PSYCHOSOCIAL ADJUSTMENT FOLLOWING A STROKE

Suzanne C. Thompson,[1,2]* Alexandria Sobolew-Shubin,[2] Melody A. Graham[2] and
Aris S. Janigian[2]

[1]Pomona College and [2]Claremont Graduate School, Claremont, CA 91711, U.S.A.

Abstract—A stroke can be a serious and debilitating health problem. The present study examined the effect of the severity of the stroke, patients' cognitive adaptation to their situation, the relationship with the caregiver and caregivers' adaptation on patient depression and motivation in outpatient therapy. Forty poststroke patients and their primary caregivers (usually a spouse) were interviewed an average of 9 months poststroke. Three independent predictors of depression were identified: a lack of meaningfulness in life, overprotection by the caregiver, and a less recent stroke. Motivation was independently related to less overprotection and lower perceptions of control over recovery. It was found that psychosocial factors predicted depression and motivation even when the effects of severity and site of the stroke were controlled for. The implications of cognitive adaptation and social support ideas for coping with a stroke are discussed.

Key words—stroke, coping, cognitive adaptation, social support, motivation

INTRODUCTION

Cerebrovascular accident, or stroke, is a serious health problem, striking as many as 600,000 people in the United States each year [1]. Those who survive the initial incident are often left with a variety of medical problems, including hemiplegia, cognitive deficits, and speech dysfunction. Treatment consists of physical, speech and occupational rehabilitation programs designed to help the stroke patient recover lost functioning.

In addition to physical disability, stroke patients are likely to experience a variety of psychological problems arising from concerns about their present plight. These include feelings of loss of control, fears about death and disfigurement, social isolation, helplessness, and worry about the loss of social roles [1–4]. Depression and emotional instability are common reactions [2]. These concerns are felt not only by stroke patients themselves, but also by their families, who are faced with the prospect of long-term care of a disabled person [5], financial and emotional strain [6], and a major change in family roles [7]. A stroke can be a devastating and traumatic experience for patients and their families; the ability to cope with these problems and changes has major implications for the quality of life in the years following the stroke.

Surprisingly few studies have investigated factors that predict adaptive coping with the problems raised by a stroke and the effects that they may have on treatment. Those studies that have been done find that the meaning of the disability and loss to the patient [8], feelings of being stigmatized by others [9] and attitudes on the part of caregivers and family members [1,2] are related to successful adjustment.

The effects of social support on coping are not clear. Although some studies find that patients with social support have an easier time adjusting to their circumstances, a number of studies have found just the opposite to be the case, suggesting that support provided by the family often takes the form of 'overprotection' which creates additional adjustment problems such as helplessness on the part of the patient [10, 11].

Psychological and social support factors have also been found to be associated with motivation to work in rehabilitation and with progress made toward recovery. Patients with cooperative and accepting attitudes toward their disability make more progress in treatment [12, 13]. Stroke patients who feel stigmatized by their condition or who have dependent attitudes toward illness are less motivated in treatment and make less progress toward recovery [3, 14]. As is the case for psychological adjustment, progress in rehabilitation bears no clear relationship to social support. The ability of the patient and a family member to predict each other's attitudes toward disability was related to more rapid progress in therapy in one study [15], but several studies have found that patient satisfaction with family support is associated with poorer progress [3] and that stroke survivors who live alone show more improvement than those who live with their spouses or other family members [5, 11].

Although there is some evidence in these studies that cognitive interpretations and social support are related to adjustment after stroke and progress in treatment, few firm conclusions can be reached both because of the dearth of studies and because much of the research that has been done is methodologically flawed [16]. For the most part, research reports have involved clinical impressions or unstructured interviews. In only a few cases have important psychological variables been assessed with objective, reliable instruments (e.g. 3). In addition, none of the research

---

*Requests for reprints should be sent to: Suzanne C. Thompson, Department of Psychology, Pomona College, Claremont, CA 91711, U.S.A.

has been based on a theoretical approach to understanding psychological adjustment to stressful events. The present study examines two theoretical approaches that may be useful for understanding reactions to stroke: cognitive adaptation and social support. The extent to which these two psychosocial categories of variables predict poststroke reactions over and above less psychological causes of poststroke depression, such as the site of the stroke or the degree of physical and cognitive impairment, is explored.

Cognitive adaptation theory

Recent research on coping with stressful life events has led to the development of a cognitive adaptation theory* for understanding victims reactions to traumatic life experiences [17–19]. According to this model, many people hold a number of benign adaptive assumptions about the world and about themselves. These beliefs include the idea that the world is understandable and fair, that one's life is purposeful and meaningful, that there are reasons to be hopeful and optimistic about the future, and that one has control over important outcomes. A negative life event, such as a serious disease or injury, can challenge these assumptions. Successful adjustment depends upon maintaining or restoring a sense of meaningfulness, optimism, and control. This approach shows great promise as a model for understanding and researching adjustment to negative life events. There is evidence from a number of different types of victimization that finding meaning in the event [20–22], a sense of optimism [23], and perceptions of control [20, 24–26] are related to good coping.

Social support

Support from others has been hypothesized to ease the trauma of stressful life events and to aid in successful adjustment [27–29]. Positive social support has been found to help victims maintain self-esteem and speed recovery from post traumatic stress [30–32]. Although the exact mechanisms through which social support works are not known, presumably, support serves a number of functions, including providing material aid, physical assistance, and a chance for the expression of feelings [33]. Most theoretical discussions of the effects of social support focus on these positive, stress-reducing properties; however, there is increasing recognition that all social support is not necessarily beneficial, and that some social relationships may serve as a source of further stress for a victim [33, 34].

Social support is an important issue for stroke patients. First, help from others is essential for those who are partially or totally disabled, and may determine whether or not home care is feasible. Second, the physical and cognitive disabilities brought on by

a stroke can result in major changes in self-image and in societal and family-related roles [35]. Positive emotional support from others can help patients avoid feelings of being stigmatized [14], and may make the transition to new roles easier. But family support that is overprotective of the patient can foster helplessness and dependency, leading to poor motivation and impaired progress in rehabilitation [10, 36]. As some observers have noted, the family plays a vital role in the course and outcome of therapy [14, 37].

Objective circumstances

It might be expected that the extent of loss one suffered because of the stroke would be a major determinant of the ability to cope following the stroke. Individuals may have trouble coping because of the difficult circumstances of their lives: physical disability, cognitive impairment, or financial stress. Those who had lost more or those on whom the stroke had a greater impact because they were older or had experienced more than one stroke would be more likely to be depressed.

There is some evidence that the site in the brain at which the stroke occurs may also affect coping. Robinson and his colleagues [38] have proposed that a major cause of poststroke depression is physiological change in the brain as the result of focal brain injury. In a series of studies they have found that site of lesion predicts severity of depression. Anterior left hemisphere injury patients are more likely to be depressed than those with lesions in any other site [38–40]. They hypothesize that anterior lesions are associated with greater catecholamine depletion which leads to depression [38]. Although House [41] has reviewed this evidence and concluded that the case for lesion site as a cause of poststroke depression, is far from proved, it seems likely that site of lesion is at least one cause of poststroke depression for some patients.

Although these 'objective circumstance' variables were not a focus of the present study, they were included because they provide a viable alternative explanation if the cognitive adaptation and social support factors are found to be related to coping. For example, if patients with overprotective caregivers are more depressed, it may be because those who are more physically impaired by the stroke get more protection from caregivers and also are more depressed due to their greater loss. To demonstrate the importance of cognitive adaptation and social support factors, it is necessary to show that they predict coping even when the effects of the objective circumstances are controlled for.

The aim of the present study was to examine factors that are related to patient depression and motivation following a stroke. Four classes of variables were assessed. The first was the objective circumstances of the patients' poststroke life that might be expected to affect emotional state. This included age, whether or not there had been a previous stroke, the site of the stroke (left or right infarct), time since the stroke, financial stress caused by the stroke, and the patients' degree of physical and cognitive impairment.

---

*The name 'cognitive adaptation' may be confusing in the context of stroke patients for whom cognitive deficits are a major issue. Cognitive adaptation theory does not refer to these impairments in memory, understanding and speech production, but rather to changes in beliefs and attitudes about one's life, one's situation, and the world in general.

The second set of variables, which assessed patients' interpretation of their situation, were suggested by the cognitive adaptation model of coping. The interpretation variables included a measure of meaningfulness (meaning, purpose, and fairness in life), perceived control over three outcomes relevant to stroke, and a sense of hope for the future.

The third class of variables concerned the relationship between the patient and the primary caregiver, usually a spouse, and the perceived social support available to the patient. These included measures of emotional and tangible social support, overprotection by the caregiver, and patient and caregiver perceptions of each other.

The fourth category of variables assessed the caregivers' interpretation of their situation using the same measures given to patients: meaningfulness in life, perceived control, and hope for the future, as well as a measure of caregiver depression.

One hypothesis about reactions to a severely negative event, such as a debilitating disease, is that those who experience more serious consequences or have a poorer prognosis will be more depressed. A second view, represented by the cognitive adaptation model of coping [17], is that good copers are not necessarily those who have suffered a less severe loss; but rather those who, despite the loss, have maintained or restored a sense of meaning and purpose in their lives, and feelings of control over important outcomes. A third hypothesis is that emotional adjustment following an event such as a stroke that often increases one's dependency on others will be strongly related to the quality of support one receives from the caregiver and the caregiver's general adjustment to the situation. These three hypotheses about coping are not, of course, mutually exclusive. In fact, we expected all four categories of variables to be related to depression and motivation. However, previous research has not examined the ways in which these different types of variables are interdependent. For example, does finding meaning and control following a loss depend on having good support from others or on being in more favorable circumstances? It this is the case, then meaning and control may not be directly related to coping but merely associated with other variables that predict coping. To explore these issues, we analyzed the effects of variables when the effects of other categories of variables were controlled to see if each category predicted depression or motivation over and above the effects of other variables, that is, to see if each set makes an independent contribution to depression and motivation.

METHODS

Research participants

Patient group. The participants in the patient group were cerebrovascular accident (CVA) patients in outpatient therapy at the Casa Colina Rehabilitation Hospital in Claremont, California. Forty subjects, 25 males and 15 females, between 24 and 80 years of age (mean = 62.9) volunteered to be interviewed. The

---

*Additional information was collected and will be reported elsewhere.

†Complete copies of all scales are available from the first author.

interviews took place an average of 9 months poststroke (range = 1–60 months). It was the first stroke for 82% of the participants. The stroke involved a left hemisphere infarct for 53%; 35% had a right infarct; for the remaining 12%, site of infarct was not determined. The majority of the patients were white and working or middle class.

Caregiver group. Patients were asked to identify the individual most responsible for their care; these individuals constitute the caregiver group. Forty caregivers, 27 females and 13 males, between 21 and 81 years of age (mean = 56.0) were interviewed: 80% were spouses, 10% were relatives other than an adult child, 5% were adult children, and 5% were not related to the patient.

Procedure

Initial contact with potential participants was made via a letter describing the research project and requesting them to consider participation. Several days later they were telephoned to solicit their participation and schedule interviews.

Interviews of approx. 1.5–2 hr in length were conducted in patients' homes by the researchers and trained students. The stroke patient and the caregiver were interviewed separately. Upon completion of the interview protocol, caregivers were asked to complete the short form of the Questionnaire on Resources and Stress (QRS) [42]. Immediately prior to their participation, all subjects signed informed consent forms; those in the patient group also signed medical information release consent forms.

Measures

Four classes of predictor variables were examined*. Standard scales were not available to measure some of these variables, so it was necessary to develop items for these concepts. Unless otherwise noted, the items had a four-point response scale (strongly disagree to strongly agree). Items were reversed where appropriate and summed so that a higher number means more of the concept or the more positive end†.

Objective circumstances. The seven measures used to assess the objective circumstances of participants included: (1) age; (2) previous history of stroke; (3) the site of the CVA (left or right). Almost all patients had been given a CAT scan during initial hospitalization. Reports were summarized in the medical records; (4) time since the stroke; (5) financial stress; (6) degree of physical impairment; and (7) degree of cognitive impairment. Data concerning the first four variables were obtained from the medical records of the patient. The Financial Stress subscale of the shortened version of the QRS [42] provided a measure of the financial situation of participants. The shortened QRS is an 11 subscale, 66-item questionnaire designed to measure variables pertinent to those providing care for the chronically ill or handicapped.

The stroke patient's degree of physical impairment was assessed by a composite of four measures: (1) patients rated their overall ability to care for themselves on a six-point index, ranging from 'Totally dependent on others for everyday care' to 'Can function independently in all settings'; (2) caregivers rated patients on the same scale; (3) the Physical

Limitations subscale of the QRS; and (4) interviewer ratings of degree of patient physical impairment on a four-point scale. Cronbach's alpha was 0.83 for this composite, indicating considerable agreement among the four individual measures of physical impairment. The stroke patient's degree of cognitive impairment was assessed by a composite of two variables: interviewers' ratings of patients' verbal fluency and ratings of patients' level of understanding, both on four-point rating scale*.

Patient's interpretation. Three measures were constructed to assess the patient's interpretation of events: meaningfulness, control, and hope. The definition of meaningfulness was derived from Thompson and Janigian's [19] analysis of finding meaning after traumatic events. They suggest that feeling that life is meaningful consists of having a sense of order, of fairness, and of purpose. The scale used in this study consisted of 11 items tapping these three dimensions. It included statements such as 'I have important goals that I am working towards' and 'I feel that my life is meaningful right now', and 'It seems very unfair that I had a stroke'. The measure of control consisted of eight items constructed to tap three outcomes relevant to stroke: control over recovery (e.g. 'The harder I work in therapy the more I'll recover'), three items concerned the avoidance of another stroke (e.g. 'I can do things to prevent having another stroke'), and two items dealt with social reintegration (e.g. 'I can still have the same social life that I had before the stroke; it's up to me'). Finally, a measure of hope consisting of three items was used. 'I feel confident that things will improve' is typical of the sort of items comprising this measure.

The reliability of these three scales was calculated using the present sample and data from an additional sample of 52 stroke patients who were interviewed in a subsequent study. The internal consistency was adequate: Cronbach's alpha = 0.78 for meaning, 0.68 for control, and 0.70 for hope. The relationships found in this study between depression and these variables were replicated in the subsequent study using a different measure of depression (the CES-D), a further indication of the scales' reliability.

Relationship between patient and caregiver. Scales were constructed to assess emotional social support, tangible social support, and overprotection. The measure of emotional social support consisted of five items (e.g. 'If I feel down, I have someone to talk to'). The measure of tangible social support consisted of four items (e.g. 'There are people who will run errands for me'). Overprotection was measured on a six-item scale that included items such as 'The people around me don't let me do things that I could do myself' and via the Overprotection subscale of the QRS. These two measures of overprotection are positively correlated in this study. Cronbach's alphas for these three scales were 0.61, 0.77, and 0.63, respectively. The overprotection scale that was

devised for this study was used in the subsequent research described above and the relationships found in this study were replicated.

Patient and caregiver perceptions of one another were assessed with eight questions. Respondents were asked: 'Overall, to what extent has — been —?' (e.g., patient, appreciative, demanding). Items were rated on a five-point response scale ranging from 'not at all' to 'a great deal'. Cronbach's alpha for both these scales was 0.76.

Caregivers' interpretation. Caregivers' interpretations of events were measured with the same scales given to the patient, except that the wording was changed to reflect the caregivers' perspective (e.g. '—'s stroke has disrupted all my plans'). Caregiver depression was assessed by means of the Geriatric Depression Scale [43], a 30-item questionnaire with a yes/no response format that has been shown to have adequate reliability and validity. The GDS has been found to do a better job of identifying depression in the elderly than the CES-D and the Beck Depression Inventory [43]. It was deemed an appropriate measure of depression for this study because we expected the majority of the respondents to be older adults. As it turned out, 88% of the patients and 61% of the caregivers were over the age of 55.

Dependent measures

Two dependent variables were assessed: patient depression and patient motivation. Patient depression was measured by means of the Geriatric Depression Scale [43]. The definition of motivation given by Hyman [14] was used as a guideline for identifying motivated and unmotivated patients. Motivated patients are those whom physicians and therapists describe as eager for rehabilitation, willing to expend effort, not needing excessive encouragement, and tending not to complain about the rigors of treatment. Information in the medical records was used to assess patient motivation. Physical therapists and physicians regularly make written comments on patient progress, cooperation, and attitudes in therapy. Approximately 3 months after rehabilitation began, one of the researchers examined the medical records of each patient and rated patient motivation on a five-point scale (1 = clear evidence that the patient is not motivated; 5 = clear evidence that the patient is motivated) on the basis of written comments about each patient's attitudes toward rehabilitation. A second researcher also rated 25% of the patients; the two raters agreed on 90% of the cases.

Open-ended questions were also asked to gain a broader perspective on the problems and concerns facing stroke patients and those responsible for their care.

RESULTS

Descriptive data

The mean level of patient depression was 9.5 (SD = 5.7). About half of the patients had scores in the nondepressed range (0–10) and about half had scores indicating moderate depression (11–20) [41]. Caregivers were significantly less depressed than patients [$t(39) = 4.26$, $P < 0.001$, mean = 5.3, SD = 4.2]. Mean patient motivation was 3.2 on a

---

*The measure of cognitive impairment does not, of course, adequately assess the diverse deficits that may be manifested in stroke patients. It is intended only as a rough indicator of the extent to which the patient was noticeably impaired in conversation which might be expected to have a significant effect on day-to-day social life.

Table 1. Zero-order correlation between patient depression and motivation and the other variables in the study

Set	Variable	Mean	SD	Patient depression	Patient motivation
Objective circumstances	Months since stroke	8.5	12.0	0.40**	−0.23
	First or second stroke	–	–	0.36*	−0.05
	Age	62.9	12.7	0.16	−0.15
	Site of stroke	–	–	−0.23	0.32*
	Physical functioning	4.6	2.9	−0.31*	0.24
	Cognitive functioning	6.7	1.8	−0.35**	0.30*
	Financial stress	0.9	1.1	0.17	0.04
Patient interpretation	Meaningfulness	32.8	5.5	−0.61**	0.30*
	Patient hope	9.5	1.8	−0.46**	0.30*
	Patient control-stroke	6.2	1.3	−0.10	0.23
	Patient control-recovery	11.9	1.6	−0.12	−0.24
	Patient control-social	5.5	1.3	−0.52**	0.17
Relationship	Overprotection	4.2	2.8	0.56**	−0.37*
	Social support	16.3	2.3	−0.23	0.02
	Tangible support	12.7	2.4	−0.15	0.19
	Patient perception of CG	32.7	5.2	−0.39**	0.02
	CG perception of patient	30.9	5.3	−0.28*	0.12
Caregiver (CG) interpretation	CG meaningfulness	35.6	3.6	−0.42**	0.34*
	CG hope	9.9	1.9	−0.21	0.04
	CG control-stroke	5.7	1.2	0.07	0.05
	CG control-recovery	9.3	1.8	−0.15	0.12
	CG control-social	2.9	1.0	−0.14	0.08
	CG depression	5.3	4.2	0.21	0.08

*$P < 0.05$; **$P < 0.01$.

five-point scale, $SD = 1.0$. Patient depression and motivation were significantly correlated [$r(39) = -0.36$, $P < 0.05$]. The mean physical functioning score, as rated by the caregivers, was 4.2, indicating that the average patient could function independently with supervision in the home. Patients' ratings of their level of functioning on the same scale did not differ significantly from caregivers' ratings [$t(39) = 1.53$, n.s.].

Plan of analysis

The first step in the analysis was to identify through multiple regression analysis the variables in each set that were significantly and independently related to depression. Those variables within each set with significant b-coefficients were then used to represent the set in further analysis.

A similar procedure was used to analyze motivation. Sex of the patient was not a significant variable in any analysis so will not be discussed further in the section.

Depression analysis

The zero-order correlations between depression and the variables in each category are given in Table 1.

Objective circumstances. As can be seen in Table 1, four variables have significant zero-order correlations with depression. Patients are more depressed if they have had a previous stroke, if more time had passed since the stroke, and if their level of physical and cognitive functioning was lower.

The forward multiple regression predicting depression from the seven objective circumstances variables was significant [$R = 0.52$, $F(2, 37) = 6.73$, $P < 0.003$] and accounted for 27% of the variance in depression. Only two variables entered the equation and had significant b-coefficients: time since stroke [$t(37) = 2.67$, $P < 0.01$] and having a previous stroke [$t(37) = 2.35$, $P < 0.03$]. Thus, from this set, time and

having a previous stroke are the only variables to be significantly related to depression when the effects of the other variables in this set are controlled for.

Patient interpretation. Three of the five zero-order correlations between depression and the patient interpretation variables were significant (see Table 1). Patients who were more depressed also had lower ratings on meaningfulness, had less hope, and were less likely to feel they had control over their social life.

The multiple regression predicting depression was significant [$R = 0.61$, $R^2 = 0.36$, $F(1, 38) = 22.01$, $P < 0.001$]. The b-coefficient was significant for meaningfulness [$t(38) = -4.71$, $P < 0.001$], the only variable to enter the equation.

Relationship with the caregiver. As can be seen in Table 1, three of the five variables in this category had significant zero-order correlations with depression. Patients who were more depressed felt more overprotected, had more negative perceptions of their caregivers, and had caregivers who saw them more negatively.

The multiple regression predicting depression was significant [$R = 0.62$, $R^2 = 0.38$, $F(2, 37) = 11.38$, $P < 0.001$]. Two of these variables entered the equation and had significant b-coefficients; overprotection [$t(37) = 3.71$, $P < 0.001$], and patient perceptions of the caregivers [$t(37) = -2.06$, $P < 0.05$].

Caregiver interpretation. As shown in Table 1, only one variable in this set was significantly correlated with depression. Patients whose caregivers saw less meaningfulness in their lives were more depressed.

The multiple regression with depression as a dependent variable was significant [$R = 0.42$, $R^2 = 0.17$, $F(1, 38) = 8.04$, $P < 0.007$]. The b-coefficient for meaningfulness [$t(38) = -2.83$, $P < 0.007$], the only variable to enter the equation, was significant.

Overall analysis. Not surprisingly, many of the variables in one set that significantly predict depres-

Table 2. Multiple regression results for each set of variables predicting depression and the increase in variance predicted when a second set is added to the equation

Set of variables first entered in equation	R	R^2	Increase in R^2 due to			
			OC	PI	RC	CI
Objective circumstances (OC)	0.52**	0.27	—	0.23***	0.22**	0.11*
Patient interpretation (PI)	0.61**	0.36	0.13*	—	0.12*	n.s.
Relationship with caregiver (RC)	0.62***	0.38	0.10*	0.11**	—	n.s.
Caregiver interpretation (CI)	0.42**	0.17	0.20**	0.23***	0.24**	—

*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

sion are correlated with variables in other sets*. For example, patients who have a previous stroke are more overprotected [$r(39) = 0.38$, $P < 0.05$].

To control for these correlations, a further multiple regression was done, predicting depression from the variables in each analysis that were significantly related to depression: time since stroke, previous stroke, patient meaningfulness, overprotection, patient perception of caregiver, and caregiver mean- ingfulness. The multiple R (0.73) was significant [$F(3, 36) = 14.13$, $P < 0.001$], $R^2 = 0.53$. Only three variables had a significant b-coefficient: patient meaning and purpose [$t(36) = -3.32$, $P < 0.002$], overprotection [$t(36) = 2.10$, $P < 0.05$], and time since the stroke [$t(36) = 2.67$, $P < 0.01$].

Thus, three variables are strongly and independently related to patient depression. Stroke patients who are less depressed are those who interpret their lives as meaningful, are not overprotected by their caregivers, and who have had a more recent stroke.

Another test of the independent contribution of a set of variables to predicting depression is to see if the set adds significantly to the predictions obtained by another set. To do this, one set was used to predict depression and the change in R^2 obtained by adding a second set was examined.

The results of these analyses are presented in Table 2. As can be seen, patient interpretation, the relationship with the caregiver, and caregiver inter- pretation each adds significantly to the prediction of depression over and about the predictive power of the objective circumstances in which patients find them- selves. Thus, the greater depression of patients with lower feelings of meaningfulness, and more over- protective caregivers cannot be solely due to their worse objective circumstances.

Further inspection of the table shows that both the patient interpretation and the relationship sets each add significantly to the predictive power of the other three sets. Thus, although the patient interpretation and relationship variables are correlated with each other and with variables in other sets, they are each independently related to patient depression.

---

*A copy of a table listing the intercorrelations is available from the first author.

Motivation analysis

A similar analysis was done with patient motivation to work in outpatient treatment as the dependent variable.

As can be seen in Table 1, patients are rated as being less motivated when they have a left infarct, are more impaired cognitively, have a lower sense of meaningfulness, have less hope, are more over- protected and their caregivers have a lower sense of meaning in life.

Multiple regression analysis within each set found that for the objective indicators only site of infarct significantly predicted motivation [$R = 0.32$, $R^2 = 0.10$, $F(1, 38) = 4.42$, $P < 0.05$]. For the patient interpretation variables, hope [$t(37) = 2.79$, $P < 0.01$] and perceived control over recovery [$t(37) - -2.34$, $P < 0.05$] were related to motivation [$R = 0.47$, $F(2, 37) = 5.30$, $P < 0.01$]. Surprisingly, those who perceive more control over their recovery are also less motivated. From the relationship set, only over- protection was significant [$R = 0.37$, $R^2 = 0.13$, $F(1, 38) = 5.90$, $P < 0.05$]. And only meaning and purpose was a significant predictor of motivation from the caregiver interpretation set [$R = 0.33$, $R^2 = 0.11$, $F(1, 38) = 4.80$, $P < 0.05$].

Overall analysis. In a multiple regression using the best predictors from each set, only overprotection [$t(37) = -3.27$, $P < 0.01$] and perceived control over recovery [$t(37) = -2.62$, $P < 0.01$] are significantly related to motivation [$R = 0.52$, $R^2 = 0.27$, $F(2, 37) = 6.85$, $P < 0.01$]. If site of infarct is added to the equation, it is marginally significant [$t(36) = P < 0.06$]. Thus, there are two independent predictors of motivation: overprotection of the patient and patient perceptions of control over recovery. There is a trend for site of infarct also to independently predict motivation.

As in the depression analysis, multiple regressions were done to see if one set of variables adds significantly to the effects of another set.

As can be seen in Table 3, both the patient interpretation and the relationship variables add significantly to the prediction of motivation over and above the objective circumstances. Looking down the columns, the patient interpretation variables predict

Table 3. Multiple regression results for each set of variables predicting motivation and the increase in variance predicted when a second set is added to the equation

Set of variables first entered in equation	R	R^2	Increase in R^2 due to			
			OC	PI	RC	CI
Objective circumstances (OC)	0.32*	0.10	—	0.26**	0.12*	n.s.
Patient interpretation (PI)	0.47**	0.22	0.08*	—	0.07*	n.s.
Relationship with caregiver (RC)	0.37*	0.13	0.09*	0.16*	—	n.s.
Caregiver interpretation (CI)	0.33*	0.10	n.s.	0.19*	n.s.	—

*$P < 0.05$; **$P < 0.01$.

motivation over the effects of all three other sets. The relationship variables add significantly to the prediction afforded by the patient interpretation set.

Thus, taken as a whole, the analyses suggest that the patients who are most motivated to work in outpatient therapy are those who are not over-protected, who have hope for the future, who do not feel they can control their own recovery, and who have had a right infarct.

DISCUSSION

The predictions that stroke patients will be more depressed if they are in worse circumstances follow-ing the stroke, interpret their situation more nega-tively, had a poorer relationship with their caregiver and a caregiver who sees the situation more nega-tively, have a poorer relationship with their caregiver and a caregiver who sees the situation more nega-tively were supported. When the intercorrelations among the variables from each category are con-overprotected, and a longer time since the stroke occurred. Thus, as might be expected, stroke patients who are in worse circumstances following the stroke because they are more impaired or have had more than one stroke or have lived longer with the effects of the stroke are more depressed. However, indepen-dent of that, depression is related to how one inter-prets the circumstances one is in and to one's relationship with the person who provides care.

Similarly, patients are less motivated if they are in objectively worse circumstances, but, independent of that, motivation to work in therapy is related to how patients interpret their situation and to their re-lationship with the caregiver. The finding that post-stroke depression is not entirely a reaction to the severity of the stroke fits with the conclusions reached in a longitudinal study of mood disorders following stroke [44]. These researchers found that measures of physical, intellectual and social impairment did not predict the development of depressive symptoms. They did find however, an increased correlation between impairment and depression over the 2 years following the stroke which they suggest means that, over time, depression and impairment interact in a reciprocal fashion. In other words, degree of im-pairment does not cause depression, but in the months following the stroke those who are more depressed make less progress and those who make less progress become more depressed.

Why, then, do some stroke patients initially be-come depressed and others do not? Some research has found that severity of poststroke depression is related to the site of the lesion; left anterior infarcts are associated with more severe depression [38], sug-gesting a neurophysiological basis for the mood disorder. In the present study, left infarct patients were only marginally more depressed than those with lesions elsewhere. We did not have a measure of whether a left lesion was anterior or posterior, and this may account, in part, for the weak relationship between site of lesion and depression. However, it is unlikely that site of infarct can completely explain differences in depression in this study. The small correlation between site and depression indicates that many patients with right hemisphere strokes were also depressed.

Our findings suggest that, in addition to the vari-ance in depression that is due to the site of the infarct, poststroke depression is related to patient inter-pretations of their situation and to their relationship with those who provide daily care.

Limitations and interpretation

Because these data are correlational, it is possible that the factors identified here as leading to depres-sion are, in fact, the result of being depressed. Depression and a lack of motivation, for example, may make it difficult to see one's life as meaningful and to find and set goals that can be obtained in those circumstances, and may also elicit overprotection from others.

This interpretation cannot be completely ruled out with the type of data collected in this study. In fact, it seems likely that depression could have some of these effects. However, there are two reasons to suspect that patient interpretation and relationship factors function as a cause of depression.

First, if differences in depression following a stroke are not caused by how patients interpret their plight and by their relationship with their families, then it is difficult to explain depression. Two likely causal factors, the severity of the stroke, and the site of infarct, were considered in this study. Stroke patients *are* more depressed if the consequences of their stroke are more serious, but the interpretation and re-lationship variables still account for a large and significant portion of the variance in depression when the analysis controlled for the type and severity of the stroke. So, differences in depression are not solely caused by differences in objective circumstances.

It is possible, of course, that another factor, such as a depressive or other personality style prior to the stroke, is a major cause of poststroke depression. Longitudinal research that follows a sample of indi-viduals before a stroke occurs could resolve this issue. At this point, however, it is a viable hypothesis that differences in poststroke depression are caused by psychosocial factors; other factors, of course, may also be important.

Second, the answers to some of the open-ended questions support the interpretation that, at least to some extent, the psychosocial factors assessed in this study exert a causal influence on depression. A number of patients mentioned that having the stroke had caused them to reevaluate their priorities and to appreciate areas of their life that they had formerly taken for granted. The impression that one gets from these comments is not that merely because these patients were not depressed, they saw meaning in the experience, but that some active learning or re-evaluation had taken place so that they saw their life differently than they had prior to the stroke. It may be the case that this change in perspective is easier to obtain if one is not depressed, but the perspective does not seem to be merely a by-product of a lack of depression.

An important question here is why some people changed their priorities or found some benefits in the experience and others did not. Because little is known about the antecedants of such changes, we can only speculate. Perhaps, certain world views or personal philosophies, such as optimism, make it easier to find

meaning in the experience. Another possibility is that supportive relationships with family and friends help patients sort out their priorities and find benefits in the experience. However, because the patient interpretation variables predict depression independently of the relationship variables, support from others cannot completely explain differences in finding meaning.

The comments made by caregivers when asked if they overprotect the patient indicate that overprotection also is not entirely a reaction to a depressed patient. In fact, the most common reason given for over solicitious care was that the caregivers saw themselves as too worried or anxious about the situation. Caregivers who overprotected made comments such as: 'I worry, in general, too much.' 'Sometimes I watch out for him too much. I should let him do more.' 'I do too many things for her.' 'I worry about him too much.' No one mentioned being overprotective because the patient was depressed (although several caregivers did say they were overprotective because they did not want the patient's feelings to get hurt). Thus, to the extent that caregivers are accurate in assessing the cause of their overprotective behavior, it does not seem to be in reaction to a depressed patient.

Of course, these points do not resolve the issue of causality, but they do lend support to the view that depression and motivation are, in part, the result of the poststroke psychosocial factors that were examined in this study.

A second potential problem is the use of the self-reports of stroke patients. It could be argued that due to the cognitive deficits experienced by some stroke patients their self-reports of beliefs, attitudes and moods are not reliable. However, for those areas where direct comparison is meaningful, stroke patients and their caregivers in this study did not have widely divergent views of the situation. Stroke patients' estimate of the degree of their physical disability, for example, did not differ significantly from their caregiver's estimate. The fact that many of the predicted relationships between attitude variables and coping outcome were in the correct direction and significant also argues against the view that unreliable, meaningless data was generated.

A third limitation of the study concerns the considerable variance within both the sample of patients and of caregivers on factors such as age, number of strokes, and length of time since the stroke. On the one hand, the heterogeneity of the samples increases the generalizability of the results to stroke patients in general. In only a few ways would the results not be generalizable, for example, to those patients with severe aphasia and cognitive deficits that made it difficult to participate in an interview. On the other hand, such a nonhomogeneous sample raises the possibility that those uncontrolled variables are a source of confounding in the study. This, however, was not a problem in those analyses in the which the objective circumstance variables were controlled for.

CONCLUSION

Both cognitive adaptation and social support theories appear to be useful approaches to understanding people's ability to cope following a stroke.

The next step is to examine the causal direction of these relationships through longitudinal and experimental designs, and to see if interventions to enhance finding meaning and purpose and to discourage overprotection are feasible.

REFERENCES

1. Goodstein R. Overview: cerebrovascular accident and the hospitalized elderly—A multidimensional clinical problem. *Am. J. Psychiat.* **140**, 141, 1983.
2. Charatan F. B. and Fisk A. Mental and emotional results of strokes. *N.Y. St. J. Med.* 1403, 1978.
3. Hyman M. D. Social psychological determinants of patients' performance in stroke rehabilitation. *Archs Phys. Med. Rehabil.* **53**, 217, 1972.
4. Isaacs B., Neville Y. and Rushford I. The stricken: the social consequences of stroke. *Age & Aging* **5**, 188, 1976.
5. Rogoff J. B., Cooney D. V. and Kutner B. Hemiplegia: a study of home rehabilitation. *J. Soc. Issues* **17**, 539, 1964.
6. Dzau R. E. and Boehme A. R. Stroke rehabilitation: a family-team education program. *Archs Phys. Med. Rehabil.* **59**, 236, 1978.
7. Overs R. P. and Healy J. R. Stroke patients: their spouses, families and the community. In *Medical and Psychological Aspects of Disability* (Edited by Cobb A. B.). Thomas, Springfield, Ill., 1972.
8. Lawrence L. and Christie D. Quality of life after stroke. A three-year follow-up. *Age & Aging* **8**, 167, 1979.
9. Gordon W. A. and Diller L. Stroke: coping with a cognitive deficit. In *Coping with Chronic Disease* (Edited by Burish T. G. and Bradley L. A.). Academic Press, New York, 1983.
10. D'Afflitti J. G. and Weitz G. W. Rehabilitating the stroke patient through patient-family groups. *Int. J. Group. Psychother.* **24**, 323, 1974.
11. Labi M. L., Phillips T. F. and Gresham G. E. Psychosocial diability in physically restored long-term stroke survivors. *Archs Phys. Med. Rehabil.* **61**, 561, 1980.
12. Anderson E., Anderson T. P. and Kottke F. J. Stroke rehabilitation: maintenance of achieved gains. *Archs Phys. Med. Rehabil.* **58**, 345, 1977.
13. Lee P. R., Groch S., Untereker J., Silson J., Dasco M. M., Feldman D. J., Monahan K. and Rusk H. A. An evaluation of rehabilitation of patients with hemisparesis or hemiplegia due to cerebral vascular disease. *Rehab. Monogr.* **15**, 1, 1958.
14. Hyman M. D. The stigma of stroke. *Geriatrics* **26**, 132, 1971.
15. Robertson E. K. and Suinn R. M. The determination of rate of progress of stroke patients through empathy measures of patient and family. *J. psychosom. Res.* **12**, 189, 1968.
16. Krantz D. S. and Deckel D. S. Coping with coronary heart disease and stroke. In *Coping with Chronic Disease* (Edited by Burish T. G. and Bradley L. A.). Academic Press, New York, 1983.
17. Janoff-Bulman R. and Frieze I. H. A theoretical perspective for understanding reactions to victimization. *J. Soc. Issues* **39**, 1, 1983.
18. Taylor S. E. Adjustment to threatening events: A theory of cognitive adaptation. *Am. Psychol.* **38**, 1161, 1983.
19. Thompson S. C. and Janigian A. S. Life schemes: a framework for understanding the search for meaning. *J. soc. clin. Psychol.* In press.
20. Bulman R. J. and Wortman C. Attributions of blame and coping in the "real world": severe accident victims react to their lot. *J. Person. soc. Psychol.* **35**, 351 1977.

21. Silver R. L., Boon C. and Stones M. H. Searching for meaning in misfortune: making sense of incest. *J. Person. soc. Psychol.* **39**, 81, 1983.

22. Thompson S. C. Finding positive meaning in a stressful event and coping. *Basic. Appl. Soc. Psychol.* **6**, 279, 1985.

23. Antonovsky A. *Health, Stress, and Coping.* Jossey-Bass, San Francisco, Calif., 1979.

24. Baum A., Fleming R. and Singer J. E. Coping with victimization by technological disaster. *J. Soc. Issues* **39**, 117, 1983.

25. Taylor S. E., Lichtman R. R. and Wood J. V. Attributions, beliefs about control, and adjustment to breast cancer. *J. Person. soc. Psychol.* **46**, 489, 1984.

26. Thompson S. C. Will it hurt less if I can control it? A complex answer to a simple question. *Psychol. Bull.* **90**, 89, 1981.

27. Caplan R. D. Patient, provider and organization: Hypothesized determinants of adherence. In *New Directions in Patient Compliance* (Edited by Cohen S. J.). Heath, Lexington, Mass., 1979.

28. Dean A. and Lin N. The stress-buffering role of social support: problems and prospects for systematic investigation. *J. nerv. ment. Dis.* **165**, 402, 1977.

29. Wills T. A. Supportive functions of interpersonal relationships. In *Social Support and Health* (Edited by Cohen S. and Syme S. L.). Academic Press, New York, 1985.

30. Friedman K., Bischoff H., Davis R. and Person A. Samaritan blues. *Psychol. Today* 26, July, 1982.

31. Silver R. L. and Wortman C. B. Coping with undesirable life events. In *Human Helplessness* (Edited by Garber J. and Seligman M. E. P.). Academic Press, New York 1980.

32. Wortman C. B. and Conway T. L. The role of social support in adaptation and recovery from physical illness. In *Social Support and Health* (Edited by Cohen S. and Syme S. L.). Academic Press, New York, 1985.

33. Barrera M. Social support in the adjustment of pregnant adolescents: assessment issues. In *Social Networks and Social Support* (Edited by Gottlieb B. H.). Sage, London, 1981.

34. Wortman C. B. Social support and the cancer patient. *Cancer* **53**, 2339, 1984.

35. Whitehouse F. A. Stroke: some psychological problems it causes. *Am. J. Nurs.* **63**, 81, 1963.

36. Watzlawick P. and Coyne J. C. Depression following stroke: brief, problem-focused family treatment. *Fam. Prac.* **19**, 13, 1980.

37. Stroker R. Impact of disability on families of stroke clients. *J. Neurosurg. Nurs.* **15**, 360, 1983.

38. Robinson R. G., Lipsey J. R. and Price T. R. Diagnosis and clinical management of post-stroke depression. *Psychsomatics* **26**, 769, 1985.

39. Robinson R. G., Kubos K. L., Starr L. B., Rao K. and Price T. R. Mood disorders in stroke patients: importance of location of lesion. *Brain* **187**, 91, 1984.

40. Robinson R. G., Starr L. D., Lipsey J. R., Rao K. and Price T. R. A two-year longitudinal study of post-stroke mood disorders: dynamic changes in associated variables over the first six months of follow-up. *Stroke* **15**, 510, 1984.

41. House A. Depression after stroke. *Br. med. J.* **294**, 76, 1987.

42. Holroyd J. The questionnaire on resources and stress. An instrument to measure family response to a handicapped family member. *J. commun. Psychol.* **2**, 97, 1974.

43. Brink T. L., Yesavage J. A., Lum O., Heersema P., Adey M. and Rose T. L. Screening tests for geriatric depression. *Clin. Geron.* **1**, 37, 1982.

44. Robinson R. G., Starr L. B., Lipsey J. R., Rao K. and Price T. R. A two-year longitudinal study of poststroke mood disorders. In-hospital prognostic factors associated with six-month outcome. *J. nerv. ment. Dis.* **173**, 221, 1985.