

Can we improve patients' physical activity levels after discharge by interventions on the Acute Medical Unit? The 'teachable moment'

JNF Murphy & I Le Jeune

Abstract

Introduction: >30% of the population does less physical activity (PA) than recommended and few patients receive PA advice during a hospital admission (2,5). This study aimed to assess the feasibility of recruiting acute medical unit (AMU) in-patients and to examine the effect of delivering PA interventions to them.

Methods: In-patients who were inactive (<150mins/wk) were randomised to either a motivational interview (Long Interview, LI) or brief advice (Short Interview, SI). Participants' physical activity levels were assessed at baseline and at two follow-up consultations.

Results: 77 participants were recruited. At 12 weeks 22/39(56.4%) participants were physically active following the LI and 15/38(39.5%) following the SI.

Discussion: Recruitment and retention of patients on the AMU was straightforward. PA advice helped a high proportion of participants become physically active.

Keywords

Teachable moment, Physical activity, Motivational interview

Key points

- A patient's admission to hospital, even to a short stay unit such as an acute medical unit (AMU), provides an opportunity to deliver health promotion interventions because the hospital admission can be a 'teachable moment'.
- Motivational interviewing is a more effective behaviour change technique than brief PA advice, but takes longer and is a more costly intervention to deliver.
- It was feasible to recruit AMU in-patients and to deliver a PA intervention prior to discharge.
- 66% of participants increased their physical activity level during the study and at 12-weeks 48% of participants became 'active'.
- Although the LI has better outcomes for the individual, because of the additional time required to deliver the LI, delivering SIs to a larger number of people could have better outcomes for the population.
- This study gives a clear basis for planning and powering a larger trial of a short PA intervention as part of primary prevention on the AMU.

Introduction

Importance of physical activity

Physical activity (PA) is beneficial in the prevention and management of many physical and mental health conditions.¹ However, in 2016 only 66% of men and 58% of women in the UK met current PA recommendations.² PA advice is a cost-effective intervention that can help people become active.^{3,4} Unfortunately, very few patients receive any PA advice in hospital.⁵ However, a hospital admission can act as a 'teachable moment' where patients are more receptive and responsive to behaviour change interventions.^{6,7,8} Therefore, it is important to investigate how best to deliver PA interventions in hospital.

Qualitative research

Previously, we found that in-patients on an acute medical unit (AMU) were willing to receive PA advice during a hospital admission.⁶ In a further study, participants reported that a motivational interview, delivered during the hospital admission, helped them to increase their physical activity levels (PAL).⁹ However, this has not been investigated quantitatively.

Behaviour change

Motivational interviewing is a conversation technique aiming to increase the patient's intrinsic motivation for implementing a behaviour change.^{10,11} It has been shown to be a more effective behaviour change technique than brief PA advice.¹² However, motivational interviewing

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is a longer and more costly intervention to deliver. The effect of a motivational interviewing on patients' PAL has not been compared with a brief PA intervention in an acute hospital setting. It is important to investigate how much more effective a motivational interviewing is to determine whether the additional benefit justifies the increased resources required to deliver it.

PA Questionnaires

PA questionnaires are useful because they can be used at the participants bedside in hospital and then repeated at follow-up.¹³ However, ideally patients' PALs should be assessed objectively, for example, using accelerometers.¹⁴ Quickly assessing a patient's PAL at the bedside is difficult because most PA questionnaires take many minutes to complete and require computer software to calculate the result. Two short questionnaires where the PAL can be easily calculated are the Global Physical Activity Questionnaire (GPAQ) and the Exercise Vital Sign (EVS). The EVS contains only two questions compared to the GPAQ's 15. Both questionnaires performed adequately when validated against accelerometers.^{15,16,17} However, the EVS and GPAQ have not been compared against each other. If the EVS compares similarly to the GPAQ then it could be used to briefly assess patient's PAL instead of the GPAQ.

This study

We designed this feasibility study using quantitative methodology to further examine the effect of delivering PA interventions to AMU in-patients and to collect more information to justify and enable the planning of a definitive randomised controlled trial (RCT). The study's aims were to estimate: the effect of a motivational interview based PA intervention and a brief PA intervention on patients' PAL after discharge, and to compare participants' baseline PAL as assessed by the GPAQ and the EVS. The study also aimed to assess feasibility of delivering PA interventions to acute medical in-patients by assessing study processes, recruitment, and retention.

This feasibility study aimed to determine the ability to recruit and follow up suitable patients in order to provide preliminary data to justify and enable planning for a larger trial.

Methods

Patient and public involvement and ethics

Patients were involved in improving the readability of study documents. All study documents were approved by the York and Humber Research Ethics

Committee and Human Research Authority (IRAS ID 263647, REC Ref. 20/YH/0024).

Study setting

The study was a single centre study conducted on the AMU of the Queen's Medical Centre (Nottingham University Hospitals) from September 2020 to October 2021.

Sample size

A group size of 30 participants is statistically acceptable for estimating the effect of an intervention.^{18,19,20} The proposed sample size was therefore 90–100 participants to take account for participants being excluded and lost to follow-up.

Eligibility

Patients were eligible to participate if they were to be discharged from AMU when a researcher was present on the ward. Eligible patients were excluded if: they were unable to give informed consent, were less than 18 years of age, did not understand verbal and written English, or were identified by ward staff to be unable to walk 10m on flat ground, with or without a walking aid. All participants provided written informed consent before commencing the study.

Randomisation

Participants were randomised using a block randomisation approach with block sizes of 4, 6 and 8 selected randomly without stratification for covariates. A randomisation list was generated prior to the study using online randomisation software.²¹ After generation the investigators were blinded to the randomisation list.

Questionnaires

All participants were asked the GPAQ at baseline and at both follow-up consultations. Participants were excluded if their PAL at baseline reached the Department of Health's current aerobic PA recommendations (total MET minutes per week >600).²² In addition, all participants were asked the EVS questionnaire at baseline.

Interventions

The interventions in this study were a motivational interview (long intervention, LI) and brief PA advice (short intervention, SI). The LI was structured using the Moving Medicine 'more minutes' conversation tool which included discussion of topics such as: knowledge of PA, barriers to PA and the development of a plan to increase PAL. The SI was based on the Moving Medicine 'one minute'

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conversation tool. In the SI participants received advice about the benefits of PA and encouragement to try to build more PA into their daily routine. In both interventions if the participant had a chronic health condition for example, diabetes, then that section of the conversation tool was used. For participants with no underlying health conditions the primary prevention section was used.

Prior to the interventions the investigators underwent training in MI techniques through online learning modules and background reading.

Moving medicine

Moving Medicine is a web-based resource produced by Faculty of Sport and Exercise Medicine that summarises the latest evidence about PA into multiple conversation tools.²³ The 'more minutes' and 'one minute' conversation tools were used because they are most equivalent to a MI (i.e. a long PA intervention) and brief PA advice (i.e. a short PA intervention) respectively. Dr Natasha Jones (Moving Medicine project lead) gave us permission to use the tools.

Follow-up

Follow-up telephone conversations were conducted at 4-weeks and 12-weeks to assess both the effectiveness of the intervention and whether any changes were maintained. At each follow-up point the participants' PAL were assessed using the GPAQ. Participants were contacted on 3 different occasions before being considered as lost to follow-up.

Safety monitoring

Participants were asked about adverse events at both follow-up consultations. Participants were expected to have a low risk of experiencing an adverse event and were advised to "start slow and build up," to further reduce this risk.^{24,25}

Outcomes

The primary outcome was the participants' PAL (MET minutes per week) at 4-weeks with participants PAL at 12-weeks the secondary outcome. Feasibility outcomes include the number of days taken to recruit the first 50 participants and the percentage of participants who completed both follow-up points.

Data analysis

Data was entered into the trial database on hospital computers. The data was analysed on an intention to treat basis. Descriptive statistics were used to identify patterns in the data. The investigators were not blinded to participants' group during data analysis. Participants were considered 'inactive' if they had a

GPAQ result of <600 MET mins/wk and 'active' if 600 MET mins/wk.

Results

Sample and Demographics

312 patients were recruited into the study. 153 patients were eligible and willing to participate. 76 patients were excluded because they had a GPAQ result >600 MET mins/wk (Figure 1). 45/77 (58.4%) of participants were female and the mean age of participants was 56.4.

Baseline

At baseline the mean GPAQ result across all participants was 169 MET mins/wk and the median GPAQ result was 80 MET mins/wk.

Primary Outcome

At 4-weeks 69 participants were followed up. Of these, 51 had increased their PAL from their baseline (Figure 3). Across the two groups the mean GPAQ change was 615 MET mins/wk and the median GPAQ change was 420 MET mins/wk. In the SI group, 61% (23/38) of participants increased their PAL, the mean GPAQ change was 550 MET mins/wk and the median GPAQ change was 360 mins/wk. In the LI group 72% (28/39) of participants increased their PAL, the mean GPAQ change was 682 MET mins/wk and the median GPAQ change was 420 MET mins/wk.

At 12-weeks 63 participants were followed up. Of these, 50 participants had increased their PAL from their baseline. Across the two groups the mean GPAQ change was 645 MET mins/wk and the median GPAQ change was 600 MET mins/wk. In the SI group 55% (21/38) of participants had increased their PAL, the mean GPAQ change was 556 MET mins/wk and the median GPAQ change was 370 MET mins/wk. In the LI group 74% (29/39) of participants had increased their PAL, the mean GPAQ change was 726 MET mins/wk and the median GPAQ change was 640 MET mins/wk.

Any participant that was 'active' at baseline was excluded. Therefore, all study participants were 'inactive' at baseline. However, at 4 weeks 42.8% (33/77) of all participants were now 'active'. Furthermore, by 12 weeks 48% of all participants were now 'active' (37/77). In the SI group 39.5% (15/38) of participants had become 'active' by 4 weeks. At 12 weeks the same number of participants in this group were also 'active' (15/38). In the LI group 46% (18/39) of participants had become active by 4 weeks and at 12 weeks 56.4% of participants (22/39) were now 'active'.

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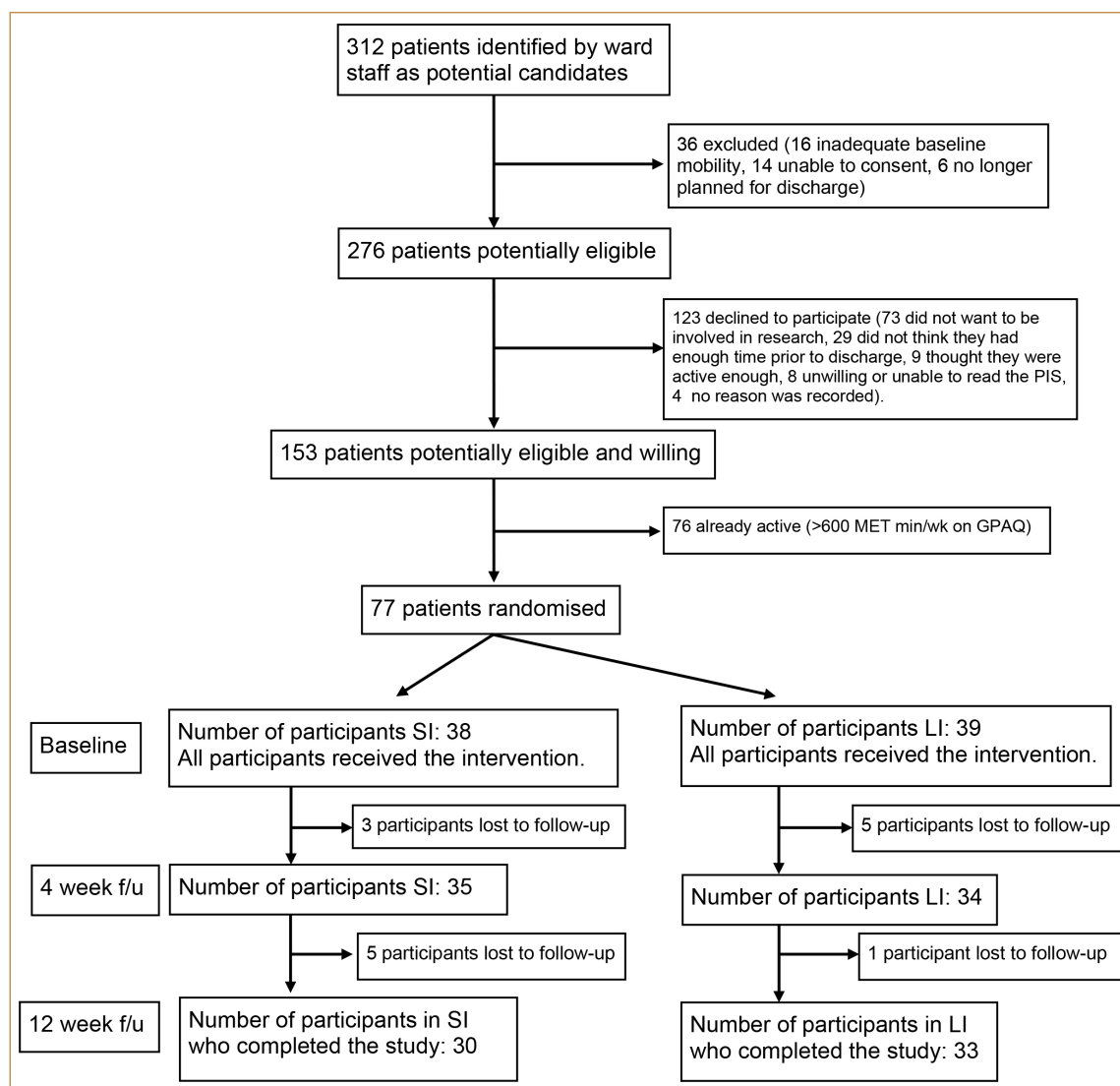


Figure 1. Flowchart of participant recruitment

EVS vs GPAQ

Where the baseline GPAQ result for a participant was 'inactive' we found that 72/77 participants were also 'inactive' according to the EVS. Therefore, in comparison with GPAQ the EVS had a 93.5% sensitivity and 85% specificity in determining whether a participant was 'inactive'. We also found that where the GPAQ result for a participant was 'active' that the EVS result was also active in 29/34 participants. Therefore, in comparison with GPAQ we found the EVS to have 85% sensitivity and 93.5% specificity in determining whether a participant was 'active'.

Feasibility

Recruitment progressed steadily with 50 participants recruited after 31 days (23 working days). Recruitment was ultimately completed after 280 days. Three investigators concurrently conducted

participant recruitment, study interventions and follow-up consultations.

Figure 1 is a flowchart of participant recruitment and follow-up. 89.6% (69/77) of participants were followed-up at 4 weeks. 5 participants were lost to follow-up (LTF) from the LI group and 3 from the SI group. At 12 weeks 81.8% (63) of participants were followed-up. 6 were LTF from the LI group and 8 from the SI group.

Adverse events

In total there 4 participants who experienced an adverse event, but no severe adverse events were reported. The adverse events that participants experienced were nausea and vomiting after eating, a breast lump, fall in bathroom, COVID infection. The patient that fell had not been taking part in any physical activity before the fall. All adverse events were deemed unrelated to the intervention.

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Figure 2. Table of results

		4 weeks	12 weeks
Whole group	Number (%) still in study	69/77 (89.6%)	63/77 (81.8%)
	Number (%) of participants who improved (all participants)	51/77 (66.2%)	50/77 (64.9%)
	Number (%) of participants who improved (participants still in the study)	51/69 (73.9%)	50/63 (79.4%)
	Number (%) now 'active'	33/77 (42.8%)	37/77 (48%)
	Mean GPAQ change	615	645
	Median GPAQ change	420	600
Short intervention	Number (%) still in study	35/38 (92.1%)	30/38 (78.9%)
	Number (%) of participants who improved (all participants)	23/38 (60.5%)	21/38 (55.3%)
	Number (%) of participants who improved (participants still in the study)	23/35 (65.7%)	21/30 (70%)
	Number (%) now 'active'	15/38 (39.5%)	15/38 (39.5%)
	Mean GPAQ change	550	556
	Median GPAQ change	360	370
Long intervention	Number (%) still in study	34/39 (87.2%)	33/39 (84.6%)
	Number (%) of participants who improved (all participants)	28/39 (71.8%)	29/39 (74.4%)
	Number (%) of participants who improved (participants still in the study)	28/34 (82.4%)	29/33 (87.9%)
	Number (%) now 'active'	18/39 (46%)	22/39 (56.4%)
	Mean GPAQ change	682	726
	Median GPAQ change	420	640

Discussion

Feasibility

It was feasible to recruit AMU in-patients and to deliver a PA intervention prior to discharge. Importantly, we were able to recruit quickly and completely which is a strong indicator of feasibility.²⁶ The LTF rate was just fewer than 20% which is acceptable, although, rates higher than this can threaten the validity of the results.²⁷ Future studies should consider strategies to increase participant follow-up and factor in a similar LTF rate into recruitment projections.²⁸

Findings

Our main findings were that 66% of participants increased their PAL during the study and at 12-weeks 48% of participants were now 'active'. When comparing the two groups, participants in the LI group were more likely to increase their PAL and were more likely to be 'active' by the end of the study. In both groups, the median change in PAL at 4 weeks was approximately equivalent to 90 minutes of moderate-intensity PA per week (MIPA/wk). This effect is clinically significant because if we take

the median baseline PAL of the participants (80mins MIPA/wk) and improve it by 90 minutes MIPA/wk the participants now meet the aerobic component of the department of health's current PA guidelines.²⁹

Delivering the interventions

We found the average time it took to deliver the interventions was 6 minutes (SI) and 33 minutes (LI). If we add on 3 minutes to each intervention for patient identification the timings become 9 and 36 minutes. Therefore, in a 6-hour period a healthcare professional could either deliver 40 SIs or 10 LIs. Extrapolating our results, if you delivered 40 SIs to inactive patients then you might expect 15 or 16 patients to become active by 4 weeks. If you delivered 10 LIs, 5 or 6 participants might become active by 4 weeks. Therefore, although the LI has better outcomes for the individual, delivering SIs to a larger number of people could have better outcomes for the population.

EVS vs GPAQ

We found that the EVS compared well to the GPAQ when identifying 'inactive' participants. The EVS has previously been shown to perform well at identifying 'inactive' adults when compared with accelerometry.^{17,30}

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However, Fitzgerald et al. found that up to 40% of patients assessed as 'active' by the EVS were 'inactive' when assessed with an accelerometer.¹⁶ Therefore, some patients could be missed if PA interventions are only given to patients the EVS has assessed as 'inactive'.^{16,17} If using the EVS in future studies practitioners should be aware that some patients assessed as 'active' may need further assessment with an alternate method to confirm their PAL.

Comparison with previous studies

In the recent independent evaluation of the Active Hospital pilot the complex medical unit pathway was not quantitatively evaluated.³¹ However, the evaluation of the maternity pathway found that a 20-minute MI helped the number of women achieving national PA guidelines to increase from 7 to 13 women. In this study the average time a woman in the group spent undertaking PA doubled from 77 mins/wk to 155 mins/wk.³² Their findings of an average baseline PAL of 77mins/wk and an increase in PAL post PA intervention of 78min/wk are similar and supportive of our results.

A recent meta-analysis by Taylor et al. found that behaviour change interventions delivered to hospital in-patients helped them increase their PAL during the hospital admission.³³ Although this is a different outcome to ours, this supports our findings that PA interventions can be delivered to hospital in-patients and help to increase their PAL. Another meta-analysis examined the effectiveness of behaviour change interventions in hospital outpatients.³⁴

Adverse events

In our study there were no adverse events related to PA and no serious adverse events. A recent expert consensus statement has strengthened the notion that for people with stable chronic conditions the benefits of PA "far outweigh the risks".³⁵

Limitations

The participants self-reported their PAL which can result in recall bias and social desirability bias.¹³ Therefore, it is possible that participants over-reported their PAL at follow-up which could have wrongly increased the effect of the interventions. Furthermore, although both questionnaires have moderate validity in determining an individual's PAL it is possible that participants were miss classified at baseline and at each follow-up point.^{15,16,37}

A further limitation is that treatment fidelity was not assessed, so it is possible that the interventions

were not delivered as intended.³⁶ Another limitation of this work is that the investigators only had basic expertise and experience delivering MI which could reduce the efficacy of the interventions.

Strengths

Strengths of this study include using a block randomisation approach and blinding investigators from the allocation list.³⁸ Secondly, we reported adverse events which are commonly omitted in studies of PA interventions.³³ The PA interventions were also based on the latest PA and behaviour change research.²³

A further strength is that there are few other published trials examining using short stay inpatient medical admissions as an opportunity for PA promotion. However, we have demonstrated that it is feasible to deliver PA interventions on a busy AMU. Furthermore, the initial results show positive trends from either intervention. We believe this study highlights that the AMU admission is likely to be a key teachable moment that healthcare professionals should be using to help improve patients PAL. However, the exact benefit of providing a PA intervention on the AMU should be further investigated.

A future study could repeat this research with a powered sample size. Researchers could consider trying to measure the outcome objectively by providing accelerometers to participants. Finally, treatment fidelity could be assessed by an independent investigator.³⁶

Conclusion

It is feasible to deliver a PA intervention to patients on an AMU. There is an opportunity to recruit patients prior to discharge and patients are willing to be involved in PA research and engage with follow-up processes. The interventions helped 'inactive' participants to become more 'active' with just under a half of all participants reaching government PA recommendations by the end of the study. Although we found the LI more effective at a patient level, we think delivering a SI to more patients would help a greater number of patients to increase their PAL and to become 'active'. This study gives a clear basis for planning and powering a larger trial of a short PA intervention as part of primary prevention on the AMU.

Declaration of competing interests

Nothing to declare.

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