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Predictors of Resuming Therapy Within Four Weeks after Discharge from Inpatient Rehabilitation

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Abstract

Purpose—1) Identify the percentage of persons with stroke resuming therapy within four weeks of inpatient rehabilitation discharge, 2) compare the characteristics of those who did and did not resume therapy, and 3) determine the predictors of resuming physical (PT), occupational (OT), and speech (ST) therapy.

Method—Socio-demographic, stroke-related, and therapy data for persons with stroke (n=131) were abstracted from inpatient rehabilitation charts. Functional Independence Measure, Stroke Impact Scale, Geriatric Depression Scale and data on therapy received after discharge were also collected.

Results—Logistic regression models demonstrated that minorities were less likely to resume PT (OR=.30) and OT (OR=.25). Survivors with neglect/visual-field cut/spatial-perceptual loss were 2–3 times more likely to resume PT, OT, and ST. Survivors with higher scores on the SIS Physical domain sub-scale were less likely to resume PT (OR=0.98) and OT (OR=0.97). Men were 3.3 times more likely to have OT than women. Those with comprehensive health insurance were 11.2 times more likely to receive ST.

Conclusions—The benefits of outpatient therapy are not universally available to all persons with stroke. Further research needs to explore the factors that hinder the prompt resumption of therapy for minority and female persons with stroke and to test appropriate interventions.

Keywords

cerebral vascular accident; rehabilitation; minority groups; gender; stroke

INTRODUCTION

Rehabilitation plays an important role in preparing stroke patients for discharge home.^{1–3} Roth reported that rehabilitation has an independent role in improving function beyond that

explained by neurological recovery alone.³ Reasons for stopping in-hospital rehabilitation include good recovery (36%), discharge or transfer from the hospital (18%), no progress or patient's request (10%), and death or other reasons (26%).⁴

Controversial results are reported in the literature regarding the use of rehabilitation services after discharge. Tyson and Turner (2000) reported that only 51% of patients were referred for follow-up therapy, and of those, 72% started therapy within six weeks of discharge.⁵ Persons with stroke have reported a high level of dissatisfaction with the amount of outpatient therapy, support from community services, and the information they receive.^{5,6} In the United Kingdom, Wiles, Ashburn, Payne, and Murphy (2004) studied the persons' disappointment and distress when therapy was ended before they and their caregivers perceived that recovery was complete.⁷ Termination of rehabilitation services sometimes occurs at discharge from the inpatient setting, but more often after a period of outpatient rehabilitation.

In a National Stroke Association (NSA) survey of 523 long-term stroke survivors, 40% reported limited success meeting rehabilitation goals related to mobility and speech, and 38% said that they lacked information about resources.⁸ While a great deal has been written about factors that predict discharge from inpatient rehabilitation, very little has been written about the factors that determine who will or will not receive therapy after discharge from inpatient rehabilitation.

The last decade has seen a significant change of focus towards community-based rehabilitation, mainly due to the increasing cost of hospital services.⁹ The national average length of inpatient rehabilitation stay is approximately 23.5 days, with patients in Veterans Affairs (VA) settings having 30–200% longer stays.¹⁰ Literature reviews report many positive results of community-based rehabilitation after discharge, even long after stroke onset.^{9, 11–16} However, studies report that patients may not actually receive the therapy that they need. In Europe, the percentage of patients with an identified need actually receiving therapy, even inpatient therapy, ranged from 44% to 90.3% for PT, from 0 to 64.9 % for OT, and from 0 to 59.5% for ST.¹⁷

Reasons for lack of therapy after discharge vary. Gilbertson, et al. (2000) reported the criteria used to exclude patients from home OT after discharge were full recovery, discharge to institutional care, terminal illness, inability to access treatment, and cognitive or communication problems.¹⁶ Wiles et al. (2004), stated that health service resources, perception of patients' motivation, and extent of physical recovery affects PT after hospital discharge.⁷ Tyson and Turner (2000) found that persons with stroke often contradicted the therapist's opinion of whether or not they would benefit from follow-up therapy; thus, lack of therapy after discharge was one of the main causes of dissatisfaction among patients.⁵ Discrepancies between how the person with stroke and the health care team view appropriate therapy goals¹⁸ may help to explain patient distress when therapy is abruptly ended.

The literature describing the association between race/ethnicity, socioeconomic status and stroke is rich.^{19–24} Likewise, much exists in the literature on the association between inpatient rehabilitation and socio-demographic variables.^{25–28} Kapral, Wang, Mamdani, and Tu (2002) reported that Canadian stroke patients in the lowest income quintile are less likely than those in the highest to receive in-hospital PT, OT, and ST.²⁴ Others found that higher monthly income in persons aged 65 years and older is weakly associated (OR 1.03, 95% CI 1.00–1.01) with attending OT and PT.²⁹

However, there is little literature about associations among race/ethnicity, socioeconomic status or health insurance and the resumption of outpatient therapy after stroke. Two studies in the 1990's came to different conclusions. Mayer-Oakes and colleagues found significantly less OT/PT use among elderly people who were a racial minority, less well educated, or in the oldest age group.³⁰ However, a study conducted in the Netherlands found that while older age,

lower income, and inadequate discharge information decreased the use of therapy, overall there was equity in access to care after a stroke as determined by functional status, living arrangements and social circumstances.³¹ A study in 2002 in the Netherlands similarly found that while persons with stroke from the lower socioeconomic group had more impairments long term than those in the higher socioeconomic group, there were no statistically significant associations between socioeconomic status and health care utilization after adjusting for health care needs.³² More recently, McKevitt, Coshall, Tilling and Wolfe (2005), in their study of inner city persons with stroke, found no significant differences between ethnic groups using PT, OT or ST in the first 90 days post-stroke.³³

While no specific characteristics of persons with stroke are always associated with recovery, there are some factors that are often associated with functional recovery after stroke. These factors include age, aphasia, depression, cognitive function, incontinence, severity, the Functional Independence Measure (FIM) score, neglect, and the level of social support.^{34–36}

The purposes of this paper are as follows:

1. Identify the percentage of persons with stroke resuming physical (PT), occupational (OT) and speech (ST) therapy within 4 weeks after discharge from inpatient rehabilitation.
2. Compare the characteristics of persons with stroke resuming or not resuming PT, OT, or ST within four weeks after discharge from inpatient rehabilitation.
3. Determine the variables that predict the resumption of PT, OT, or ST within four weeks after hospital discharge.

METHODS

Study design

A prospective cohort study was conducted from inpatient rehabilitation discharge through the first four weeks at home. Four weeks was chosen as a reasonable period of time to allow the person with stroke and family to adjust to the home environment and to make arrangements for continued therapy.

Setting

Study participants were recruited from five different hospital systems within the Texas Medical Center (TMC), a very large medical tertiary care and referral center in Houston, Texas, the fourth largest city in the US. Recruitment sites included tertiary care hospital rehab units, a rehabilitation hospital, the VA, and a L-TACH (Long Term Acute Care Hospital). All study participants received orders for therapy as a part of the discharge process. After discharge, study participants returned to their own homes within a 50-mile radius of the TMC which included parts of seven counties. Within this area there are 80 acute care hospitals, many with outpatient rehabilitation facilities. In addition, there are many free-standing rehabilitation centers within this seven county area. Therefore, the study participants were able to receive their outpatient rehabilitation therapy in facilities near their own homes.

Sample

The sample for this study was 131 persons with stroke who met the following inclusion criteria: 1) age 50 or greater, 2) hospitalized in an inpatient rehabilitation unit with a diagnosis of stroke, 3) received PT, OT and/or ST in the inpatient rehabilitation unit, 4) discharged home with a spouse, and 4) English speaking. Since age and the presence of a spousal caregiver have been shown to influence discharge home and functional outcomes, these variables were controlled

by only enrolling participants who were at least age 50 and were going home with a spouse. Persons with stroke were excluded who had global aphasia, were on hospice or had another major physical or psychiatric condition that could interfere with participating in rehabilitation (i.e. dementia, severe Parkinson's disease). The sample was recruited between November, 2001 and December, 2005. All eligible participants received written materials and oral explanations; additionally, discussions were held when the spouse was present to ensure that the persons with stroke, especially those who had cognitive impairments, were able to clearly consider their options and discuss them with family before consenting. Among the eligible persons with stroke, 50.6% agreed to participate in the study; they were representative of those who met the inclusion criteria.³⁷ The study was approved by the university Institutional Review Board (IRB) and by the IRB committees of the five health care systems from which patients were recruited.

Data Collection Procedures

Data from the inpatient rehabilitation chart were abstracted by the recruiters immediately prior to discharge. A well-trained research nurse interviewed study participants in their homes immediately after their discharge to complete the Functional Independence Measure (FIM), the Stroke Impact Scale (SIS), and the Geriatric Depression Scale (GDS15). Service utilization data, including amount and type of outpatient therapy, were collected on a specially-designed weekly calendar that was sent home with the study participants and families at the time of discharge.

Instruments

At the time of discharge, trained nurses and occupational therapists abstracted demographic data (age, gender, race/ethnicity, income, educational level, and health insurance coverage), preexisting risk factors, stroke-related impairments, inpatient rehabilitation complications, and the number and type of inpatient rehabilitation therapies from rehabilitation charts. The four-factor Hollinghead's formula was used to determine socioeconomic status (SES).³⁸

The FIM, an 18-item instrument, measures performance in self-care, sphincter control, transfers, locomotion, communication, and social cognition on a scale of 1 (total assistance) to 7 (complete independence).³⁹ The total scores range from 18–126 with higher scores representing more independent functioning. The FIM has been found to be a reliable measure of function for persons with stroke (Cronbach's $\alpha = 0.93$) with inter-rater correlations ranging from 0.86 to 0.88.³⁹ Cronbach's α for the FIM was 0.95 in this study.

The Stroke Impact Scale (SIS), version 2, is a 59-item stroke-specific quality of life instrument, developed based on the feedback from persons with stroke and their caregivers to better understand their perceptions of the impact of the stroke on the physical, mental and emotional aspects of their lives.⁴⁰ The SIS measures recovery in eight domains: strength, hand function, mobility, activities of daily living, emotion, memory, communication and social participation. The first four domains may be combined into one Physical domain score, which is used in this paper. Higher scores indicate fewer negative impacts from the stroke, and therefore, a higher quality of life. All domains demonstrated moderate to strong correlations (0.44 to 0.84) when compared with established outcome measures (e.g., FIM, SF-36, GDS15, and National Institutes of Health Stroke Scale (NIHSS)).⁴⁰ Cronbach's α for the SIS Physical domain in this study was 0.95.

The Geriatric Depression Scale (GDS15) was specifically designed to assess depression in older adults. The scale omits somatic items in order to avoid assessing physical complaints that can be associated with the normal aging process.⁴¹ The 15-item scale used in this study had a cut-off of 4/5 for significant depressive symptomatology. It has been found to be

acceptable to older patients (87.6%) with only 3.6% finding it very difficult or very stressful to complete. The GDS15 has been shown to have a high level of internal consistency (Cronbach's $\alpha = 0.80$) and all of the individual items have been significantly associated ($p < 0.01$) with the total score.⁴¹ The reliability for the GDS15 in the current study was 0.76.

Data Management & Analysis

All data were collected on specially-designed forms that were scanned into the computer using Cardiff Teleform software, version 8.1.⁴² After checks for accuracy, the data were directly transferred into a Microsoft Access database and then imported into SAS software, version 9.1.3 for statistical analysis.⁴³

Separate analyses were done for each of the three types of therapy (PT, OT, and ST). Univariate analyses of continuous variables for persons with stroke who did or did not resume outpatient therapy within four weeks after discharge were conducted with the t test for independent samples and the Wilcoxon rank sum test. The chi-square test was used for group comparisons with categorical variables, with Fisher's exact test used when expected cell counts were less than five. Those variables with a $p < 0.25$ in the univariate analyses were selected for multiple logistic regression analysis to identify those factors that were associated with the resumption of outpatient PT, OT, or ST within the first four weeks post discharge from inpatient rehabilitation. A p level of 0.25 was used to ensure that all potentially important variables were selected, as recommended by Hosmer & Lemeshow (2000).⁴⁴ Odds ratios presented are adjusted for the other predictors in the model.

RESULTS

Profile of Study Participants

The socio-demographic profile of the study participants and scores from the three previously mentioned instruments, FIM, GDS15, and SIS Physical domain, are shown in Table 1. While all study participants were discharged home with spouses, 46% of the spouses were working at least part-time outside the home.

Twenty-seven percent ($n=36$) of study participants had experienced at least one stroke prior to their current admission; the cause of the current stroke for the majority of participants was a thrombus (74.0%, $n=97$) and slightly more than 50% had a right-hemisphere stroke (55.0%, $n=72$). Fifty percent of the study participants ($n=65$) had two to three major risk factors. The three most common risk factors were hypertension (89.3%, $n=117$), diabetes (41.2%, $n=54$) and hyperlipidemia (42.0%, $n=55$).

Ninety-two percent ($n=121$) of persons with stroke had hemiparesis or hemiplegia of an arm and/or leg and 76.3 % ($n=100$) had some cognitive impairment, including decreased memory or attention span, trouble with problem solving and learning difficulties. Aphasia was reported in 29.8% ($n=39$) and neglect, visual cut and/or visual-spatial deficits in 51.9% ($n=68$). The most common stroke-related impairments are shown in Table 2.

Rehabilitation Therapy

While the mean rehabilitation length of stay (LOS) was 38.3 days, the median was 24 days and the mode was only 15 days. Almost 99% ($n = 129$) of the persons with stroke received inpatient PT and OT; 110 (84.0%) received inpatient ST. One individual who received inpatient PT and OT had missing data for therapy after discharge. At the point of discharge from inpatient rehabilitation therapy, the persons with stroke reported that they had experienced, on average, a 52.0% recovery (on a scale of 0 – 100%). The majority of the persons with stroke who received therapy after discharge went to an outpatient facility near their home. Family and/or a paid

attendant provided the transportation in a private vehicle. Less than 20% of the patients received home-based therapy: PT = 25 (19.5%), OT = 18 (14%), ST = 8(7.3%).

Seventy percent (n = 89) of the persons with stroke receiving inpatient physical therapy had resumed PT within the first four weeks post rehabilitation hospital discharge, while only 61.7% (n=79) of the patients who had received inpatient OT had resumed OT. Less than one-half (38.2%, n=42) of the persons with stroke who received inpatient ST had resumed it within four weeks post discharge.

The mean total number of hours of combined (PT, OT & ST) therapy received by persons with stroke during their first four weeks at home was 13.80 hours (SD=13.15, range 0 to 57 hours). For those who received outpatient therapy, the mean number of hours spent on the three therapies per week for the first four weeks were very similar: PT = 2.78 hours/week (SD .98, range 1–5), OT = 2.75 hours/week (SD 1.06, range 1–5) and ST = 2.92 hours/week (SD 1.22, range 1–5).

Comparison Between Those Who Resumed and Did Not Resume Therapy

The significant differences between persons with stroke who did and did not resume therapy within four weeks after hospital discharge are shown in Table 3 (PT), Table 4 (OT) and Table 5 (ST). As can be seen, persons with stroke who were minorities and had inadequate health insurance coverage were less likely to have resumed PT, OT, or ST, while those with lower SES were less likely to resume OT or ST. Persons with stroke who had a lower mean score (45.9 vs. 56.1) on the SIS Physical domain sub-scale, meaning that they perceived that they had less strength, hand function, mobility, and ability to do activities of daily living, were more likely to resume OT. In addition, men were statistically more likely than women to resume OT ($\chi^2(1) = 5.61, p = 0.02$).

A greater percentage of persons with stroke with neglect, visual field cut and/or spatial-perceptual deficits resumed all three types of outpatient therapy within the first four weeks after discharge from inpatient rehabilitation. The presence of hemiparesis or hemiplegia did not increase the likelihood of resuming therapy. In fact, there was a higher percentage of persons with hemiparesis/hemiplegia in the group that did not resume PT, as compared to those that did (100% vs. 88.8%, $p = 0.03$). However, having aphasia and having more impairments and medical complications were associated with receiving speech therapy; 57% of those resuming speech therapy had aphasia, as compared to 21% of those who did not resume ST ($p < 0.01$).

There were no statistically significant differences in the FIM, depression scores (GDS15), the inpatient rehabilitation LOS, or in their perceptions of percent of recovery between the persons with stroke who resumed or did not resume PT, OT or ST within the first four weeks after hospital discharge. The GDS mean score of 3.7 fell in the normal category indicating that overall, this sample was not depressed. Furthermore, there were no significant differences in terms of the brain hemisphere affected and whether this current hospitalization was for the first or a recurrent stroke.

Predictors of Resuming Therapy Within Four Weeks After Hospital Discharge

Logistic regression models for predicting the resumption of therapy in the four weeks after hospital discharge are presented in Table 6. Results indicated that the significant predictors of resuming PT were non-minority status, SIS Physical domain score, and neglect/visual field cut/spatial-perceptual deficits. Those persons with stroke categorized as minorities were 70% less likely than non-Hispanic whites to have PT in the first month (OR = .30). A one point higher score on the SIS Physical domain sub-scale decreased the odds of resuming PT by 2%.

Persons with stroke who had neglect/visual field cut/spatial-perceptual loss were 2.4 times as likely to have PT in the first four weeks as those without.

For resumption of OT, the significant predictors derived from logistic regression were gender, minority status, SIS Physical domain score, and neglect/visual field cut/spatial-perceptual loss. In the first four weeks after discharge from inpatient rehabilitation, males were more than three times as likely to have OT than females, while minorities were 75% less likely to have OT (OR = 0.25) as non-Hispanic whites. As with PT, higher SIS Physical domain scores reduced the odds of OT in the first four weeks. The presence of neglect/visual field cut/spatial-perceptual loss increased the odds of resuming OT by 2.7 times.

Comprehensive health insurance coverage, aphasia, and neglect/visual field cut/spatial-perceptual loss were significant predictors of ST resumption in the first four weeks. Those with comprehensive insurance were more than 11 times as likely to resume ST in the first four weeks after discharge. The presence of aphasia increased the odds of ST almost six-fold, while those with neglect/visual field cut/spatial-perceptual loss were 2.6 times as likely to have ST in the first four weeks.

DISCUSSION

The major therapeutic approach to facilitate recovery after stroke is rehabilitation, which is aimed at limiting the extent of disability and enabling the persons with stroke to regain maximum independence. Inpatient rehabilitation is usually the start of this process; however, most persons with stroke are discharged home from inpatient rehabilitation with continuing disabilities. In this study, participants perceived that they had regained only 50% of their pre-stroke function. The amount of time spent in inpatient rehabilitation was variable (range of 3 to 302 days). The mean of 38.3 days in this study was above the national average of 23.5 (SD = 13.2). This reflects the complexities of the needs of some of the study participants and also the fact that study participants were recruited from many settings, including a L-TACH and the VA, which has been shown to have longer LOS than other hospitals. Stineman, Ross, Hamilton, Maislin, Bates, Granger, and Asch (2001)¹⁰ reported that persons with stroke receiving inpatient rehabilitation at the VA had a mean LOS of 32.5 days (SD = 21.7), statistically higher ($p < .0001$) than non-VA hospitals. The median of 24 days, however, was very close to the national mean of 23.5. The length of stay as an inpatient was not associated with resuming PT, OT, or ST within the first four weeks after discharge. Unlike a previous study,¹⁷ almost all of the persons with stroke (96%) received PT and OT in the hospital, and 82% received speech therapy. Substantial numbers of persons with stroke who had received inpatient PT had resumed PT within four weeks of discharge (70%). However, these numbers decreased for OT (62%) and dropped to less than 40% for ST (38%). In this study, speech therapists provided therapy to survivors with aphasia, dysarthria, dysphagia, and cognitive impairments; this may help to account for the drop in ST as an outpatient.

A major finding of this study was that SES, race/ethnicity, and health insurance were all statistically associated with the resumption of prompt outpatient therapy, and race/ethnicity and health insurance were significant predictors. There are few studies of the relations among rehabilitation services and these factors among persons with stroke.^{24–33} Kapral, Wang, Mamdani, and Tu (2002) attributed SES differences in inpatient therapy in Canada to uneven distribution of resources of specialist and advanced technology.²⁴ In this study, the inpatient utilization of services was high for all groups, but the discrepancies occurred with outpatient therapy. The differences in utilization by persons with stroke in this study could not be explained by uneven distribution of resources because the study participants were all discharged from health care systems within a large medical complex and received orders for outpatient rehabilitation near their homes in a seven county area around the medical complex

which had many available rehabilitation facilities. Minority status, not SES, was a predictor of not resuming OT or PT within four weeks of discharge. Minority survivors were 70–75% less likely to resume PT or OT than non-Hispanic whites. A number of factors may account for these differences; possible explanations include lack of responsiveness of the system to scheduling assessments and appointments, the aggressiveness of the person with stroke and family in pursuing therapy, working spouses who had difficulty providing transportation, or lack of cultural sensitivity to minority needs and perspectives.

The type of health insurance has been shown to explain differences in levels of access to medical care among different races. According to Carlisle,⁴⁵ African American and Latino patients were less likely to use cardiovascular procedures than non-Hispanic white patients for most types of insurance, but there were not disparities among the privately insured. In this study, health insurance was the major predictor of resuming ST within the first four weeks after discharge with an odds ratio of 11.2, suggesting that without comprehensive health insurance most persons with stroke do not have the benefit of ST following discharge.

Many factors (depression, cognitive function, FIM score, number of comorbidities, impairments, or complications, lack of availability of services, or distance to services) that have been reported as being related to outcomes in other studies, and thus might have influenced decisions about continued rehabilitation, appeared to have little to no influence on who did and did not resume prompt outpatient therapy. The depression score indicated that overall the sample was not depressed at discharge. While there was wide variability in the scores, the FIM score of 89 is consistent with the discharge FIM scores of 70–108 reported in the literature.^{46–49} It is interesting to note however, that the scores on SIS physical domain sub-scale as a measure of the individual's perception of recovery was a significant predictor. Persons with stroke who perceived that they were functioning better (high SIS physical domain scores) were less likely to have resumed PT or OT within four weeks after discharge. This suggests that although the more objective FIM scores were not related to resumption of therapy, persons with stroke who reported they were not recovering physical function might have been more motivated to make the necessary arrangements to resume therapy more quickly. In addition, their spouses, or health care professionals may have moved more quickly to resume therapy for persons who scored lower on physical functional ability. The presence of neglect, visual cut, and/or spatial-perceptual deficits, were significantly associated with resuming PT, OT, and ST, suggesting that there was recognition by professionals and families that these impairments complicated and slowed the process of recovery, thus requiring more therapy after discharge home. Persons with stroke who were aphasic were also significantly more likely to receive speech therapy after discharge than those without aphasia who had received speech therapy for other impairments (i.e., dysphagia, dysarthria).

With the exception of SES, minority status, and insurance coverage, socio-demographic factors were generally not related to the resumption of therapy within the first four weeks after discharge from inpatient rehabilitation. In the logistic regression models, being a minority (for OT and PT), being a woman (for OT) and lacking comprehensive health insurance (for ST) were the only statistically significant predictors of not resuming therapy promptly after discharge. Age was not related to resuming therapy, as has sometimes been reported in the literature. This may reflect the relatively narrow age span in this study.

LIMITATIONS

One limitation of this study was the use of four weeks as the cut-off point for measuring the resumption of therapy. Additional persons with stroke might have started therapy later due to difficulties with scheduling initial evaluations, arranging transportation, getting approvals from health organizations or encountering waiting lists for therapy appointments. The numbers do,

however, compare favorably with those reported by Tyson and Turner (2000), where only 51% of patients were referred for follow-up therapy and of those, only 72% had started therapy within six weeks of discharge.⁵

A second limitation is that the data on the resumption of therapy and the number of hours of therapy per week are based on the weekly reports of the persons with stroke and their caregivers. There was no central provider for therapy, but study participants received therapy in many different sites throughout the metropolitan area. The therapy data were not verified by examining therapy service records.

A third limitation of this study is that the sample included all persons with stroke who were discharged home with a spouse. The fact that persons with stroke were discharged home with a spousal caregiver may have influenced the results. The presence of a spousal caregiver may have provided additional pressure for continuing therapy, as well as providing social support to the individual, and transportation to appointments, thus increasing the likelihood that therapy would resume promptly.

CONCLUSIONS

In conclusion, persons with stroke with lack of neglect, field cut and/or spatial-perceptual deficits, and aphasia are more likely to resume prompt therapy after discharge than others. The survivors' perceptions of their physical recovery, as measured by the SIS Physical domain score, are better predictors of resumption of therapy than more objective measures, such as the FIM score. The study findings suggest that referrals are made for therapy for those with lower physical function scores, with neglect/field cut and/or spatial perceptual deficits, and persons with stroke and their families are motivated to make the necessary arrangements within the first four weeks at home, in spite of all of the other adjustments that must be made to living at home. However, the study suggests that the benefits of therapy are not universally available to all persons with stroke. Minorities, women, and those without comprehensive insurance coverage still lack prompt access to therapy. The reasons for these differences are not entirely clear. Further research needs to explore the factors that influence the prompt resumption of therapy for minority and female persons who experience strokes and to test appropriate interventions. More research is needed to determine if the lack of access for these groups only affects the immediate post inpatient rehabilitation discharge period (first four weeks) or if access to therapy is a continuing problem for persons with stroke who are seeking to maximize their recovery.

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Table 1

Sociodemographic and Stroke-Related Characteristics of Persons with Stroke Who Received Inpatient PT, OT and/or ST and Were Discharged Home with a Spouse N=131

Variable	$\bar{X}$	SD	Range
Age	66.2	9.14	50.1–87.6
Socioeconomic Status	42.8	11.52	13–66
Total FIM	89.3	22.1	22–123
SIS Physical Score	49.5	21.26	5–96
SIS % Recovery	52.0	23.53	0–100
GDS15 (Depression) Score	3.7	2.7	0–11
Inpatient Rehab Length of Stay ^a	38.3	45.5	3–302
Number of Comorbidities	2.8	1.3	0–6
Number of Impairments	7.0	2.9	2–15
Number of Inpatient Rehab Complications	3.4	2.9	0–13
	n	%	
Gender			
Male	100	76.3	
Female	31	23.7	
Race			
Minority	55	42.0	
Non-Hispanic White	76	58.0	
Education			
< High School	22	16.8	
High School Graduate	30	22.9	
Partial College	34	26.0	
College Graduate	45	34.4	
Comprehensive insurance coverage (Medicare with supplement, Private, VA)	108	82.4	
Inadequate insurance coverage (No insurance, Medicare or Medicaid without supplement)	23	17.6	

^aMedian = 24, Mode = 15

Table 2

Stroke-Related Impairments of Persons with Stroke Who Received Inpatient PT, OT and/or ST and Were Discharged Home with a Spouse N=131

Impairment	Frequency (%)
Aphasia	39 (29.8)
Apraxia	23 (17.6)
Ataxia	86 (65.7)
Cognitive Impairment	100 (76.3)
Dysarthria	78 (59.5)
Dysphagia	63 (48.1)
Facial paralysis	85 (64.9)
Hemiparesis/Hemiplegia	121 (92.4)
Sensory changes	72 (55.0)
Spasticity	45 (34.4)
Visual neglect/Neglect of one side	68 (51.9)
Pain	45 (34.4)
Diplopia/Blurred vision	10 (7.6)
Emotional lability	4 (3.1)

Table 3
Significant Differences Between Persons with Stroke Who Resumed Physical Therapy Within Four Weeks After Discharge and Those Who Did Not

Variable	Physical Therapy n = 89		No Physical Therapy n = 39		Test Statistic	p-value
	n	%	n	%		
Minority – yes	31	34.8	23	59	6.48	0.01
Comprehensive insurance coverage	77	86.5	28	71.8	3.99	0.05
Hemiparesis/plegia present	79	88.8	39	100	*	0.03
Neglect/Visual Cut/Spatial-Perceptual Problems	52	58.4	14	35.9	5.51	0.02

* Fisher's exact test

Significant Differences Between Persons with Stroke Who Resumed Occupational Therapy Within Four Weeks After Discharge and Those Who Did Not

Table 4

Variable	Occupational Therapy n = 79		No Occupational Therapy n = 49		Test Statistic	p-value
	$\bar{X}$	SD	$\bar{X}$	SD		
SES	44.4	11.02	40.1	11.91	t	0.04
SIS Physical	45.9	20.49	56.1	20.83	2.73	0.01
	n	%	n	%	χ^2	
Gender - male	66	83.5	32	65.3	5.61	0.02
Minority - yes	26	32.9	27	55.1	6.14	0.01
Comprehensive insurance coverage	70	88.6	35	71.4	6.06	0.01
Neglect/Visual Cur/Spatial-Perceptual Problems	48	60.8	18	36.7	6.99	0.01

Significant Differences Between Persons with Stroke Who Resumed Speech Therapy Within One Month of Discharge and Those Who Did Not

Table 5

Variable	Speech Therapy n = 42		No Speech Therapy n = 68		Test Statistic	p-value
	$\bar{X}$	SD	$\bar{X}$	SD		
SES	46	10.20	40.0	11.33	t	0.01
Number of Impairments	8	3.02	6.8	2.84	-2.09	0.04
Number of Medical Complications	4.3	2.82	3.1	2.75	-2.26	0.03
	n	%	n	%	χ^2	
Minority - yes	13	31	34	50	3.85	0.05
Comprehensive insurance coverage	40	95.2	51	75	7.44	0.01
Aphasia present	24	57.1	14	20.6	15.34	<0.01
Neglect/Visual Cur/Spatial-Perceptual Problems	29	69.1	29	42.7	7.26	0.01

Table 6
Logistic Regression Model Predictors of Resuming Therapy Within 1 Month After Hospital Discharge

Variable	Odds Ratio	95% CI
Physical Therapy		
Minority – Yes	.30	.13 – .70
SIS Physical	.98	0.96 – 0.998
Neglect/Visual Cut/Spatial-Perceptual Problems	2.39	1.06 – 5.40
Occupational Therapy		
Gender – Male	3.32	1.27 – 8.70
Minority – Yes	.25	0.10 – 0.59
SIS Physical	.97	0.96 – 0.99
Neglect/Visual Cut/Spatial-Perceptual Problems	2.70	1.20 – 6.04
Speech Therapy		
Comprehensive Insurance Coverage	11.20	2.06 – 60.91
Aphasia	5.84	2.25 – 15.13
Neglect/Visual Cut/Spatial-Perceptual Problems	2.63	1.05 – 6.55