, evaluation or treatment of study participants. The random allocation schedule was kept concealed from other investigators.

In the ward where the study was conducted, the rooms accommodated two to four participants. Although the intervention was administered to one participant at a time, each participant's physical activity behaviour could have influenced other participants' behaviour if they stayed in the same room, thus affecting the results. Participants allocated to different groups were allocated to different rooms to minimise the potential for this problem to occur.

Both groups received usual hospital care for their clinical condition, as determined by the hospital staff. In addition, the experimental group received verbal advice and a booklet with information about the deleterious effects of hospitalisation and the importance of staying physically active during hospitalisation. At baseline, the participants in both groups had an accelerometer attached to their wrist, which recorded physical activity throughout the hospital admission. In addition, participants were evaluated for mobility, peripheral muscle strength, length of hospital stay, and incidence of complications during the admission. After discharge from hospital, participants were requested to complete a questionnaire about barriers to physical activity during their hospital admission. The study design is presented in Figure 1.

Participants, therapists, centres

We consecutively screened people admitted to the Respiratory and Clinical Medicine Clinics of the Instituto de Assistência Médica ao Servidor Público Estadual, Sao Paulo, Brazil. To be eligible for inclusion in the study, patients had to be: aged $\geq$ 60 years;[16] hospitalised for any clinical condition for $<$ 48 hours; and able to mobilise without professional assistance or an accompanying person. Potential participants were also required to be able to understand the advice and evaluations involved in the study (outlined further below). This criterion was verified through Mini Mental State Examination in the version proposed by Brucki et al,[17] which corrects the total score according to the level of the formal education of the patients. Patients were ineligible for this study if they did not reach the expected score for their educational levels. Patients were also excluded from the study if they: were placed in isolation; were scheduled for elective surgery during their admission; had a medical restriction to leaving the bed; had undergone emergency surgery; or had a condition that would limit the placement of the accelerometer (skin infections, amputation or fracture in the dominant limb).

Intervention

Participants in the experimental group received a booklet containing advice in the form of text and illustrations about the importance and benefits of moving around during hospitalisation. In addition, the booklet showed what the participant should do to increase their level of physical activity in the hospital. A physiotherapist delivered the booklet individually to each participant and verbally oriented them to the contents of the booklet, during a single orientation session lasting 20 minutes. The booklet was easy to understand and inexpensive. An English translation of the booklet is provided in Appendix 1 (see eAddenda for Appendix 1). The participants were instructed to read the booklet every time they had any doubts about physical activity or forgot the advice during the hospitalisation period. The participants were also instructed to keep the booklet in the drawer of their bedside tables, to maintain blinding of the assessors. Participants in the control group did not receive a booklet or other verbal advice.

All participants in both groups received the usual hospital care to treat the condition that lead to their hospitalisation, as determined by the hospital clinicians treating them.

Outcome measures

All evaluations were performed by an assessor who was kept unaware of the group to which each participant belonged.

Primary outcome

Physical activity level: This was assessed by an accelerometer[a] placed on the wrist[18] of the dominant limb, according to the participant's report. Accelerometry was performed 24 hours a day, from baseline to hospital discharge. The equipment was waterproof, so there was no need to remove it for bathing or personal hygiene. The accelerometer battery lasted for up to 20 days of consecutive collection. The accelerometer recorded the number of steps and time at different intensities of activity (Table 1) and estimated the metabolic rate.[19]

Secondary outcomes

Mobility: This was assessed via the de Morton Mobility Index (DEMMI) at baseline and at hospital discharge. The DEMMI has been validated for older hospitalised patients.[20] Mobility was assessed using 15 activities divided into five groups: in a bed, in a chair, static balance, gait and dynamic balance. The assessor evaluated the performance of the older patients in each of the activities. Scores

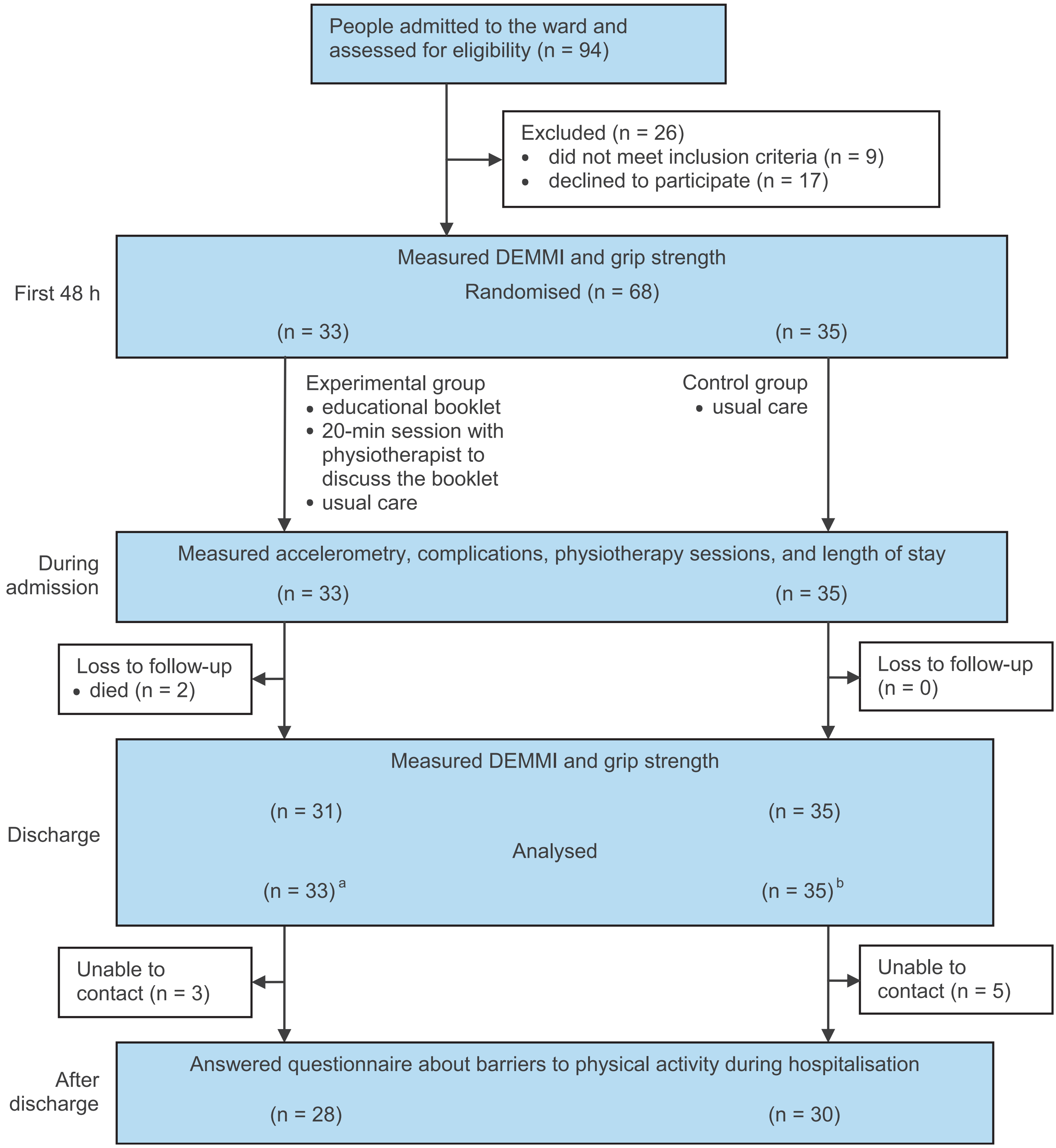

Figure 1. Design and flow of participants through the trial.
DEMMI = de Morton Mobility Index.
[a] Most data were available for the two participants who died; the remaining data were imputed.
[b] Two participants contributed no data to the accelerometry analysis due to device malfunction.

ranged from 0 to 19. Higher scores indicated greater patient mobility. A conversion table allowed the transformation of the raw score into a specific scale score, called the DEMMI score, which ranges from 0 to 100 points.[20] The current study analysed the variation of mobility. Participants with loss of mobility (defined as a decrease in DEMMI score at hospital discharge compared with baseline) were recorded.

Peripheral muscle strength: This was assessed using a handgrip dynamometer[b] at baseline and at hospital discharge. Participants were instructed to sit comfortably in a chair with their feet resting on the floor.[21] The participant's dominant upper limb remained in 90 degrees of flexion without support and the forearm remained in a neutral position.[21] The other upper limb rested on the thigh of the participant.[21] The participant was instructed to perform the handgrip movement three times, with one minute of rest between attempts.[21] A mean of the three trials[22] was used in the analysis. To characterise the study participants, the absolute values and the predicted values for the Brazilian population were used.[22] In the analysis of this outcome measure, the data were dichotomised; loss of peripheral muscle strength was defined as a decrease in absolute force at hospital discharge compared to baseline.

Table 1
Accelerometer movements/minute rating by Actigraph GTX3.

Levels	Movements/minute
Sedentary behaviour	0 to 99
Light activity	100 to 759
Daily life activity	760 to 1951
Moderate activity	1952 to 5724
Intense activity	> 5725

According to Freedson et al, 1998.[16]

Length of stay: The period from admission to the ward until hospital discharge was recorded in days.
Complications: Complications were defined as a new clinical condition requiring treatment, such as pneumonia, atelectasis with clinical repercussion, severe hypoxaemia, or deep venous thrombosis. The diagnosis of complications was given by a physician who was blind to the intervention groups.
Physiotherapy input: The number of physiotherapy sessions was extracted from the participant's hospital record.
Barriers to activity in hospital: A questionnaire was developed to determine barriers to staying active during hospitalisation. The questionnaire was evaluated by 30 physiotherapists who had each worked in hospitals for ≥ 5 years. All suggestions were accepted. The final version of the questionnaire comprised 16 questions with 'yes' or 'no' answers. The questions concerned fears, symptoms, external factors and infrastructure. Two open-ended questions were also included; these asked about the importance of staying active and factors that made it difficult to remain active. The questionnaire was administered to participants via a telephone call 72 hours after hospital discharge. A copy of the questionnaire is provided in Appendix 2 (see eAddenda for Appendix 2).

Data analysis

The calculation of the required sample size was based on power of 80%, an alpha of 5%, a smallest worthwhile effect of 618 steps/day, and an anticipated standard deviation of 817 steps/day.[23] This calculation gave a sample size of 58 participants (29 per group); this was increased to 68 participants, to allow for some potential loss to follow-up.

All study data were entered into an electronic database after being collected. Access to the data was provided to the researcher who performed the statistical analysis blindly using a coded form. Access to the database was restricted to researchers involved in data collection and analysis. Participant confidentiality was maintained through secure data storage, both during and after the study. The data in the database were carefully monitored for any errors. Descriptive analysis was used to identify outliers and possible data transcription errors.

Statistical analysis was performed according to the principle of intention to treat by a researcher not involved in the recruitment, assessment and intervention aspects of the study. If there were missing data for an outcome measure, data were imputed for ≤ 15% of the participants by carrying forward the baseline value. Continuous outcomes were compared between groups using a t-test. Dichotomous outcomes were compared between groups using the chi-square test. The level of statistical significance was set at $p < 0.05$. Data from the questionnaire were summarised using descriptive statistics.

Results

Flow of participants, therapists, centres through the study

After screening of 94 patients, 68 were enrolled in the study: 33 were allocated to the experimental group and 35 to the control group. The flow of participants through the study is shown in Figure 1.

Table 2
Characteristics of the participants (n = 68).

Characteristic	Exp (n = 33)	Con (n = 35)
Age *(yr)*, mean (SD)	69 (7)	69 (7)
Sex, n male (%)	16 (48)	24 (69)
BMI *(kg/m²)*, mean (SD)	25.5 (4.6)	24.9 (5.5)
Education *(yr)*, n (%)		
< 8	7 (21)	5 (14)
8 to 11	14 (43)	22 (63)
≥ 12	12 (37)	8 (23)
History of smoking, n (%)	23 (70)	25 (72)
Alcoholism, n (%)	0 (0)	4 (12)
Previous PA practice, n (%)	11 (33)	8 (23)
Reason for admission, n (%)		
pneumonia	14 (42)	15 (43)
exacerbation of COPD	9 (28)	6 (17)
neoplasm	5 (15)	5 (14)
diagnostic investigation	1 (3)	4 (12)
other	4 (12)	5 (14)
Antibiotic use, n (%)	15 (45)	15 (43)
Inpatient use of oxygen, n (%)	14 (43)	12 (35)
Companion, n (%)	18 (58)	24 (67)
MMSE *(0 to 30)*, mean (SD)	27.1 (2.0)	26.7 (1.6)
Muscle strength, mean (SD)		
(kgf)	24.2 (8.5)	25.7 (8.0)
(% predicted)[19]	75 (6)	75 (6)
DEMMI *(0 to 100)*, mean (SD)	77 (14)	79 (12)

BMI = body mass index; COPD = chronic obstructive pulmonary disease; DEMMI = de Morton Mobility Index; MMSE = Mini Mental State Examination; PA = physical activity.

Compliance with the study protocol

No ineligible participants were randomised. No assessors were unblinded during the study. All participants received the designated intervention. Two participants were moved, later in their admission, to a room where they were with a participant in the opposite group of the study, but all participants were still analysed in the group to which they had been randomly allocated. There was minimal missing data for the randomised trial outcomes, as shown in Figure 1. Fifty-eight participants (88% of those still alive) answered the questionnaire about barriers to physical activity during hospitalisation.

Baseline characteristics of the participants

The groups were similar with respect to demographic data, anthropometric data, range of reasons for hospitalisation, use of supplemental oxygen, use of intravenous antibiotics, cognitive status, and baseline measures of strength and mobility (Table 2).

Effect of the intervention

Primary outcome
Physical activity level: There was high diversity among the daily step counts of the participants, ranging from 825 to 9350 steps/day. The experimental group recorded a greater average number of steps (4945 steps/day, SD 2117) than the control group (3971 steps/day, SD 1706). The mean between-group difference was 974 steps/day (95% CI 28 to 1919), as presented in Table 3. The percentage of time that participants were sedentary ranged from 42 to 92% of the total hospitalisation time. The mean between-group difference was 6% less sedentary time in the experimental group (95% CI 0 to 11). The percentage of time that participants were engaged in moderate-intensity activity ranged from 0 to 13% of the total hospitalisation time. The mean between-group difference was 1% more moderate-intensity activity time in the experimental group (95% CI 0 to 3). Although the light activity time was 4% more in the experimental group than the control group, the 95% CI spanned from −1 to 8. These results are also presented in Table 3. Individual participant data are presented in Table 4 (see eAddenda for Table 4).

Table 3
Between-group comparison of physical activity level, mobility and muscle strength.

Outcomes	Exp (n = 33)	Con (n = 33)[a]	Between-group difference (95% CI) Exp – Con
Steps *(n/day)*, mean (SD)	4945 (2117)	3971 (1706)	974 (28 to 1919)
Accelerometry category (% of time)			
sedentary	63 (11)	68 (10)	−6 (0 to −11)
light activity	33 (9)	29 (9)	4 (−1 to 8)
moderate activity	4 (3)	3 (2)	1 (0 to 3)

[a] Missing data for two participants due to accelerometer malfunction.

Secondary outcomes

Mobility: The mobility assessment using the DEMMI at hospital discharge identified similar results for the experimental group (77 points, SD 11) and the control group (81 points, SD 13). However, participants in the experimental group were almost one-fifth as likely to lose mobility during their hospital admission (two of 33, 6%) than participants in the control group (10 of 35, 29%). This equated to a relative risk of 0.21 (95% CI 0.05 to 0.90), as presented in Table 5. Individual participant data are presented in Table 4 (see eAddenda for Table 4).

Peripheral muscle strength: The absolute values of handgrip strength in the experimental group (24.65 kgf, SD 2.5) and the control group (25.97 kgf, SD 3.1) remained similar during the hospital admission. The percentage predicted values were also similar between the groups: 76% (SD 6) versus 75% (SD 6), respectively. The proportion of participants who lost strength was seven of 33 (21%) in the experimental group and 14 of 35 (40%) in the control group. Although this suggests that the intervention almost halves the risk of loss of strength during an admission (ie, relative risk 0.53), there was substantial uncertainty inherent in this estimate (95% CI 0.25 to 1.15); that is, the intervention might substantially reduce or marginally increase the risk of losing strength during a hospital admission, as presented in Table 5. Individual participant data are presented in Table 4 (see eAddenda for Table 4).

Other outcomes: The mean duration of hospitalisation was 5.8 days (SD 2.9) in the experimental group and 5.3 days (SD 2.9) in the control group. This result strongly suggests that any effect of the intervention on length of stay would not exceed 1 day (MD 0.4 days, 95% CI −0.2 to 0.9). None of the prespecified complications were recorded for any participant in either group. The mean number of physiotherapy sessions was 0.8 (SD 1.3) in the experimental group and 0.4 (SD 0.8) in the control group (MD 0.4, 95% CI −0.2 to 0.9).

Barriers to activity in hospital: The main barriers to staying active during hospitalisation that the participants reported were: lack of infrastructure (space and mobile oxygen therapy equipment); lack of staff; symptoms; and fear (Table 6). In addition, 44 (76%) participants reported knowing the importance of moving during hospitalisation and 39 (67%) received some advice about staying active during their admission. Phrases such as 'moving during hospitalisation improves or maintains function', 'staying immobile is bad for health', and 'moving improves the breathing' were answered on the open-ended questions. The open-ended questions also elicited some barriers that were additional to those listed in the questionnaire: 'debilitated due to prolonged fasting for exams' and 'equipment in the corridor hindered walking'.

Discussion

The results from this study showed that older patients who received advice about staying physically active during hospitalisation spent less time being sedentary, accrued more moderate physical activity, and took approximately 1000 more steps per day, compared with the control group. The confidence intervals associated with these results, however, indicate that there is some uncertainty about the size of the effect. While these confirm that the effects are beneficial, they do not exclude the possibility that the benefits may be trivially small.

Regardless of the exact size of these effects on the amount of physical activity maintained during hospitalisation, the amount of extra physical activity that was stimulated appears to be enough to carry over into the prevention of loss of mobility. The study's best estimate was that the risk of losing mobility was reduced to almost one-fifth of the risk in the control group. Whilst this estimate again comes with some uncertainty, even the milder limit of the confidence interval (ie, a reduction of 10% in the risk of losing mobility) is probably worthwhile, given that the only thing required to achieve it is a very brief and low-cost intervention.

The effect of the intervention on physical activity was not clearly sufficient to prevent loss of peripheral muscle strength, reduce length of stay, or prevent complications. These effects do, however, appear worthy of further investigation. For example, the main estimate that the intervention halves the risk of loss of muscle strength would certainly be clinically worthwhile; further data could therefore help to give a more precise estimate.

Another welcome finding was that there were no clinical complications in either group in this study. This indicates that patients can follow the advice of the booklet and the physiotherapist without increasing their risk of complications.

The verbal advice associated with the illustrated booklet kept older patients more active during hospitalisation. Other studies have used the same strategy to increase the level of physical activity and decrease sedentary behaviour in community-dwelling older adults;[23,24] however, this is the first study to focus on hospitalised patients. In a study with older adults with chronic obstructive pulmonary disease, verbal advice for 12 weeks was also an efficient strategy, with a difference of 803 daily steps ($p < 0.001$) compared to the group that received only usual care. The intervention consisted of individualised verbal advice and determination of weekly goals to increase the level of physical activity.[23] In another study, a pulmonary rehabilitation program associated with eight verbal counselling sessions on physical activity increased levels of daily physical activity (daily steps and time of light and moderate activities) of older outpatients with chronic obstructive pulmonary disease.[24] The

Table 5
Number (%) of participants exhibiting loss of mobility and muscle strength, and relative risk (95% CI) between groups.

Outcomes	Exp (n = 33)	Con (n = 35)	Relative risk (95% CI)
Loss of mobility, n (%)	2 (6)	10 (29)	0.21 (0.05 to 0.90)
Loss of muscle strength, n (%)	7 (21)	14 (40)	0.53 (0.25 to 1.15)

Table 6
Number (%) of participants who agreed that the nominated reasons were barriers to staying active during hospitalisation (n = 58).

Reason	Participants n (%)
Lack of space	44 (76)
Continuous oxygen therapy	14 (61)[a]
Fear of infection	29 (50)
Dyspnoea	28 (48)
Lack of professional help	24 (41)
Lack of companion encouragement	26 (66)[a]
Pain in any part of the body	18 (31)
Fear of losing venous access	13 (22)
Dizziness	11 (19)
Unwillingness to move	11 (19)
Lack of equipment	9 (16)
Use of intravenous medications	7 (12)
Fear of falling	5 (9)
Fear of missing a doctor's visit	1 (2)

[a] The percentages of the barriers 'continuous oxygen therapy' and 'lack of companion encouragement' were calculated based on the elderly respondents who used oxygen (n = 23) and who had a companion (n = 39).

increase in the level of physical activity achieved in these studies has been previously tested as a strategy with which to prevent the decrease in the mobility of older adults.[25] In a group with almost 900 outpatients with no dementia, higher levels of physical activity were associated with lower loss of mobility.[25]

Interestingly, in our study, prevention of loss of mobility caused by increased levels of physical activity was not associated with the risk of loss of muscle strength. Our study showed that muscle strength was maintained during hospitalisation. This finding was probably due to the fact that older patients had preserved muscle strength and body mass index at hospital admission. In addition, the hospitalisation period was insufficient to impair these factors. A previous study showed that reduced handgrip at hospital admission was related to functional decline at hospital discharge;[26] therefore, the preserved nutritional status of the participants in the present study should have been a protective factor against weakening of the peripheral muscles. On the other hand, a study with inpatients showed that the handgrip remained unchanged over a period of 10 days of hospitalisation.[27] Karlsen et al[27] showed that mobility assessed via DEMMI gradually improved between the sixth and tenth days of hospitalisation. An improvement in mobility during hospitalisation was observed in patients with a higher level of physical activity.[27] However, patients with a low level of physical activity during hospitalisation presented functional decline,[28] as in the current study. Our results show that older patients who did not receive guidelines and remained in sedentary behaviour for longer lost more mobility compared with the more active elderly patients during hospitalisation. Our hypothesis was that functional physical activities may not be sufficient to prevent loss of mobility in older eutrophic patients. On the other hand, these same functional activities appear to be sufficient for the maintenance of muscular strength for a short period of hospitalisation, without the need for specific muscle strengthening exercises when patients are eutrophic.

There was minimal difference between the groups in the length of hospital stay. This result can possibly be explained by pneumonia being the most frequent cause of hospitalisation in both groups. The duration of antibiotic use would have determined the duration of hospitalisation to complete the course of treatment.

The use of intravenous medications such as antibiotics was one of the barriers reported by participants to performing physical activity during hospitalisation. Others factors that were widely reported included lack of space, use of continuous oxygen therapy, fear of infection upon leaving the room, and dyspnoea. Similar factors were previously reported by 28 older hospitalised patients during a semi-structured interview.[13] They pointed out that facilitators of physical activity for them included: knowledge of the negative effects of prolonged bed rest, the feeling of wellbeing that occurs with activity, and knowledge that they are regaining their function. As in our results, the reported barriers were disease-related symptoms, infrastructure and fear of injury.[13] In addition, 85% of these patients reported that they could be influenced by whether the physician had suggested exercise.[13] Presumably, sedentary behaviour of older inpatients could be decreased if the healthcare teams increased their attention to keeping the corridors free of extraneous equipment, purchased mobile equipment for oxygen therapy, and engaged in a more integrated multiprofessional approach. This would be likely to prevent the deleterious effects of poor mobility.

This study had some limitations, the main one being the lack of control over the advice that other healthcare professionals gave participants (including the control group) about physical activity. However, at the beginning of the protocol, all clinicians were instructed not to give advice about physical activity to participants, in order to reduce study bias. In addition, we believe that usual advice is similar for all hospitalised patients. Another limitation was the occasional existence of one participant from the experimental group and another from the control group in the same room; this situation could have affected the results.

Overall, this study's results suggest that verbal advice and an illustrated booklet on the benefits of staying active during hospitalisation increased the level of physical activity, ultimately reflecting less loss of mobility in older patients hospitalised for clinical reasons. In addition, the main barriers to staying active during hospitalisation reported by the patients were related to infrastructure.

What was already known on this topic: Older inpatients spend long periods resting in bed, regardless of their reason for hospitalisation. Low physical activity during hospitalisation is associated with loss of muscle strength and function. These losses are associated with important outcomes after hospital discharge, including disability and mortality.
What this study adds: Verbal and written advice to remain active during hospitalisation improves physical activity levels among older inpatients. While the size of these benefits is uncertain, they appear to be large enough to carry over into the prevention of loss of mobility.

Footnotes: [a] ActiGraph GT3X accelerometer, ActiGraph Corp, USA. [b] Smedley dynamometer, Smedley, Sahean, Belgium.

eAddenda: Table 4 and Appendices 1 and 2 can be found online at https://doi.org/10.1016/j.jphys.2019.08.006.

Ethics approval: This study was approved by the Ethics Committee of Instituto de Assistência Médica ao Servidor Público Estadual, Sao Paulo, Brazil (71339417.4.0000.5463 and protocol number 2.251.125). All participants gave written informed consent before data collection began.

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