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Older Adult Stroke Survivors Discussing Post-stroke Depressive Symptoms with a Healthcare Provider: A Preliminary Analysis

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Abstract

Purpose—The purposes of this study were to examine the relationship between the post-stroke depressive symptoms, older adult stroke survivors' perceptions of the depressive symptoms, and the congruence with an informal caregiver about the presence of depressive symptoms, and comfort talking to the healthcare provider with whether or not older stroke survivors discussed their depressive symptoms with a healthcare provider.

Method—A cross-sectional study where 44 caregiver/older adult stroke survivor dyads completed questionnaires including the Center for Epidemiologic Studies Depression Scale, Symptom Perception Questionnaire, and reporting of depressive symptoms to the healthcare provider via one time interview.

Results—Thirty-seven percent (n=16) of all older stroke survivors reported depressive symptoms to their healthcare provider. Of the stroke survivors who had high levels of depressive symptoms (CESD 16; n=11), seven reported the depressive symptoms to their healthcare provider. Identifying the symptoms as possible depression and attributing the cause of the depressive symptoms to the stroke were related to stroke survivors reporting the depressive symptoms to a health care provider.

Conclusions—High functioning, older stroke survivors may benefit from strategies to help them identify when they experience depressive symptoms, in order to be able to play an active role in their recovery by appropriately discussing their symptoms with a healthcare provider.

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Special Circumstances:

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Five keywords or brief phrases

Stroke; caregiver; depressive symptoms; congruence; symptom reporting

Introduction

Post-stroke depression is one of the most common psychiatric complications of stroke, occurring at rates of approximately 33–40% and affecting close to 3 million Americans (Hackett, Yapa, Parag, & Anderson, 2005; Robinson & Spalletta, 2010). Post-stroke major depression is the experience of five or more depressive symptoms over a two week period with at least one symptom being that of depressed mood or anhedonia after the occurrence of a cerebrovascular accident. Minor depression is similar but requires at least two but less than five symptoms (American Psychiatric Association, 2000). Symptoms in the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition, Text Revision (DSM-IV-TR) for depression include: depressed mood, lack of interest in previously enjoyable activities, changes in eating patterns, changes in sleeping patterns, apathy, restlessness, feeling slowed down, fatigue, feelings of worthlessness, excessive or inappropriate guilt, diminished ability to think or concentrate, indecisiveness, and recurrent thoughts of death (American Psychiatric Association, 2000). Recognizing and interpreting depressive symptoms may be difficult for stroke survivors after the stroke event, particularly older stroke survivors who may have additional co-morbidities.

Depressive symptoms are extremely detrimental to stroke recovery and quality of life of stroke survivors (Robinson & Spalletta, 2010). Post-stroke depression is associated with increased mortality (Almeida & Xiao, 2007; Jorge, Robinson, Arndt, & Starkstein, 2003; L. S. Williams, Ghose, & Swindle, 2004), more cognitive impairment (Brodaty, Withall, Altendorf, & Sachdev, 2007; Chodosh, Kado, Seeman, & Karlamangla, 2007; Kimura, Robinson, & Kosier, 2000), decreased quality of life (Jonsson, Lindgren, Hallstrom, Norrving, & Lindgren, 2005; Sturm et al., 2004; Suenkel et al., 2002), and inhibited participation in rehabilitation therapy (Gillen, Tennen, McKee, Gernert-Dott, & Affleck, 2001; Jorgensen, Engstad, & Jacobsen, 2002; Pohjasvaara, Vataja, Leppavuori, Kaste, & Erkinjuntti, 2001), and are associated with substantial burden and decreased quality of life for the primary informal caregiver of the stroke survivor (Blonder, Langer, Pettigrew, & Garrity, 2007; Cameron, Cheung, Streiner, Coyte, & Stewart, 2011; Klinedinst et al., 2009; McCullagh, Brigstocke, Donaldson, & Kalra, 2005). In addition, post-stroke depressive symptoms are costly to society by increasing hospital length of stay and increasing use of other health care resources (Jia et al., 2006) and decreasing the odds of returning to work after stroke (Glozier, Hackett, Parag, Anderson, & Auckland Regional Community Stroke Study, 2008).

Fortunately, post-stroke depressive symptoms are treatable (Robinson & Spalletta, 2010). Several forms of treatment such as psychotherapy, exercise, and medications, have been found to be effective in treating post-stroke depression (Huffman & Stern, 2003; Linda S. Williams et al., 2007). Early detection and effective treatment decreases mortality (Jorge et al., 2003), increases the stroke survivor's participation in and the effectiveness of physical

rehabilitation (Huffman & Stern, 2003; Saxena, Ng, Koh, Yong, & Fong, 2007; Teasell et al., 2005), decreases cognitive impairment (Kimura et al., 2000) and improves quality of life (Lai et al., 2006; Mitchell et al., 2009).

Although post-stroke depression is often treatable, post-stroke depressive symptoms are frequently hidden, missed, or attributed to another condition leading to under treatment (Klinedinst, Dunbar, & Clark, 2012; Okon et al., 2004; Paul, Dewey, Sturm, Macdonell, & Thrift, 2006; Teasell et al., 2005). In the clinical setting, it is the responsibility of the healthcare provider (HCP) to assess for depressive symptoms in stroke survivors. It is also the responsibility of the stroke survivor to report the symptoms to the healthcare provider when asked about them or to seek treatment if they are no longer in regular contact with their healthcare provider. Reporting one's depressive symptoms to the HCP is the first step toward having the depressive symptoms evaluated and treated as necessary. Therefore the purpose of this study was to examine the relationships between the frequency of depressive symptoms, the stroke survivors' perceptions of their depressive symptoms, the congruence with an informal caregiver about the presence of depressive symptoms, and comfort talking to the healthcare provider with older stroke survivor reporting the depressive symptoms to a healthcare provider.

The Common Sense Model of Self-Regulation (CSM) (Leventhal, Brissette, & Leventhal, 2003; Leventhal, Meyer, & Nerenz, 1980) provided a framework for examining factors related to reporting depressive symptoms to a HCP among older adult stroke survivors. According to the CSM, upon the experience of stimuli, or symptoms, people use five major constructs in order to form a mental schema for an illness related to the symptom experience. Cognitive illness representation has five attributes: illness *identity*, perceived *causes*, perceived *controllability*, expected *consequences*, and anticipated *timeline* of the illness or symptoms (Leventhal & Diefenbach, 1991). *Identity* incorporates the person's self-diagnosis or label for the disease related to the symptoms he or she is experiencing. Perceived *causes* depict a person's belief about the reason for the symptoms. Causes can be biological, emotional, environmental, or psychological (Hagger & Orbell, 2003). *Controllability* refers to the belief that the illness can be controlled or cured and incorporates the idea of self-efficacy to adhere to treatment regimens and belief in the effectiveness of treatment. *Consequences* of the illness refer to a person's belief about how the illness will affect his/her quality of life or functional capability. The concept of *timeline* incorporates both the perceived length of illness (acute vs. chronic), and the persistence of symptoms (constant or cyclical). Once an illness representation is created, a coping strategy is used to deal with the symptoms, and this coping strategy affects health outcomes. In this study we examined the specific coping strategy of reporting depressive symptoms to their HCP.

The experience of having post-stroke depressive symptoms may differ for older and younger stroke survivors which may influence whether or not they report the symptoms to a healthcare provider. For example, older adults who suffer a stroke are less likely than their younger counterparts to have to cope with role changes associated with job loss or raising young children, which could affect one's mood and coping mechanism (Simon, 1997). Some older adults attribute depressive symptoms to normal aging (Sarkisian, Lee-Henderson, & Mangione, 2003). Post-stroke depressive symptoms may be confused with other somatic

symptoms related to the stroke or other chronic illnesses (Klinedinst et al., 2012). Additionally, a comfort level of talking about psychological health with a HCP could influence the decision to discuss mental health problems (Corrigan, Swantek, Watson, & Kleinlein, 2003). Older adults perceive stigma with depressive symptoms that is associated with both lower intentions to seek care and depression treatment discontinuation (Conner et al., 2010; Sirey et al., 2001). Post-stroke depressive symptoms peak in the sub-acute recovery period, usually about 3–6 months post-stroke (Hackett et al., 2005; Whyte & Mulsant, 2002). Therefore, depressive symptoms often develop after the stroke survivor is no longer in continual contact with the healthcare system because acute recovery and traditional rehabilitation therapy have concluded. This places the onus on the stroke survivor to seek help and report depressive symptoms to his/her healthcare provider. Low perceived need for care or decreased access to care can hinder an older stroke survivor from reporting depressive symptoms to a HCP (Garrido, Kane, Kaas, & Kane, 2009; Prins, Verhaak, Bensing, & van der Meer, 2008). However, U.S. citizens are eligible for Medicare after age 65, so lack of health insurance should not be a barrier for seeking treatment for depression.

Additionally, life experience and the insight of a caregiver (i.e. a family member, friend, or colleague) influences both illness representation and the chosen coping mechanism. For example, Ryan and Zerwic (2003) explored delay in seeking treatment for symptoms of stroke and found that patients who delayed had difficulty interpreting symptoms as a potential stroke. Those who had a bystander while experiencing symptoms sought treatment faster than those who did not (Zerwic, 2003). Therefore, bystanders, such as caregivers, may be critical in assessing and defining symptoms post-stroke as well. In order to increase depression treatment rates and potentially stroke recovery, it is important to understand how reporting post-stroke depressive symptoms to a HCP is related to perceptions of depressive symptoms by the stroke survivor and the congruence, or agreement, of these perceptions with an informal caregiver.

Based on the CSM and available literature, we explored relationships among identifying the symptoms as ‘depression’, attributing the cause of the symptoms to the ‘stroke’, frequency of symptoms, perceiving the symptoms to be treatable, perceived consequences of symptoms, controllability of symptoms, and duration of the depressive symptoms, congruence between the stroke survivor and informal caregiver regarding the recognition of depressive symptoms, and comfort in talking with the healthcare provider regarding mental health issues would be associated with the older stroke survivors’ reporting their depressive symptoms to a HCP.

Method

Study Design and Sample

This is a cross-sectional, exploratory study. All participants, stroke survivors and their caregivers, completed questionnaires during an in-home, in-person structured interview. As described elsewhere (Klinedinst et al., 2012) a non-random, sample of 44 older stroke survivor-caregiver dyads was recruited from seven hospital or rehabilitation centers in the southeastern United States. Stroke survivors were eligible if they were at least 50 years old, suffered a hemorrhagic or ischemic stroke as documented by the in the medical record

(imaging report and attending physician), and returned to the community after completing acute rehabilitation. Because age 50–65 year olds are not typically eligible for Medicare, information on whether or not the participant had health insurance was collected for those under age 65.

Stroke survivors were excluded they had aphasia or cognitive deficits to the extent that they could not answer study questions or sign consent. Aphasia and cognition were assessed through their ability to hold a conversation with the PI and their ability to explain study procedures including what was expected of them, as part of the consent process. Cognition also was assessed with the Mini-Mental State Exam (MMSE), quick (5–10 minutes) screening tool for mental status (Folstein, Folstein, & McHugh, 1975). The maximum MMSE score is 30. The MMSE is commonly used in stroke research for purposes of screening and assessing cognitive impairment in stroke survivors (Narushima, Chan, Kosier, & Robinson, 2003; Toso et al., 2004; Winstein et al., 2003). The MMSE exclusion cut point score of 21 was chosen based on literature suggesting that ratings of MMSE scores of 26–30 are adequate and 21–25 are borderline for dementia in older adults (Launer, Dinkgreve, Jonker, Hooijer, & Lindeboom, 1993; Siu, 1991). Because stroke survivors tend to score lower on the MMSE than the normal population (Launer et al., 1993), borderline cases were enrolled ensure we did not exclude a stroke survivor based on functional deficits of the stroke, such as inability to draw the diagram required in the MMSE due to upper extremity weakness or paralysis and to increase generalizability of the results.

Caregivers were the self-identified informal, unpaid person who provided the most assistance to the survivor of the stroke and were at least 18 years old. All participants spoke English and lived in the southeastern United States. Approval for this study was granted from a University Institutional Review Board and the Atlanta Veteran Affairs Hospital Research and Development Committee. All participants provided written informed consent.

Stroke survivors and caregivers were then interviewed in the home of the stroke survivor when the stroke survivor was 3–6 months post-stroke. To reduce potential bias, stroke survivors were interviewed by the PI and a trained research assistant in separate rooms behind closed doors so they could not hear each other's responses.

Measures

Stroke survivor depressive symptoms and caregiver perception of the stroke survivor's depressive symptoms were assessed using the Center for Epidemiologic Studies Depression scale (CES-D)(Radloff, 1977). This is a 20-item Likert-scale assessing the frequency during the past two-weeks that the stroke survivor experienced depressive symptoms. Scores 16 indicate a need for further evaluation for depression (Radloff, 1977). The CES-D has established reliability and validity and has been used extensively with both stroke survivors and stroke caregivers (Caracciolo & Giaquinto, 2002; Kase et al., 1998; King, Ainsworth, Ronen, & Hartke, 2010; Parikh, Eden, Price, & Robinson, 1988; Pickard, Dalal, & Bushnell, 2006; Roger & Johnson-Greene, 2009). The tool has well-established reliability with reported alpha coefficients ranging from .76–.91 (McDowell & Newell, 1996) and remains reliable and valid even when used with stroke survivors with less than optimal MMSE scores (Caracciolo & Giaquinto, 2002; Kase et al., 1998). The CES-D has been shown to be

highly sensitive (86%) and specific (90%) in measuring post-stroke depression (Parikh et al., 1988). Although there is not a specific informant version of the CES-D, proxies have been shown to be reliable sources of information using the CES-D in other older adult populations (Bassett, Magaziner, & Hebel, 1990). Additionally, the North Carolina Established Populations for Epidemiologic Studies of the Elderly (EPSEE) study, a large epidemiologic study of older adults including stroke survivors used caregiver proxy reports of the CES-D in their analyses of stroke survivors (Boyington, Howard, & Holmes, 2008). Internal consistency reliability was .78 for stroke survivors and .85 for caregivers describing symptoms of the stroke survivors.

Symptom Reporting—Stroke survivors who had at least two depressive symptoms at least ‘some of the time’ responded yes or no to a single item about reporting symptoms: “Have you ever told your healthcare provider you were experiencing these symptoms?”

Comfort reporting—As a representation of stigma associated with talking with a healthcare provider about depressive symptoms, stroke survivors were asked about their comfort level discussing the symptoms using the following question: “How comfortable did (would) you feel reporting these symptoms to your healthcare provider?” Likert-type scale response choices rated 1–4 included the following choices ‘not comfortable at all’, ‘not very comfortable’, ‘comfortable’ ‘very comfortable’.

Stroke survivors’ perceptions of depressive symptoms were assessed from each stroke survivor via the Symptom Perception Questionnaire for Post-stroke Depressive Symptoms (SPQ). The SPQ was adapted (with permission) from the Revised Illness Perception Questionnaire (IPQ-R) (Moss-Morris et al., 2002). The IPQ-R was developed specifically to measure the illness representation concepts in the CSM. The SPQ has been previously described (Klinedinst et al., 2012). In brief, the list of symptoms the stroke survivor endorsed on the CES-D was read back to the stroke survivor and he/she was asked to answer questions from the SPQ regarding the endorsed depressive symptoms. The dimensions in the CSM measured by the SPQ included: perceived identity, cause, timeline cyclical, timeline acute/chronic, consequences, control, and treatment of the stroke survivors’ cluster of depressive symptoms endorsed on the CES-D.

The ‘depressive symptom identity’ questions required stroke survivors to indicate (yes/no/unsure) whether they perceived a particular identity for that symptom cluster. Stroke survivors could endorse multiple identities. The ‘cause’ questions required stroke survivors to respond to how strongly they agree or disagree about each possible cause for their symptoms on a Likert scale (1=strongly disagree and 5=strongly agree). The ‘identity’ and ‘cause’ subscales are single item descriptors and cannot be summatively scored.

Twenty-seven Likert-type questions assessed the remainder of the concepts. Higher scores indicated more negative symptom perception (i.e. longer or more cyclical timeline, more severe consequences, less control, less potential for treatment or cure). For the purposes of this study the two timeline subscales were combined into one scale. The number of items and reliabilities for each subscale are as follows: timeline: 10 items, $\alpha = .69$; consequences: 6 items, $\alpha = .42$; control: 6 items, $\alpha = .79$; and treatment: 5 items, $\alpha = .72$. The internal

reliability of the consequences subscale was previously found to be reliable when tested with a sample of stroke caregivers (unpublished data). However, when used with this group of stroke survivors, the internal consistency of the consequences subscale was low ($\alpha = .42$) and could not be improved by removing items. Therefore, we did not include it in the logistic regression model as a possible predictor of reporting depressive symptoms.

Demographic and clinical characteristics of the sample—Information on demographic and clinical variables including caregiver gender, age, race, education, relationship to stroke survivor, cohabitation of the caregiver and stroke survivor; stroke survivor age, race and gender; date stroke occurred; location in brain that stroke occurred; whether the stroke survivor had health insurance; and medications including antidepressants. All items were collected using participant self-report, except for location of stroke, which was obtained from the medical record. In addition, functional ability of the stroke survivor was measured to better characterize stroke survivors in this study using the Barthel Index (BI) (Mahoney & Barthel, 1965). The BI is a 10-item scale frequently used to assess functional ability to perform activities of daily living (ADLs) among stroke survivors. Scores range from 0–100 and maximum scores indicate more independence in performing ADLs. Data for the BI were provided by the caregiver. BI scores using data obtained from relatives of stroke survivors correlated with data obtained from occupational therapists, providing support that caregiver report is an acceptable method of collecting data on this variable (Wyller, Sveen, & Bautz-Holter, 1995). The BI was adequately reliable in this study with a Cronbach's alpha of .85.

Stroke survivors answered all questionnaires except the Barthel Index. Caregivers answered the CES-D reporting about the stroke survivor's symptoms and the Barthel Index only. For consistency and to reduce missing data, all questionnaires were read to participants and their responses were recorded on the questionnaires by the trained interviewers.

Data Analysis

Data were analyzed using version 19.0 of SPSS (Chicago, IL, USA) statistical software. Alpha was set at $p < 0.05$ for statistical significance for all analyses. Descriptive statistics were used to characterize the sample. A consistency type agreement, 2-way mixed-effects intraclass correlation coefficient (ICC) (ρ) (Fleiss & Cohen, 1973; McGraw & Wong, 1996) was computed to determine the overall congruence for the CES-D scales between the stroke survivor and caregiver score about the stroke survivor. In addition, a continuous congruence variable was calculated for the CES-D. Responses for individual CES-D items of the stroke survivor reporting about him/herself were subtracted from the responses of the caregiver reporting about the stroke survivor. The absolute value of these differences was then summed to create an overall congruence variable for the scale. The higher the values of these scores, the more difference, or less congruence existed between caregivers and stroke survivors.

Descriptive information regarding stroke survivor and caregiver perceptions of depressive symptoms has been reported elsewhere (Klinedinst et al., 2012). Identification of the symptoms as 'depression' or not, and antidepressant use were compared to whether or not

the stroke survivor reported the depressive symptoms to the healthcare provider using Chi-Square analyses. Fisher's Exact Test was used in cases with expected cell counts of less than 5. Odds ratios were computed for significant results. Overall descriptive statistics for the individual representation variables including the timeline, consequences, control, and treatment subscales of the SPQ have been reported previously (Klinedinst et al., 2012). An independent t-test and chi square analysis were used to compare those who reported symptoms to the HCP and those who did not and number of depressive symptoms among the subset of stroke survivors with high depressive symptoms. A logistic regression was computed to determine the relationship between number of symptoms recognized, identification of the symptoms as possible depression, perceived timeline, control, and treatability of the symptoms, perceiving the stroke to be the cause of the depressive symptoms, symptom recognition congruence with an informal caregiver, and comfort discussing depressive symptoms with the dichotomous dependent variable of stroke survivor having reported the symptoms to their healthcare provider or not. Based on the results of the full model, a more parsimonious model was analyzed using only the variables that were significant at least at $p < 0.10$.

Results

Stroke survivors were 68.52 ± 8.87 years old, about half male, 55% African American (45% Caucasian), and most college educated (73%). The majority suffered an ischemic stroke (91%) with left hemisphere involvement (55%). Survivors of stroke in this sample were highly physically functional (Barthel Index: $M=87.95 \pm 16.61$) and had sufficient cognitive ability to sign consent and participate in the study as evidenced by moderate to high MMSE scores ($M=27.37 \pm 2.30$; min=22, max=30,) and their ability to describe the study and what was expected of them as participants. Twelve stroke survivors (27%) were taking an antidepressant medication at the time of interview. Caregivers were primarily female, 58.73 ± 15.15 years, 52% African American (46% Caucasian), married, spouses or daughters of the stroke survivor, and 75% lived with the stroke survivor. The majority (91%) of caregivers had at least a high school diploma.

Stroke survivors had a mean CES-D score of 10.80 ± 7.40 and 25% ($n=11$) had total scores ≥ 16 . All stroke survivors except one ($n=43$) had at least two depressive symptoms. Five stroke survivors who were taking an antidepressant medication had high levels of depressive symptoms (≥ 16). Three of the 12 stroke survivors taking an antidepressant did not recollect discussing depressive symptoms with their healthcare provider.

Overall absolute difference of caregivers' assessment of the stroke survivor's depressive symptoms and of the stroke survivors' CES-D scores had a mean of 7.25 ± 4.88 . Neither caregivers nor stroke survivors were more likely to indicate that the stroke survivor was more depressed. The ICC for the overall CES-D scores showed significant, although moderate, agreement between stroke survivors and their caregivers ($\rho_1 = .41, p = .002$). Congruence of recognition of depressive symptoms was significantly better for those dyads where the stroke survivor scored < 16 on the CES-D ($M = 6.36 \pm 4.65$) than those scoring ≥ 16 on the CES-D ($M = 9.91 \pm 4.76; t = 2.18, df = 42, p = .04$).

Sixty-three percent ($n=27$) of all stroke survivors did not report their depressive symptoms to their healthcare provider. Of the stroke survivors who had high levels of depressive symptoms (CES-D ≥ 16 ; $n=11$), 7 reported the depressive symptoms to the HCP. There was no significant difference in the number of symptoms recognized between reporting ($M = 7.94 \pm 4.92$) and non-reporting stroke survivors ($M = 6.18 \pm 3.39$; $t = 1.26$, $df = 23.54$, $p = .22$). However, when stroke survivors were dichotomized by CES-D score ≥ 16 and CES-D scores < 16 , those with higher scores were 4.47 times more likely to report the depressive symptoms to the healthcare provider ($p=.04$ Fishers Exact test). The majority of stroke survivors (95.5%) felt 'very comfortable' or 'comfortable' discussing depressive symptoms with their healthcare provider.

Results of the full model logistic regression analysis examining the factors associated with the stroke survivor reporting or not reporting the depressive symptoms to their HCP are presented in Table 1. The model was a good fit based on the Hosmer and Lemeshow test ($\chi^2 = 4.40$, $df = 8$, $p = .82$). The model was not significant overall ($\chi^2 = 13.39$, $df = 8$, $p = .10$) but upon examination of the variables, both identifying (labeling) the symptoms 'depression' and agreeing that the symptoms were caused by the stroke approached significance. Therefore, because of the small sample size and number of variables, a more parsimonious model was used to examine the influence of these two factors on reporting the depressive symptoms to the HCP.

The results of the revised model are presented in Table 2. Again this model fit the data well based on the Hosmer and Lemeshow test. ($\chi^2 = 5.45$, $df = 4$, $p = .24$). This model was significant ($\chi^2 = 10.75$, $df = 2$, $p < .01$). In this model, stroke survivors who had a symptom identity of 'depression' were 5.95 times more likely to report the symptoms to a healthcare provider than stroke survivors who did not have a symptom identity of 'depression' and for every unit increase in agreement that the stroke caused the depressive symptoms, stroke survivors were 2.46 times more likely to report the depressive symptoms to their HCP.

Discussion

Consistent with previous literature about one quarter of this sample of stroke survivors had CES-D score ≥ 16 , indicating a need for further evaluation for depression. In addition, almost half of the stroke survivors who were taking antidepressant medications had high levels of depressive symptoms. Stroke survivors who were taking an antidepressant and had high depression scores may have been undertreated, which is common with depression (de Man-van Ginkel et al., 2010; Trivedi, Hollander, Nutt, & Blier, 2008). However, we did not collect data on when antidepressant medication was initiated. If it was early in the initiation of antidepressant treatment, the possibility exists that the stroke survivor was not yet at therapeutic levels.

In the overall sample, only about a third of stroke survivors discussed their depressive symptoms with their HCP. This should be interpreted with caution because stroke survivors were included who had scores as low as 2 on the CES-D. The CES-D is a screening tool for depressive symptoms and is not diagnostic of depression. Taken alone, several items on the CES-D may represent symptoms of other health conditions rather than symptoms of

depression, possibly not warranting discussion with a HCP. However, this low number of depressive symptoms was chosen because even subthreshold levels of depressive symptoms can be detrimental to stroke recovery (Robinson & Spalletta, 2010; Saxena, Ng, Yong, Fong, & Koh, 2008). It is our opinion that it is important for stroke survivors to share any cluster of potential depressive symptoms with the HCP. This gives the HCP the opportunity to assess the symptoms further and make a medical determination of a diagnosis of depression- or something else. If the stroke survivor does not mention the symptoms, the HCP would not have a chance to assess the stroke survivor further and possibly diagnose depression. However, what was more concerning in this sample is that among the subset of stroke survivors who had high depression scores (≥ 16) on the CES-D ($n=11$), still about one third ($n=4$) did not report their symptoms to a HCP. This has negative implications for getting assessed and treated if necessary.

When stroke survivors labeled or identified the cluster of depressive symptoms as possible depression, they were more likely to discuss the symptoms with their HCP. It is possible that some stroke survivors were able to identify the symptoms as depression because they had already talked to their HCP about the symptoms and learned from their HCP that the identity of the symptoms was depression. However, based on anecdotal evidence through discussions and referrals for depression evaluations among the sample, stroke survivors were not always enlightened by a HCP that their symptoms may indicate post-stroke depression. Thus, this finding has important clinical implications for the healthcare team. If members of the healthcare team can develop creative strategies to educate stroke survivors to correctly identify a cluster of depressive symptoms as possible depression, then high functioning older stroke survivors will be more able to play an active role in their recovery. Providing written materials about post-stroke depression may be helpful, as stroke survivors who received and read written materials regarding post-stroke depression had significantly more knowledge about the symptoms of post-stroke depression than those stroke survivors who were only given verbal information or no information at all (Klinedinst et al., 2012).

Among older adults in general, those with lower levels of depressive symptoms are less likely than those with more symptoms to perceive a need for treatment (Garrido et al., 2009). In this study overall level of post-stroke depressive symptoms was not related to discussing the symptoms with a HCP, but this is probably due to the fact that only one quarter of survivors of stroke had high levels of depressive symptoms. When the sample was dichotomized by high and low levels of depressive symptoms, those with higher levels were more likely to report the depressive symptoms. The stroke survivor reporting the depressive symptoms to their HCP, either when asked during an assessment for depression or by bringing up the symptoms directly, gives the HCP the opportunity to assess the symptoms further and make a medical determination of a diagnosis of depression. Because even minor depression can be unfavorable for stroke recovery, stroke survivors should be taught to seek care even if the levels of depressive symptoms are perceived to be low. In addition, stroke survivors can be taught to recognize when antidepressant medications are not working and should be encouraged to follow up with their prescriber if they believe the medication is ineffective.

In addition, attributing the cause of the depressive symptoms to the stroke was related to the stroke survivor discussing the symptoms with their HCP. It is possible that because the stroke survivor experienced the stroke, a physical illness, when the stroke survivor then experienced the depressive symptoms, he/she was able to attribute the symptom to the physical illness and associate a physical cause for the depressive symptoms. This may have reduced some potential stigma with a mental health issues and made the stroke survivors more open to discussing the depressive symptoms with a HCP. Alternatively, it is possible that stroke survivors who have already had discussions with their HCP about their symptoms have been influenced by those interactions or read materials related to post stroke depression and, as a result this information, were more likely to view depressive symptoms as a cause or secondary condition following stroke.

Contrary to the CSM, perceived consequences, timeline, control and treatability of the depressive symptoms had no relationship to the stroke survivor discussing depressive symptoms with their HCP. The lack of relationship between severity of the symptoms and reporting is likely due to low variability on the severity measure as most stroke survivors did not have high levels of depressive symptoms and believed the symptoms were of minor consequence, short-lived and manageable. Additionally, congruence with an informal caregiver on symptom recognition had no influence on reporting the depressive symptoms to the HCP and we suggest two possible explanations for this. First, congruence between the stroke survivor and informal was highest when there was an absence of depressive symptoms, and therefore discussing the symptoms with a HCP would be less necessary. Second, we did not ask the stroke survivors and caregivers whether they had actually discussed the stroke survivor's depressive symptoms with each other. So, even if congruence was high at the time of interview, if the stroke survivor and caregiver had never discussed the symptoms, congruence would not play a role in whether the stroke survivor reported the symptoms to the HCP. Future studies should more closely examine the influence of family communication on stroke survivor reporting the depressive symptoms to a HCP.

According to the CSM, one has both cognitive and emotional reactions to illness and symptoms. One emotional reaction that may preclude an older stroke survivor from discussing depressive symptoms with a HCP is discomfort or fear of stigma. The majority of stroke survivors in this sample said they felt comfortable talking about depressive symptoms with a HCP. However, other types of stigma such as fear of being treated differently by friends or family or treatment stigma may have hindered the older stroke survivor from discussing the depressive symptoms with his/her informal caregiver or HCP.

All stroke survivors in this sample had health insurance and a self-identified informal caregiver who was helping in their care, giving the stroke survivors at least a basic level of access to care. However, regardless of access, receiving medical care for the depressive symptoms may not have been the preferred treatment strategy for all stroke survivors. We did not inquire about other methods of coping with the depressive symptoms which may be important for older adults. Therefore, it is possible that stroke survivors were coping with the symptoms in other ways such as talking with family or friends or using spirituality. Future studies may want to further explore what guides older stroke survivors' choices of

coping strategies for post-stroke depressive symptoms and examine difference between older and younger stroke survivors.

This study makes a significant contribution to the literature on factors related to older stroke survivors' reporting post-stroke depressive symptoms to a HCP. However, it was limited by the small sample size and low variability in some of the measures. In particular the consequences subscale of the SPQ had a lower than optimal internal consistency ($\alpha = .42$) and was not able to be analyzed in this study. This subscale should be revised if used in future studies with stroke survivors. Although, the sample in this study mirrored other studies with regard to the percentage of stroke survivors with high levels of depressive symptoms, the small total sample size further limited the analyses. However, older stroke survivors with lower levels of depressive symptoms were included in the sample because even low levels of depressive symptoms may be detrimental to stroke recovery and warrant intervention or close monitoring (Robinson & Spalletta, 2010). The results of this study should also be generalized carefully because this sample of stroke survivors is unique in that they were older, community dwelling, and most had moderate to high cognitive function, were highly physically functional and well educated. The results of this study would likely differ in stroke survivors who were younger, more physically or mentally disabled, or institutionalized. Post-stroke depression remains an important and detrimental illness for stroke survivors. Since post-stroke depression may become evident at any time in the stroke recovery trajectory, HCPs need to make sure that stroke survivors and families are educated about post stroke depressive symptoms being a separate, treatable illness and the importance of recognizing and initiating reporting of these symptoms to their HCP.

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Impact

- Post stroke depressive symptoms are detrimental to the stroke survivor's recovery and quality of life. However, these symptoms continue to be under recognized and undertreated. There is a dearth of evidence regarding factors that are related to older stroke survivors discussing their depressive symptoms with a healthcare provider. This exploratory study is the first to address this issue using a theory based model of stroke survivor perceptions of depressive symptoms and which factors are related to older stroke survivors discussing their depressive symptoms with a healthcare provider.
- This study demonstrates older stroke survivors often do not report their depressive symptoms to a healthcare provider. The stroke survivor identifying that the symptoms he/she is experiencing may be depression and believing the symptoms have a physical cause related to the stroke are important factors related to whether or not older stroke survivors discuss their depressive symptoms with a healthcare provider.
- Educational and policy interventions that help older stroke survivors and their families identify even low-levels of post-stroke depressive symptoms and encourage discussions of depressive symptoms between stroke survivors and their healthcare providers may facilitate professional evaluation for post-stroke depression and treatment when needed.

Table 1

Full Logistic Regression Model for Variables Related to Stroke Survivors Reporting Depressive Symptoms to the Healthcare Provider (n = 16) and Not Reporting (n = 27)

Variable	Stroke Survivor Reporting the Depressive Symptoms to the Healthcare Provider		
	<i>B</i>	<i>SE B</i>	<i>e^B</i>
CES-D score	-.03	.09	.97
Identity: Depression	2.13	1.19	8.37 [†]
Cause: Stroke	1.04	.58	2.82 [†]
Perceived treatability	.10	.20	1.10
Perceived timeline	.001	.15	1.00
Perceived control over symptoms	-.09	.26	.91
Congruence with caregiver	-.07	.11	.94
Comfort reporting symptoms to healthcare provider	.75	.68	2.12
Constant	-6.54		
χ^2		13.39 [†]	
<i>df</i>		8	
% Reporting Depressive Symptoms to the Healthcare Provider		37%	

Note: e^B = exponentiated *B*. Identity: Depression coded as 1 for yes and 0 for no.

CES-D: Center for Epidemiologic Studies depression scale.

Cause: Stroke scored from 1 for strongly disagree to 5 for strongly agree.

[†] $p < .10$.

* $p < .05$.

** $p < .01$.

Table 2

Revised Logistic Regression Model for Variables Related to Stroke Survivors Reporting Depressive Symptoms to the Healthcare Provider (n = 16) and not Reporting (n = 27)

Variable	Stroke Survivor Reporting the Depressive Symptoms to the Healthcare Provider		
	<i>B</i>	<i>SE B</i>	<i>e^B</i>
Identity: Depression	1.78 [*]	.84	5.95
Cause: Stroke	.90 [*]	.47	2.46
Constant	-4.48 [*]		
χ^2			10.75 ^{**}
<i>df</i>			4
% Reporting Depressive Symptoms to the Healthcare Provider			37%

Note: *e^B* = exponentiated *B*. Identity: Depression coded as 1 for yes and 0 for no.

Cause: Stroke scored from 1 for strongly disagree to 5 for strongly agree.

[†] *p* < .10.

^{*} *p* < .05.

^{**} *p* < .01.