

## Original Article

# Older Hospitalised Patients' Reported Confidence in Managing Discharge Needs: A Retrospective Observational Study

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## Abstract

**Objectives:** To evaluate the introduction of a patient-reported outcome measure (PROM) of self-confidence in managing discharge needs in an acutely hospitalised older adult population. **Methods:** A retrospective service evaluation in an English hospital. The PROM measure consisted of a visual analogue scale asking patients to rate their confidence with managing the things that they would need to do at home. This was collected on admission and discharge. **Results:** Of 923 patients, 461 had both admission and discharge confidence scores. Median confidence was higher at discharge (8.00, IQR: 6.20-9.80) than on admission (7.20, 5.00-9.00) ( $P < 0.001$ ). Predictors of high confidence with managing discharge needs at admission were: being male; having a lower number of morbidities; self-reporting fewer falls over the last year; and a higher level of functional mobility. Low confidence score on admission, being from one's own home, and a higher number of physiotherapy contacts were associated with improvement in PROM scores. Self-confidence in managing discharge needs at discharge was not associated with readmission within 30 days. **Conclusions:** Measuring patient-reported confidence to manage discharge needs is feasible in an older inpatient population. Confidence improved from admission to discharge, and more frequent physiotherapy input was associated with improved confidence.

**Keywords:** Aged, Confidence, Hospital, Patient Reported Outcome Measure

## Introduction

The use of patient reported outcome measures (PROMs) has the potential to transform healthcare<sup>1</sup>. PROMs seek to ascertain patients' views of their symptoms, their functional status, and their health related quality of life<sup>1</sup>. From a service perspective, using PROMs to measure the quality or success of the service ensures that patient remains the focus of service improvement. From a clinical perspective, using PROMs may have other advantages such as allowing the clinician to track treatment impact, assist with clinical reasoning and treatment planning, and engaging the patient in self-management<sup>2</sup>.

A primary focus of physiotherapy in acute geriatric wards is the rehabilitation of the loss of function associated with admission to hospital in frail older adults, so that they can

manage their activities of daily living on discharge. Doing so in a timely manner facilitates early discharge which frees up hospital beds and prevents adverse events for the patient such as hospital associated infection and functional decline.

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Elderly (DME) Physiotherapy Team at Cambridge University Hospital NHS Foundation Trust developed a PROM to focus on patients' confidence with managing their discharge needs. The PROM was based on the question: "*Thinking about the things you need to do at home, how confident are you now that you can manage?*". In designing the measure, two service improvement aims were prioritised: to guide the therapist with undertaking a holistic assessment, treatment planning and goal setting, and to be meaningful for patients. The specific needs were purposefully not specified in order for patients to be able to interpret the question in the way that would be most meaningful to them, and to stop clinicians making presumptions about their patients.

The aims of this study were to retrospectively examine the feasibility of measuring a PROM score in self-confidence with managing discharge needs in a geriatric inpatient population; to describe changes in patient-reported self-confidence with managing discharge needs during hospitalisation and identify variables associated with admission scores and changes from admission to discharge in patient-reported self-confidence with managing discharge needs; and to examine if self-reported confidence with managing discharge needs on discharge was associated with early hospital readmission, after adjusting for potential confounders.

## Materials and Methods

### Setting and participants

This was a retrospective service evaluation in a large tertiary university NHS hospital in England. We analysed all first admission episodes of people admitted to the Department of Medicine for the Elderly (DME) wards between 2<sup>nd</sup> May and 26<sup>th</sup> Aug 2016. The setting has been described elsewhere<sup>3,4</sup>. In brief, the 6 DME wards specialize in ward-based Comprehensive Geriatric Assessment. All patients who are admitted to DME wards are routinely assessed by a physiotherapist, and the dedicated nursing and medical teams are able to refer to other allied health professionals (e.g. occupational therapy, dietetics, speech and language therapy, social work) or other medical specialties or Psychiatry of old age if their inputs are required.

### Measures

Anonymous routinely collected clinical data was retrospectively obtained from the hospital electronic medical records. Most data were collected from running an electronic report of variables of interest. All measures used in this service evaluation were recorded in the patients' charts during routine clinical care.

The PROM development process was iterative involving the whole physiotherapy team. Once the concept was agreed upon, patients provided feedback regarding their preferred wording. Since the inception of the tool, various versions have been used, however the version used during the study period is shown in Online Resource 1. The question asked: "*Thinking about the things you need to do at home, how*

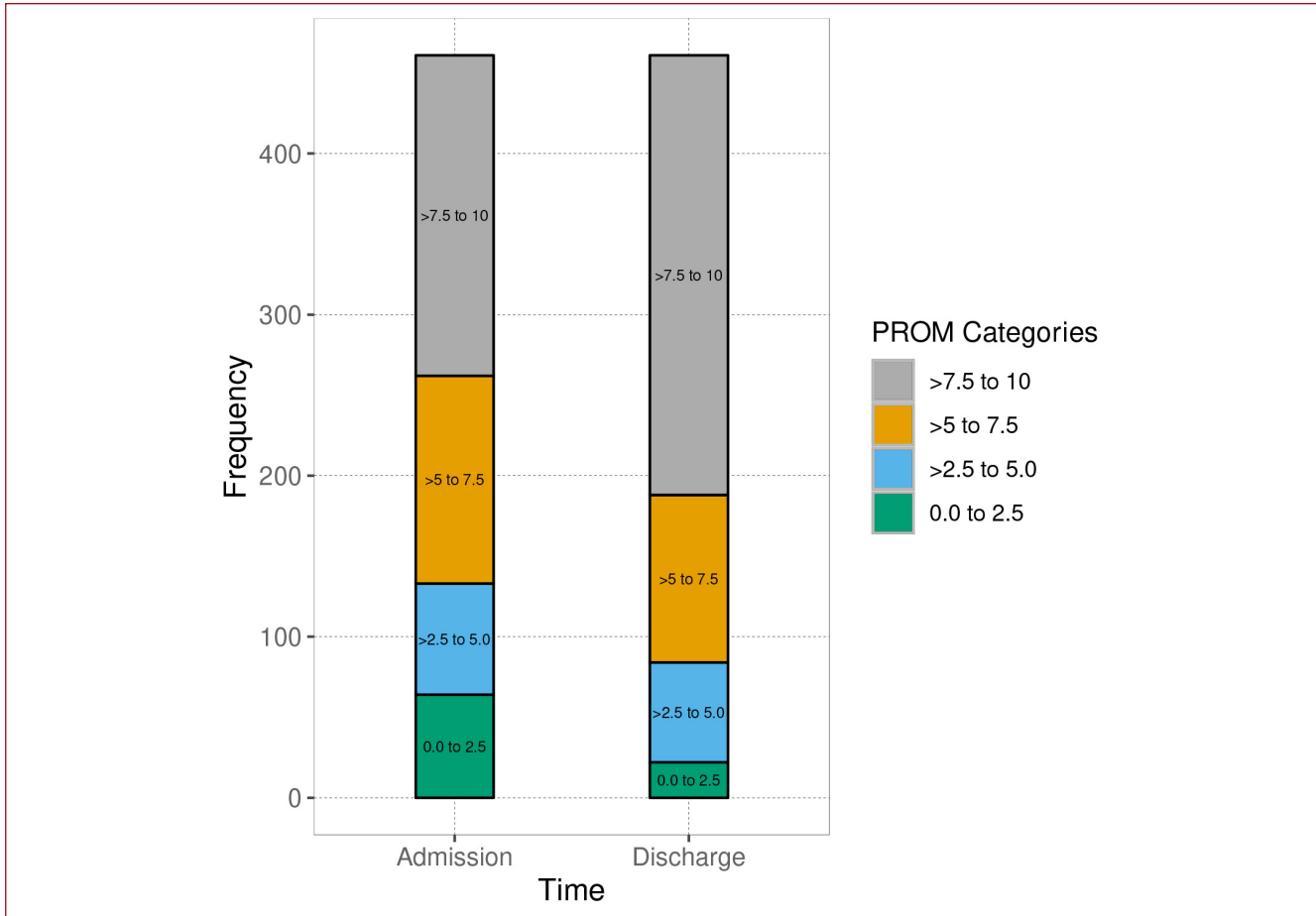
*confident are you now that you can manage?*" The patient was then given a 20 cm vertical based visual analogue scale (VAS) (one end: "*Fully confident*", and the other "*Not at all confident*"). The physiotherapist measured the score with a ruler and then divided the score by 2 to give a score out of 10 to 1 decimal place. If the patient was not at the "*fully confident*" end, the physiotherapist would follow up with a question such as: "*what would bump up (increase) your score?*", with the aim to engage the patient in setting the agenda for their physiotherapy sessions and setting of goals.

Other than the PROM described above and in Supplementary Materials 1, the patient characteristics collected (where available) were: age, gender, the existence of a diagnosis of dementia or delirium based documentation within the hospital medical records, the existence of a formal care package on admission (yes or no, as reported by the patient or a next of kin), number of falls in past twelve months (as reported by the patient or next of kin), whether the patient had daily contact with a family member or friend (yes/no, as reported by the patient or a next of kin), whether they lived on their own (yes/no, as reported by the patient or next of kin), pre-admission and discharge abode (own home, residential home or nursing home), the Charlson Comorbidity Index (non-age adjusted)<sup>5</sup>, number of physiotherapy and occupational therapy (OT) sessions during the hospital admission, the Emergency Department Modified Early Warning Score (ED-MEWS, highest recorded in the ED)<sup>6</sup>, the Clinical Frailty Scale (CFS)<sup>7</sup>, length of stay (LOS (days)), the Elderly Mobility Scale (EMS)<sup>8</sup> on admission and discharge, the need for a new formal care package on discharge (yes or no), discharged with the NHS Continuing Healthcare 'Fast Track' (for end of life care) process (yes/no), number of hospital admissions in the past year, readmission within 30 days of discharge, and inpatient mortality. Variables were chosen based on what was routinely collected as part of normal clinical care, and by what the authors felt may be relevant to the analyses and useful for descriptive purposes.

The EMS is routinely measured by DME physiotherapists on initial assessment and on day of discharge from hospital. The EMS is a 20-point ordinal scale for the assessment of function in frail older patients (worst: 0 points; best: 20 points)<sup>8</sup>. The scale includes the assessment of balance, mobility and ability to change body positions (e.g. from lying to sitting). The inter-rater reliability of the EMS has been reported as  $r=0.88$  ( $P<0.001$ ), and it has good convergent validity with the Barthel Index ( $r=0.787$ ,  $P<0.001$ )<sup>9</sup>.

Pre-admission and discharge abodes were categorised as: own home; residential home; or nursing home. In the UK, both residential and nursing homes provide accommodation with access to 24-hour care. Nursing homes also have at least one qualified nurse on duty at all times and can generally provide a higher level of care to meet the needs of more dependent individuals, or individuals with a higher complexity of needs.

A new formal care package on discharge was defined as



**Figure 1.** Change in PROM scores from admission to discharge (n=462).

new care provided by an external care agency as opposed to informal arrangements of support with family or friends. Patients are discharged home once they are deemed clinically fit for discharge by the multi-disciplinary team and any social support required is in place.

The Charlson Comorbidity Index (CCI) is based on patients' diagnoses as coded by the World Health Organization's International Classification of Diseases (10<sup>th</sup> version)<sup>5</sup>.

ED-MEWS scores are routinely collected by nursing staff in ED, and are considered as a measure of acute illness severity<sup>6</sup>. An ED-MEWS score of 4 or more has been shown to be an independent predictor of survival time (HR=2.87, 95% CI: 2.27–3.62, P<0.001)<sup>10</sup>.

The CFS has been routinely collected at the hospital since 2013. All patients aged 75 years or older admitted to the Trust through the emergency pathway should be screened for frailty using the CFS within 72 h of admission. Participants are scored based on their pre-admission level of frailty on a scale of 1 to 9 (1=very fit to 8=very severely frail, or 9 terminally ill)<sup>11</sup>.

The NHS Continuing Healthcare Fast Track process is for patients who have a rapidly deteriorating condition and may be in a terminal phase<sup>12</sup>. The process is designed to enable a person's needs to be urgently met, for example, to enable them to go home or to a care home to receive end of life care with an appropriate package of support<sup>12</sup>.

**Statistical Analysis**

Anonymised data was analysed with R software<sup>13</sup>. Descriptive statistics were given as count (with percentage) or mean (with standard deviation (SD)). For continuous variables with a non-normal distribution, median values with inter-quartile ranges (IQR) were used.

The Wilcoxon paired signed rank test was used to assess whether there had been a significant change in confidence scores from admission to discharge. The association between confidence in managing discharge needs and functional mobility (Elderly Mobility Scale score) was measured using Kendall's tau-b statistic.

Multivariate linear regression was used to identify

Variable	With admission and discharge PROM scores n = 461	Unable to provide admission and/or discharge scores n = 212	Missing admission and/or discharge scores n = 250
Age	84.9 (±6.6)	86.4 (±6.9)	85.7 (±7.1)
Female	258 (56.0%)	128 (60.4%)	138 (55.2%)
CCI	2.0 (1.0-3.0)	2.0 (1.0-3.0)	2.0 (1.0-4.0)
ED MEWS	2.0 (1.0-3.0)	3.0 (2.0-4.0)	3.0 (2.0-4.0)
CFS	5.0 (4.0-6.0)	6.0 (6.0-7.0)	6.0 (5.0-7.0)
Dementia	50 (10.8%)	136 (64.2%)	81 (32.4%)
Delirium	49 (10.6%)	79 (37.3%)	51 (20.4%)
Number of admissions in last year	1.0 (0.0-1.0)	1.0 (0.0-2.0)	1.0 (0.0-2.0)
Admitted from own home	431 (93.5%)	141 (66.5%)	203 (81.2%)
<b>Admitted from residential home</b>	25 (5.4%)	46 (21.7%)	30 (12.0%)
<b>Admitted from nursing home</b>	4 (0.9%)	25 (11.8%)	12 (4.8%)
Formal POC on admission	161 (34.9%)	151 (71.2%)	130 (52.0%)
Live alone	205 (44.5%)	56 (26.4%)	104 (41.6%)
Daily contact with family/friend	387 (83.9%)	154 (72.6%)	191 (76.4%)
Number of PT sessions during admission	3.0 (1.0 – 5.0)	3.0 (1.0 – 6.0)	4.0 (2.0 – 7.0)
Number of OT sessions during admission	1.0 (0.0-3.0)	0.0 (0.0-3.0)	1.0 (0.0-4.0)
Died during hospital admission	0 (0.0%)	0 (0.0%)	70 (28.0%)
Length of stay (days)	5.5 (2.9-11.5)	8.9 (3.8-23.0)	11.5 (5.9-23.4)
Readmission within 30 days	90 (19.5%)	41 (19.2%)	31 (12.4%)

<sup>a</sup>Refers to NHS Continuing Healthcare Fast Track process

CCI: Charlson Comorbidity Index; ED MEWS: Emergency Department Modified Early Warning Score; CFS: Clinical Frailty Scale, POC: package of care, PT: Physiotherapy; OT: Occupational Therapy

**Table 1.** Patient characteristics and hospital outcomes.

variables associated with the confidence on admission. Independent variables included were: age, sex, CCI, ED-MEWS, CFS, whether the patient lived alone prior to admission, number of falls in the last 12 months, diagnosis of dementia, diagnosis of delirium, number of admissions in the last 12 months, formal package of care prior to admission, their type of residence before admission (own home, residential home or nursing home), whether they had daily contact with a family member or friend, and admission EMS score. Univariate linear regression models were also computed for each of the covariates in the multivariate analyses and are reported in Supplementary Materials 2.

Multivariate linear regression was used to identify variables associated with the change in the confidence in managing discharge needs PROM from admission to discharge in patients who stayed in hospital for at least 2 days. Independent variables included were: age, sex, CCI, ED-MEWS, CFS, whether the patient lived alone prior to

admission, number of falls in the last 12 months, diagnosis of delirium, diagnosis of dementia, number of admissions in the last 12 months, formal package of care prior to admission, their type of residence before admission (own home, residential home or nursing home), whether they had daily contact with a family member or friend, admission EMS score, length of stay, number of OT sessions, number of physiotherapy sessions, and whether they had Continuing Healthcare Fast Track funding. The confidence in managing discharge needs PROM score on admission was controlled for in the analysis. A minimum stay of 2 days was selected as it was felt that the aims of the PROM, particularly with a view to improving confidence in managing discharge needs, were less relevant to people staying in hospital for less than 2 days. This also removes some confounding bias associated with people with very short lengths of stay and minimal therapy needs appearing to have higher frequency physiotherapy input (i.e. at least one assessment per day).

Variable	Coefficient	Lower 95% CI	Upper 95% CI	P value
Age	0.02	-0.03	0.06	0.469
Female	<b>-0.69</b>	<b>-1.20</b>	<b>-0.18</b>	<b>0.008</b>
CCI	<b>-0.14</b>	<b>-0.27</b>	<b>-0.01</b>	<b>0.039</b>
ED MEWS	0.04	-0.12	0.20	0.641
CFS	-0.15	-0.36	0.06	0.156
Live alone	0.04	-0.49	0.57	0.885
Number of falls in last 12 months	<b>-0.07</b>	<b>-0.13</b>	<b>0.00</b>	<b>0.043</b>
Delirium	0.07	-0.69	0.84	0.849
Dementia	0.46	-0.27	1.20	0.217
Number of admissions in last 12 months	0.14	-0.01	0.30	0.075
Formal package of care prior to admission	0.19	-0.40	0.78	0.518
Residence before admission				
From own home	reference			
From residential home	-0.55	-1.61	0.51	0.311
From nursing home	-0.19	-2.99	2.61	0.895
Daily contact with family or friend(s)	0.33	-0.36	1.02	0.347
EMS score on admission	<b>0.17</b>	<b>0.13</b>	<b>0.22</b>	<b>&lt;0.001</b>

415 participants not included due to missing data; 1 participant removed from model due to high-leverage from estimated 150 falls in last year. CCI: Charlson Comorbidity Index; ED MEWS: Emergency Department Modified Early Warning Score; CFS: Clinical Frailty Scale; EMS: Elderly Mobility Scale.

**Table 2.** Multivariate linear regression model estimating confidence in managing discharge needs PROM scores on admission (n=507\*)

Multivariate binary logistic regression was used to assess whether the confidence in managing discharge needs PROM scores at discharge were associated with readmission within 30 days. Variables controlled for were: age, sex, CCI, ED-MEWS, number of hospital admissions in last 12 months, length of hospital stay and discharge EMS score.

For all models the selection of independent variables was based on the available variables routinely collected by the hospital, and subsequently chosen by the authors based on the likely possibility of being associated with the dependent variable. All models were checked for multicollinearity by computing the variance inflation factor (VIF) using the car package in R<sup>14</sup>. We applied the rule of thumb of a VIF that exceeds 5 as being problematic<sup>15</sup>.

## Results

There were 923 patients with first admission episodes of DME between 2<sup>nd</sup> May and 26<sup>th</sup> August 2016. In total, 575 (62.3%) patients had admission confidence in managing discharge needs PROM scores recorded, 263 patients were unable to provide a score (80.5% of those had history of dementia and/or a documented delirium), 14 patients

declined to answer, and data was otherwise missing for 71 patients. Patients who were unable to answer on admission had a longer median hospital stay (9.9 days, IQR: 4.5-24.0) compared to those who could (6.6 days, IQR: 3.2-13.4), P=0.003. At discharge, confidence in managing discharge needs PROM scores were collected for 527 (57.1%) patients (172 were unable to provide a score, 11 patients declined to answer, 70 patients died in hospital and data for 143 patients was otherwise missing). The number of patients with both admission and discharge confidence in managing discharge needs PROM scores was 461 (49.9%). Of those who were able to provide an admission confidence in managing discharge needs, there was a significant positive correlation between confidence and functional ability (measured with the Elderly Mobility Scale)  $r_t=0.30$ ,  $p<0.001$  (n=565).

Patient characteristics on admission and discharge outcomes are presented in Table 1, including those with missing data. In those who had both admission and discharge PROM scores (n=461), median confidence was significantly higher on discharge (8.00, IQR: 6.20-9.80) than on admission (7.20, 5.00-9.00), P<0.001. The admission confidence PROM scores of 573 participants were predictive

Variable	Coefficient	Lower 95% CI	Upper 95% CI	P value
<b>Confidence PROM Admission</b>	<b>-0.64</b>	<b>-0.73</b>	<b>-0.56</b>	<b>&lt;0.001</b>
Age	0.02	-0.02	0.07	0.330
Female	0.24	-0.26	0.74	0.343
CCI	-0.07	-0.21	0.06	0.294
ED MEWS	0.11	-0.04	0.27	0.136
CFS	-0.04	-0.25	0.17	0.710
Live alone	-0.36	-0.87	0.16	0.175
Number of falls in last 12 months	0.00	-0.03	0.03	0.978
Delirium	-0.32	-1.02	0.38	0.373
Dementia	0.21	-0.57	0.99	0.600
Number of admissions in last 12 months	-0.04	-0.19	0.11	0.629
Formal POC prior to admission	0.20	-0.39	0.80	0.500
Residence before admission				
From own home	<b>reference</b>			
<b>From residential home</b>	<b>-1.76</b>	<b>-2.83</b>	<b>-0.70</b>	<b>0.001</b>
From nursing home	-2.60	-5.25	0.05	0.054
Daily contact with family or friend(s)	-0.02	-0.68	0.64	0.955
EMS admission	-0.01	-0.06	0.03	0.568
Length of stay	-0.03	-0.06	0.00	0.094
Number of OT sessions	-0.07	-0.18	0.04	0.202
<b>Number of PT sessions</b>	<b>0.09</b>	<b>0.00</b>	<b>0.18</b>	<b>0.045</b>
For 'fast track' funding <sup>a</sup>	-0.54	-2.53	1.45	0.595

<sup>a</sup>Refers to NHS Continuing Healthcare Fast Track process

CCI: Charlson Comorbidity Index; ED MEWS: Emergency Department Modified Early Warning Score; CFS: Clinical Frailty Scale; POC: package of care; EMS: Elderly Mobility Scale; PT: Physiotherapy; OT: Occupational Therapy.

**Table 3.** Multivariate linear regression model estimating change in confidence in managing discharge needs PROM from admission to discharge for patients with a length of stay of 2 or more days (n=349).

	Log odds ratio	Lower 95% CI	Upper 95% CI	P value
Confidence PROM at discharge	0.08	-0.02	0.19	0.109
Age	-0.02	-0.05	0.02	0.369
Female	0.20	-0.26	0.66	0.406
<b>CCI</b>	0.17	0.05	0.30	<b>0.007</b>
ED MEWS	-0.07	-0.24	0.08	0.355
<b>Number of admissions in last 12 months</b>	0.15	0.02	0.28	<b>0.025</b>
EMS Discharge	-0.03	-0.08	0.01	0.133
Length of stay	0.00	-0.02	0.02	0.800

CCI: Charlson Comorbidity Index; ED MEWS: Emergency Department Modified Early Warning Score; EMS: Elderly Mobility Scale

**Table 4.** Multivariate linear regression model estimating odds of 30-day readmission (n=518, events=102).

of length of hospital stay, with higher confidence being associated with a lower length of stay ( $\beta=-0.73$ ,  $R^2=0.03$ ,  $P<0.001$ ).

Figure 1 illustrates the shift in scores from admission to discharge in the sample of 462 patients with both admission and discharge confidence scores; importantly, it shows a significantly lower frequency of patients with scores  $\leq 2.5$  a higher frequency of patients with scores of  $>7.5$  on discharge compared to admission. A significant number of patients ( $n=201$ , 43.6%) did not change the scores by less than or more than 1 point on the PROM, 196 (42.5%) increased their score by discharge by  $>1$  point, and 64 (13.9%) reduced their score by discharge by  $>1$  point.

A multivariate linear regression model including 507 participants suggested that being male, having a lower CCI score, self-reporting fewer falls over the last year and having a higher admission EMS score were independently associated with higher confidence in managing discharge needs PROM scores on admission  $R^2_{adj}=0.15$  (Table 2). Univariate linear regression analyses of the association between each covariate and the confidence in managing discharge needs PROM are presented in Supplementary Materials 2.

A multivariate linear regression model including 349 participants who stayed in hospital for at least 2 days estimating change in confidence in managing discharge needs PROM scores from admission to discharge suggested that having a low confidence score on admission, being from one's own home as opposed to a residential home, and a higher number of physiotherapy contacts were independently associated with improvement in PROM scores  $R^2_{adj}=0.43$  (Table 3).

In a multivariate binary logistic regression model including 466 participants (88 of whom were readmitted within 30 days of discharge), no significant association was found between the confidence PROM scores at discharge and 30-day readmission, but a higher CCI score and higher number of admissions in the previous 12 months were both associated with increased odds of readmission in 30 days (Table 4).

## Discussion

The initial aim of this study was to consider the feasibility of measuring a PROM score in self-confidence in an older adult inpatient population. In our sample, half of patients had both admission and discharge patient-reported confidence scores. Being unable to provide a score could be considered to be a value in itself, in that it was associated with a longer length of stay than those who were able to provide a score. Despite many patients in this cohort being unable to answer the question, collecting a PROM score in this population may be feasible and gives clinicians an important insight into the patient perspective of the outcomes of their hospital admission. As well as providing insight for the care team, the very act of asking patients for this measure may improve patient motivation, in line with previous studies showing that

creating a caring environment and the sense of reciprocity with staff is an important positive motivating factor for older institutionalised adults<sup>16</sup>.

Our results show that generally, confidence is related to baseline mobility and improves across admission. This is a very encouraging finding, suggesting that the majority of these hospital admissions resulted in positive changes from the patient perspective, suggesting that for our patient sample, the care provided also included psychosocial benefit, rather than simply achieving medical fitness as an outcome.

Additionally, higher confidence on discharge was associated with a higher level of physiotherapist input. This suggests that a greater involvement of the physiotherapy team in patient care during admission may influence patients' self-confidence in managing discharge needs. There are many mechanisms that may explain this hypothesis such as physiotherapists providing patients with the mastery experiences and encouragement required to improve their confidence in their ability to recover and therefore improve self-efficacy<sup>17</sup>. The model controlled for all factors that we previously found to be associated with frequency of physiotherapy input such as length of stay, functional ability on admission, and a diagnosis of dementia<sup>18</sup>, as well as others we suspected might also be confounding factors such as illness severity and number of occupational therapy sessions, but it is possible that other unmeasured factors may confound the observed relationship between physiotherapy input and change in confidence. We have previously hypothesised that physiotherapy frequency may be influenced by a 'clinical eyeball test' whereby physiotherapists may be able to predict patients who have the greatest potential for recovery or who will benefit most from high frequency input and consciously or unconsciously prioritise those patients<sup>18</sup>.

In this population, low confidence at discharge was not associated with 30-day readmission rates. This reflects the complexity of factors that contribute to readmission and highlights the difficulties clinicians face in predicting readmission<sup>4</sup>.

Our study has important limitations, including its retrospective observational design which precludes any causality inferences. Findings from this single centre study are not necessarily externally valid. In addition, previous studies have demonstrated the role of psychometric and psychological factors in motivation – personality metrics were not available for this patient sample and as such we have not explored the impact on patient personality on self-confidence<sup>19</sup>. However, we do not underestimate the impact of psychological well-being on patient-reported outcome measures, and feel a significant effect may have been shown if patients were screened for depression at the time the questionnaire was administered. The roles of personality and mental health upon PROM scores would need to be further explored in this setting to be fully appreciated. Similarly, we were not able to collect data on the severity

of cognitive impairment. Although those with high severity were likely deemed as 'unable to provide a score', there remain questions regarding the suitability and interpretation of the self-confidence PROM within this population. Finally, we did not measure inter or intra-rater reliability of the model. The association between the Elderly Mobility Scale on admission and number of falls in the previous year offers some indication of convergent validity, though further work is needed to validate the PROM such as investigating the association between the PROM and measures such as the Barthel Index and EQ-5D. The PROM was specifically designed to be interpreted by the patient in a way that was most meaningful for them. It is likely that the construct of 'discharge needs' that we have measured in this study varies considerably from patient to patient, such as the meaning of 'independence' which has been shown to be diverse<sup>20</sup>.

As well as quantifying self-confidence in managing discharge needs, the PROM was designed to provide the physiotherapists with a better understanding of their patients' concerns and goals beyond what they may typically ask about in an initial assessment, and to actively engage patient's in problem solving and treatment planning. Work is needed to understand the clinical utility of the tool, and whether the tool achieved these aims.

Further, we were unable to collect information regarding participants' admission diagnoses and are therefore unable to explore relationships to self-confidence.

## Conclusions

From this study, we conclude that measuring patient-reported confidence to perform activities of daily living is likely to be feasible in a geriatric inpatient population. Additionally, we have demonstrated that within our sample physiotherapy input during hospital admission was associated with a higher patient confidence at discharge compared to admission, and that generally patients experienced an increase in confidence across their hospital stay.

### Ethics Approval

*This study was registered as a service evaluation with our centre's Safety and Quality Support Department (Project Register Number 4899). Formal confirmation was received that approval from the Ethics Committee was not required.*

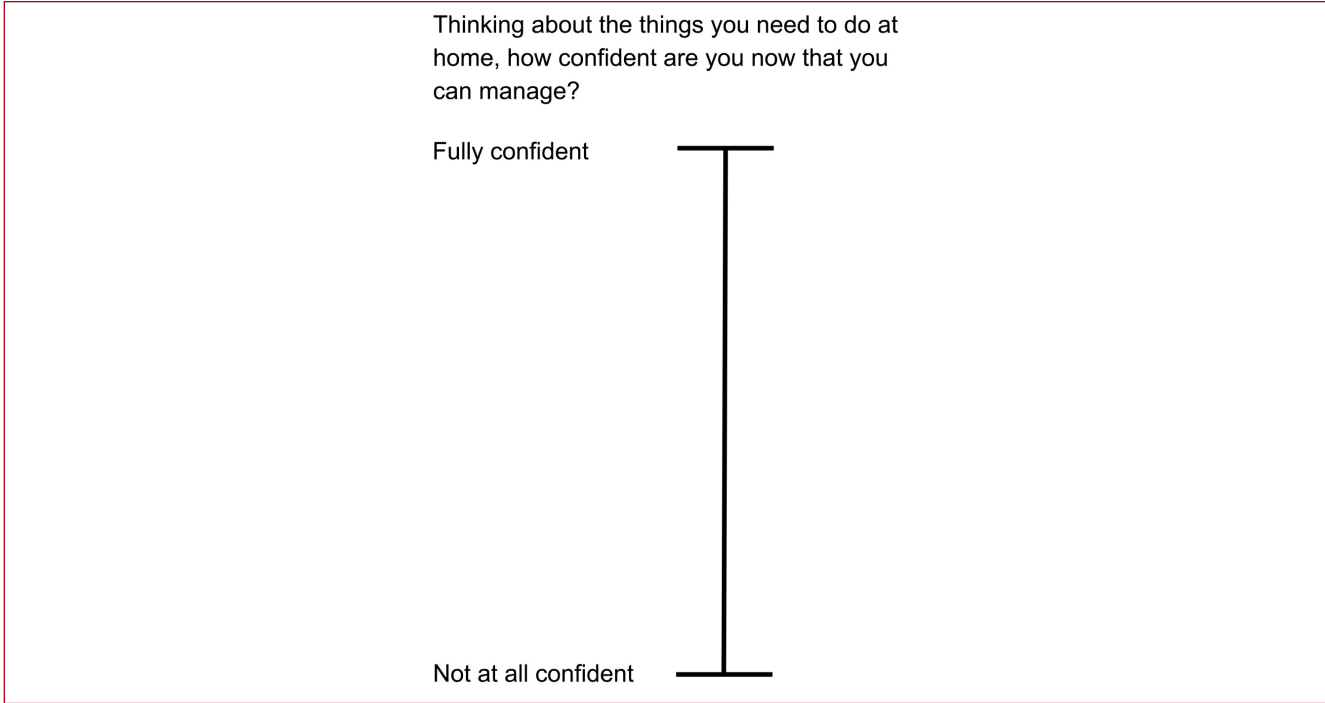
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## References

1. Black N. Patient reported outcome measures could help transform healthcare. *BMJ* 2013;346:f167.
2. Kyte DG, Calvert M, van der Wees PJ, ten Hove R, Tolan S, Hill JC. An introduction to patient-reported outcome measures (PROMs) in physiotherapy. *Physiotherapy* 2015;101(2):119-25.
3. Wallis SJ, Wall J, Biram RW, Romero-Ortuno R. Association of the clinical frailty scale with hospital outcomes. *QJM* 2015;108(12):943-9.
4. Romero-Ortuno R, Forsyth DR, Wilson KJ, Cameron E, Wallis S, Biram R, et al. The Association of Geriatric Syndromes with Hospital Outcomes. *J Hosp Med* 2017;12(2):83-9.
5. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis* 1987;40(5):373-83.
6. Subbe CP, Kruger M, Rutherford P, Gemmel L. Validation of a modified Early Warning Score in medical admissions. *QJM* 2001;94(10):521-6.
7. Rockwood K, Song X, MacKnight C, Bergman H, Hogan DB, McDowell I, et al. A global clinical measure of fitness and frailty in elderly people. *CMAJ* 2005;173(5):489-95.
8. Smith R. Validation and Reliability of the Elderly Mobility Scale. *Physiotherapy* 1994;80(11):744-7.
9. Prosser L, Canby A. Further validation of the Elderly Mobility Scale for measurement of mobility of hospitalized elderly people. *Clin Rehabil* 1997;11(4):338-43.
10. Romero-Ortuno R, Wallis S, Biram R, Keevil V. Clinical frailty adds to acute illness severity in predicting mortality in hospitalized older adults: An observational study. *Eur J Intern Med* 2016(35):24-34.
11. Belloni G, Bula C, Santos-Eggimann B, Henchoz Y, Seematter-Bagnoud L. A Single Question as a Screening Tool to Assess Fear of Falling in Young-Old Community-Dwelling Persons. *J Am Med Dir Assoc* 2020;21(9):1295-301 e2.
12. Health Do. National Framework for NHS Continuing Healthcare and NHS-funded Nursing Care. *GOV.UK* 2012.
13. R Core Team. R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing. 3.3.2 ed. Vienna, Austria 2016.
14. Fox J, Weisberg S. *An R Companion to Applied Regression*. Third ed. Thousand Oaks CA: Sage; 2019.
15. James G, Witten D, Hastie T, Tibshirani R. Linear Regression. In: James G, Witten D, Hastie T, Tibshirani R, editors. *An Introduction to Statistical Learning: With Applications in R*. New York: Springer Publishing Company; 2013. p. 59 - 126.
16. Resnick B. Motivation to perform activities of daily living in the institutionalized older adult: can a leopard change its spots? *J Adv Nurs* 1999;29(4):792-9.
17. Whitehall L, Rush R, Gorska S, Forsyth K. The General Self-Efficacy of Older Adults Receiving Care: A Systematic Review and Meta-Analysis. *Gerontologist* 2020;61(6):e302-e17.
18. Hartley P, Adamson J, Cunningham C, Embleton G, Romero-Ortuno R. Higher physiotherapy frequency is associated with shorter length of stay and greater functional recovery in hospitalized frail older adults: a retrospective observational study. *J Frailty Aging* 2016;5(2):121-5.
19. McAuley E, Szabo A, Gothe N, Olson EA. Self-efficacy: Implications for Physical Activity, Function, and Functional Limitations in Older Adults. *Am J Lifestyle Med* 2011;5(4):10.1177/1559827610392704.
20. Taylor E, Goodwin V, Clegg A, Ball S, Frost J. 696 Understanding Independence-Older People's Perspectives. *Age and Ageing* 2022;51(Supplement\_1):afac037.696.





**Supplementary File 1.** PROM for self-reported confidence in managing discharge needs.

Variable	Coefficient	Lower 95% CI	Upper 95% CI	P value	R <sup>2</sup>
Age	-0.02	-0.06	0.02	0.291	0.00
<b>Female</b>	<b>-0.68</b>	<b>-1.16</b>	<b>-0.19</b>	<b>0.006</b>	<b>0.01</b>
CCI	-0.06	-0.19	0.07	0.347	0.00
ED MEWS	0.03	-0.14	0.19	0.750	0.00
<b>CFS</b>	<b>-0.47</b>	<b>-0.64</b>	<b>-0.29</b>	<b>&lt;0.001*</b>	<b>0.05</b>
Live alone	0.17	-0.32	0.65	0.504	0.00
Number of falls in last 12 months	-0.02	-0.05	0.01	0.276	0.00
Delirium	-0.25	-1.04	0.53	0.525	0.00
Dementia	0.03	-0.68	0.74	0.935	0.00
Number of admissions in last 12 months	0.02	-0.14	0.17	0.826	0.00
<b>Formal package of care prior to admission</b>	<b>-0.73</b>	<b>-1.23</b>	<b>-0.23</b>	<b>0.004</b>	<b>0.01</b>
Residence before admission					
From own home	reference		0.519		0.01
From residential home	-1.04	-2.08	0.499	0.051	
From nursing home	-0.96	-3.87	0.519	0.519	
Daily contact with family or friend(s)	0.23	-0.43	0.89	0.499	0.00
<b>EMS score on admission</b>	<b>0.19</b>	<b>0.15</b>	<b>0.22</b>	<b>&lt;0.001</b>	<b>0.15</b>

CCI: Charlson Comorbidity Index; ED MEWS: Emergency Department Modified Early Warning Score; CFS: Clinical Frailty Scale; EMS: Elderly Mobility Scale.

**Supplementary File 2.** Univariate linear regression models with predictors of confidence in managing discharge needs PROM scores on admission.