Consequences of Poststroke Falls: Activity Limitation, Increased Dependence, and the Development of Fear of Falling

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KEY WORDS
• accidental falls
• activities of daily living
• mobility limitation
• self concept
• stroke

OBJECTIVES. We used qualitative data to explore the perceived consequences of poststroke falls during the first 6 months after discharge from the hospital.

METHOD. We interviewed 132 male stroke survivors 1 and 6 months after discharge to describe stroke recovery trajectories. Interviews of participants who discussed falling after stroke as one of their major concerns were analyzed to explore the consequences of poststroke falls.

RESULTS. During the first 6 months after stroke, 42 (32%) participants discussed poststroke falls. The results of the qualitative analysis indicate three important emergent themes related to the consequences of poststroke falls: (1) limiting activity and participation, (2) increasing dependence, and (3) developing a fear of falling.

CONCLUSION. Falls after discharge home were common in this group of stroke survivors. Future research is needed to better understand the impact of fall-related consequences and to explore strategies for fall prevention.

The American Heart Association has reported that stroke is a common neurological event, occurring in 700,000 people a year in the United States (Thom et al., 2006). Stroke is the primary cause of disability in the United States, and those surviving a stroke are often left with sensory, cognitive, motor, and balance impairments that negatively affect mobility and other activities of daily living (ADLs) and instrumental activities of daily living (IADLs; Taub, Wolfe, Richardson, & Burney, 1994; Wilkinson et al., 1997; Wolfe et al., 1993).

Forster and Young (1995) examined falls incidence and reported that 73% of participants fell in the first 6 months after a stroke. This percentage is a significant increase from the annual 30% incidence of falls in the community-dwelling elderly population (Tinetti, Speechley, & Ginter, 1988). Falls can have severe consequences. Severe consequences related to falls include hip fractures and head trauma, increased health care use, declines in ADLs and IADLs, decreased socialization,
increased admissions to long-term care (LTC) facilities, premature disability, and death (Donald & Bulpitt, 1999; Sterling, O‘Connor, & Bonadies, 2001). In the United States, falls are the leading cause of injurious death for community-dwelling people ages 65 or older (National Center for Injury Prevention and Control, 2004). Donald and Bulpitt (1999) found that risk of death increased at both 1 and 3 years for recurrent fallers, and those who fell demonstrated a loss of function and independence, consequently increasing admissions to LTC facilities. Tinetti et al. (1988) reported that 40% of all nursing home admissions were fall related. Additionally, King and Tinetti (1995) determined that morbidity, physical injury, restriction of mobility, reduction of activity and participation, and generalized decreases in independence were fall-related consequences.

Restriction of mobility and declines in ability to complete ADLs and IADLs are also severe consequences associated with falls (Hyndman, Ashburn, & Stack, 2002; King & Tinetti, 1995; Vellas, Cayla, Bouquet, de Pemille, & Albarede, 1987), and both are negatively related to decreased independence and quality of life. Stel, Smit, Pluijim, and Lips (2004) examined fall-related declines in functional status and physical activity and found that 35.3% of their sample reported postfall declines in functional status, and 15.2% reported declines in physical activity. Vellas et al. (1987) determined that those who fell demonstrated restricted activity and decreased independence at 6 months.

Although the consequences of falls are well documented, little qualitative research has described the relationship among poststroke deficits, poststroke falls, and the consequences of those falls. Interviewing people with a disability is commonly done to explore individual and group perceptions, such as the consequences of falls. This kind of knowledge can contribute to an understanding among rehabilitation professionals that can be integrated into their clinical practice.

Our purpose in this article is to qualitatively explore stroke survivors’ perceptions of the consequences of poststroke falls during the first 6 months after discharge home.

Method

Design

We obtained data for this study from an ongoing longitudinal study using mixed methods including in-depth qualitative interviews (Rittman, 2000). The longitudinal study was completed to examine recovery patterns after stroke and included people who had experienced an acute stroke and were discharged home. Study participants continued to receive usual medical and rehabilitation care after their discharge home. Caregivers were included in this study and interviewed separately from the person who sustained the stroke.

This secondary analysis focused on participants who naturally, without prompts, discussed poststroke falls and the consequences of those falls.

Study Participants

One hundred thirty-two participants were enrolled in the main longitudinal study. All stroke survivors were male and treated at a U.S. Veterans Affairs Medical Center. All data collection and analyses had human participants approval.

Inclusion criteria for people to be involved in the longitudinal study were as follows:

- Being a member of one of three ethnic groups (White, African-American, or Puerto Rican Hispanic),
- Being discharged directly home from an acute care unit after a stroke,
- Having a Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975) score of ≥18 and being able to verbally communicate at discharge,
- Having a caregiver willing to participate, and
- Signing a consent form or having the consent form signed by a proxy.

Exclusion criteria were an inability to communicate or unwillingness to participate. Inclusion criteria for data analysis also required participants to discuss fall-related issues during the 1- or 6-month interviews.

Identification of Participants Discussing Falls

Participants did not complete a standardized falls assessment. Rather, participants were included in this secondary analysis when they naturally discussed falls during interviews as an important issue of poststroke recovery. Specifically, we included participants when they used words from the following list to discuss falls or concerns or worries about falls: fall, fell, balance, trip, stumble, wobble, wobbly, slip, dizzy, dizziness, walk, walking, walker, cane, crutches, crutch, fear, fearful, afraid, scared, worry, and worried. We then used these words to search all interviews as a way to ensure inclusion of all participants who discussed issues related to falls at both 1 month and 6 months after discharge home. We reread texts to verify that participants reported information relevant to falling. A qualitative research specialist validated the selection of participants.

Data Collection

Quantitative Data. We collected demographic data and baseline assessments at the time of discharge for each stroke survivor. Stroke survivor demographic data included age, gender, race and ethnicity, employment status, and income.
Baseline standardized assessments included the Functional Independence Measure™ (FIM; Granger, Hamilton, Linacre, Heinemann, & Wright, 1993; Stineman, Jette, Fiedler, & Granger, 1997; Stineman et al., 1996) to assess change in functional status over time and the MMSE to measure cognitive status for study eligibility purposes (Folstein et al., 1975; Folstein, Robins, & Helzer, 1983).

**Qualitative Data.** We obtained the qualitative data included in this analysis during at-home, in-depth, semistructured 50-min interviews with the stroke survivors in their homes at 1 and 6 months after discharge home. Interviews were completed with the stroke survivor using a script and probing questions to encourage participants to describe their experiences after discharge, including problems in managing their daily lives, stroke-related disabilities, and recovery. Interviews were tape recorded and transcribed verbatim by a research assistant who was not involved in original data collection. Interviews conducted in Spanish were translated and verified.

**Data Analysis**

**Quantitative Data.** We used quantitative data to describe the participants; these data are represented through means and standard deviations or frequencies and proportions as appropriate. We made group comparisons with Student t tests and chi-square analyses as suitable.

**Qualitative Data.** We used latent content analysis to analyze the interview data (Tashakkori & Teddlie, 1998). The latent approach involves an analysis similar to the constant comparative process commonly used in qualitative analysis in which the researchers identify emergent themes and patterns in the data.

Two stroke researchers independently reviewed the interviews and hand coded the data segments into key thematic codes. Initially, 12 themes emerged from the data; all were influenced by supportive literature, clinical experience, and quantitative data. Subsequent coding was completed using QSR NUD*IST 6 software (QRS International, Sydney, Australia).

We met to ensure commonality in thematic codes and agreed on two primary and multiple secondary themes that encompassed all major fall-related constructs of the interviews (see Table 1). Supporting quotes could be coded under more than one thematic code. We each then independently reanalyzed and coded supporting quotes under each secondary theme. When a disagreement occurred regarding coding, we asked an additional rehabilitation researcher to evaluate the quote and assist with identifying it under a thematic code. We synthesized all comments and discussed them as needed for consensus regarding coding of each quote, thus ensuring trustworthiness of the analysis. The objective was to detect patterns in the data that characterized the consequences of poststroke falls.

**Results**

**Quantitative Data**

The larger study enrolled 132 participants. We included 42 (32%) participants in the secondary analysis because they described experiences related to poststroke falls during the first 6 months after discharge home. Thirteen participants indicated fall-related concerns at both 1 and 6 months; thus, we included both of their interviews in the analysis (42 participant interviews + 13 participants with second interviews = 55 analyzed interviews). The average age was 66.33 (±7.82) years. See Table 2 for baseline data of those who did and did not discuss falls. There were no significant differences in these measures between those who did and did not discuss falls after stroke.

**Qualitative Data**

The analyses indicate that falls were a common issue for patients after a stroke. Quotes regarding the subsequent consequences of poststroke falls categorized into the following

<table>
<thead>
<tr>
<th>Table 1. Primary and Secondary Themes</th>
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<tr>
<td><strong>Primary Theme</strong></td>
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<td>Physical aspects of falls</td>
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<th>Table 2. Baseline Measures for Those Discussing and Not Discussing Falls (N = 132)</th>
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<td>Measures</td>
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<td>Age, years</td>
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<td>Race or ethnicity, n (%)</td>
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<td>White</td>
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<td>African-American</td>
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<td>Puerto Rican Hispanic</td>
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<td>FIM Score</td>
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**Note:** Values are means (and standard deviations) except as noted. There were no significant differences between groups. FIM = Functional Independence Measure; MMSE = Mini-Mental State Examination.
three themes: (1) limiting activity and participation, (2) increasing dependence, and (3) developing a fear of falling. See Table 3 for a summary of primary, secondary, and final themes.

Limiting Activity and Participation

Physical Activity and Decreased Activity. Participants discussed physical bodily changes; not being able to move the same as before the stroke; and the ensuing negative impact of decreased mobility, activity, and participation. Many talked freely about paralysis and hemiplegia or general bodily changes that affect balance and strength. The simple task of walking across a room becomes problematic after a stroke, and the risk of falling must be managed in the home and community environment.

Oh, am I tired . . . legs just bow, buckle underneath me . . . the feeling that any time now, the hip and leg are gonna give out and I’m gonna fall.

Uh, the only problems I can think of . . . is balance . . . I have to hold onto things, so it’s a balance problem and I’m . . . prone to fall down.

Activity and Participation Limitation as a Strategy to Prevent Falls. Because falling became common for some participants, talk about strategies for the prevention of future falls was common and emerged naturally during interviews. A significant consequence was the choice to limit everyday life activities at home and in the community to help manage and prevent falls.

I wasn’t a real religious fella or anything like that, but I did go to church . . . with my wife on Sunday. But . . . the last time I went to church with her I lost my complete balance as we were walking out o’ church, because of the fall problem I have, and I almost knocked an old lady down . . . and I won’t go back to church.

Table 3. Summary of Primary, Secondary, and Final Themes

<table>
<thead>
<tr>
<th>Primary Theme</th>
<th>Secondary Themes</th>
<th>Final Themes</th>
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<tbody>
<tr>
<td>Physical aspects</td>
<td>Paralysis or hemiplegia</td>
<td>• Increased dependence</td>
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<tr>
<td>of falls</td>
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<td>• Development of FoF</td>
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<td></td>
<td>Fell at time of stroke</td>
<td>• Limited activity and participation</td>
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<td></td>
<td>Balance and stability</td>
<td>• Development of FoF</td>
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<td></td>
<td>Dizziness</td>
<td>• Development of FoF</td>
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<tr>
<td>Impact of falls</td>
<td>Decreased participation</td>
<td>• Limited activity and participation</td>
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<td></td>
<td>Assistive device for mobility</td>
<td>• Development of FoF</td>
</tr>
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<td></td>
<td>Reliance on others or caregivers</td>
<td>• Increased dependence</td>
</tr>
<tr>
<td></td>
<td>Being careful or cautious</td>
<td>• Increased dependence</td>
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Note. FoF = fear of falling.

Well . . . I wobble and, uh, that’s why I don’t get out in the streets too much, I could fall . . . I hardly leave the house.

Well, well . . . I wobble and, uh, that’s why I don’t, I don’t get out in the streets too much, I could, I have enough energy to go walk and do more, but I don’t.

Increasing Dependence

Changes in Physical Needs. Participants discussed their dependence on assistive devices such as walkers, canes, and wheelchairs to reduce falls and feel secure in their environment. Some participants indicated use of the furniture, walls, or people as alternative assistive devices.

I keep my cane . . . because I never know whether one of my legs is gonna decide to give out. Yeah, I use the cane . . . for protection . . . so I don’t fall.

The only thing that I am really concerned about is . . . I might fall . . . so . . . if I have a banister, I think, great, hold on to the banister.

Increased Caregiver Needs to Feel Safe. Other participants indicated reliance on caregivers as an additional strategy to reduce falls. Many discussed dependence on caregivers for maintaining balance and preventing falls. Participants easily became isolated because they were fearful to leave their home, and some were even fearful to move about their own home, becoming increasingly dependent. Caregivers also discussed concerns about falls and often instructed stroke survivors to stay in a chair all day long and limited activities at home and in the community as a method to reduce future falls.

I was settin’ there goin’ to the left like that, kept slidin’ to the left, ’cause the left side’s gone . . . She’s sittin’ on the left and she slid her chair right up against mine, put her shoulder there where I can lean against her, keep me from slidin’ out, fallin’ out of this chair.

Well, my beliefs are that I never will walk alone. . . . I want someone beside me . . . to prevent me from falling because the last time I fell. I’m afraid of falling when she’s not here. I may hurt myself. . . . Yeah, it makes a difference when she is here, I walk around and all that.

I want someone beside me to tell me things and . . . at least to prevent me from falling because the last time I fell.

Developing a Fear of Falling

Falling at the Time of Stroke. Falling at the time of stroke onset was a commonly discussed experience. Some participants discussed the fall at the time of the stroke as losing control of their body and lying on the floor without someone to help them, sometimes for hours. This initial experience of falling with stroke onset was a traumatic event that consequently resulted in participants expressing fear that future
Falls would mean having another stroke. They also discussed the subsequent development of fear of falling and the fear of being left on the floor for hours at a time.

Yes, I fell. It was horrible. . . . It [the stroke] just attacked me all at once. I fell when I had that stroke . . . I lost control of my left arm, and my hand, my left foot . . . that’s why I fell . . . that was enough falls.

Well I’m alright, but I’m not stable, you know. . . . I tried to get up outta that chair that night and I couldn’t. Yeah. I had to hang onto everything, you know. I was scared of falling, you know, uh, it’s sorta like it was the other stroke, you know.

Fear of Falling and Future Injuries. Still other participants talked about falls, safety, and concern for injury. The consequences of hip fractures and other physical injuries were of great concern. Participants described genuine fear of falling and fear about being hurt as well as the subsequent impact on function and independence.

I didn’t feel safe ’cause I didn’t know if I was goin’ to fall or what . . . ’cause once you fall, you could break a hip.

I think that you. . . . I don’t know how to describe it, but I think that you are more cautious and more careful, like when you are in bathrooms if you’re in the shower and you have to sit down in the chair so that you won’t fall. I think it’s falling . . . it’s falling all the time that’s your worst fear; it’s falling and you might hurt or break a leg or, or you might, uh, break a hip or something. I think that you’re more conscious of it, yeah . . . you could never come home from that.

Constant Worry. Some participants discussed falls becoming a frequent event and a common and pervasive concern; fear, worry, and concern became a daily consequence of poststroke falls. Some participants were fearful that they would fall while out in the community and addressed the embarrassment of a public fall. They were concerned about how they looked while walking around and seemed to be worried about the stigma related to falls and decreased mobility. Managing falls and fear of falling in everyday life became an important aspect of poststroke adjustment.

Sometimes I fall down, but I’m used to that now.

I always fall on the stairs. . . . I’d make about four steps and I fall down.

What worries me is that I had the experience that I fell down on a street, someone called 911 and they picked me up because when I fell I had lost my consciousness; because I have unbalance in my legs, I fall down.

Discussion
To our knowledge, this is the first qualitative study of falling at home in the poststroke population and, more specifically, the first to explore the perceived consequences of poststroke falls. We found three primary consequences of poststroke falls: activity and participation limitation, increased dependence, and the development of fear of falling.

Many of the participants discussed falls during the first 6 months after a stroke. Our findings on the experience of poststroke falls as a common occurrence is supported by Forster and Young (1995), who reported a 73% incidence of falls in the first 6 months poststroke. However, fewer of our participants discussed falls than expected. The lower incidence of falls in this study may be related to the high functioning of participants (as reported by the FIM).

Incidence may also have been affected by an all-male sample. Men are less likely to report a fall, and women are more likely to demonstrate increased activity curtailment related to falls and to suffer a hip fracture with a fall (American Geriatrics Society, British Geriatrics Society, & American Academy of Orthopaedic Surgeons Panel on Falls Prevention, 2001; Gillespie et al., 2001). The all-male veteran sample may have been less likely to discuss falls or their concern surrounding falls if they considered it to be a threat to their masculinity or independence. Others may not have reported falls because of fear of institutionalization (Cumming, Salkeld, Thomas, & Szonyi, 2000; Myers et al., 1996). Tinetti et al. (1988) reported 40% of all nursing home admissions as being fall related. This fear of being institutionalized likely affects not only reports of falls but also the management of falls through reduction of activities. People are likely to curtail their activity and stay home rather than risk a fall and face institutionalization.

Yardley and Smith (2002) examined the consequences of falling and activity curtailment with the Consequences of Falling Scale. Participants cited social discomfort, a loss of confidence and personal identity, long-term functional disability, and loss of independence as the most commonly feared consequences. They avoided social participation to decrease the risk of social embarrassment secondary to a fall. The stroke survivors in this study demonstrated concern regarding many of the same consequences, with discussion of apprehension of future disability, dependence, injury, embarrassment of a public fall, and restriction of activity and community participation as a way to manage or prevent future falls. Participants specifically discussed the embarrassment of a fall in public and how they had to curtail community activity to prevent a future fall.

Clinical Implications
Participants readily, openly, and naturally discussed falls and their negative consequences as an important aspect of stroke recovery. Through review and analysis of the interviews, we
have determined important clinical issues related to poststroke occupational therapy that may have an impact on the negative consequences of poststroke falls.

1. Experiencing a fall at the time of the stroke may have a direct impact on the development of fear of falling, future falls, and activity curtailment. Those who fall at stroke onset may have a greater fear of a second stroke occurring with future falls. In preparation for discharge, clinicians need to talk with stroke survivors and their caregivers about fall risk factor modification in the home environment. The occupational therapist may include home modification, medication management, and home-strengthening exercises to help manage fall risk.

2. The occupational therapist must address physical, bodily changes that are related to impaired balance, stability, and strength. Therapists and researchers need to develop interventions to support mobility and safety among those patients with poststroke risk for falls. Clinically, it is necessary to teach both the caregiver and the stroke survivor risk factor modification and safety awareness related to the changed body, including balance and strengthening exercises.

3. Falling may become a common experience for some people after a stroke. Those who fall daily or weekly will likely require different interventions than those who fall once in a 6-month period. It is likely that stroke severity and side of stroke will affect fall frequency. Learning how to safely get up from a fall or having consistent access to a telephone or lifeline may also be helpful.

4. Occupational therapists must address activity and participation restriction related to falls and fear of falling. Therapists have identified fear of falling and depression as the top two reasons why people decrease activity after stroke (Schmid et al., in press). Those who restrict activity because of falls may become increasingly dependent on caregivers and may increase caregiver burden and depression. Clinicians need to address activity curtailment with this population because they are already at great risk for decreased functioning. Because fall risks are multidimensional (Rubenstein, 2006), the use of multiple strategies represents the need for multidimensional and individualized assessment and interventions to manage falls in the poststroke population.

**Study Limitations**

Our study primarily used qualitative data derived from a larger study. We were restricted to a convenience sample. As is common to all qualitative studies, generalization is not possible, although findings may be informative across similar populations. Additionally, this sample was an all-male sample of veterans who received their care at a Veterans Affairs Medical Center, which does not allow for generalizability but provides information about a specific cohort.

This study was a secondary analysis of communication about falling that occurred naturally or spontaneously during in-depth interviews about daily life and recovery poststroke. There was no specific interview question related to falls, falls incidence, or poststroke mobility. Instead, we were dependent on the use of natural conversation elicited from questions regarding changes since the stroke, concerns about bodily changes, and barriers to everyday life to determine those who discussed falls and their consequences. Although this approach provides evidence that falls are naturally considered a barrier after stroke, other participants may have experienced falls and related issues that were not discussed. If that was the case, those participants were not included in the analysis. Therefore, the incidence data cannot be assumed to correctly reflect the poststroke population.

**Future Research**

Future studies are needed to better define the natural history of recovery from stroke related to falls and the consequential effects of falls. Clearly, identification of stroke survivors who are at risk for falls is important. Rehabilitation research needs to include both caregivers’ and stroke survivors’ experience of falls to develop the intervention that best allows both the caregiver and the survivor to feel safe, reduce falls, and maintain activity levels. Our participants were from a relatively high-functioning poststroke population, but many still indicated that they had falls and fall risks. This population would be well served by an individualized prevention intervention. ▲

**Acknowledgment**

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