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Post-stroke depression

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POST-STROKE DEPRESSION

A Thesis

Presented to

The Faculty of the School of Nursing

San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

by

Joan A. Albers

May, 1994

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ABSTRACT

POST-STROKE DEPRESSION

by Joan A. Albers

This thesis explored the relationship between depression levels of post-stroke patients and the length of time since the stroke. The goal was to describe the extent and pattern of post-stroke depression in order to suggest appropriate care. Depression is a common complication following a stroke. However, little is known about treating depression in this population. The Beck Depression Inventory (BDI) scores for a group of post-stroke patients ($N = 10$) obtained at 1 and 3 months were compared.

The data suggest a complex scenario. The mean depression level was greater at 3 months ($M = 10$) than at 1 month ($M = 8.2$). However, the number of test scores indicating less depression ($n = 5$) exceeded the number indicating increased depression ($n = 4$). This study suggests that an expert clinician is required to continuously assess these inconsistent and changing client situations.

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Chapter 1

INTRODUCTION

Treatment and rehabilitation of post-stroke patients presents an ongoing challenge for society and nursing today. Potentially, this will be a greater challenge in the future. Those over 65 represent the fastest growing segment of the population in the United States. This age group has the highest incidence of stroke. Stroke is the third leading cause of death for Americans 65 years and older (Parikh et al., 1990). Each year 400,000 people suffer thromboembolic strokes in the United States. Advances in technology have increased the life expectancy of stroke survivors dramatically. In 1988, at least 50% of stroke patients that survived 1 month were expected to live 3 years or more (Primeau, 1988). With advances in technology, the percentage of survivors can be expected to improve. Therefore, the percent of the health care budget invested in treatment and after care for stroke patients, while substantial now, will continue to grow.

The challenge is to effectively treat stroke survivors with the goal of returning them to functional independence as quickly as possible. The occurrence of post-stroke depression compounds the rehabilitation process and further reduces the chances of independent living. Post-stroke

depression, if not recognized and treated, may delay all phases of recovery from the stroke (Morris & Raphael, 1987). Parikh et al. (1990) also report that post-stroke depression may have a significant negative impact on recovery curves. Tiller (1992) found that, although depression correlates highly with failure to resume social and physical activities, many post-stroke patients are not treated for this complication. Failure to treat post-stroke depression may occur because it is falsely assumed that depression is a reasonable response to a stroke; therefore, specific treatment is not indicated. Robinson, Morris, and Fedoroff (1990) found that depression may contribute as much to impairment following a stroke as impairment contributes to depression.

Although the connection between post-stroke impairment and depression is well documented, many reports indicate that the level of functional impairment does not correlate with the level of depression following a stroke (Morris & Raphael, 1987; Stern & Bachman, 1991). Turner and Noh (1988) found a number of studies of the psychological status of disabled and nondisabled populations that did not report a difference in depression levels. However, Morris, Robinson, Andrzejewski, Samuels, and Price (1993) reported

patients with a diagnosis of depression post-stroke were 3.4 times more likely to have died in a 10-year follow-up than were nondepressed patients.

Because of the significant growth in the elder population and the enormous impact stroke has on this population, nursing practice is affected. The work of treating and interacting with stroke patients in all phases of the post-stroke process is a large part of nursing practice today. The post-stroke patient is vulnerable and needs an advocate even in relatively minor strokes. In more severe cases, the patient may be unable to perform even the simplest functions and the nursing implications are enormous. As in many illnesses, the inter-relatedness that exists between body, mind, and spirit has been altered, and it is this altering of the total person that the nurse must be conscious of treating.

Depression following stroke is only a part of the post-stroke sequelae. In the beginning, the extent of recovery may be uncertain; in the later periods, accepting and adapting to the known limitations may be the goal. Catapano and Galderisi (1990) found the greatest level of depression in the 6-month to 2-year post-stroke range. At any point in the recovery process post-stroke depression is a potential limitation to progress.

Nurses need to recognize depression in the post-stroke population and realize its potential for limiting the efficacy of treatment, as well as its potentially lethal effect if not properly treated. Yet, nurses and other health workers do not always recognize depression in post-stroke patients (Schubert, Taylor, Lee, Mentari, & Tamaklo 1992). Failure to recognize and treat post-stroke depression can have a long term negative effect on the patient's ultimate recovery (Parikh et al., 1990).

This study focused on the post-stroke patient's level of depression as reported for 10 subjects. The Beck Depression Inventory (BDI) was used as a tool to measure the level of depression within 1 month of the stroke event and again at 3 months post-stroke event. Work for this thesis compared the first score on the BDI to the subsequent depression level as measured by the BDI. An analysis of selected demographic data was done. The larger goal was to describe the extent and pattern of post-stroke depression in order to suggest appropriate care by nurses and other health care providers.

Background

Currently, there are problems dealing with post-stroke depression both in defining depression as it relates to the stroke, and in determining normal and abnormal reactions to

the loss of function. Kerr (1988) observed that, although depression is a universal experience affecting some 15% of the total population at any one time, it cannot be considered a healthy state. The description that Kerr (1988) gives of the depressed state as a mind filled with despairing thoughts and a body sluggish, dull, and unalive, could very well be used to describe the experience of a post-stroke patient.

The dilemma in treatment is to determine if this depressed feeling is an illness apart from the stroke, to be treated and resolved through medical intervention, or a normal period of adjustment. Johnson, Roberts, Ross, and Witten (1992) noted that the possibility of significant medication side effects might explain why depression in stroke survivors is frequently untreated. Some medications used to treat depression may have side effects that would mask or mimic impairments suffered in a stroke, making treatment more problematic. Electroconvulsive therapy (ECT) on the other hand, may not be used to treat post-stroke depression because memory impairment, a common complication of ECT, is one that would be particularly troublesome for stroke patients (Johnson et al., 1992). Further, treatment of depression may impose additional risks in this

post-stroke population because the mind has suffered the physical assault of a stroke. However, failure to treat may pose an even greater risk. Finally, some studies have emphasized the need for early recognition and treatment of post-stroke depression. This need is highlighted by the sustained adverse effect of depression on functional recovery after stroke, even when the depression improved (Parikh et al., 1990).

Problem Area

Current problems in the treatment of stroke patients include the inadequate recognition of post-stroke depression and the failure to treat that depression either because of the difficulty inherent in treatment or the fear of doing more harm to a mind already in a compromised state. An additional problem involves determining what is a normal reaction and what is an abnormal one that requires treatment.

Although depression is the most common emotional problem among post-stroke patients, the systematic study of the frequency, course, relationship to lesion location, and response to treatment have only recently been undertaken (Catapano & Galderisi, 1990). The question of right-sided lesions or left-sided lesions being more frequently associated with depression in the post-stroke patient is an

unresolved issue. Lesion location will specifically affect the type of physical impairment the stroke patient will suffer, but how lesion location and depression are related needs additional research.

Purpose of Study

This study specifically examined part of the body of research that will be required to define the best treatment for post-stroke depression. The study identified the possible changes that occur in the post-stroke patients' level of depression from the initial stroke reaction to the period 3 months after the stroke event.

This study was a secondary analysis of data from an ongoing study entitled "Recognizing Depression Following Stroke." The funding source for the ongoing study was the National Institute of Health, Center for Nursing Research, NRO2324. Fay W. Whitney was principal investigator, with Irene D. Lewis responsible for the Minority Supplement. The goal of this ongoing research is to characterize the depressive signs and symptoms experienced over time in stroke patients and to explore the relationships among site of the lesion, length of time since the stroke, and depression. This thesis study will provide information to assist health care providers in detecting depression so that treatment and referrals can be initiated.

Research Questions

The research questions for this study were as follows:

1. What are the initial levels of depression experienced by stroke patients as measured by the Beck Depression Inventory within 1 month of the stroke event?
2. What are the subsequent levels of depression for stroke patients as measured by the Beck Depression Inventory at 3 months after the stroke event?

Definitions

1. Depression is an affective disorder which has as its essential feature a disturbance in mood and an inability to respond (Kerr, 1988).
2. Stroke is the sudden, usually severe impairment of body functions caused by a disruption in the supply of blood to the brain (The Road Ahead: A Stroke Recovery Guide, 1989).
3. Post-stroke depression is the behavioral and affective response to injury at brain areas by physiological or neurochemical mechanisms, rather than a simple psychological reaction to physical disability (Primeau, 1988).
4. Mini Mental Status Exam (MMSE) is a quickly administered test of orientation, registration, attention and calculation, recall, language, and ability to follow a three-part command (Matteson & McConnell, 1988).

Summary

Post-stroke depression affects a large and growing segment of the population. It presents challenges to nursing practice at every level. The issues range from how to recognize this depression to how to understand its cause and treat it effectively. There are many aspects to the problem of post-stroke depression. Although there are no complete answers to the questions posed, much additional work must be done to demonstrate the most effective treatments of post-stroke depression. Clearly, additional investigation is needed. This thesis was a part of that ongoing research into the problem of post-stroke depression. It was a secondary analysis of archival data concerning 10 post-stroke patients.

The immediate goal of this thesis was to describe levels of depression in post-stroke patients. The broader goal was to contribute to the body of literature on this significant problem so that health care for stroke patients can be improved.

Chapter 2

CONCEPTUAL FRAMEWORK AND RELATED LITERATURE REVIEW

Introduction

This chapter relates Roy's conceptual framework to the study of patients with post-stroke depression. Roy's theory helped to guide this study and provided a clarification of the problems experienced by patients dealing with post-stroke depression. Examples are used to relate each area of Roy's Adaptation Model to the study.

Conceptual Framework

Roy's conceptual model directs researchers to study problems in adaptation to constantly changing environmental stimuli (Fawcett & Tulman, 1990). Frequently, the physiological needs, as well as the self-concept, role function and interdependence of stroke patients is suddenly and drastically altered following the stroke. Typically, their needs are profoundly greater and, at the same time, their ability to care for themselves is greatly diminished. This physiological impairment coupled with the altered self concept, diminished role function, and greater dependence may be seen to precipitate depression following a stroke. This has led some authors to suggest that depression is a natural outcome of the stroke trauma (Primeau, 1988). Following a stroke, the former provider for a family may

become dependent, and individuals accustomed to living totally independent lives may need to rely on others for even the most basic activities of daily living. The Roy Adaptation Model describing patients as biopsychosocial beings required to adapt to environmental stimuli (Fawcett & Tulman, 1990) is very well suited to research in general and to the study of post-stroke patients in particular.

The conceptual framework for this thesis was the Roy Adaptation Model of nursing (Riehl & Roy, 1980). This model deals with individuals as complex beings involved in adaptation to changing environments. Adaptation is both a process and a state (Roy, 1990). As a process, the individual is involved in a purposeful series of actions moving toward some goal. Roy states it is far from a passive process; in fact it involves all of the person's capabilities, hopes, dreams, aspirations, and motivations.

All of these adaptations are seen to move the person toward greater mastery. Adaptation is always positive, active, and creative (Roy, 1990). Roy also considers adaptation a state, that is, the static condition of the person with respect to their environment. This state is a point in time of the on-going adaptive process. Adaptation is considered to take place in one biological and three psychosocial modes (Fawcett & Tulman, 1990). The four

modes are closely related, and responses in any mode may have an effect on any or all of the other modes. Roy has further developed each of the modes as an adaptive subsystem, and has stated that the goal of nursing is to promote adaptation (Riehl & Roy, 1980).

According to Roy, the individual is made up of six subsystems; the regulator, the cognator and the four adaptive modes. These elements form a complex system that enables an individual to adapt to stimuli. Environmental stimuli, which influence adaptation are categorized as focal, contextual, and residual. The stimuli that cause a behavior are the focal stimuli. They are the stimuli the person is responding or adapting to at any given time. All other stimuli the person is responding to, with some form of behavior, are referred to as the contextual stimuli. Any other stimuli that may be affecting behavior are referred to as residual stimuli. These residual stimuli may become contextual or focal stimuli as the individual adapts.

Biological or Physiological Mode

Roy defines the biological or physiological mode as that concerned with basic needs that are required to maintain the physical and physiological integrity of the human system. That is, the ways the body has of dealing with adaptation necessary to survive. This would include fluids and

electrolytes, exercise and rest, elimination, nutrition, circulation and oxygen, also regulation using the senses, temperature, and endocrine systems (Riehl & Roy, 1980).

Post-stroke patients will cope with alterations of a biological and physiological nature. Depending on the severity of the stroke, the changes may be minor or profound. When nurses are caring for post-stroke patients, the biological and physiological needs must be the first priority; they support life. In the case of a severe stroke, patients are usually unable to identify or express their needs. This further compounds the nursing problems presented by these patients.

Self-concept Mode

Self-concept is a composite of the beliefs and feelings that individuals have concerning themselves at a particular time. This concept is drawn from the perceptions individuals have of self, especially of others' reactions to them. This perception, in turn, influences individual behavior.

The self-concept mode is made up of the physical self and the personal self. The physical self includes sensation and body image. This is the body as it exists in the physical world. The personal self involves components such as the moral and ethical self, and the self-ideal or

self-expectancy. Each mode is related to the whole, and as stated earlier, what impacts one will affect one or more modes. This interrelatedness means that an individual cannot change one mode without altering another (Riehl & Roy 1980).

Self-concept and perceptions of self as derived from the reactions of others are profoundly affected by stroke. Post-stroke patients face a drastically altered physical self and realistically a changed self-expectancy. These changes affect the people close to the stroke patient as well.

Role Performance Mode

Each role an individual plays has a reciprocal role; that is, each role occurs in a dynamic relationship with others. Many of the roles played lead to secondary roles for at least a time in one's life. These secondary roles may lead to tertiary roles. Role function means performing duties related to roles in society and reacting with others in each role. Performance of the role depends in part on this interaction. The primary role one plays depends on the developmental level achieved in life. From this primary role will flow the secondary and sometimes tertiary roles of one's life, again depending on individual development and the interplay of relationships.

One's life is made up of roles played in response to others. The stroke event alters that, sometimes forever; new ways of relating begin, and some roles can never again be assumed.

Interdependence Mode

In meeting needs for nurturance and affection, an individual maintains psychic integrity. These needs are met in an individual's relationships with significant others and with support systems (Riehl & Roy, 1980).

The regulator and the cognator are two coping subsystems that Roy describes. The regulator is the coping subsystem that responds automatically through neuro-chemical-endocrine processes. The cognator is the coping subsystem that responds through a complex process of perception, information processing, learning, judgment, and emotion.

As stated before, stroke patients may have experienced a dramatic change following the stroke. The need for nurturance and affection are intact, but the coping subsystems are altered. The automatic responses as well as the perception, learning, judgment, and emotional responses may be ineffective.

Application of Roy's Model

Roy defines a person as biopsychosocial and in constant

interaction with a changing environment (Fawcett & Tulman, 1990). For the stroke patient, the changing environment is one that may have become extremely difficult to manage, because of the impairments suffered in the stroke. These impairments may affect all six subsystems of the individual. The patient acts in the four adaptive modes to maintain integration. Health is defined by Roy as the state and process of being and becoming an integrated and whole person (Fawcett & Tulman, 1990). A lack of integration is a lack of health. The task for the stroke patient is to strive to integrate while dealing with multiple problems.

Nursing's goal is to help patients adapt to changes in their physiological needs, self-concept, role function, and their interdependent relationships during times of illness. Nurses do this by acting as a facilitator of adaptation and assessing behaviors in all of the adaptive modes. Nurses then plan and carry out interventions which concern the managing of influencing stimuli. In time, as the stroke patient is able to adapt and to integrate self following the loss, the role of the nurse is diminished.

Review of Related Literature

This section is organized by the subtopics of the four adaptation modes and relates to how post-stroke depression

is managed by patients. Each pertinent article will be described in relation to one or more of the adaptation modes. The physiological mode will be considered first. Self-concept mode will be second, and third will be the role performance mode followed by the interdependence mode.

Physiological Mode

Following a stroke, a patient may be dealing with stimuli affecting only some, or in extreme cases, all of the body's basic needs. Depending on the location of the brain lesion and on the overall severity of the stroke, the post-stroke patient may be dealing with multiple changes. Riehl and Roy (1980) list basic physiological needs including exercise and rest, nutrition, elimination, fluid and electrolytes, and oxygen. Post-stroke patients may be dealing with problems in each of these areas. Immobility, malnutrition, constipation or incontinence, dehydration and edema, electrolyte imbalance, and oxygen deficit are all problems frequently identified in post-stroke patients.

The lesion location will affect the outcome of the physiological mode, depending on functional impairments related to the exact location of the brain lesion. The lesion location is very specific for type of physical impairment suffered. However, the lesion location does not seem to relate specifically to the post-stroke depression.

There is in fact, disagreement on the effect that lesion location has on depression following a stroke.

Morris and Raphael (1987) noted that depression is a significant complication tending to be associated with particular sites in the brain. They mention studies that cite anterior lesions in the left hemisphere associated with depression, and right-sided parietal lesions associated with severe vegetative abnormality. In addition they indicate cerebral lesions may act as a general precipitant of depression.

However, later studies reported by Morris, Robinson, Raphael, and Bishop (1991) did not find an association between gross hemispheric lesion location and depression. Stern and Bachman (1991) found that patients with left anterior cerebral lesions have a higher incidence and severity of depression than do patients with lesions in any other area. This is similar to the findings of Starkstein, Robinson, and Price (1988) who reported that left hemisphere lesions show a higher frequency of depression compared with any other location. Catapano and Galderisi (1990) simply stated that left frontal location alone is the best predictor of depression in post-stroke patients.

Primeau (1988) concluded that it is difficult to say depression is more common in patients post-stroke than

elderly with other physical ills or that any particular brain lesion location is definitely linked to higher rates of depression in stroke patients. Tiller's (1992) study concurred that the side of the lesion has not generally been shown to relate to the presence or absence of depression.

Depression may affect overall recovery and outcome. Parikh et al. (1990) reported that post-stroke depression may have a significant negative impact on recovery curves. Even after the depression has improved there is a sustained adverse effect of the depression on functional recovery. This would suggest that depression prevents the post-stroke patient from adapting in the physiological mode. In a 10-year study of post-stroke mortality, Morris et al. (1993) found that many factors, including the type of stroke or the lesion location, were not as important as the depressed mood in predicting mortality. Depressed mood following stroke was strongly associated with an increased risk of subsequent mortality in their study.

Despite the severe effects depression has on the recovery of the post-stroke patient in the physiological mode of adaptation, as well as other areas, it is frequently insufficiently recognized and treated. Schubert et al. (1992) reported that depression in nonpsychiatric medical patients is inadequately diagnosed because of the concurrent

nonpsychiatric medical illness. Clearly the physiology of stroke will affect the post-stroke patients' outcome. The significance of other factors on the outcome needs to be more closely examined.

Self-Concept Mode

A post-stroke patient's self-concept can be altered following a stroke. In some cases, the severity of the stroke may directly affect the patient's self-concept. However, as Morris and Raphael (1987) noted, a patient may suffer very little physical loss in a stroke, but the psychic affects may be dramatic. In contrast, a patient may experience a tremendous loss physically and not report a corresponding loss of self-ideal. This variation in response may be related to many factors. Self-expectancy will necessarily be altered following a stroke for many patients. In addition, sensation and body image may very well be altered. Patients respond to their very unique experience of stroke in a way that is based on their adaptation abilities. The interplay of all modes of adaptation of the individual will be involved in the response (Riehl & Roy, 1980).

The relationship of physical disability and depression is not clearly established (Turner & Noh, 1988). Similarly, Morris et al. (1991) found that depression was not directly

associated with physical disability. In additional findings, Stern and Bachman (1991), and Feibel and Springer (1982) reported that depressive symptoms were not associated with functional impairment as measured by activities of daily living, motor strength, or severity of aphasia.

Other authors report findings that suggest an association with physical disability and depression. Tiller (1992) found that depression was associated with physical disability and loss of function, but it is not simply a response to the disability. Morris and Raphael (1987) stated that depression in the post-stroke patient is not directly attributable, in the acute phase, to the severity of the stroke. However, Primeau (1988) reported that the depression in post-stroke patients organized around the frustrations of physical handicaps. Starkstein et al. (1988) noted that a depressed group of post-stroke patients had a greater cognitive impairment, and that the depression itself may produce an intellectual impairment. According to this literature, there is a convoluted relationship between depression and impairment. Does depression cause impairment, or does impairment cause depression? The relationships in all adaptive modes are complex and interrelated.

Role Performance

Role performance is related very closely to functional ability. As stated earlier the level of function as measured by a variety of indicators does not relate directly to the level of depression (Feibel & Springer, 1982; Stern & Bachman, 1991). Turner and Noh (1988) disagreed with these findings, stating that physical disability is associated with significantly increased risk for depression regardless of age or gender. Stating that the greatest number of diagnosed depressions occur in the 6-month to 2-year period post-stroke, Catapano and Galderisi (1990) indicated that depression is related to something other than disability. Disability will not significantly change in that time frame. Tiller (1992) noted that depression post-stroke is highly correlated with a failure to resume premorbid social and physical activities. Role performance, as well as other adaptive modes, appears to relate to level of depression. The current literature does not establish the precise relationship.

Interdependence mode

Interdependence is an adaptive mode that seems to be clearly related to the incidence of depression in post-stroke patients. As in many other illnesses, a strong

support system indicates that the outcome will more often be favorable for the patient.

Tiller's (1992) article describes the treatments appropriate for post-stroke depression. It specifically mentions reassurance, advice, and education for both the patient and the patient's family. In the study of depression and mortality, Morris et al. (1993) noted that depressed patients who are socially isolated are particularly vulnerable. The research reported by Feibel and Springer (1982) reported that the only significant correlate of depression status was lost social activities measured as a percentage of premorbid activities. Feibel and Springer's (1982) study had examined the age, sex, lesion location, marital status, and cognitive status of patients as well as physical independence in activities of daily living, mobility, and changes in residence.

Turner and Noh (1988) found that only the effects of mastery and social support were clearly observable within all age groups in the longitudinal analysis of depression and physical disability. Robinson, Morris, and Fedoroff (1990) reported that among patients who perceived inadequacy of support, there was a greater frequency of depression than among patients who perceived adequate support. This relationship was found if the caretaker was a spouse. If

the caretaker was not a spouse no relationship was found between perceived adequacy of support and depression. In a later study, Morris et al. (1991) reported a strong association between perception of social support and subsequent depression. This was especially true if there was inadequate support from a spouse.

Morris and Raphael (1987) pose the interesting question, does reduced support lead to depression or does depression lead to reduced support? They do acknowledge a link between reduced quality of support and more severe depression, but state that it may be a result rather than a cause.

Summary

The interplay of all of Roy's adaptive modes as discussed in the different sections of this chapter underline the complexity of the post-stroke problems that elderly depressed patients face. The biological or physiological mode is the first involved. The events that occur in this sphere, specifically the brain lesion that the patient has suffered, may determine many of the problems with which the patient must cope. Any impairments that occur will lead to an alteration in the self-concept mode. Similarly, the physiological impairments will alter the role performance for many stroke patients. All three of the modes, physiological, self-concept, and role performance

will affect the interdependence mode. If the physiological mode has been drastically altered, the role an individual plays in relation to others will be changed, and how a person perceives himself will be altered accordingly. Each of these changes will alter the interdependence of individuals as well.

There is clearly a need for more research in this area of post-stroke depression. The literature highlighted earlier underscores the necessity for more studies to answer questions about the relationship of post-stroke depression to all modes of adaptation. Post-stroke depression is not only a psychological reaction to the physical disability, nor is it simply a response to the physical brain injury. Rather, post-stroke depression affects all modes of adaptation in a very complex way.

Chapter 3
METHODOLOGY
Design

This study utilized secondary analysis of previously reported data in a descriptive nonexperimental design. These data were previously collected by Lewis in an unpublished study concerning post-stroke patients.

The purpose of the study for this thesis was to compare the level of depression of patients as measured within 1 month of the stroke and again at 3 months post-stroke. The independent variable is the time measured from the stroke event. The dependent variable is the level of depression as measured by the Beck Depression Inventory (BDI). This study examines the depression level of post-stroke patients at two points in time.

Subjects/Setting

The subjects in this research project were chosen from subjects in the larger Lewis study. All subjects in this larger study were diagnosed with stroke after admission to an urban medical center in northern California. This larger study was in progress during the years of 1991 through 1993.

Subjects were volunteers for this study and they were aware of their diagnosis of stroke. These volunteers were

medically stable and mentally capable of taking part in the tests to participate in the study. Medical stability was determined by the nursing staff, and mental capacity was determined by administration of the Mini-Mental State Exam (MMSE). If subjects scored 20 or better on the MMSE, they were qualified to participate in the study. Subjects did not, however, need to be able to write to participate in testing. If patients could respond to verbal questions, they were included in the post-stroke depression study. If the subjects could not speak English, they were included using an interpreter to assist with testing.

The exclusion criteria included anyone who had a previous diagnosis of depression or anyone currently on antidepressant medication. Permission to conduct the present research was granted by the San Jose State University Institutional Review Board-Human Subjects (Appendix A).

Measurement

The instrument used to measure depression level in the stroke patients was the Beck Depression Inventory (BDI) (Appendix B). Depression levels were assessed and reported both in the period immediately following the stroke and again at 3-months post-stroke. This tool has been found to

be valid and reliable in rating depression in the elder population. The test-retest correlation coefficient for elder samples was .90. The scale's internal consistency as measured by the coefficient alpha was .91 overall. The test has been used extensively over more than 25 years in a broad range of populations. It has been translated into many different languages and used effectively in many different cultural settings. This tool can be used very quickly to assess a patient and establish the presence of depression (Gallagher, 1986).

The questionnaire consists of 21 groups of statements. After listening to each group of statements carefully, the subjects are asked to indicate the numbered statement or statements (0, 1, 2 or 3) that best describes the way they have been feeling in the past week. Zero represents the least depression and 3 represents the highest level of depression for each item. The scores are then added for all 21 items. The lowest total potential score is 0 and the highest potential score is 63. The subjects can indicate more than one answer if it seems to apply equally well to them. If more than one answer is indicated the highest number is used in scoring. The higher the score the greater the depression level.

Scores from 0 to 9 on the BDI are considered within the normal range or asymptomatic. Scores of 10 to 18 indicate mild-moderate depression, 19 to 29 indicate moderate-severe depression, and 30 to 63 indicate extremely severe depression.

A second tool was used by Lewis to gather demographic data on each subject. This thesis study used only the responses for age, sex, and marital status of the subjects.

Data Analysis

The data were analyzed using standard descriptive statistical techniques. These included calculation of the frequency, percentage, mean, and standard deviation for the data obtained within 1-month of the stroke event and for the data obtained 3-months post-stroke. In addition, charts and tables of demographic data are included for reference.

Chapter 4

ANALYSIS AND INTERPRETATION OF THE DATA

Introduction

The purpose of the study was to discover the relationship between the time elapsed since the stroke and the level of depression. This study attempted to identify the depression level at 1 month and again at 3 months post-stroke event.

This chapter presents the analysis and interpretation of data obtained from stroke patients at two points in their post-stroke period. This analysis and interpretation includes the Beck Depression Inventory scores within 1 month after the stroke and again at 3 months after the stroke event. The data include the demographic information regarding the age, gender, and marital status of these stroke patients.

Description of the Sample

The sample ($N = 10$) used in this thesis was drawn from a larger project of Lewis entitled "Recognizing Depression Following Stroke." Table 1 shows that the majority of this thesis sample was female ($n = 7, 70\%$). More were married ($n = 3, 30\%$) than single ($n = 2, 20\%$), widowed ($n = 2, 20\%$), or divorced ($n = 2, 20\%$). The ages ranged from 51 to 84, with a mean of 68.9 and a standard deviation of 10.2.

Table 1

Demographic Characteristics of the Sample (N = 10)

	<u>n</u>	<u>%</u>
Gender		
Female	7	70%
Male	3	30%
Marital status		
Married	3	30%
Single	2	20%
Widowed	2	20%
Divorced	2	20%
Not reported	1	10%
Age groups		
51-60	2	20%
61-70	4	40%
71-80	3	30%
81-90	1	10%

Note. M age = 68.9 (SD = 10.2)

Figure 1. Beck Depression Inventory (BDI) Scores, 1 Month and 3 Months Post-Stroke.

Left Bar: 1 Month ($\bar{M} = 8.2$, $\underline{SD} = 3.9$)

Right Bar: 3 Months ($\bar{M} = 10$, $\underline{SD} = 5.2$)

Depression Levels

Figure 1 shows the two depression scores for each of the 10 subjects. The scores for patients tested within 1 month of the stroke event had a range of 2 to 15 with a mean of 8.2 and a standard deviation of 3.9. When these same patients were tested again at 3 months post-stroke, the range was 3 to 18 with a mean of 10 and a standard deviation of 5.2. That is, among these subjects there may be a trend

toward greater depression at 3 months post-stroke, compared to depression levels at 1 month post-stroke. However, in the sample tested the depression levels of the greatest number went down ($\underline{n} = 5$) compared to those that stayed the same ($\underline{n} = 1$), or those that went up ($\underline{n} = 4$) in the follow up test. There may be a trend as these patients' mean scores moved from 8.2 (normal range is 0 to 9) to 10 (mild-moderate depressed range is 10 to 18).

Chapter 5

SUMMARY OF STUDY

Depression in post-stroke patients is one of many factors that health workers must be aware of when working with stroke patients. When a patient is experiencing depression, the recovery process is impeded; therefore, it is important for health workers to recognize depression and be aware of its potential for preventing the patient's progress.

This study investigated post-stroke depression, only a part of the larger problem of post-stroke sequelae that will affect the recovery process. As the changing test scores indicate, depression in post-stroke patients is a flexible factor; it may vary from day to day as well as from patient to patient. There is no consistent pattern. There may be a delay in the development of depression, an important factor to be aware of when treating post-stroke patients.

The lower initial mean score on the Beck Depression Inventory in this study supports the idea that depression may increase as patients deal with disability and accept the fact that improvement may be slow or, in some cases, nonexistent. This idea is supported in some research (Catapano & Galderisi, 1990).

Additional research needs to be done to establish this possible link in post-stroke depression and time since the

stroke event. Post-stroke depression is the potentially impeding factor that was the focus of this study. These data suggest that depression, while frequently present in post-stroke patients, may become more pronounced or only develop as the recovery process proceeds. It is at some point after the initial shock of the stroke event that patients become aware of the limitations with which they will live for the rest of their lives.

Conclusions

Depression is a factor that may exist in the post-stroke patient population. How health care workers treat this factor may potentially inhibit or promote healing and health in this patient population. Being aware of the depression and responding appropriately can enhance the treatment and healing of post-stroke patients as noted by Tiller (1992). Failure to recognize and treat the depression can lead to delayed recovery (Parikh, 1990). In addition, as this study suggested, there are many changing factors in the patient's psychological makeup. A patient who appears normal and well adapted today may be depressed in the future. The increasing mean depression scores suggest that the patients are not adapting as well as possible for optimal recovery. However, some patients' depression scores stayed the same or improved. Therefore,

assumptions cannot be made without careful assessments and sensitivity to other factors that may be influencing the patients' adaptation.

Scope and Limitations

This study was limited by design, sample, and measurement. The design is descriptive and does not allow any statistical comparisons of the data at the two points in time. In addition, no inferences about cause and effect can be made. The design was limited to testing completed during the first 3 months after the stroke. Long term study of these patients would more accurately describe the problems of post-stroke patients.

The study was further limited by a small sample which was not large enough for statistically significant data analysis. The sample may not be representative of the post-stroke population and results should not be generalized beyond this study.

Measurement in this study was limited by the instrument and the numerical assignment of a depression level. Numbers do not guarantee that the score accurately represents the depression level, nor do the differences between numbers represent valid measurement of the differences in depression levels.

Recommendations

Much remains unanswered in the field of health care concerned with post-stroke patients. The first step would be to recognize depression as a treatable illness that frequently accompanies stroke. The second step would be evaluating the patients for depression in the initial period following the stroke and at regular intervals after that. The depression level scores obtained would give the health care team a basis for treating the patient. The third step would be ongoing treatment and monitoring of the patients' depression level in the post-stroke phases of recovery. This early intervention and aggressive treatment might promote more rapid recovery, and prevent the delays and setbacks untreated depression can present to patients and health care teams.

Health care providers' thoughtful awareness of post-stroke patients' adaptations are critical. The Roy Adaptation Model presents an opportunity to evaluate the patient, and it suggests a theoretical framework and process for logical interventions.

Recommendations for Future Research

These data indicated an overall increase in the mean scores on the Beck Depression Inventory for post-stroke patients from the initial period post-stroke to the 3-month

point. However, there was much variability and no consistent pattern in the limited results of this study. Future research should study both a larger segment of the post-stroke population and for a greater length of time. Since the post-stroke population is adapting to multiple factors, additional research is needed to understand their impact. For example, what effect do factors such as the role of spousal support or the degree of disability suffered by the stroke survivor have on overall depression levels? Future research is needed to adequately answer these and other questions.

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APPENDIX A
Permission

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To: Joan A. Albers
16715 Wild Oak Way
Morgan Hill, CA 95037

From: Serena W. Stanford *Serena W. Stanford*
AAVP, Graduate Studies and Research

Date: November 25, 1993

The Human Subjects-Institutional Review Board has approved your request to use human subjects in the study entitled:

"Depression Levels in Post Stroke Patients"

This approval is contingent upon the subjects participating in your research project being appropriately protected from risk. This includes the protection of the anonymity of the subjects' identity when they participate in your research project, and with regard to any and all data that may be collected from the subjects. The Board's approval includes continued monitoring of your research by the Board to assure that the subjects are being adequately and properly protected from such risks. If at any time a subject becomes injured or complains of injury, you must notify Dr. Serena Stanford immediately. Injury includes but is not limited to bodily harm, psychological trauma and release of potentially damaging personal information.

Please also be advised that each subject needs to be fully informed and aware that their participation in your research project is voluntary, and that he or she may withdraw from the project at anytime. Further, a subject's participation, refusal to participate or withdrawal will not affect any services the subject is receiving or will receive at the institution in which the research is being conducted. If you have questions, please contact me at 408-924-2480.

APPENDIX B
Instrument

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Appendix B**

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