Frequency of Physical Therapist Intervention Is Associated With Mobility Status and Disposition at Hospital Discharge for Patients With COVID-19

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ABSTRACT

Objective. For patients diagnosed with the novel coronavirus, COVID-19, evidence is needed to understand the effect of treatment by physical therapists in the acute hospital on patient outcomes. The primary aims of this study were to examine the relationship of physical therapy visit frequency and duration in the hospital with patients' mobility status at discharge and probability of discharging home.

Methods. This retrospective study included patients with COVID-19 admitted to any of eleven hospitals in one health system. The primary outcome was mobility status at discharge, measured using the Activity Measure for Post-Acute Care 6-Clicks basic mobility (6-Clicks mobility) and the Johns Hopkins Highest Level of Mobility (JH-HLM) scales. Discharge to home vs. to a facility was a secondary outcome. Associations between these outcomes and physical therapy visit frequency or mean duration were tested using multiple linear or modified Poisson regression. Potential moderation of these relationships by particular patient characteristics was examined using interaction terms in subsequent regression models.

Results. For the 312 patients included, increased physical therapy visit frequency was associated with higher 6-Clicks mobility (b = 3.63; 95% CI = 1.54–5.71) and JH-HLM scores (b = 1.15; 95% CI = 0.37–1.93) at hospital discharge and with increased probability of discharging home (adjusted relative risk=1.82; 95% CI = 1.25–2.63). Longer mean visit duration was also associated with improved mobility at discharge and the probability of discharging home, though the effects were less pronounced. Few moderation effects were observed.

Conclusion. Patients with COVID-19 demonstrated improved mobility at hospital discharge and higher probability of discharging home with increased frequency and longer mean duration of physical therapy visits. These associations were not generally moderated by patient characteristics.

Impact. Physical therapy should be an integral component of care for patients hospitalized due to COVID-19. Providing sufficient physical therapist interventions to improve outcomes must be balanced against protection from viral spread.

Lay summary. Patients with COVID-19 may benefit from more frequent and longer physical therapy visits in the hospital.

Keywords: Acute Care, Mobility, Patient Discharge, Delivery Patterns

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INTRODUCTION

The overall cumulative hospitalization rate associated with the novel coronavirus disease, COVID-19, is 120.9 per 100,000 population and continuously increasing.[1] COVID-19 is associated with varying levels of illness severity and a multitude of symptoms.[2] Those who are hospitalized, especially with critical illness, most often present with respiratory symptoms including acute respiratory distress syndrome.[3–5] In patients with respiratory disease not related to COVID-19, greater illness severity in the hospital is associated with greater deficits in mobility.[6] This loss of mobility has been shown in previous studies to be amenable to improvement via rehabilitation interventions.[7–9]

Limited mobility at the time of hospital discharge is also associated with greater likelihood of discharge to post-acute care (PAC) facilities.[10–12] In the era of COVID-19, and especially for patients with active COVID-19 disease or those in high-risk groups, efforts to limit spread have caused health systems to focus on increasing the proportion of patients that are discharged from the hospital to home.[13,14] Since physical therapists providing care in the acute hospital setting play a role in improving patients' mobility status prior to hospital discharge,[15] their interventions may positively influence patients' ability to discharge home from the hospital rather than to a PAC facility for ongoing rehabilitation.

Specifically for patients with COVID-19, evidence is needed to understand the effect of treatment by physical therapists in the hospital on mobility status at hospital discharge and the likelihood of discharging home. The primary aim of this study was to examine, for patients hospitalized with COVID-

19, the relationship between the frequency of physical therapy visits in the acute hospital and patients' mobility status at hospital discharge (score on the Activity Measure for Post-Acute Care 6-Clicks basic mobility [6-Clicks mobility] short form and Johns Hopkins Highest Level of Mobility [JH-HLM] scale). We also analyzed the relationship between physical therapy visit frequency and the likelihood of discharge to home as a secondary outcome. In secondary analyses, we examined the effect of the mean duration of individual physical therapy treatment visits on these same outcomes.

METHODS

Study Population and Data Sources

This was a retrospective study using records for patients admitted to one of eleven acute care hospitals in one health system. Patients were included if they had a confirmed positive test (via nasopharyngeal swab) for COVID-19 either during hospitalization or which resulted in a hospitalization, had been discharged from the hospital by June 10, 2020, and had been evaluated by a physical therapist during their hospital stay. Patients were excluded from the analyses of mobility status at discharge if only one score was recorded from the 6-Clicks mobility or JH-HLM. Patients who died in the hospital or were discharged with hospice services (since their prognosis for recovery was poor) were excluded when analyzing the likelihood of discharging to home.

Data were extracted from the Cleveland Clinic (CCHS) COVID-19 research data registry and the Rehabilitation and Related Outcomes Learning Lab, a data registry that links patient demographic and rehabilitation care episode data across CCHS-affiliated care settings. The CCHS IRB approved this study and provided a waiver of informed consent since these data were accessed retrospectively.

Predictor Variables

For the primary analysis, the predictor variable was the frequency of physical therapy visits. This was calculated as the total number of completed visits divided by the number of days from the date of the physical therapist evaluation through the date of hospital discharge. In secondary analyses, we included

the mean duration of individual physical therapy treatment visits as the primary predictor variable. This was calculated as the mean of billed minutes of physical therapist interventions for all completed visits. To better understand care utilization patterns, we also described the number of days from hospital admission to physical therapist evaluation, the number of days from physical therapist evaluation to hospital discharge, the count of completed physical therapy visits, and the count of attempted physical therapy visits (including completed visits).

Outcome Variables

Mobility status at the time of hospital discharge was the primary outcome and was evaluated separately using scores from the 6-Clicks mobility and the JH-HLM. The 6-Clicks mobility is a valid and reliable measure of mobility in the acute hospital setting.[16,17] It assesses a patient's capability to complete basic transferring and ambulation tasks. Higher 6-Clicks mobility scores (which range from 6 to 24) indicate greater levels of independence with those tasks. The JH-HLM captures the level of activity that patients complete within a specific timeframe. JH-HLM scores range from 1 (only lying) to 8 (walking 250+ feet).[18] In CCHS hospitals, both the 6-Clicks mobility and the JH-HLM are scored by physical therapists for each completed visit.

The likelihood of discharge to home versus to a PAC facility was analyzed as a secondary outcome. Patients were considered to have discharged to home regardless of whether or not home health services were in place.

Data Analysis

Patient demographic and clinical characteristics were described for the full cohort of patients evaluated by a physical therapist during their hospital admission. We also described these characteristics for the samples included for the analysis of each outcome and compared them to the full cohort to evaluate their representativeness.

We examined the adjusted effect of physical therapy visit frequency and mean visit duration on patients' mobility status at discharge using multiple linear regression. To examine the adjusted effect of physical therapy visit frequency and mean visit duration on patients' likelihood of discharging to home vs. to a PAC facility, we estimated adjusted relative risk (aRR) using a modified Poisson regression with robust variance estimation.[19] The mean visit duration for each patient was divided by 10 for use in the models where it was the primary predictor. In all models, we controlled for patient-level covariates that are associated with other important outcomes including hospital readmission,[20–23] hospital discharge disposition,[11,24] and morbidity or mortality.[25,26] These included patient demographics (age, sex, and race), the primary payer for the episode of care, the hospital in which the patient was treated, and clinical factors including medical complexity as indicated by the All Patient Refined (APR) Diagnostic Related Group Illness Severity modifier—a valid[27,28] and reliable predictor[29] of in-hospital mortality across clinical populations—and whether the patient was admitted to the intensive care unit (ICU) during their hospitalization. Overall hospital length of stay (LOS) was included as a covariate in the models where the mean visit duration was the primary predictor variable, but excluded where physical therapy visit frequency was the primary predictor since our calculation of frequency accounted for a portion of the LOS. For the analysis of 6-Clicks mobility score at hospital discharge, we included the first recorded 6-Clicks mobility score as a covariate and similarly included the first recorded JH-HLM score as a covariate when analyzing the JH-HLM score at hospital discharge.

To aid interpretation, marginal estimation from the multivariable models was used to obtain predicted 6-Clicks mobility scores and JH-HLM scores at discharge and probabilities of discharge to home at representative values of physical therapy visit frequency and mean visit duration.

As an exploratory analysis to understand whether the relationships between physical therapy visit frequency or mean visit duration and mobility status at discharge or discharge to home were moderated by patient characteristics, we included interaction terms in separate regression models. We evaluated for moderation effects between physical therapy visit frequency or mean visit duration and initial 6-Clicks

mobility (or JH-HLM) score, age, sex, race, APR severity, or an ICU admission. We considered that a moderating effect may be present if the interaction term in the respective model was statistically significant ($\alpha<.05$).

All statistical analyses were completed using Stata version 15.1 (College Station, Texas, USA) at a significance level of $p<0.05$. Sample size guidelines for linear and logistic regression indicate a minimum of 2-10 cases per independent variable.[30,31] Given a maximum of 17 parameters in the primary analysis models, our minimum model sample size of 221 will achieve adequate power for our analyses. As the results of this study are hypothesis-generating and focused on estimates of effects, there was no formal adjustment for multiple comparisons.

RESULTS

We identified 963 patients discharged from a CCHS hospital after treatment for COVID-19. The full study cohort included 312 patients who were evaluated by a physical therapist during their hospitalization. Their demographic and clinical characteristics are provided in Table 1. Notably, the mean (SD) initial 6-Clicks mobility score was 14.7 (5.3) and initial JH-HLM score was 4.8 (1.7).

As shown in Table 2, the number of completed physical therapy visits was highly variable with a median of 3 and interquartile range (IQR) of 1 to 5 visits over, on average, 6 days between the date of the physical therapist evaluation and hospital discharge. The frequency of physical therapy visits was also variable with a mean of 0.5 visits per day (ie, one visit every other day), but which ranged from 0.1 to 1.5. The mean visit duration was 25.3 minutes.

Of the 312 in the full cohort, 89 and 91 patients had only one 6-Clicks mobility and JH-HLM score recorded, respectively. The 89 patients with only one score recorded had only one documented visit during their hospitalization; a description of these patients' characteristics and discharge disposition can be found in Supplemental Table 1.

The sample of 223 patients for whom 6-Clicks mobility scores at discharge were evaluated differed slightly from the full cohort in the proportion with an ICU stay (60.5% vs. 54.8%), overall hospital LOS (15 vs. 13 days), and first recorded 6-Clicks mobility score (13.9 vs. 14.7). After excluding those with only one 6-Clicks mobility score recorded, the median number of days from physical therapist evaluation to hospital discharge increased from 6 to 8 days and the median number of completed visits increased from 3 to 4. The frequency and mean duration of visits were similar in this sample compared to the full cohort (0.6 vs. 0.5 visits per day and 28.0 vs. 25.3 minutes per visit, respectively).

Of those in the cohort, 22 (7.1%) patients died in the hospital and 8 (2.6%) were discharged from the hospital with hospice services. The sample of 282 patients who were included in the analysis of likelihood for discharge to home did not differ meaningfully in any characteristics from the full cohort. The median number of days from physical therapist evaluation to hospital discharge was 5 days in this sample. The frequency and mean duration of visits were similar in this sample compared to the full cohort (0.6 vs. 0.5 visits per day and 25.5 vs. 25.3 minutes per visit, respectively).

Mobility Status at Discharge

As shown in Table 3, the mean (SD) 6-Clicks mobility score at discharge was 16.3 (5.6) and JH-HLM score at discharge was 5.4 (1.8) (mean improvements of 2.3 [4.4] and 0.8 [1.6] points, respectively). There were significant independent associations between visit frequency and both the 6-Clicks mobility (b = 3.63; 95% CI = 1.54–5.71) and JH-HLM (b = 1.15; 95% CI = 0.37–1.93) scores at discharge. Similarly, each additional 10 minutes of physical therapy per visit was significantly associated with improved 6-Clicks mobility (b = 1.55; 95% CI = 0.86–2.24) and JH-HLM (b = 0.56; 95% CI = 0.30–0.82) scores at discharge. The predicted values of 6-Clicks mobility and JH-HLM scores at discharge increased with marginal increases in visit frequency and mean visit duration (Tab. 4). For example, the adjusted mean 6-Clicks mobility score at discharge for patients with a visit frequency of 0.5 (ie, once every other day) was 16.1 compared to an adjusted mean score of 17.9 for patients with a visit frequency of 1.0 (ie, once every day).

Discharge to Home

There were 132 (46.8%) patients discharged home vs. to a PAC facility. Supplemental Table 2 shows the characteristics of these patients by discharge destination. In adjusted models, there was a statistically significant increase in likelihood of discharge to home with higher visit frequency (aRR=1.82; 95% CI = 1.25–2.63) and mean visit duration (1.22; 95% CI = 1.09–1.37). As shown in Table 4, the probability of discharge to home increased with marginal increases in visit frequency. For example, the probability of discharge to home for patients with a visit frequency of 0.5 was 45% compared to a probability of 60% for patients with a visit frequency of 1.0.

Moderating Effects

We did not observe any statistically significant interaction effects between visit frequency and the patient characteristics we tested as potential moderators in the relationship between visit frequency and the outcomes of interest. There were a number of significant interaction effects using mean duration of each visit. With each additional 10 minutes of physical therapy per visit, female patients achieved significantly higher 6-Clicks mobility scores (b = 1.19; 95% CI = 0.06–2.33) and were more likely to discharge home (aRR=1.28; 95% CI = 1.03–1.59) than otherwise similar male patients. With each additional 10 minutes of physical therapy per visit, patients who were admitted to the ICU during their hospital stay were significantly less likely to discharge home (aRR=0.77; 95% CI = 0.60–0.98) than otherwise similar patients who were not admitted to the ICU. No other significant interaction effects were observed for patient characteristics we tested as potential moderators in the relationship between mean visit frequency and the outcomes of interest.

DISCUSSION

In this examination of data for patients treated in one of eleven hospitals in a single health system for COVID-19, we identified that higher frequency of physical therapy visits and longer individual visits are both significantly associated with better mobility status at hospital discharge and with increased

probability of discharging to home. Further, with a few noted exceptions, our results suggest that individual patient characteristics do not moderate these observed associations. Thus, any patient with COVID-19 being treated by a physical therapist should have visits at a higher frequency and for longer durations than may be typical for most patients in the acute hospital setting in order to achieve higher 6-Clicks mobility and JH-HLM scores at discharge and to have a higher probability of discharging to home.

These findings are novel given our examination in patients with COVID-19, a novel disease. However, they are consistent with previous findings in other patient populations. For patients hospitalized across a broad range of health conditions, Peiris et al[32] have demonstrated that extra physical therapy treatment—extra visits, longer visits, or both—improves ability to complete activities of daily living and self-care tasks, while reducing hospital length of stay. For patients with total hip arthroplasty, more physical therapy utilization in the hospital has been shown to be associated with greater likelihood of discharge to home.[33] Following an acute stroke, patients with higher frequency of treatment from physical, occupational, and speech therapists have a decreased risk of hospital readmission,[34,35] suggesting a relationship between physical therapy utilization and positive downstream patient outcomes. Separate from physical therapist interventions specifically, more frequent ambulation during hospitalization has been shown to improve discharge to home,[36] as well as 6-Clicks mobility scores[37] and JH-HLM scores at discharge.[38]

Typical patterns for physical therapy treatment in the hospital are highly variable.[32,39] Jette et al,[39] in an observational study of general acute care practice in 3 hospitals in the Northeast United States, reported a visit frequency of approximately 0.4 to 0.5 visits per day (an average of 2 visits over a 4- or 5-day stay) with visits lasting, on average, 41 minutes. This duration included chart review, documentation, and other tasks that would not be included in the calculation of mean visit duration in our study since we accounted only for billed time during which the therapist was engaged in bedside patient care. Walsh et al[40] reported that usual practice in two hospitals in Scotland included mobility interventions on approximately 29% of, on average, 10 post-ICU days (visit frequency = 0.29). These usual utilization

patterns may not be adequate to appreciably improve mobility status at discharge or increase the probability of discharge to home for patients with COVID-19.

Compared to large heterogeneous cohorts of hospitalized patients,[10,16] a similar proportion of patients in our sample were discharged home, but with poorer mobility status at discharge. While no minimal clinically important difference (MCID) has been established for the 6-Clicks mobility or JH-HLM, estimates of the MCID (half a standard deviation for the sample)[41] are 2.2 points for the 6-Clicks mobility and 0.8 points for the JH-HLM. Thus, the observed average change we observed in this sample of patients with COVID-19 (2.3 and 0.8 points, respectively) is equivalent to the estimated MCID for each measure. However, mobility limitations at discharge persist as evidenced by average 6-Clicks mobility and JH-HLM scores (16.3 and 5.4, respectively). These scores are consistent with difficulty transferring from a bed to a chair and walking short distances (up to 10 feet) even with use of an assistive device.[42] Thus, there is a need to further understand the post-acute functional complications associated with COVID-19 and create solutions to address any persistent deficits.

The few moderating effects that we observed in our exploratory analyses were between the mean duration of each visit—not the frequency of visits—and particular patient characteristics. Females were more likely than otherwise similar males to benefit from longer visits with better mobility at discharge and higher probability of discharging home. Longer visits did not improve the probability of discharge to home for patients who were in the ICU. These observations deserve further exploration in subsequent studies as more data become available. For the latter, it may be that physical therapists dedicated significant time providing treatment for patients with the most critical illness, but that these patients remained unable to discharge home primarily due to their medical status. Our sample size was inadequate to determine whether this is the case.

For patients with COVID-19, the literature pertaining to the delivery of physical therapy—or any rehabilitation service—in the hospital continues to grow. Evidence to date has primarily come in the form of clinical recommendations from limited experience treating COVID-19 itself and from past experience

treating similar diseases (severe acute respiratory syndrome [SARS], Middle East respiratory syndrome [MERS], and the more broad acute respiratory distress syndrome).[43–51] These recommendations have focused generally on progressing mobility as patients' medical stability allows. They suggest an early emphasis on positioning (both in prone and upright, depending on the patient's respiratory status) and passive airway clearance in the most critically ill patients. Patients should progress to active airway clearance, strength training, gait training, and balance training as they improve. Additionally, there are varied recommendations to balance rehabilitation interventions with protection of staff and others from viral spread. For patients who have active infection with critical symptoms and are in quarantine it has been suggested that no intervention, intervening via telephone or virtual care as able, or intervening in person with the maximum available personal protective equipment may be appropriate. Additional papers have noted the need to prepare now for the ongoing rehabilitation needs for survivors of COVID-19, particularly those who may develop post-intensive care syndrome.[52–54]

In the acute care hospital, especially given our findings that patients benefit from more frequent and longer physical therapy visits, it is imperative that patients' needs for intervention be balanced with staff safety. This requires that protocols be established to maximize both. In CCHS hospitals, protocols have been developed in a collaborative effort between physicians and both frontline staff and management teams in physical therapy, occupational therapy, respiratory therapy, and nursing. At our main campus hospital and several regional hospitals, a COVID-19 team of therapists has been designated. This team provides the preponderance of physical therapy care for patients with COVID-19. Daily rounding tools were created to enable status tracking and efficient interprofessional communication for all patients with COVID-19 regardless of the presence of a physical therapy consult. These tools include real-time markers of illness severity, medical status, and functional status. They are used to facilitate timely, appropriate involvement of physical therapists in patients' care. For patients who are identified to have no skilled physical therapy needs, the patient and nursing team are provided with mobility and activity handouts that are consistent with the patient's current status. These handouts allow targeted

mobility sustainment when skilled therapy is not necessary. All of these tools and practices have been shared as "best practice" with all hospital therapy managers throughout CCHS. Their daily use is assured at the main campus and several regional hospitals.

Limitations

Given its observational design, potential biases do exist in this study. Our models included several patient characteristics and clinical variables that are associated with the outcomes of interest, but our adjustment was not comprehensive. For example, more traditional markers of illness severity in the hospital (eg, ICU LOS or hours on mechanical ventilation) were missing for a large proportion of the sample (49.0% and 72.8%, respectively). As we noted, however, the APR severity modifier does have good evidence as a robust substitute. Unknown patient-level confounders, and/or their moderating relationships, could contribute to improved mobility at discharge and discharge to home.

Improved mobility at discharge was assessed only for patients who had at least two physical therapy visits. We are unable to determine from our data why some patients did not receive a physical therapist consult at all or were seen only once. The patient-level data do suggest that patients who were seen only once tended to have more mild illness as indicated by shorter LOS and higher initial 6-Clicks mobility and JH-HLM scores. Our sample size was not adequate to determine whether these observations were consistent in some measurable way**,** but this should be explored further with larger patient cohorts. Further, the sample was drawn from only one health system so generalizability may be limited.

Additionally, the fact that there is an emphasis in hospitals to discharge patients home in order to limit spread of COVID-19 in PAC facilities could introduce some confounding by indication. That is, knowing this emphasis exists may predispose clinical decision-making on the part of physical therapists to both increase the frequency and duration of their visits and recommend that patients be discharged to home despite persistent functional deficits that would otherwise prompt a recommendation for additional rehabilitation in a PAC facility. We are unable to determine whether this was the case for patients in this

study, but the fact that >50% of patients did discharge to a PAC facility suggests that there may have been some clinical rationale for continuing to recommend PAC for patients with the need for such ongoing care.

Lastly, our study is limited to evaluating physical therapist intervention in terms of temporal factors (frequency and duration) rather than content. We assume that longer and more frequent visits enabled higher intensity interventions focused on activity, mobility, and strength training that would be meaningful for patient outcomes. We do not, however, have data available to confirm this assumption.

Conclusion

For patients with COVID-19, more frequent and longer physical therapy visits in the hospital are directly related to better mobility at discharge and greater probability for discharge to home. Physical therapist teams should collaborate with interprofessional colleagues to enable an adequate volume of physical therapist interventions to improve patient outcomes while ensuring safety from viral spread. As the COVID-19 pandemic continues to evolve, additional research will be needed to better understand and facilitate the role of acute care physical therapists in setting an optimal trajectory of functional recovery early in the course of patients' care.

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Ethics Approval

The Cleveland Clinic Institutional Review Board approved this study and provided a waiver of informed consent, as these data were accessed retrospectively.

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The authors completed the ICMJE Form for Disclosure of Potential Conflicts of Interest and reported no conflicts of interest.

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Table 1. Demographic and baseline clinical characteristics (N = 312)[a]

Characteristic	Value
Age at Admission, mean (SD)	69.6 (14.1)
Female, N (%)	143 (45.8%)
Race, N (%)	
White	168 (53.8%)
Black	128 (41.0%)
Other Race	16 (5.1%)
Payer, N (%)	
Medicare	219 (70.2%)
Medicaid	29 (9.3%)
Commercial	28 (9.0%)
Other	36 (11.5%)
Final Discharging Hospital, N (%)	
Hospital 1	71 (22.8%)
Hospital 2	74 (23.7%)
Hospital 3	48 (15.4%)
Hospital 4	30 (9.6%)
Hospital 5	15 (4.8%)
Hospital 6	53 (17.0%)
Hospitals 7-11	21 (6.7%)
APR DRG Severity Modifier, N (%)	
Minor	38 (12.2%)
Moderate	8 (2.6%)
Major	100 (32.1%)
Extreme	166 (53.2%)
Admitted to ICU, N (%)	171 (54.8%)
Total Hospital LOS, median (IQR)	13.0 (7.0, 20.0)
Initial 6-Clicks Mobility Score, mean (SD)	14.7 (5.3)
Initial JH-HLM Score, mean (SD)	4.8 (1.7)

[a]APR DRG = all-payer refined diagnostic related group; ICU = intensive care unit; JH-HLM = Johns Hopkins Highest Level of Mobility; LOS = length of stay.

Table 2. Physical therapy utilization in the hospital (N = 312)

Variable	Value
Days from Hospital Admission to Evaluation, median (IQR)	4.0 (2.0–9.5)
Days from Evaluation to Hospital Discharge, median (IQR)	6.0 (3.0–13.0)
Count of Completed Visits, median (IQR)	3.0 (1.0–5.0)
Count of Attempted Visits, median (IQR)	4.0 (2.0–7.0)
Frequency of Visits,[a] mean (SD)	0.5 (0.3)
Minutes of Billed Treatment per Visit, mean (SD)	25.3 (9.8)

[a]Calculated as the number of completed visits divided by the number of days from evaluation to hospital discharge.

Table 3. Observed outcomes and adjusted effect of physical therapy visit frequency and mean visit duration[a]

Outcome	Observed, mean (SD) or N (%)	Adjusted coefficient estimated	Adjusted effect of visit frequency (95% CI)	Adjusted effect of mean visit duration[b] (95% CI)
6-Clicks mobility score at discharge[c] (N=223)	16.3 (5.6)	β	3.63 (1.54–5.71)	1.55 (0.86–2.24)
JH-HLM score at discharge[c] (N=221)	5.4 (1.8)	β	1.15 (0.37–1.93)	0.56 (0.30–0.82)
Discharged to home[d] (N=282)	132 (46.8%)	aRR	1.82 (1.25–2.63)	1.22 (1.09–1.37)

[a]aRR = adjusted relative risk; JH-HLM = Johns Hopkins Highest Level of Mobility.
[b]Per 10-minute increase in mean visit duration.
[c]Excludes patients who had only one score recorded.
[d]Excludes patients who died in the hospital or were discharged to hospice care.

Table 4: Predicted outcome values at representative visit frequencies and mean visit durations[a]

Visit Frequency[a]	6-Clicks mobility score at discharge (95% CI)	JH-HLM score at discharge (95% CI)	Probability of discharge to home (95% CI)
0.25	15.1 (14.3–15.9)	5.0 (4.7–5.3)	39% (32%–45%)
0.50	16.1 (15.5–16.6)	5.3 (5.1–5.5)	45% (40%–50%)
0.75	17.0 (16.3–17.6)	5.6 (5.4–5.9)	52% (46%–57%)
1.00	17.9 (16.8–18.9)	5.9 (5.5–6.3)	60% (50%–80%)
1.25	18.8 (17.3–20.3)	6.2 (5.6–6.8)	70% (53%–87%)
1.50	19.7 (17.7–21.7)	6.5 (5.8–7.3)	81% (54%–101%)
Visit Duration (minutes)			
10	13.5 (12.1–14.8)	4.4 (3.9–4.9)	35% (27%–42%)
15	14.2 (13.2–15.3)	4.7 (4.3–5.1)	38% (32%–44%)
20	15.0 (14.3–15.8)	5.0 (4.7–5.2)	42% (37%–47%)
25	15.8 (15.3–16.3)	5.2 (5.0–5.4)	47% (42%–51%)
30	16.6 (16.1–17.1)	5.5 (5.3–5.7)	52% (46%–57%)
35	17.3 (16.7–18.0)	5.8 (5.5–6.0)	57% (49%–66%)
40	18.1 (17.2–19.1)	6.0 (5.7–6.4)	64% (52%–75%)
45	18.9 (17.6–20.2)	6.3 (5.8–6.8)	70% (54%–87%)

[a]JH-HLM = Johns Hopkins Highest Level of Mobility.

[a]Calculated as the number of completed visits divided by the number of days from evaluation to hospital discharge