# THE EVOLUTION OF POST-STROKE DEPRESSIVE SYMPTOMS ACROSS REHABILITATION AND DISCHARGE SETTINGS

A Dissertation

by

JAMES R. LONG

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2004

Major Subject: Counseling Psychology

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Approved as to style and content by:

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ABSTRACT

The Evolution of Post-Stroke Depressive Symptoms

Across Rehabilitation and Discharge Settings. (August 2004)

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Chair of Advisory Committee: Dr. Michael Duffy

Previous literature has shown that depression is the most common major emotional result following a stroke. Although the prevalence and severity of this issue have been well documented, limited research has been done to identify the evolution of post-stroke depressive symptoms in the acute phase following a stroke. During this period of time, the patient is faced with a number of significant changes from his / her previous level of functioning. These issues can include loss of physical functioning, loss of independence, changes in living arrangements, and an increased reliance on the support and care of others. The purpose of the current study was to examine fluctuations in depressive symptoms as each participant progressed through rehabilitation and discharge, and to gather qualitative information pertaining to the contributing factors that could play a role in this issue.

A sample of nine participants between the ages of 50 and 85 was obtained from a regional rehabilitation unit. Data and clinical information were collected using an intensive case study design. Participants were asked to complete the Geriatric Depression Scale (GDS) at three-day intervals while on the rehabilitation unit and

following discharge. This information was interpreted in the context of qualitative information gathered through reports from the participant, his or her significant other / family member, nursing and professional staff members on the rehabilitation unit, and patient records. Other analyses performed included an examination of the interactions between performance and motivation during the rehabilitation process and role of discharge site in the development and course of depressive symptoms.

When examined as a whole, the information collected across all nine participants would suggest that following discharge there was a statistically significant increase in the level of post-stroke depressive symptoms. While the individuals were on the rehabilitation unit, the depressive symptoms decreased significantly and this trend continued following discharge, but the slope was not as significant as that which was observed on the rehabilitation unit. The results also suggested that there is a significant difference between the progression of depressive symptoms between groups separated based on discharge site.

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# CHAPTER I

# INTRODUCTION

## Background

The issue of post-stroke depression is one that has gathered more attention over the last several years as awareness of the possible negative repercussions related to this problem have improved. The realizations that depressive symptoms can significantly hinder both physical and emotional recovery have caused the health care community to take notice of a growing issue. However, despite the recent influx of attention in this area, recent estimates have shown that more than 50% of nonpsychiatric physicians underdiagnose post-stroke depression (Schubert, et al., 1992). Similar findings make it clear that the health care profession still has much to learn on the presentation and progression of this disorder.

The long-term effects of this problem reach further than simply a slowed recovery during the immediate phase of treatment. If left untreated, post-stroke depressive symptoms can affect any number of treatment variables. Depressive symptoms after a stroke have been found to contribute to longer stays on rehabilitation units, decreased performance in rehabilitation therapy, more negative outcomes in medical treatment, and added stress to relationships with caregivers and family members (Huffman & Stern, 2003; Wyller & Kirkevold, 1999).

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This dissertation follows the style of the *Journal of Counseling Psychology*.

As a result of the growing awareness of this issue, researchers have begun to examine the course of these symptoms during treatment to better define how the symptoms develop and what methods could be helpful in the early identification and management of this problem. An important component of more accurately defining the problem is the research that has focused on defining the prevalence and course of the disorder. Prior studies have estimated the prevalence rates for post-stroke depression to range from 25% - 79% (Provinciali & Coccia, 2002). Several problems that have been discussed in performing this type of research is how the disorder is defined and when the measurement should be made (Paolucci et al. 1996; Burvill et al. 1997; Pohjasvaara et al. 2002). Despite the understanding of this limitation, very little research has been done to intensively measure the progression of this disorder in a manner that would provide vital information about the course and presentation of symptoms following the initial diagnosis of the stroke injury.

**Statement of the Problem**

Previous literature has examined the course of these symptoms, but it has failed to closely monitor the progression of these symptoms using intensive case study methods. Prior research has instead focused on gathering information on the prevalence and treatment of these issues, rather than examining individual characteristics that are invaluable in providing an accurate representation of the issue as a whole. In addition, most studies that have been done in this area have only briefly measured the presence of these symptoms using follow-up measures at one or six month intervals.

Although procedures such as this have provided good feedback about the overall presence of this problem, the measurement of variables such as depression are made difficult by the transient and unstable presence of symptoms over time. For example, some studies have shown that the peak prevalence of depressive symptoms is during the three month period of time immediately following the stroke (Whyte & Mulsant, 2002), whereas others have argued that the most problematic period is one to two years following the initial presentation of the stroke (Astrom et al., 1993a).

Mood can fluctuate severely over one day, much less one month, and therefore more intensive methods of gathering this type of data are vital to the process of gaining an accurate representation of the presence of these symptoms. The use of single case research methodology, or intensive case studies, has proven to be most valuable when gathering information on variables that are difficult to measure. The use of this type of research structure provides an opportunity to gain a more global assessment of the participant's level of functioning, taking into consideration variables such as family support, daily activities, level of functioning, and physical health.

Prior research in this area has conceptualized the presence of post-stroke depressive symptoms as an understandable reaction to the presence of a variety of impairments and possibly due to a more organic cause (Hosking, Marsh, & Friedman, 2000). However, during the post-acute phase (1-3 months post-stroke) these same symptoms have been hypothesized to be a consequence of an individual's personal understanding of the effects of stroke and the realization that a full recovery may not be a plausible goal. This realization often occurs during the one to three month period

following a stroke because this is the time in which most rehabilitation progress is recorded (Lofgren et al., 2000).

**Research Questions and Hypotheses**

Using an intensive case study approach, the current research study will address the course of post-stroke depression in a rehabilitation unit and post-discharge setting, also. The researchers will examine the psychological characteristics of the depression, how depressive symptoms influence the participant's progression through rehabilitation, and if the current information gathered on neurological site of the lesion are consistent with the previous research in this area. These issues will be tracked and studied using the recovery trajectory in both rehabilitation and institutional and home-based discharge settings. The specific research questions are as follows:

1. What is the overall course of depressive symptoms following a stroke?
2. What is the relationship between level of depressive symptoms and performance in rehabilitation therapy?
3. Does the degree of post-stroke depression increase or decrease after medical discharge from the rehabilitation unit?
4. Is there any difference in the progression of depressive symptoms in those that are discharged home vs. those that are discharged to an outside care facility (nursing home, intensive care unit)?
5. What role do depressive symptoms play in a participant's perceived overall level of functioning during the recovery phase following stroke?

6. To what extent does the current sample of participant's presentation of symptoms agree with past research on the relationship between location of Cerebrovascular Accident (CVA) and depressed mood?

To answer these questions, four sources of information were used: the Geriatric Depression Scale (GDS; Yesavage, et al., 1983), a likert scaled self-rating question inquiring about the individual participant's overall level of emotional and physical functioning, the physical medicine staff's rating scale for rehabilitation performance, and information extracted from the participant's chart. The GDS provided quantitative information on the participant's level of depressive symptoms and how these issues fluctuated over the course of the current study. The likert scaled self-report item provided a global rating of the participant's physical and emotional well-being during the study for comparison with other variables. The physical medicine staff's rating scale for rehabilitation performance was used to chart the participant's progression during physical and occupational therapy. Finally, a review of the participant's chart provided information on the participants' medical and social history, results of medical tests that had been run, and diagnostic information relating to his or her condition.

The following six hypotheses were generated from the research questions listed above:

1. The overall course of depressive symptoms will decline following a stroke.
2. As rehabilitation scores improve and functional behavior increases, the participant's depressive symptoms will decline.

3. The degree of post-stroke depressive symptoms will increase briefly following discharge from the rehabilitation setting, but as adjustment to the new setting increases, depressive symptoms will decrease.
4. Those who are discharged home will experience a smaller degree of depressive symptoms than those discharged to more intensive care settings.
5. The depressive symptoms will have an inverse relationship with the participant's perceived recovery from stroke.
6. There will be no significant relationship between location of lesion and level of depressive symptoms.

The following chapters present the background literature, the details of the study, and the findings. Chapter II provided the foundation for understanding the importance of post-stroke depressive symptoms, as well as what research has been done previously in this area. Chapter III focuses on the methodology and process entailed in examining the course and characteristics of post-stroke depressive symptoms. Chapter IV presents the results and Chapter V attempts to make sense of the findings, and enumerates the limitations of this study and directions for future research.

# CHAPTER II

# REVIEW OF THE LITERATURE

## An Overview of Post-Stroke Depression (PSD)

Prevention, treatment and rehabilitation of cerebrovascular accidents remain among the most difficult challenges for the medical and psychological professions today. Despite many of the advances that have been made in treatment and early identification for this problem, stroke remains the third leading cause of death for Americans 65 years and older, trailing only heart disease and cancer (American Heart Association, 2003; Primeau, 1988). It has been estimated that stroke accounts for 150,000 fatalities per year and that at any given time a population of approximately 3 million stroke survivors exist in the United States (Chemerinski & Robinson, 2000; Parikh, Eden, Price, & Robinson, 1988; Robins & Baum, 1999). Furthermore, strokes are ranked among the 10 most common admitting diagnoses for acute care hospitals (United States Department of Health and Human Services, 1991) and are the most common diagnoses for participants in rehabilitation settings (Bacher, Korner-Bitensky, & Mayo, 1990).

Stroke also remains a leading cause of serious, long-term disability in the United States. The length of time needed for an individual to recover from a stroke depends largely on its severity and location. Studies have shown that 50 – 70% of stroke survivors regain the majority of their functional ability, but 15 – 30% are permanently disabled (Popovich, Fox, & Burns, 2002). These figures support the current notion that cerebrovascular accidents are a problem in society, but are especially troubling given the fact that society as a whole is an aging population with adults living longer now than

ever before (Rybarczyk, Winemiller, Lazarus, Haut, & Hartman, 1996). With more adults aging and dealing with increasing medical concerns, there is an urgent need for a better understanding of the problems that adults in the later stages of life face, as well as how these issues can impact broader areas of functioning. Stroke often results in major changes in a person's life, including issues such as loss of health, loss of occupation, change in social status, and perhaps most importantly loss of independence and an altered sense of self (Whyte & Mulsant, 2002).

Although the physical deficits encountered with this disorder have received the majority of attention thus far in the literature, many researchers are shifting focus to the emotional effects of cerebrovascular accidents. Psychological ramifications of this disorder include feelings of losing control, fears about death and disfigurement, social isolation, helplessness, and worry about the loss of social roles (Ellis-Hill & Horn, 2000; Stern & Bachman, 1991; Thompson, Sobolew-Shubin, Graham, & Janigian, 1989). Although these issues vary by individual, it is important to understand the nature of these complex psychological issues and the effect these can have in treatment and prognosis for the participant and his or her family members.

Although a wide variety of psychological problems associated with stroke have been identified, the general consensus from the literature is that depression is the most common major emotional concomitant of stroke (Aben et al., 2001; Nelson, Cicchetti, Satz, Sowa, & Mitrushina, 1994). As a result of this finding, the issue of depression following a cerebrovascular accident has been researched in a number of different settings and populations within the past 15 years (Robinson & Starkstein, 1990).

Depressive symptoms have been estimated to affect 30% - 60% (Bacher, Korner-Bitensky, Mayo, Becker, & Coopersmith, 1990) of participants who have suffered a stroke. Women were found to be more likely than men to exhibit depressive symptoms following a stroke and it was found that women also reported more reduction in social activities (Martin et al., 2002). The depressive symptoms that often accompany incidences of stroke have been found to lengthen hospital stays when compared to individuals with similar physical problems who did not exhibit depressive symptomatology (Rusin, 1990).

It has also been found that depression is a significant predictor of mortality, rehospitalization, and increased disability in those that have suffered traumatic medical problems (Barefoot, 1997; Levine et al., 1996; Steffens et al., 1999). In another study, participants who were rated as depressed two weeks after stroke were 3.4 times more likely to die over the subsequent 10 years (Morris et al., 1994). The clear impact that depressive symptoms can have on the healing process help to make clear the vital need for further exploration in this area. Through early identification and the execution of appropriate treatment techniques, depressive symptoms could be treated and therefore avert health problems later in the recovery process.

## The Course of PSD Symptoms

The general literature on coping with chronic illness suggests that diseases have different trajectories in how they develop and also what symptoms are most prevalent during the different stages. According to Kirkevold (2002), the onset of a stroke is frequently very abrupt, followed by an intense rehabilitation and improvement phase that

gradually moves into a more stable phase of general functioning. The early stages of the recovery phase are characterized mostly by surprise and a feeling of helplessness, given the immediate nature of the onset of symptoms characterize. Despite these initial feelings of shock, researchers have found that stroke participants are able to quickly realize what has happened and begin to deal with it using normal coping skills (Backe, Larsson, & Fridlund, 1996). This period usually begins during the first week following the initial presentation of stroke symptoms and increases gradually throughout the rehabilitation and treatment process. During this time, the participant is usually under intensive care and observation by medical professionals, in order to stabilize the situation and limit the physical damage caused by the stroke. A significant number of stroke participants develop depressive symptoms several hours to a few days after the initial presentation of the stroke. Post (1972), in the past has labeled this a type of reactive depression, conceptualized as a normal consequence of the sudden onset of symptoms and radical change in style of life. However, depressive symptoms immediately after the stroke are not always present and opinions vary on the development of these symptoms as a person begins to recover from the initial shock of a stroke. Robinson, Star, and Price (1984) pointed out that in a study of stroke participants, 30% of individuals who did not present with depressive symptoms shortly after the cerebrovascular accident were diagnosed with depression six months after the incident. He hypothesized that much of this had to do with the individual participant's coping style and how they progressed through the rehabilitation, treatment, and discharge process.

After the initial medical emergency has been addressed and the participant is judged to be medically stable, often they are transferred to rehabilitation settings to begin treatment. Research has shown that during this intensive rehabilitation period the participant often shows the fastest rate of recovery, leveling off after a period of three to six months. It is also during this stage that depressive symptoms are most present and most problematic (Lofgren et. al, 2000). Hosking et al. (2000), found that the prevalence rate at one month post-stroke was approximately 31%, but for the same group of individuals this number increased to 39% at three months post-stroke. This was hypothesized to be due to the fact that many of the participants had stopped seeing improvements in levels of daily functioning and as a result had become more pessimistic about regaining a high level of physical functioning. During this period, depressive symptoms often occur as a reaction to the presence of various impairments. The realization of physical limitations, cognitive impairment, and the global impact that the stroke will have on the participant's level of functioning usually become more clear during this initial period of recovery and can result in feelings of helplessness and hopelessness on the part of the participant. It is also during this time that the participant considers where they will be discharged and how they will be able to function in different settings (Burvill et al. 1997).

As is clearly evident, the two weeks to three months period of time that includes rehabilitation treatment and the discharge to an aftercare setting is one of significant stress and uncertainty. Estimates have shown that it is during this time that participants show the highest levels of depressive symptoms, often gradually increasing until

approximately the one year mark, when there is a significant overall decrease (Whyte & Mulsant, 2002). The prevalence of depression has been reported to be 22% at two months post-stroke (Morris et al., 1994) and 8% at four months post-stroke (Burvill et al., 1995). Depressive symptoms have been shown to continually decline after six months post-stroke and have been shown to be about 50% of initial reported rates at the one-year post-stroke mark (House et. al, 1991; Astrom et. al., 1993b; Kauhanen et al., 1999). This extended period of depressive symptoms was also found in research done by Robinson, Bolduc, and Price (1987). They examined the prevalence of post-stroke depression over time using a longitudinal design to enable them to better monitor fluctuations in the depressive symptoms over different conditions. The researchers examined the severity of post-stroke major depression at one and two year intervals after the individual participant's first cerebrovascular accident. They found that the prevalence of depression remains high but relatively stable for the first two years after a stroke. This finding would suggest that despite transferring to different treatment settings, the symptoms of depression that were originally present would continue through rehabilitation settings and also different discharge settings as well. It is important to note that this study only examined those individuals who did not receive any type of follow-up psychological treatment during the period following their stroke.

In a study by King et al. (2002), it was also found that depressive symptoms steadily decreased over time. These trends continued throughout the first year following the stroke, but it was also found that in a follow-up two years later depressive symptoms increased significantly in a large portion of the participants. Symptoms of depression

have even been found in some stroke participants up to seven years after discharge (Dam, 2001). In this study, the researchers examined a cohort of individuals who were discharged from a rehabilitation setting following a stroke. After seven years time, it was found that 20% of the stroke participants who initially presented with depressive symptoms after discharge continued to experience these issues. It was also found that only 11% of control subjects who did not initially demonstrate depressed feelings after discharge were found to have significant symptoms at seven-year follow-up. The stroke participants who did demonstrate depressive symptoms reported experiencing more lability of mood and irritability during the seven-year period following stroke than the control subjects.

Some researchers have hypothesized that the one-year follow up studies fall at a period during which the participant is experiencing some level of delayed grieving (Kirkevold, 2002). The gradual understanding of what the stroke has entailed and how significant the effect of the stroke will be on the participant is thought to be an ongoing process during the first year following the initial presentation of symptoms. By the end of the first year, most of the participants have begun to understand that some adjustment is needed in how they view themselves and how they feel they will function in the world around them. For some, this process is met with frustration and despair, while others are able to manage this issue with an optimistic attitude and a continued hope of improvement.

Morris, Robinson, and Raphael (1990) found somewhat similar results regarding the longitudinal nature of the depressive symptoms in post-stroke participants. They

reported that clinically significant depression occurred in approximately one-third of participants who were seen during the follow-up post-stroke period. However, after seventeen months, the number of individuals exhibiting diagnoses of depression fell to one-eighth of the participants involved in the study. Although the depressive symptoms remained in a small portion of the individuals who participated in this study, it continues to emphasize the point that these depressive symptoms continue throughout treatment and discharge phases if the medical and psychological needs of these individuals are not addressed adequately.

In similar research, it has also been demonstrated that there is a negative relationship between quality of life and depression after one-year follow-up. In an article by King (1996), it was found that as level of depression increased within the participants that were sampled, the participant's report of how satisfied they were with their current quality of life decreased significantly, suggesting an inverse relationship between these two factors. The researchers hypothesized this was possible due to the fact the participant's continued to decline medically and little progress was made after this amount of time.

Wyller and Kirkevold (1999) reported a similar finding, in that they reported the majority of subjects in their study described a significant drop in quality of life after suffering a stroke. It was important to note, however, that this was found to be more of a result of the individual's interpretation and evaluation of the changes that resulted from the stroke rather than only bodily changes. An essential component of this research was whether the participant compared the situation they found themselves in post-stroke to

life prior to the stroke or to a post-stroke reference point. Those individuals who compared level of post-stroke functioning to level of functioning prior to suffering the stroke displayed a higher level of depressive symptoms and lower levels of quality of life. This finding would suggest that many participants grasp onto the hope that they will gain a pre-morbid level of functioning if they work hard in rehabilitation and follow the doctor's suggestions. The point in recovery in which the participant recognizes that the optimum level of physical functioning they can achieve through rehabilitation will be less than where they were prior to the stroke is an important shift in how they conceptualize themselves and their disorder. This shift in thinking often occurs during the vital period of time that a participant spends in a hospital or intensive rehabilitation setting. For this reason, the participant's experience of this time in recovery and the manner in which emotional and physical symptoms are handled are a vital part of the healing process.

**Depressive Symptoms in Rehabilitation Settings**

Studies have shown that people who experience a stroke are now more likely to be left physically disabled than to die from it (Wolf & D'Agostino, 1998). As a result of the marked physical impairment that accompanies stroke, one of the most common treatment methodologies following strokes is that of intensive rehabilitation therapy. Studies have shown that early medical treatment and physical therapy after stroke improves a participant's chance of recovery of activities of daily living and is related to a decreased amount of time spent in inpatient settings (Schubert et al., 1992). This is somewhat difficult to generalize across participants, due to the diversity of impairment

that may be present for any one person. Though a stroke is a specific physiological event, the resulting impairments may be long term and diverse and could effect several areas of functioning including physical, cognitive, sensory, emotional, or motor functions (Becker & Kaufman, 1995; Hoffman & McKenna, 2001). Although the focus in rehabilitation is often physical in nature, studies have shown that a participant's progress in therapy is highly mediated by several factors including age, level of education, cognitive status, and emotional status following stroke (Pohjasvaara et al., 2002). The evidence has repeatedly shown that one of the most important factors that should be considered in evaluating rehabilitation treatment is the psychological well being of the participant. Reports have shown that participants who scored higher on measures of depression also demonstrated poor functional outcome up to a year after the initial rehabilitation stay (Pohjasvaara et al., 2001). The authors stated that the observed differences are most likely due to the effect depressive symptoms can have on a participant's outlook, motivation, and morale during this critical time. It has also been reported that despite the remission of depression at a two-year follow-up, the functional recovery of participants who had experienced depression while in hospital lagged behind their counterparts who had not (Parikh, et al., 1990). These authors suggested that if the early impetus for physical recovery is lost, possibly due to lower levels of motivation hampering their active participation in rehabilitation, then maximal levels of recovery might never be reached, even after depression is resolved.

Conversely, researchers have found that the level of confidence participants hold concerning their recovery and the level of satisfaction they have with the care that is

provided are strongly associated with less distress (Morrison, Johnston, & Walter, 2000). Participants who were found to be more satisfied with their treatment were less likely to be anxious or depressed at six months following their acute stroke. This finding highlights the importance of not only gains that are made during the rehabilitation process, but also the need for competent and caring professionals in the rehabilitation and treatment settings.

During the initial stages of recovery, participants are most often kept in the intensive rehabilitation settings shortly after the stroke has occurred in order to stabilize and treat medical problems. Most participants will recover the majority of the overall physical gains that will be made in rehabilitation during the first six weeks of therapy (Kirkevold, 2002; Nilsson et al., 1997). Thereafter for about six months, substantial improvement may occur, with a gradual slowing of improved functioning following this period (Dancan, et al., 1997; Duncan & Lai, 1997). For this reason, the period of time immediately following the stroke is critical for rehabilitation and medical gains. If extraneous factors, such as depression, interfere during this period it can limit the gains that are made in general. For this reason, it is important that medical and rehabilitation staff work together to target emotional problems while a participant is on the rehabilitation unit so that these issues can be addressed before they become more problematic. If these issues are addressed, then rehabilitation could improve uninterrupted. This is most reflected in studies that have shown that participants who had a remission of their post-stroke depression over the first few months after stroke also

showed significantly greater improvement in their level of functioning than those participants whose depression did not remit (Chemerinski et al., 2001).

Thompson, Sobolew-Shubin, Graham, and Janigian (1989) found that psychological factors are also important in recovery, as they are associated with motivation to work in rehabilitation and the ultimate progress that is made towards recovery. Other authors have also stressed the importance of motivation in rehabilitation therapy (MacLean et al., 2000). These researchers found that information from professionals about rehabilitation, favorable comparisons with other stroke participants, and the desire to leave the hospital had a positive effect on motivation. Those participants who were highly motivated demonstrated fewer numbers of depressive symptoms and a higher level of overall rehabilitation progress. It was also shown that overprotection from family members and professionals, lack of information or the receipt of "mixed messages" from professionals, and unfavorable comparisons with other participants had a negative effect on motivation and rehabilitation outcomes. Those participants who demonstrated lower levels of motivation did not make as much perceived progress in rehabilitation therapy and showed a decreased level of satisfaction with rehabilitation results.

The influence of how an individual views his or her situation and its relationship to overall rehabilitation progress has been intensely studied by other researchers and similar results have been found (Dowswell, et al., 2000; Ellis-Hill & Horn, 2000). It was discovered that participants who used more negative terms to describe their level of functioning after the stroke were found to make less progress overall towards their

physical goals in rehabilitation. The authors hypothesized that this process could become a type of self-fulfilling prophecy in that if the participant has a negative attitude towards current level of functioning and the prospect of regaining abilities that were lost, the manner in which they express this feeling to others and the manner in which they think about this issue could serve to breed more negative thoughts and behaviors. This downward spiral of negative thinking would only serve to limit the participant's ability to remain motivated and positive during the rehabilitation process.

Another interesting finding from this research is the impact that how the participant measured progress effected mood. Researchers found that the participants who focused on comparing their level of functioning after the stroke to level of functioning prior to the stroke showed much more depressive symptoms than those individuals who focused on immediate goals and how they were progressing post-stroke only (Dowswell et al., 2000). In measuring psychological and physical well being the standard used by participants to measure recovery was their pre-stroke lives in the individuals who showed the most depressive symptoms. In using this personal yardstick for comparison, they admitted to dissatisfaction with the size of the gap between where they had reached and where they were prior to the stroke. Researchers found that emotionally intact individuals took a much more adaptive view. These participants focused most on the present and how they were progressing right now in rehabilitation therapy. In other words, they maintained focus on their goals rather than what they had lost and were likely never to regain. These findings suggest that the depressive

symptoms experienced by stroke victims are related to how the individual participant interprets the circumstances he or she is experiencing.

Although the research would appear to indicate a clear relationship between the prognosis and progress of stroke participants while they were residents of rehabilitation settings, some researchers have failed to find a significant relationship in this area. Sinyor, Amato, Kaloupek, Becker, Goldenberg, and Coopersmith (1986) found that participants diagnosed with post-stroke depression showed similar improvements in functional status following short-term rehabilitation stays when compared to the functional improvements of individuals who did not suffer from post-stroke depression. This would suggest that the diagnosis of post-stroke depression, when compared with participants who did not have a diagnosis of depression did not alter the participant's progress in therapy. However, in this study it is important to note that upon a post-discharge six-week follow-up, the individuals suffering from post-stroke depression exhibited decreases in functional status. Therefore these individuals were able to maintain the pace and progress of treatment despite the diagnosis of depression while they were still actively participating in the inpatient rehabilitation hospital. Upon discharge, however, these individuals showed a significant drop in functional behavior from the time they were residents in the rehabilitation facility. There are many possible explanations for this finding, but the authors warn that these results should be considered carefully due to the small sample that was used for this research. However, even interpreting these results cautiously would suggest that screening for post-stroke depression would be an important area in which to focus research interest. Through

better screening techniques, one might be able to determine those participants at risk and make allowances for a more detailed rehabilitation follow-up in order to increase the opportunity for continued progress.

Despite the shortcomings of the research by Sinyor, et al. (1986), the finding that participants suffering from post-stroke depression had a decrease in functional status after discharge is an important concept and one that is often seen in rehabilitation settings. The decline in level of functioning following discharge could be related to the treatment methods used in these types of settings. The majority of rehabilitation settings address the participant's physical issues in an aggressive manner, which actively seeks the participant's participation. Many times following an inpatient intensive rehabilitation stay, the participant is discharged to a facility in which rehabilitation gains are not necessarily a priority. Participants who are discharged to nursing homes and to original home environments often have difficulty maintaining the level of motivation to continue with intensive therapy regimens. More often than not, the focus in these settings is on maintaining an already achieved level of functioning rather than continuing to improve and make progress. For this reason, the participant's emotional and physical reaction to a change in setting and the absence of active involvement by professional therapy staff is an area that should be examined when discussing the issue of post-stroke depression.

**The Relationship Between Discharge Setting and PSD**

After discharge from the rehabilitation or intensive care settings, the participant is usually confronted with a number of other issues, which make this period critical in

the continuing process of treatment. Participants who have achieved a higher level of functioning in treatment and have a favorable prognosis for recovering much of their pre-stroke level of functioning are often discharged home. However, those participants whose symptoms are more severe and who require more intensive follow-up care could be discharged to nursing homes, intensive care hospital facilities, or structured living apartment complexes that specialize in elderly care. There has been a negligible amount of research looking at the role that discharge site plays in level of depressive symptoms, but what has been done highlights the need for more research in this area.

**Home Discharge Settings**

Studies have shown that 57% of participants who were living in their own homes prior to the stroke were able to return to this setting after discharge from rehabilitation sites (Lofgren et al., 1997). The most important variables that were used to predict the discharge site were stable scores on scales of physical functioning, low age of the individual, and absence of perceptual impairment. When examining these variables, it becomes clear that the higher the level of functioning an individual is able to achieve and the more progress he or she is able to make in therapy, the more likely it will be that a return home is possible after discharge. As level of physical and cognitive functioning decreases, the more likely it becomes the individual will need outside assistance in maintaining an acceptable level of personal care. This becomes a significant issue because of the emotional ramifications that can result solely based on the discharge location.

Being discharged to a familiar environment has been found to be an important aspect of post-stroke depressive symptoms (King et al., 2001). Results would indicate that most individuals experience a level of comfort when she or he returns to familiar settings. A person normally feels safer when surrounded by personal items and in an environment that he or she played a part in developing and structuring. This feeling of control is soothing to most, which facilitates the recovery and healing process. Studies have also shown that participants who were discharged to supportive home environments displayed a higher life satisfaction, decreased levels of depression, and an increased level of morale at twelve months post-stroke (Osberg et al., 1988). The same study found the higher the level of social support the participant had at home, the more likely he or she was to be discharged to a personal home setting. This is a factor that is problematic for many family members and caregivers due to the amount of effort that is often needed to care for an ill loved one in a home environment.

It is important to understand that the abrupt onset of stroke often creates a crisis for stroke survivors and their primary support group. Problems such as worry, fatigue, and the need to master multiple tasks related to the survivor's illness could contribute to the distress experienced by members of the participants primary support group (Schulz, Tompkins, & Rau, 1988; Gottlieb, Salagnik, Kipnis & Brill, 2002). Rates of depressive symptoms in these groups have been shown to range between 20 and 42% during the first three months after stroke onset (Kotila, Numminen, Waltimo & Kaste, 1998). These findings are easy to imagine, given the large amount of stress that the primary support group is under and the increased degree of responsibility that must be assumed

given the health of the participant. It has also been suggested that early interventions for those that are caring for loved ones who are discharged home should focus on coping skill for managing multiple roles and maintaining emotional equilibrium (King & Shade-Zeldow, 1995).

Another important issue is that just as a supportive home environment can be a significant motivator for continued physical progress, the opposite can be true as well. Families that were "dysfunctional" pre-morbidly, or those that find it difficult to adjust to the participant's change in functioning and the rehabilitation process, are less likely to promote the participant's well-being and emotional functioning (Khan-Bourne & Brown, 2003). The pre-stroke level of stress within a family can be hugely affected by a family member's stroke and can drastically exacerbate any problems that were present in the family pre-stroke. Clark and Smith (1999) reported a significant deterioration in family functioning in a sample of stroke participants who were discharged to a home setting. It was found that whereas 43% of survivors judged their family functioning to be dysfunctional at the time of hospital discharge, 58% made this same judgment at one-year follow-up. This is understandable given the enormous amount of stress that is placed on family members who have taken the responsibility of caring for a family member who is recovering from a medical disorder as severe as a stroke can present.

Researchers have found that being discharged to the participant's original home environment is an important determinant of how they view their health status (Bosworth et al., 2000). Participants who are able to return home have a more favorable view of their ability and feel as though they have regained more of their functioning when

compared to individuals who have been discharged to more intensive care facilities. It has also been demonstrated that a large percentage of individuals who are discharged to home settings remain in those areas despite increased medical problems (Thommessen, Bautz & Laake, 1999). The study showed that 73% of stroke survivors in the study were still living at home one year after discharge from an inpatient setting. This same pattern has been observed three years after discharge, when another study found that 71% of individuals who were discharged home were able to remain in that setting (Lofgren, et al., 1999). The majority of the participants who did move were forced to do so due to declining health and an increased need for outside help. This was especially true for individuals who lived alone and who did not have family members who were able to assume the role of caretaker for the participants.

**Nursing Home / Intensive Care Facilities**

A smaller number of participants are discharged from rehabilitation sites to nursing homes or more intensive medical care facilities. Some studies have indicated that about one-third of stroke survivors, those who are the most severely effected by the stroke, cannot be discharged directly home after rehabilitation and must be discharged to geriatric clinics, more intensive care settings, or nursing homes (Gustafson et al., 1991). Other studies have shown that approximately 15% of participants were discharged to institutional care settings, whereas 55% were discharged to the original home environment (Kalra et al., 1993). These same researchers reported that the decision to discharge home or to a nursing home setting was evident early in the evaluation process. The clinical assessment at two weeks correlated significantly with eventual discharge

home or the need for long-term care. The participants who appeared to be more appropriate for nursing home settings had lower physical abilities, severe motor deficits, sensory / perceptual problems, or incontinence.

Burvill et al. (1997) found that those individuals who were discharged to nursing homes had higher levels of depressive symptoms when compared to those that were discharged home. However, despite these results, the researchers stated it was important to consider the role that physical impairment plays in this relationship. The researchers believed that those participants who were discharged with more physical problems had to be discharged to nursing home or intensive care sites because of the higher need for continued care. For this reason, the higher number of reported depressive symptoms could be due to the increased number of physical problems rather than to discharge site alone.

Some researchers have hypothesized that the reason for the significant increases in depressive symptoms following discharge to a nursing home setting have to do with the discontinuity of life patterns and the failure to return to "normal" (Kirkevold, 2002). This problem results in the participants being forced to move towards a redefinition of self and create a new self-understanding in order to function in new surroundings. Many participants found that they could no longer live life as before and the fact that they did not measure up to a previous level of premorbid normality resulted in significant depressive symptoms. As a result of the huge life changes that resulted, many participants have problems integrating this new information into their current level of functioning and their view of self.

One possible positive finding about those that were discharged to nursing home settings was discovered by Colantonio et al. (1993). The researchers found that those individuals who had higher levels of social contacts after stroke had fewer functional limitations six weeks after suffering the stroke. The researchers hypothesized that this was primarily due to the fact that individuals with more social contacts and opportunities to interact with others used this as more of a motivating factor to remain physically able and active. The goal of remaining socially active with others could serve as a huge motivating factor in nursing home placements due to the value that is placed on activities and interactions within the nursing home setting.

## Psychological Treatment for PSD

Another topic that is related to the course of post-stroke depression is the types of treatment and care that is provided after discharge. Although much of what has been discussed until this point focuses on the prevalence and the causes of this disorder, an area that has been significantly overlooked is that of psychological treatment and follow-up care following a stroke. After a close examination of the articles that have been outlined above, it is clear that there is a significant problem with mood disorders resulting from cerebrovascular accidents. The medical field has mostly addressed these problems and therefore the preferred method of treatment has largely been pharmacological in nature or focused solely on the physical rehabilitation of the participant (Rusin, 1990; Provinciali & Coccia, 2002). Accordingly, one of the major treatment techniques that has been overlooked is that of interpersonal psychological interventions. Through proper identification and treatment of these disorders, it is

possible that emotional issues following a stroke can be addressed in a more effective and meaningful manner within both treatment and discharge settings.

Some researchers have found that a short-term cognitive based treatment, following the principles of the cognitive model of depression, could be useful in working with participants suffering from post-stroke depression (Gottlieb et al., 2002). Khan-Bourne and Brown (2003) have stated that this treatment would be most useful after the initial phase of recovery. The reason being that some investigators have suggested the depression that often results is due to the development of awareness of the full impact of the injury and a more complete understanding of just how severely this problem could influence a participant's daily level of functioning (Wallace & Bogner, 2000). The process of enhancing a participant's ability to cope with this issue more effectively through the use of psychotherapy could be helpful in navigating this difficult period. Another difficult issue that often arises during this period involves a normal slowing of progress in rehabilitation sessions and a leveling off or decrease in the trajectory of progress. This is often the period of time that the true impact of a participant's disorder is likely to come to realization. Recruiting the services of a trained mental health professional to help with this adjustment process and a general redefining of personal goals for the participant could provide some much needed help during this period.

## PSD and Neurological Location of the Lesion

The relation between depressive disorders and lesion location is perhaps the most controversial research area in the field of mood disorders following stroke (Provinciali & Coccia, 2002). The current data on the psychological effects of location of the lesion are

inconclusive and should be examined further before a firm relationship can be established to exist. One of the first studies to examine the relationship between mood disorders and the site of the brain lesion was conducted by Gianotti (1972). In this study, he found that debilitating emotional reactions, but not necessarily depressive ones, were found more frequently in individuals with left-hemisphere damage. Participants who had lesions that affected the right hemisphere were significantly more likely to exhibit euphoria and indifference. This experiment was one of the earlier studies that marked the beginning of the investigation of the relationship between the site of the lesion and the resulting problems that are experienced by the participant. Despite the fact that many studies have followed, it is still quite apparent that there are several questions that remain and need to be addressed to help further our understanding in this area of research.

In a study by Morris, Robinson, and Raphael (1992), they found evidence that supported the reports that individuals experiencing left-hemisphere damage were more likely to exhibit more depressive symptoms. However, they also found that this is particularly true the closer the damage approximates the anterior location of the brain. This same study found that there was also evidence, albeit it less significant, of a relationship between depressive symptoms and damage to the right hemisphere. It is interesting to note Morris, Robinson, and Raphael found the same tendency for depression also to be evident in those participants when the damage was to the right cortex and was located in the anterior region of the brain. This study had several limitations, and this later finding was not supported by other research.

Similar to the research of Morris, Robinson, and Raphael (1992), Robinson and Starkstein (1990) found that the highest incidence of post-stroke depression was observed in participants with damage to the left anterior areas of the brain. The closer the left lesion is to the anterior portion of the brain, then the more severe the depressive symptoms. Also, they found that when depressive symptoms were found in the right hemisphere of the brain, this was more frequent when the lesion involved the right parietal lobe. However, in these findings, individuals with right hemisphere lesions were significantly more likely to have a family history of psychiatric disorders than either non-depressed participants with right-hemisphere lesions, or participants with major depression and left-hemisphere lesions. This could suggest that participants with right hemisphere lesions were only found to be more depressed than those with left hemisphere lesions when there was a significant family history of depression or other mood disorders. Although this particular article does not speculate how this risk factor could exacerbate post-stroke depressive symptoms, this is clearly an area that needs further research.

The relationship of the depressive symptoms to the nearness of the frontal lobe has also been investigated in other research (Eastwood, Rifat, Nobbs, & Ruderman, 1989). These results showed that, in examining lesions in the left hemisphere, small lesions located in the frontal region were associated with more severe depression than larger, posterior lesions. This finding would appear to suggest that despite the significance of the left / right location of the lesion, the front / back location of the lesion may be of greater pertinence.

However, in this same study, emotional sequelae from lesions in the right hemisphere were not related as much to distance from the frontal lobe as they were affected by the total size of the lesion. Although the current study had limitations in the size of the sample that was examined, the effect of specific site of lesion is more prominent among the left hemisphere participants than the right. Also, for participants with lesions in the right hemisphere, the effects of time since the stroke and the initial functioning capacity of the individual would appear to have played a more significant role in the amount of depressive symptoms and the level of decreased functional ability.

Although much research has been done examining the left / right hemisphere locations of lesions, a study by Stern and Bachman (1991) argued that many researchers were excluding certain dimensions. They stated that it is imperative to examine not only the right-left hemisphere and frontal-anterior lesion dimensions, but also to consider the dorsal-ventral aspect of the lesion. Much of the research that has been done up until this point has focused on one or two of these characteristics, which could only imprecisely define the profile of lesion location in post-stroke mood disorders. Stern and Bachman opt to take a more comprehensive view of the effects of lesion location and the existing symptoms of post-stroke depression in order to define it more completely and consider all of the data available.

The location of the lesion has also been found to play a significant role in the course of recovery from CVA and depressive symptoms. In an article by Nelson, Cicchetti, Satz, Sowa, and Mitrushina (1994), it was stated that stroke subjects showed a significant decrease in depressive symptoms from the two- to six-month period

immediately following the stroke. While these results would at first glance appear to show a general upward trend in the post-stroke level of functioning of the individuals, it is important to take into consideration the effect of the location of the lesion. Individuals who suffered from left hemisphere lesions appeared to undergo steady improvement throughout the six-month recovery phase. This improvement was shown in the variables that were examined such as indifference, inappropriateness, depression, pragnosia, and mania. However, individuals who suffered from a right hemisphere lesion were shown to exhibit improvement on depressive symptoms only up to the two-month point. At six months post-stroke, the levels of depression and indifference began to resurface with participants suffering from right hemisphere lesions only.

Despite the articles mentioned previously that argue post-stroke depressive symptoms are dependent on the location of the lesion in the brain, there are still conflicting reports. In two comprehensive literature reviews of the research in this area, both articles stated that the results were inconclusive and should not be considered as fact (Singh, Herrmann, & Black, 1998; Carson et al., 2000).

# CHAPTER III

# METHODOLOGY

Chapter III provides the methodology used to investigate the evolution of post-stroke depressive symptoms in rehabilitation and discharge settings. The first section describes the population and sample included in this study to test the hypotheses. The second portion includes the instruments used to measure the level of depressive symptoms, the participant's perceived global level of functioning, and the rating scale used by the rehabilitation staff to measure progress in level of functioning. The final section describes the procedures that were followed in collecting the data.

## Sample

A representative group of participants was selected from the Rehabilitation Unit from St. Joseph's Hospital in Bryan, Texas, for participation in the study. All individuals chosen for inclusion in the study were between the ages of 65 – 90. All participants met an initial criterion of adequate physical and cognitive functioning necessary to satisfactorily complete the requirements of the research study. The individual's current level of cognitive functioning was assessed using a brief consultation with the attending physician, nurse, or social worker that were most in control of the care for the client. Using the medical and rehabilitation staff's intimate knowledge of the participant's level of functioning, it was decided if the person was capable of participating in the current study. If there was a question of mental ability, the Mini-Mental Status Exam (MMSE) was administered in order to ensure that the individual could participate fully in the study.

Another criteria for inclusion in the current study was that participants had to have suffered a recent cerebrovascular accident (CVA) verified by history, physical exam, and CT scan or MRI. These factors were assessed through consultation with the physician and a brief chart review of the client's medical records. Individuals with a documented history of previous CVA's or neurological problems were excluded from the study due to the possibility of contamination from older cerebral injuries.

A total of 9 individuals met initial criteria for inclusion and gave their consent to participate in the study. A variety of ethnic backgrounds were represented in the sample: 1 Hispanic, 2 African American, and 6 Caucasian individuals agreed to participate. Of these nine individuals, 4 were females and 5 were males. Six of the individuals who participated were discharged to previous home settings, while the remaining three were discharged to nursing home or intensive care settings.

## Instrumentation

The Geriatric Depression Scale (GDS) was used to determine the level of depressive symptoms while the participant was on the rehabilitation unit and after he or she had been discharged. The measure was administered at three-day intervals to accurately reflect changes in mood. In the current study, the researcher used the cutoff scores as recommended in previous research by Brink, et al. (1985). These guidelines were as follows: 0 - 10 (normal), 11 - 20 (mild depression), and 21 - 30 (moderate or major depression). In their research, these cutoff estimates demonstrated a sensitivity of 84% and a specificity of 95%. It has also proven effective in measuring depressive

symptoms over short periods of time, with high levels of reliability (Fishback & Lovett, 1992).

The Geriatric Depression Scale has been shown to provide valid and reliable data when used in this capacity in a medical setting (Lieberman, et al., 1999). Research has shown that the GDS demonstrated high internal consistency (Cronbach alpha level = .94) and split half reliability (Cronbach alpha level = .94) when used in medical or rehabilitation settings (Peach, Koob, & Kraus, 2001). This measure has also been deemed appropriate for measuring depressive symptoms in individuals recovering from a cerebrovascular accident (CVA) (Mast, MacNeill, & Lichtenberg, 1999).

The GDS has also shown high concurrent validity when compared with the Diagnostic and Statistical Manual of Mental Disorders - III (Norris, et al., 1987) and the Beck Depression Inventory (Kiernan, Wilson, Suter, & Naqvi, 1986), but it does offer specific advantages when compared to other scales of depression. These benefits include the fact that the GDS uses a simpler yes / no format, requiring less cognitive effort for processing the questions, which may permit more accurate judgment of the appropriate response in older adults or those that are hospitalized in medical and rehabilitation facilities. In conjunction with this, the scales lower reliance on somatic symptoms as a measure of depression is particularly important when considering the appropriateness of this measure with a medical population. Finally, the GDS requires a short amount of time to administer and complete, with a total time commitment of approximately 8 - 10 minutes. The GDS has been shown to have good psychometric properties when administered over the telephone (Burke, et al. 1995). Studies have

shown that the GDS maintains its reliability and validity when administered over the telephone. From this particular study, the comparison of the face-to-face GDS with the initial T-GDS, three of the thirty items had kappa values below .40, and the average kappa was 0.52, suggesting substantial agreement between the two administrations.

The participant's were also required to give a rating of their general level of their overall physical and emotional well-being. This Global Functioning Item consisted of one question that was rated by the participant using a 10-point likert scale. The wording of the question was as follows, "If you had to rate your current overall level of physical and emotional well-being on a scale of 1 - 10, with one being the worst you have every felt and 10 being the absolutely best you have ever felt, where would you rate yourself right now?" This score was used as a means to better identify the participant's subjective report of the level of symptoms he or she was experiencing and his or her personal opinion of a general level of functioning. This method of data gathering has been used in a variety of medical treatment settings, primarily to provide a quick means of measuring the participant's perception of their treatment and current level of functioning. This method has been proven a reliable and effective method to measure numerous problems in medical or rehabilitation participants suffering from a variety of problems ranging from extreme pain to arthritis (Rowbotham, et al., 1998; Schumacher, et al., 2002).

The participant's progression through the rehabilitation treatments and therapies was charted using the therapist-rating format in the St. Joseph's Rehabilitation Unit (see Appendix A). This rating format consists of a six-point likert scale that requires the

rehabilitation specialist to determine what level of functioning the participant is operating at and make the corresponding rating. The rehabilitation therapists have been trained in the use of this measure and its primary function is to be used for third party reimbursement through insurance and government programs. The measure consists of a qualitative descriptor defining how functional the person is in maintaining day-to-day activities. This descriptor has a corresponding numerical value so that the participant can be assigned an overall score that is representative of his or her functioning. The descriptions of each variable and the corresponding values are provided in Appendix A.

## Procedure

Permission to conduct this study and to recruit participants from various organizations and agencies was obtained from the Institutional Review Board of Texas A & M University and the Institutional Review Board of St. Joseph's Regional Health Care Center. Both agencies were provided with a written explanation of the research project and were given copies of all forms that were used during the course of the study.

After the individuals were initially identified and it was determined they meet the criteria for inclusion in the study, they were then assessed for consent and interest in participating. If the individuals were deemed appropriate and agreed to participate, a brief clinical interview with the client, the client's family, and any other significant person in the client's life were performed to determine previous level of functioning, previous symptoms of depression, and relevant background history pertaining to these issues.

While the participants were on the unit, examinations were administered by the primary researcher between late morning and early afternoon to minimize any possible effects of mood variability due to fatigue. The administrations of the GDS and the Global Functioning Item on the rehabilitation unit also served as training for the participants so they would be familiar with the measure when they were asked to complete it after being discharged from the unit. Following discharge, the participants were monitored every three days using the Geriatric Depression Scale to determine the level of depression across settings. The participants were given the choice of being contacted by telephone or having the questionnaires mailed to them. All participants requested that they be followed through telephone contact by the primary researcher. The researcher also monitored the participant's progress through rehabilitation and after discharge through contacting a relevant family member, if the participant gave permission to do so. The family member was initially assessed for his or her interest in participating in the current study while the participant was located on the rehabilitation unit at St. Joseph's regional hospital. At that time, if the family member was willing to participate, he or she completed a consent form documenting this information.

Also with the participants' consent, the results will be made available to the staff members at St. Joseph's Regional Health Center to provide feedback about the services provided and to aid in future program development. All identifying information will be removed from the data before it is presented to St. Joseph's Hospital and Rehabilitation Unit in order to preserve confidentiality.

# CHAPTER IV

# RESULTS

This chapter discusses the results of the study, which examined the course of post-stroke depressive symptoms across rehabilitation and discharge settings. The chapter is divided into several parts. The first section provides an overview of the statistical methods that were used to answer the research questions that have been outlined thus far. The second portion provides information relating to the collective analysis of all nine individuals involved in the research study. All participants were then separated into subsections based on discharge site (home vs. intensive care setting) and statistical analyses were performed to highlight differences between the groups. Finally, the individual data is presented in case study format with relevant background history, rehabilitation and medical progress, discharge and follow-up information, overall clinical impressions, and statistical analyses for each person's individual data from the course of the study.

## Research Questions and Statistical Methodology

Several methods of analysis were used in the current study. The techniques used to interpret the collected data included a combination of visual, qualitative, and statistical approaches. The main statistical procedure that was performed was a General Linear Modeling (GLM) analysis to determine changes in the progression of symptoms over time and across phases. This procedure statistically calculates the overall change across phases, as well as the changes in the slopes across the different trend lines. The Beta weights for each analysis were examined as a measure of changes in the trend of

the data collected. This provided information about the per day change in the participant's responses to the measures that were administered, as well as how these changes impacted the study over time. T-statistics were calculated from these measurements in order to determine if there was a statistically significant difference between the items that were measured. In addition, $R^2$ effect size statistics were calculated to demonstrate how stable the data points were and how well the trend lines captured the different measurement points. Correlation analyses were also performed on the individual data in order to gather information about the relationships between the Geriatric Depression Scale, the Self-Rating Item, and the participant's performance in rehabilitation.

## Overall Analysis of Aggregate Data

### All Participants (N = 9)

The scores for each individual on the Geriatric Depression Scale were averaged and plotted in order to provide information related to the overall trajectory of depressive symptoms across both phases. The scores were analyzed using a General Linear Model analysis in which the time variable, the phase variable, and the slope change variable were all entered as covariates with GDS scores as the dependent variable. The resulting graph and analysis of scores would suggest that there was not a significant increase in the angle of time for GDS scores when the overall trend and the trend for phase B only were examined (see Figure 1). This finding is made clearer through an analysis of the amount of change between the slope of the overall data set and phase B only (Beta Weight = -.415). This finding was not statistically significant and would suggest that

there was not a significant change in the slope of the regression line when comparing the overall slope to that which was present in phase B. This would indicate that the level of depressive symptoms remained somewhat constant across both the rehabilitation and discharge settings. In the analysis of the average change in level of depressive symptoms from phase A to phase B, the results were also not statistically significant (t-statistic = 0.078). Again, this would suggest that the average level of depressive symptoms remained somewhat stable across both rehabilitation and discharge settings. It should also be noted that the effect size for this statistic indicated that the measurements were stable across time and that the trend line effectively captured the data points ($Eta^2$ = .957).

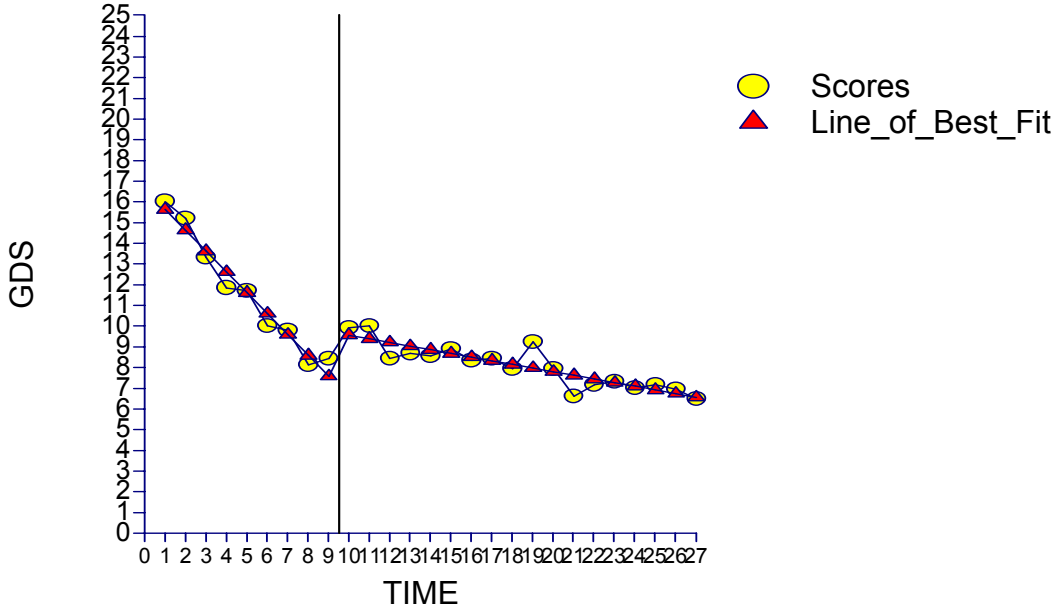


*Figure 1*. Overall Analysis of Depressive Symptoms

The scores for each individual on the Self-Report Item were also averaged and plotted in order to provide information related to the overall trajectory of the person's general level of physical and emotional functioning across both phases. The scores were analyzed using a General Linear Model analysis in which the time variable, the phase variable, and the slope change variable were all entered as covariates with the Self-Report Item scores as the dependent variable. The resulting graph and analysis of scores would suggest there was a significant decrease in the angle of time for Self-Report Item scores when the overall trend was compared to the trend from phase B only (see Figure 2). This finding is made clearer through an analysis of the amount of change between the overall slope and that which was present in phase B only (Beta Weight = 0.076; $Eta^2$ = .639). This statistically significant finding (t-statistic = 6.383; $p > .001$) would indicate that there was a significant decrease in the slope of the regression line in phase B, when compared to the overall trend, resulting in a more level regression line in phase B. This would suggest that the participant's global Self-Report ratings declined from the upward trend that was demonstrated in the overall trend analysis. Upon visual analysis, it is clear that while the participants were on the rehabilitation unit, their overall perception of both psychological and physical functioning was improving, as evidenced by the upward trend. This trend decreased significantly in phase B, suggesting that after discharge, the participant's perception of global level of functioning was not improving as significantly as it was during phase A. There was also a statistically significant decrease in the overall level of Self-Report from phase A to phase B (t-statistic = -5.193; $p < .001$; Beta Weight = -1.629). The analysis of the change in slope across phases

resulted in a medium effect size statistic ($Eta^2 = .540$) and would indicate that the participants' perception of their overall level of functioning dropped significantly after discharge from the rehabilitation unit. It should also be noted that the effect size statistic for this data would indicate that the trend line satisfactorily captured the data points across the course of the study ($Eta^2 = .925$).

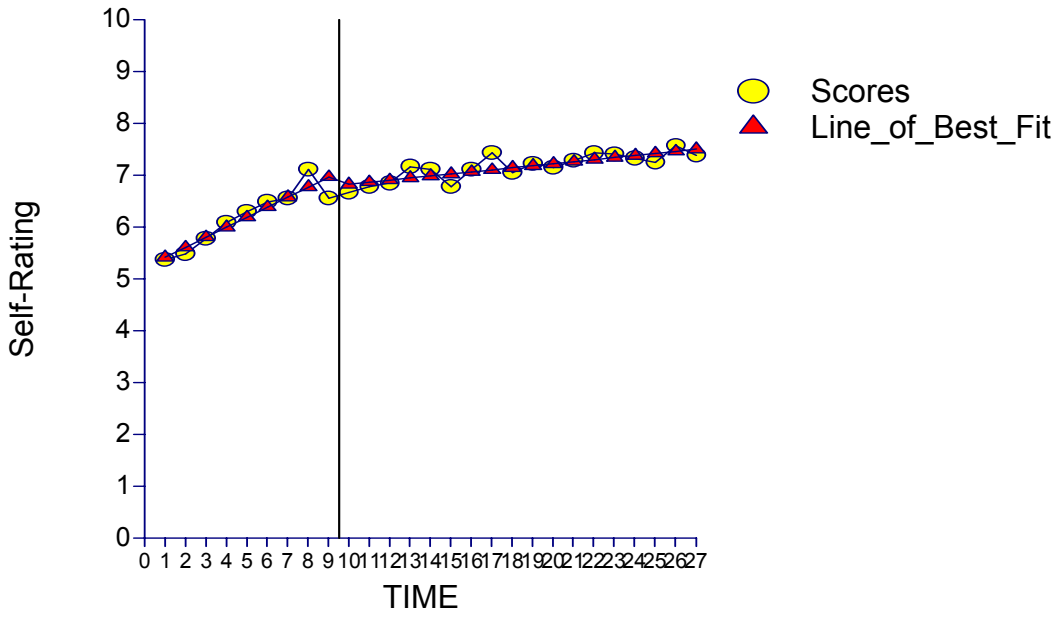


*Figure 2*. Overall Analysis of Self-Rating Item

## Analysis of Participant Data by Discharge Site

### Home Discharge Setting (N = 6)

The scores, for those individuals who were discharged back to their original home setting, on the Geriatric Depression Scale were averaged and plotted in order to provide information related to the overall trajectory of depressive symptoms across both

phases. The scores were analyzed using a General Linear Model analysis in which the time variable, the phase variable, and the slope change variable were all entered as covariates with GDS scores as the dependent variable. The resulting graph and analysis of scores would suggest there was a significant increase in the angle of time for GDS scores when the overall trend is compared to that for phase B only (see Figure 3). This finding is made clearer through an analysis of the amount of change between the overall trend and the trend of phase B only (Beta Weight = -0.653; $Eta^2$ = .891).

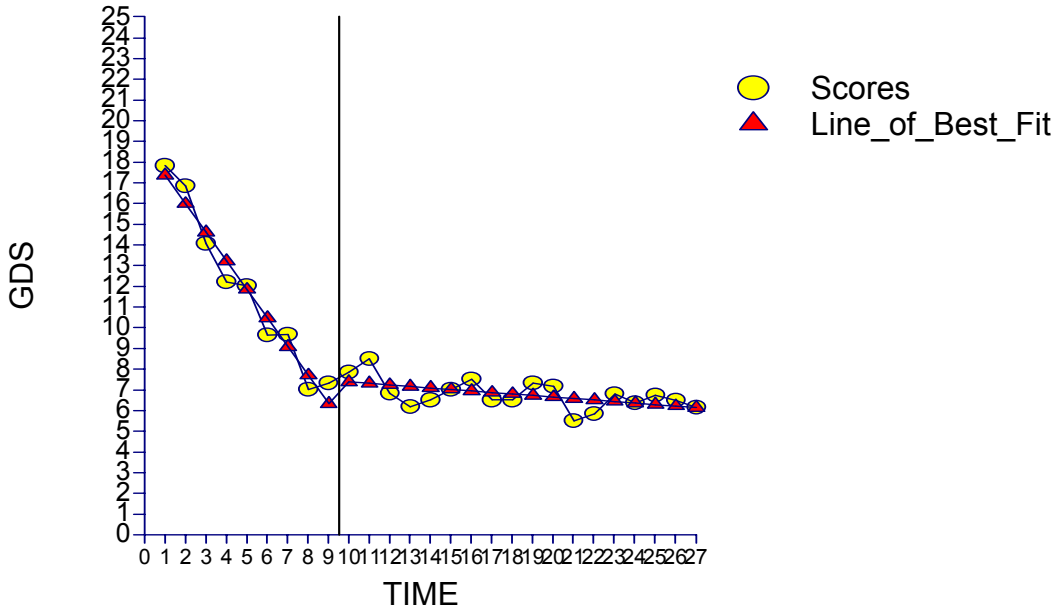


*Figure 3*. Analysis of Depressive Symptoms – Home Discharge Site

This statistically significant finding (t-statistic = -13.689; p > .001) would indicate that there was a significant increase in the slope of the regression line in phase B, when compared to the overall trend, resulting in a more severe downward slope for

the overall trend analysis. This would indicate that depressive symptoms did not decrease at the same rate, and were observed to maintain stability during phase B only.

There was also a statistically significant decrease in the overall level of depressive symptoms from phase A to phase B (t-statistic = 10.850; $p < .001$). The analysis of the change in slope across phases resulted in a large effect size statistic (Beta Weight = 13.537; $Eta^2 = .837$) and indicates that the participants' overall level of depression dropped significantly after discharge from the rehabilitation unit. The resulting effect size statistic from this analysis would also suggest that the trend line captured the data well and there was little variability in the data across time ($Eta^2 = .960$).

The scores on the Self-Report Item, for those participants who were discharged to their original home setting, were also averaged and plotted in order to provide information related to the overall trajectory of the person's general level of physical and emotional functioning across both phases. The scores were analyzed using a General Linear Model analysis in which the time variable, the phase variable, and the slope change variable were all entered as covariates with the Self-Report Item scores as the dependent variable. The resulting graph and analysis of scores would suggest there was a significant decrease in the angle of time for Self-Report Item scores when the trend from phase B only is compared to the overall trend (see Figure 4). This finding is made clearer through an analysis of the amount of change between the overall slope across the entire data set and that of phase B only (Beta Weight = 0.218; $Eta^2 = .898$). This statistically significant finding (t-statistic = 14.206; $p > .001$) would indicate that there

was a significant decrease in the slope of the regression line in phase B, when compared to the overall trend, resulting in a reversal of the direction of the regression lines. Upon visual analysis, it is clear that the participant's global Self-Report ratings were actually improving at a significant upward trend while they were on the rehabilitation unit, but following discharge home, the same individuals exhibited a downward trend in their collective responses about global level of functioning (see Figure 4).

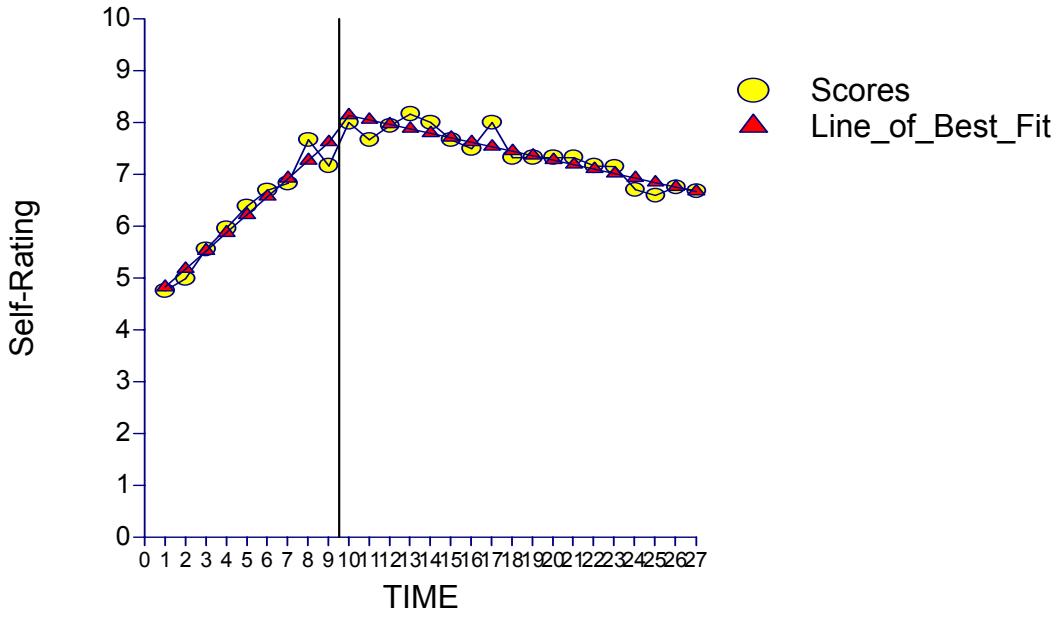


*Figure 4.* Analysis of Self-Rating Item – Home Discharge Site

There was also a statistically significant increase in the overall level of Self-Report from phase A to phase B (t-statistic = -8.810; $p < .001$). The analysis of the change in slope across phases resulted in a medium effect size statistic (Beta Weight = -3.533; $Eta^2 = 0.771$) and would indicate that the participants' perception of their overall

level of functioning increased significantly after discharge from the rehabilitation unit. However, it is also important that this information be interpreted in regards to the significant change in trend that was previously reported. Although there was a statistically significant increase in reported level of global functioning from phase A to phase B, there was a significant downward change in the trend during phase B only. The resulting effect size statistic from this analysis would also suggest that there was little variability in the data across time ($Eta^2 = .944$).

**Intensive Care Discharge Setting (N = 3)**

For those individuals who were discharged to intensive care settings, the scores on the Geriatric Depression Scale were averaged and plotted in order to provide information related to the overall trajectory of depressive symptoms across both phases. The scores were analyzed using a General Linear Model analysis in which the time variable, the phase variable, and the slope change variable were all entered as covariates with GDS scores as the dependent variable. The resulting graph and analysis of scores would indicate that there was not a statistically significant change in the slope when the overall trend was compared to the trend for phase B only (Beta Weight = 0.06). When this variable was removed from the analysis, the results showed that there was a statistically significant difference in the overall level of depressive symptoms from phase A to phase B (Beta Weight = 4.518; $Eta^2 = .697$). This finding is reflected in the graph (see Figure 5), which clearly shows that the participants had a significant increase in level of depressive symptoms after their discharge from the rehabilitation unit (t-statistic = 7.433; $p>.001$). It should also be noted that there was a significant increase in reported

depressive symptoms at the intercept point in the transition from phase A to phase B. This finding would suggest that those individuals who were discharged to intensive care settings could have experienced a significant period of adjustment when transitioning from care sites. The effect size statistic for this analysis would also suggest that there was little variability in the data trend across time ($Eta^2 = .810$).

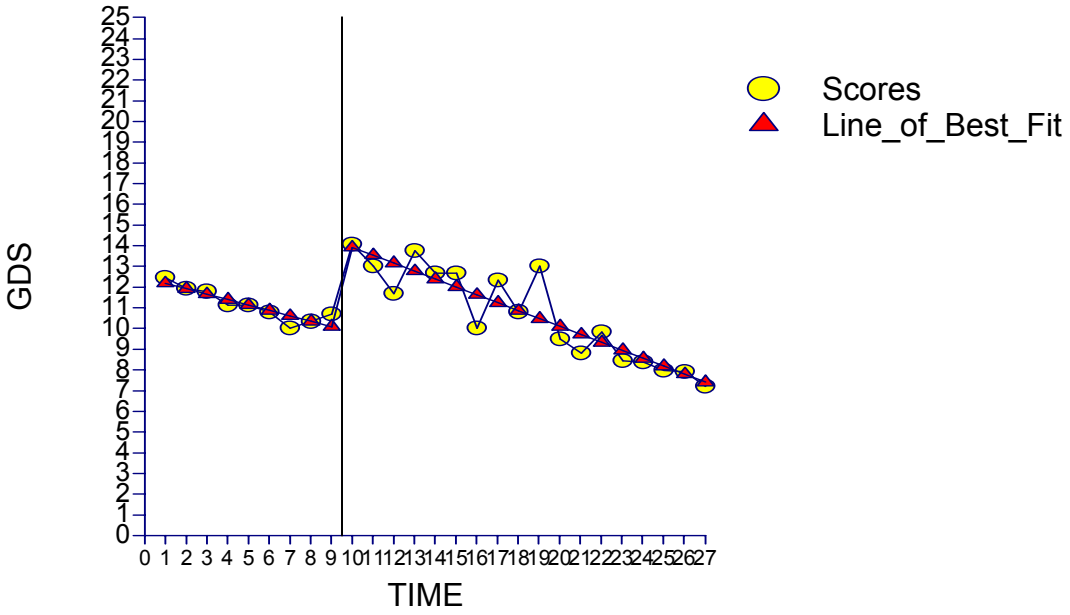


*Figure 5*. Analysis of Depressive Symptoms – Intensive Care Setting

The scores, for those participants who were discharged to intensive care settings, on the Self-Report Item were also averaged and plotted in order to provide information related to the overall trajectory of the person's general level of physical and emotional functioning across both phases. The scores were analyzed using a General Linear Model analysis in which the time variable, the phase variable, and the slope change variable

were all entered as covariates with the Self-Report Item scores as the dependent variable. The resulting graph and analysis of scores would suggest there was a significant increase in the angle of time for Self-Report Item scores when the overall trend was compared to that of phase B only (see Figure 6). This finding is made clearer through an analysis of the amount of change between the overall slope for the entire data set and that of phase B (Beta Weight = -0.206; $Eta^2$ = .845). This significant finding (t-statistic = -11.213; p > .001) would indicate that there was a significant increase in the slope of the regression line in phase B when compared to the overall trend, resulting in a more significant upward trend in phase B.

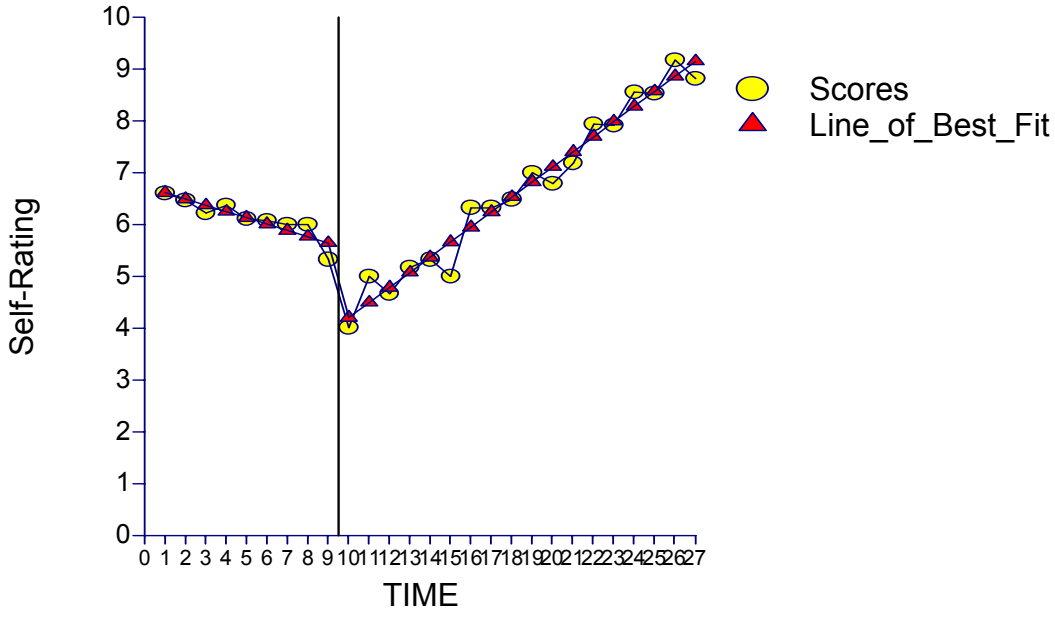


*Figure 6*. Analysis of Self-Rating Item – Intensive Care Setting

This would indicate that the participant's global Self-Report ratings were actually declining at a significant downward trend while they were on the rehabilitation unit, but following discharge to an intensive care setting, the same individuals exhibited an upward trend in their collective responses about global level of functioning. There was also a statistically significant increase in the overall level of Self-Report from phase A to phase B (t-statistic = 4.535; $p < .001$). The analysis of the overall change across phases resulted in a medium effect size statistic (Beta Weight = 2.179; $Eta^2 = 0.472$) and would indicate that the participants' perception of their overall level of functioning increased significantly after discharge from the rehabilitation unit. The effect size statistic for this analysis would suggest that there was also little variability in the data trend line across time ($Eta^2 = .810$).

## Case Study / Analysis of Individual Results

### Participant C1 Case Study Summary

Relevant Background History

The participant was admitted to the skilled rehabilitation unit in late April after he was observed to be in an altered mental state and complaining of generalized pain. He was hospitalized and diagnosed as having suffered a right-sided cerebrovascular accident after he demonstrated severe weakness on his left side. The participant has a significant medical history including problems with macular degeneration to the point where he was legally blind, and hypertension. During the interviews, the participant was observed to be aware of his surroundings and to be cognitively intact, despite his

extensive medical problems. He was also hard of hearing, which made communication difficult at times. Despite these issues, the participant was very cooperative in answering questions and was talkative with minimal encouragers.

The participant was the third of ten children in his family, and stated that he felt close to his siblings and parents. He stated that he worked very hard when he was younger, but this was dictated more by the poverty that was prevalent during this period. The participant has led a very interesting life, including a period of time when he played in a semi-professional baseball league. He was a good historian and was very willing to share his past experiences. The participant eventually received training as a barber and worked in the profession until he retired from it when he was 80 years old. The participant was very upbeat when he talked about his job and it was clear that he truly enjoyed what he did for a living and that he was very proud of what he had been able to accomplish in his life.

Prior to his admission to the rehabilitation unit, he and his wife had lived together in an independent apartment style nursing home community. His wife passed away on the same day that he was admitted to the hospital. In conversations with his daughters, it was discovered that she had suffered a heart attack before she was to go to the hospital to see her husband. She was under extreme distress and was very concerned about how she was going to be able to care for Mr. C, given his current medical problems. The participant was very distressed about this and his understandable sadness and grief continued throughout his stay on the rehabilitation unit and his discharge to the skilled nursing home.

St. Joseph's Rehabilitation and Medical Progress

The participant's progress while he was on the rehabilitation unit was gradual, but was ultimately limited due to his numerous physical and medical problems. He did regain some functioning while on the unit and was able to maneuver himself better in transferring from place to place. In conversations with the rehabilitation staff, they reported that the participant was cooperative with therapy, but tired easily and at times seemed unmotivated to get better. His therapy sessions were also cancelled several times due to medical concerns and the belief that if he were to participate in therapy, it could exacerbate the issue. The staff also reported that his mood was often flat and their opinion was that this was primarily due to the numerous losses that he had suffered. When asked about rehabilitation, the participant would often state that he did not feel like participating, but knew that it was necessary in order to continue his progress.

Discharge & Follow-up Information

The participant was discharged to the skilled nursing home facility that is located in the St. Joseph's Manor in May 2003. When the examiner first visited with the participant in his new surroundings, he was observed to be very sad and unsure about his future. He was not as talkative as he had been during earlier conversations and he appeared to be withdrawing to some extent. His medical problems continue to worsen, ultimately resulting in his being hospitalized for a week not long after he had been moved from the rehabilitation unit.

In a conversation with his primary nurse, she stated that he had been having difficulty adjusting to a recent medication change. She reported that his stomach had

been upset and that he was unable to eat and keep up his strength. A review of the client's case file would suggest that he had experienced some problems with his bowels and that there was some suspicion that this could be due to some type of infection. He returned to the skilled nursing home facility after one weeks stay in the hospital, but stated that he continued to have difficulty eating due to problems swallowing and a limited appetite.

The client's mood was observed to gradually improve during the time after his hospitalization and it was reflected in his nature during the interviews. He was found to be more talkative during some of the sessions, but still seemed hesitant to share many details of his feelings. Despite this limited improvement, the client became more resistant to physical therapy, often complaining that he did not feel as though it was necessary. He also described some dissatisfaction with the nursing staff and how they worked with him, but his observed interactions with them appeared to be constructive. Also during this time, his daughters continued to visit the participant, as did several friends from the community. When asked about this, his daughter stated that she felt as though the visitors were really helping him to keep his mood up and to motivate him to continue to work to get better. It was also mentioned that the daughters had sought the help of a psychologist to work with the participant in order to help him process through some of the emotions that he was experiencing, given his current status.

Overall Clinical Impressions

The participant was observed to display appropriate feelings of sadness and depression, given his extreme medical problems and the loss of his wife so close to his

hospitalization. He was cooperative with the study, but would often become irritated with the questions if they invoked too much emotion in him. During these times, the participant would block his emotions or change the subject before he became too emotional. He showed little signs of hope given his current condition, and often described feelings of being guilty for causing everyone so much distress and helpless for not being able to change it. It was discovered through conversations with the participant's daughter that the participant was very much the member of the family that attended to everyone else's needs and made sure that the family was functioning well and happy. She stated that since his medical problems, he had not been able to serve in this role and she felt that this could also be contributing to his difficulty handling the current stress.

The dynamics that appeared to be present with the participant's daughters were also observed to be somewhat problematic at times. The oldest daughter was very involved and supportive of her father, but the youngest daughter was observed to be somewhat resentful about the situation and what was asked of her. In conversations with her, she stated that she had been one of the primary caretakers of her father before his current hospitalization and that he had come to expect this of her. She stated that in some respects, her life had become focused on caring for her father and it is the examiner's opinion that she did not enjoy this role. During some interactions, she mentioned that her daughter was pregnant and that her doctor had recommended that she stay in bed in order to rest and facilitate the pregnancy. The participant's daughter stated that she felt as though she was needed more with her daughter, and appeared to be

somewhat resentful because she had to spend time with her father. Despite these observed dynamics, the daughters were both very supportive of their father and cared for him extensively.

Statistical Analysis

The participant's responses on the Geriatric Depression Scale were analyzed using a GLM statistical analysis to determine how the depressive symptoms progressed over time (see Figure 7).

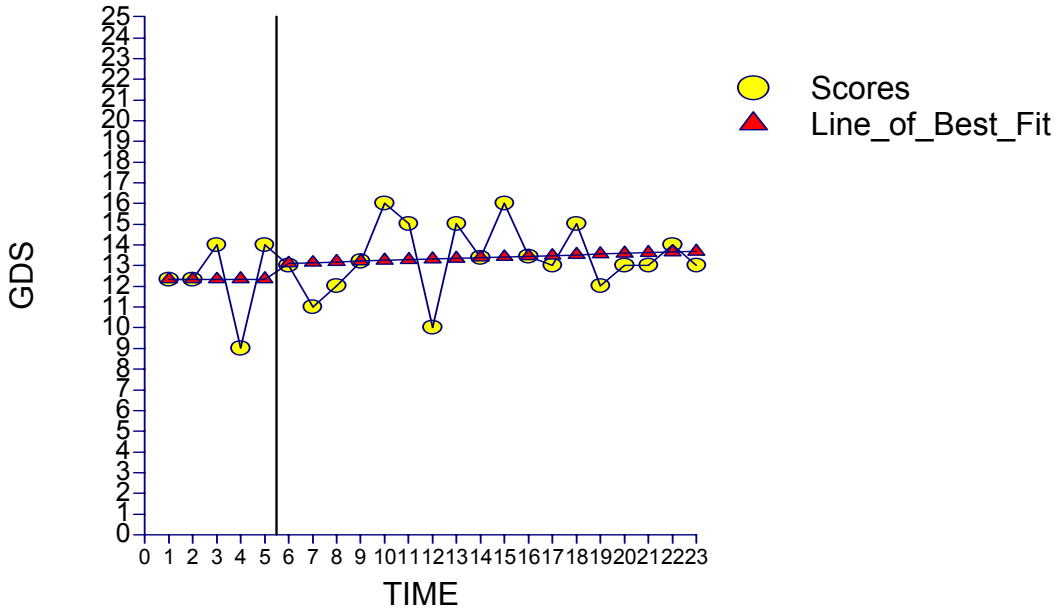


*Figure 7*. Analysis of Depressive Symptoms – Participant C1

The results would suggest that there was no statistically significant change in the degree of slope between the overall trend for the entire data set and that for phase B only (Beta Weight = -0.016873). The analysis would also suggest that there were no

statistically significant changes in overall level of depressive symptoms across phases ($Eta^2 = 0.001$). The effect size statistic reflected the fact that there was some variability in his responses ($Eta^2 = .698$). Despite this, the current results should be considered an accurate representation of the participant's exhibited depressive symptoms.

The participant's Self-Rating Item scores (see Figure 8) demonstrated no statistically significant change between phases ($Eta^2 = 0.006$). There was also no statistically significant change in the slope of the responses when the overall trend was compared to that of phase B only (Beta Weight = -0.002). The effect size statistic reflected some degree of variability of the participant's response over the course of the current study ($Eta^2 = .551$).

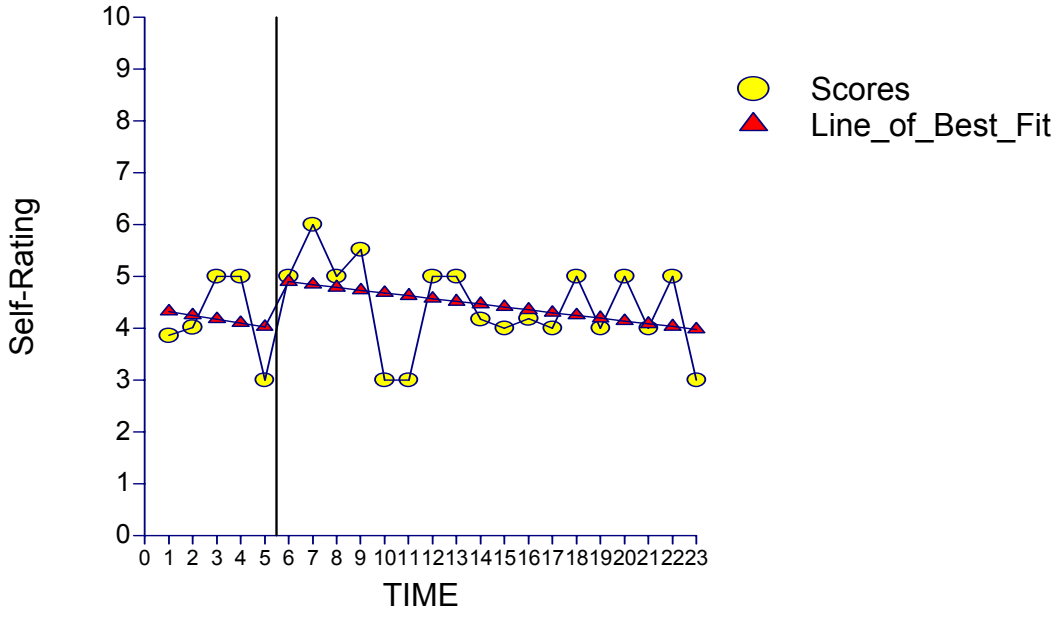


*Figure 8*. Analysis of Self-Rating Item – Participant C1

There was a small negative correlation between GDS and Self-Rating scores (Spearman Rho Correlation Coefficient = -0.283; Pearson r Correlation Coefficient = -.399), but this was not statistically significant and would only suggest a slight relationship between the variables. The participant was observed to make limited improvements in rehabilitation, but his medical and physical issues limited progress in this area. There was a positive correlation between the GDS scores and Rehabilitation scores (Spearman Rho Correlation Coefficient = 0.632; Pearson r Correlation Coefficient = .161), but this effect did not reach the level of statistical significance. Finally, there was a small negative correlation between the participant's scores on the Self-Rating Item and his rehabilitation performance (Spearman Rho Correlation Coefficient = -0.051; Pearson r Correlation Coefficient = .039).

Summary and Interpretation of Findings

The current results would suggest that the participant's depressive symptoms remained constant while he was on the rehabilitation unit, and continued following his discharge to the intensive nursing home care setting. It should be noted, however, that the participant's level of depressive symptoms would be considered clinically significantly based on number of items endorsed. One possible explanation for this finding could be the fact that the participant was discharged to the intensive care nursing home unit at St. Joseph's, which is very similar to the rehabilitation unit he was on prior to discharge. This minimal change in surroundings might not have been significant enough to arouse any emotional response from the client, given the similarity in services to the rehabilitation unit. It is also possible that the preexisting stressors of the

participant's wife passing away and his extensive medical problems could have contributed to the steady level of depressive symptoms and poor responses on the Self-Report Item. The feelings of grief and sadness related to these issues could be considered more stable and therefore would not be as susceptible to significant overall fluctuations during the course of the study.

**Participant F1 Case Study Summary**

Relevant Background History

Participant F1 is a 69 year-old Caucasian male who was admitted to the rehabilitation unit in May 2003. He was hospitalized after he awoke one morning with noticeable left-sided weakness and slurring of speech. A computed tomography (CT) scan was performed and showed a right middle cerebral artery distribution cerebrovascular accident. The medical intake report indicated that the client has a history of smoking and alcohol abuse lasting until ten years ago. When asked about this, the client stated that he had led a "full life" and that he enjoyed spending time with his friends. The participant also suffers from a number of current medical illnesses, including hypertension, previous history of heart surgery 6 months ago, hyperlipidemia, and myeloproliferative disorder with thrombocytosis (a medical disease that causes his body to produce too many platelets). He described being very ill as a result of the myeloproliferative diagnosis, primarily due to the medication that he has to take as a result. He stated that one of the major side effects of this medication was an increased susceptibility of strokes. He was taken off of this medication while he was in the hospital and prescribed a medication that did not have such drastic side effects. The

participant was also administered several subtests from the COGNISTAT, which is a test of cognitive ability frequently used in the rehabilitation facility. His scores all fell within the average range for an individual of his age and level of functioning, and he showed good language, orientation, and reasoning ability.

Prior to his admission to the rehabilitation unit, the participant lived in a small, rural town approximately two hours from Bryan, TX. He stated that he lived with his wife of thirty years, who was wheelchair bound due to a degenerative hip disorder. The participant is retired from his profession as a bricklayer, where he has worked for the last fifty years. He and his wife have only one daughter, with whom they are very close but do not see often. The participant reported that she travels extensively due to her job in sales. He stated that recently he had begun attending church near his home and that this was new for him. He emphasized several times during our conversations that he had been very rebellious and was often in trouble when he was younger. He had only recently begun to settle down into a more relaxed style of life when he began to experience the numerous medical problems he currently suffers.

He continued to lead a very social life, stating that he would join friends at a coffee shop close to his home and they would spend time talking and playing checkers or cards. He was always observed to be very open and cooperative during our conversations, and this attitude was also present in his interactions with nurses and staff. The participant did state on several occasions that he was not accustomed to others caring for him and that this was a difficult adjustment for him to make while he was on the rehabilitation unit. He would often describe having feelings of helplessness and

some brief feelings of shame due to the fact that he was unable to do many of his normal grooming and self-care tasks and relied heavily on the nurses.

St. Joseph's Rehabilitation and Medical Progress

The participant was very active in his participation with physical and occupational therapy on the unit. He was observed to be very eager to attend the therapy sessions, often transporting himself in his wheelchair to the therapy room before his appointment was scheduled to begin. He would often state that if he waited on them to come and get him, then that was taking up some of his therapy time and he did not want to waste what little he had available. He was also placed in speech therapy to address the effects of the stroke on his ability to communicate and enunciate words. The participant made great progress in the speech program and was ultimately discharged from the services due to his high degree of improvement during this time.

The participant experienced similar progress in his physical and occupational therapy sessions, and as a result he was able to regain a high level of his functioning after the stroke. Despite this progress, when asked about his perception of his current status, the participant would often state that he was not very happy with it and felt as though there was still much work to be done in therapy. He was able to understand that he had made progress while on the unit, but was more frustrated with the pace of the progress rather than his overall level of functioning. The participant would also often become upset when he would talk about how much he was able to do prior to the stroke. He was very nervous about his discharge and was not confident that he would be able to function up to his standards when he went back home. He also expressed some concern

about how his relationship with his wife would change upon his arrival back home. He stated that he was her primary caretaker and that he was unsure if he would be able to care for her in the manner that he had previously. He stated that he felt as though his stay in the rehabilitation unit was also good for her because it forced her to become more independent in her level of functioning and caring for herself.

Discharge & Follow-up Information

The participant was discharged to home in June 2003. He had been scheduled for discharge earlier, but the doctor postponed the move due to the participant's elevated blood pressure readings. The participant's medical status eventually stabilized enough for him to go home, and he was very upbeat during conversations that day with staff and the researcher. After his arrival home, the participant stated that it was a larger adjustment for him than he was expecting. He described having difficulty moving his wheelchair due to the carpet on the floors, and he was unable to maneuver himself from his wheelchair to other pieces of furniture without great effort.

He did report that he had been sleeping much better, due to the decrease in distractions and disruptions during the night. He also reported that he did not feel as though the outpatient therapy service that he was supposed to be working with was fulfilling their agreement of the contract. This problem severely affected the participant's level of depressive symptoms, as can easily be seen in the client's scores on the GDS. The client's difficulties at home only continued to compound after he had problems with his insurance company and the process by which they were providing his medications. He stated that they were not helpful and that they were considering

dropping him from the coverage due to the many medical problems that he was experiencing. Client's frustrations at home only continued to mount with problems that were due to his water well becoming contaminated and his car breaking down. These issues occurred at measurement point # 19, and the frustration that resulted is clearly reflected in the participant's report of symptoms on the GDS. Client also stated that the increased problems around his home have led to more arguments between he and his wife and that this has only served to compound the problem that he is experiencing and his negative outlook on his prognosis.

Overall Clinical Impressions

Throughout the testing session, the participant was very involved in the research program and was open and responsive to all questions that were asked. His mood fluctuated significantly throughout his time on the rehabilitation unit and after discharge. While he was on the rehabilitation unit, it appeared that his therapy was very important to him and if he did not perform up to his expectations, he viewed it as a failure on his part and as an indicator that he was not going to improve despite his efforts. He frequently compared his current level of functioning to how he had functioned prior to the stroke and was very critical of himself. Despite these issues, the participant managed to keep his social personality and did not hesitate to speak with other residents or to staff members. He was able to keep up a good outer presentation, but the depressive symptoms were obvious if the conversation went past the surface content.

The participant's overall mood after discharge was also somewhat unstable. His responses on the GDS indicated that he was experiencing a number of depressive

symptoms and that they persisted throughout the discharge period. His mood was also influenced by several difficulties that he faced (water well problems, car issues, relationship concerns), and these issues appeared to impact him severely. This was compounded by the fact that the participant believed that he had a number of responsibilities that he had to uphold. His level of functioning after the stroke would not permit him to resume these activities and as a result he often mentioned experiencing feelings of worthlessness and despair.

It also appeared that the participant's support system was limited in his home setting. His relationship with his wife was strained by her physical limitations, his feelings of responsibility to care for her, and his inability to function at a level that would allow him to resume his previous level of functioning. In conversations with her, the researcher noticed that she did not give the impression that she was happy with the situation and would often talk in a demeaning manner about her husband. She also seemed very burdened by the telephone follow-up calls, and did not give the impression that she was happy with the overall situation at home. One interesting point is that there was a significant drop in his depressive symptoms during measurement # 17, which is also the day that his daughter was home to visit with him. He described a very good relationship with her and stated that he felt as though she "was there for him" and "kept him in line." This was clearly reflected in his scores on the GDS.

Statistical Analysis

The participant's responses on the GDS would suggest that he was experiencing a clinically significant level of depression throughout the course of the study. However,

the participant's pattern of scores would not suggest a statistically significant change in the slope of the responses when the overall trend was compared to that of phase B only (Beta Weight = -0.286). The analyses of differences between phases on depressive symptoms did show that there was a statistically significant increase (Beta Weight = 8.423; t-statistic = 2.180; p>.04) in the overall level of depressive symptoms across phases (see Figure 9). There were also significant fluctuations in the participant's report of depressive symptoms across phases, and this is reflected in a lower measurement of trend line fit ($Eta^2$ = .717).

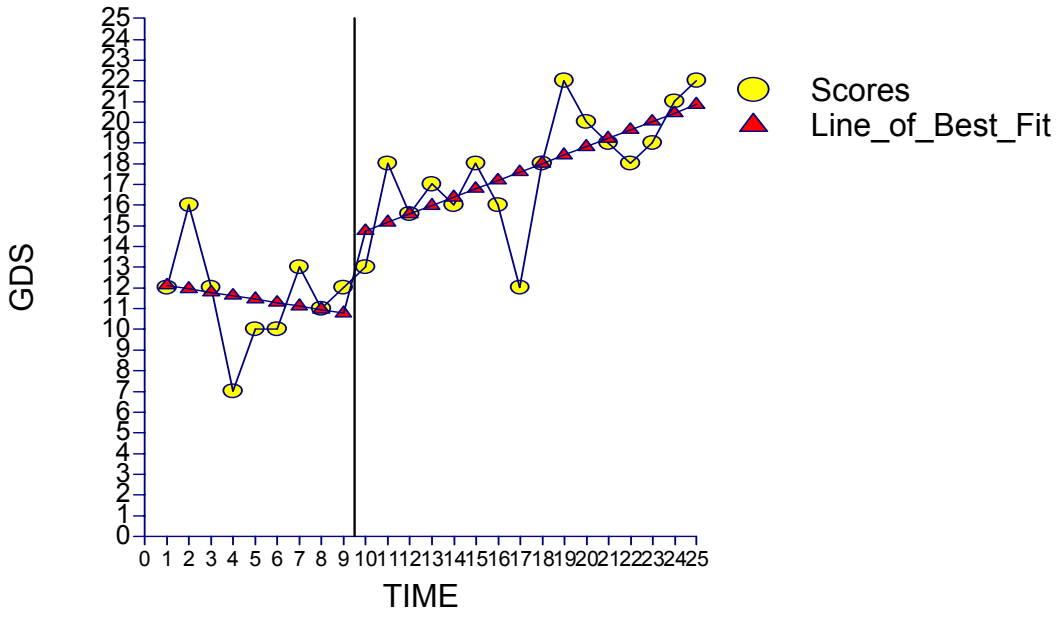


*Figure 9*. Analysis of Depressive Symptoms – Participant F1

The participant's reported scores on the Self-Report Item showed no statistically significant change in trend when the overall slope was compared to that in phase B only,

suggesting that the difference in trend was not significant (see Figure 10). There was also no significant change between phases in scores on the Self-Report Item, but there was a clear downward trend throughout the course of the study. The participant's responses on the Self-Report Item also demonstrated significant fluctuations throughout the time line, which is reflected in the trend line fit statistic ($Eta^2 = .536$).

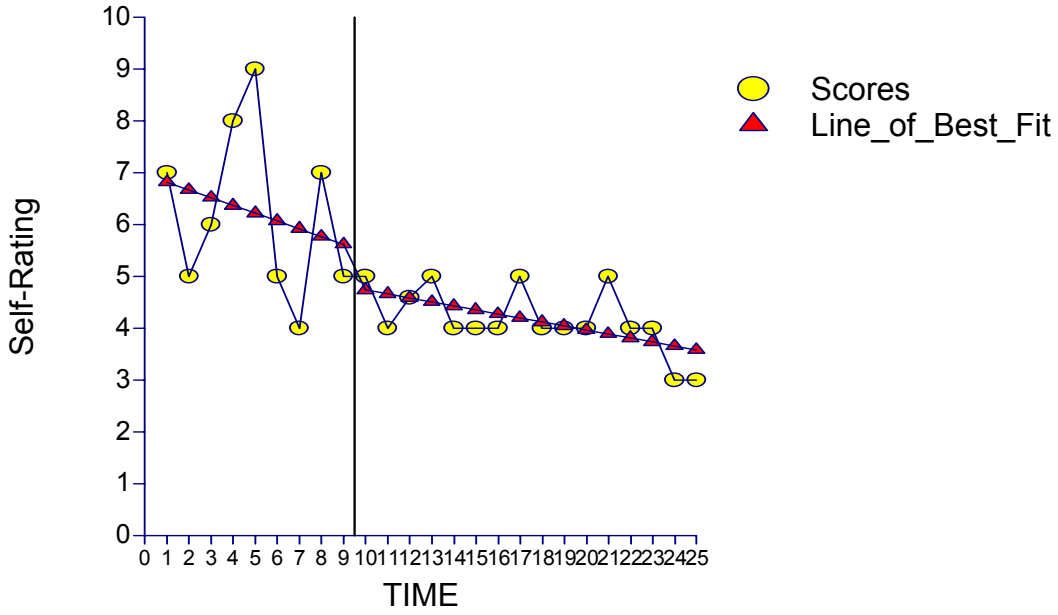


*Figure 10*. Analysis of Self-Rating Item – Participant F1

The participant's performance in rehabilitation demonstrated a small negative correlation with the GDS scores, but this relationship did not reach statistical significance (Spearman Rho Correlation Coefficient = -0.219; Pearson r Correlation Coefficient = -.289). There was, however, a statistically significant negative correlation between GDS scores and the Self-Report Item (Spearman Rho Correlation Coefficient =

-0.816; Pearson r Correlation Coefficient = -.789). When examined graphically, it is clear that as scores on the depression measure increased, the participant's self-report of overall physical and emotional functioning decreased (p>.0001). There was also a small correlation between the participant's responses on the Self-Report Item and his performance in rehabilitation therapy, but this finding was not statistically significant (Spearman Rho Correlation Coefficient = .120; Pearson r Correlation Coefficient = -.037).

Summary and Interpretation of Findings

The current results would suggest the participant experienced a high level of depressive symptoms and that these symptoms increased following his discharge from the Rehabilitation Unit. When examined in conjunction with the qualitative information gathered, this trend could be due to the participant's high expectations of being able to return to his previous level of functioning following discharge home. In follow-up interviews after the participant's discharge, it was clear that he was disappointed in the progress he had made in therapy and the slow rate in which he was recovering his level of functioning. There was also a general decrease in the trend of the participant's Self-Rating score of overall physical and emotional functioning. Although not as severe as that reflected in the measure of depressive symptoms, this trend would suggest a clinically significant decrease in conceptualized level of well-being. It is also interesting to not the severe fluctuations in symptoms due to outside influences. Increases in depressive symptoms were noted to coincide with problems with domestic problems,

whereas positive trends were present during the period of time in which his daughter was visiting.

**Participant H2 Case Study Summary**

Relevant Background History

The participant is a 67 year-old Caucasian female who was admitted to the rehabilitation unit in June 2003 after experiencing a worsening of right side weakness and increased slurring of speech. Medical records indicate that she had begun to notice some dizziness and impairment in balance dating back to June 2003, but sought no medical attention at that time. The symptoms continued to progress until family members ultimately took her to the hospital. She was diagnosed at the time of that hospitalization with a left pontine cerebrovascular accident. She had some history of previous medical problems including diabetes mellitus, hypothyroidism, and hyperlipidemia.

Prior to her stroke, the participant was living alone in her home in Bryan, TX. She was independent in activities of daily living and was employed as a record keeper at a building supply company in town. The participant stated that she has three children, one daughter and two sons, and that she had gradually lost contact with them over the last few years. Conversations with the participant's daughter showed that the participant had not been very close with her children and had been somewhat detached from her husband and her children throughout her life. Daughter reported that the participant had a difficult time during childhood and was forced to grow up quickly due to her mother passing away when she was young. The participant did not speak much about her past

history, but stated that she had to work hard and that she expected others to do the same. The participant was cooperative during the interview sessions, but would often deny emotions and deflect feelings or change the subject if the topic became too emotional for her.

St. Joseph's Rehabilitation and Medical Progress

After the participant was initially admitted to the rehabilitation unit, conversations with the nursing staff and medical doctor indicated that she was experiencing high levels of emotionality and was crying during the initial medical intake. These feelings lasted for approximately two days, and then the participant was reported to "shut down" emotionally according to nursing and case management staff. During the initial interview with the examiner, the participant stated that she had tried to block out what had happened to her and had begun to focus on improving while she was on the unit. She was very dedicated in therapy and the rehabilitation staff stated that she worked extremely hard on her exercises while she was in formal therapy and also when she was alone in her room. Rehabilitation staff also noted that the participant became emotional during several therapy sessions, and would often attempt to explain these incidents as being a normal result of experiencing a stroke. However, the therapists did note that these instances were most often triggered by outside circumstances such as seeing friends from work, or receiving positive praise for performing well in therapy. In several discussions with the examiner, she stated that she was encouraged with the progress she had made since being admitted to the unit, but at the same time she was

frustrated by the amount of time it was taking. Her mood fluctuated highly from session to session and it appeared to be greatly influenced by her progress in therapy.

The participant continued to make progress in therapy and to slowly regain functioning in her arm and wrist, but limited movement was achieved in her hand. She suffered a fall on the unit when she tried to get up to go to the restroom by herself, and this is reflected in measurement point # 8. She sustained a bruise on her cheek, but stated that mostly she was embarrassed that she had overestimated her ability to maneuver and had fallen as a result. Prior to this incident, she had been scheduled for discharge back home, but afterwards the doctor recommended that due to the client's level of functioning at the time, she should be discharged to a nursing home. This decision was made so that the participant could continue to receive therapy services and get help managing her daily activities. She was observed to be somewhat upset by this decision, but understood that it was a necessary step in the process of her recovery. She was discharged to a nursing home facility in late June.

Discharge & Follow-up Information

In the initial interview following the participant's admission to the nursing home facility, she appeared to be upbeat but was very critical of the facility and how different it was from the rehabilitation unit. She stated that the site forces her to be more independent and take responsibility for her own well being and activities of daily living. Despite these issues, the participant stated that she was functioning well and was motivated to continue her progress so that she could move out of this facility. Participant continued to participate in rehabilitation, but stated that she prefers to avoid

outside contact with other residents or staff and would rather stay in her room. She did report that several visitors came by to check on her status, including her daughter and her sons.

Overall Clinical Impressions

The participant was very cooperative with the process during the interviews and data collection. She did appear as though she would hold back on her emotions and preferred not to share these with the examiner at times. However, as time progressed she opened up more and provided more detail on her relationship with her daughter and how this changed after her stroke. It appeared that the stroke necessitated that she reestablish contact with her children and it reconnected her with them in many different ways. The participant was very aware of this and became emotional when she discussed how these changes have happened.

Statistical Analysis

The results from the analysis of the patient's responses to the Geriatric Depression Scale would indicate that there was a statistically significant change in the trajectory of responses when the overall trend was compared to that of phase B only (t-statistic = 2.060; $p > .05$). This change in trajectory was shown in the GLM analysis and is highlighted in the graph below (see Figure 11). As evidenced by the graph, the participant's report of depressive symptoms had a general upward trend across both phases, but this overall trend is contrasted by a slight downward trend when phase B is analyzed separately. The overall difference in the trajectory between phases is reflected in the slope change statistic (Beta Weight = .0245).

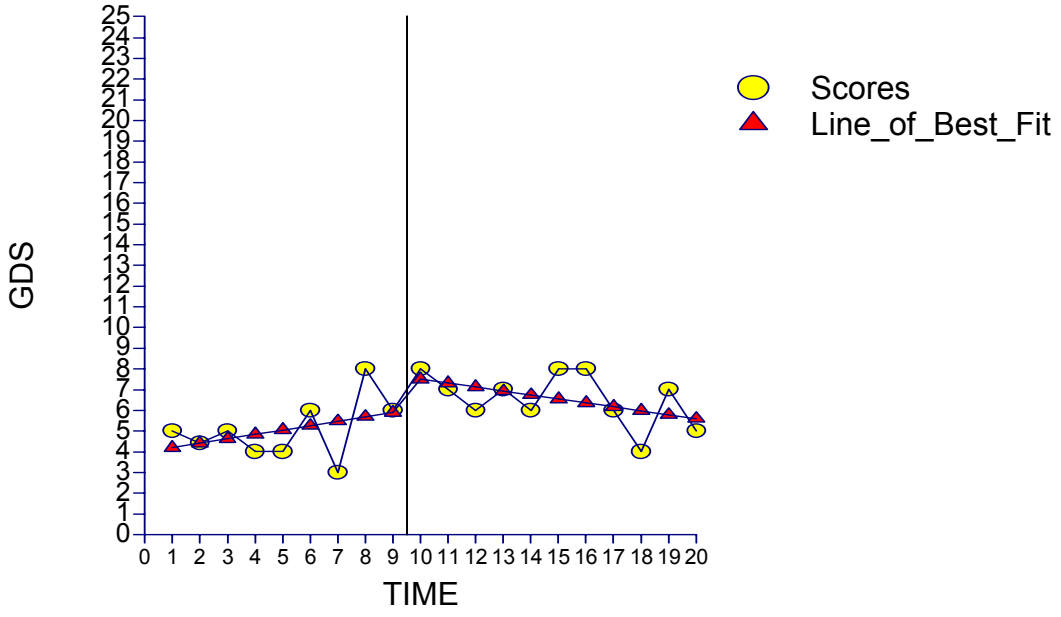


*Figure 11*. Analysis of Depressive Symptoms – Participant H2

This would suggest that the participant's level of depressive symptoms was increasing while she was on the rehabilitation unit, but following discharge home these symptoms decreased. The statistical analysis also showed that there was no statistically significant difference between phases on the Geriatric Depression Scale. It should also be noted that the participant's responses fluctuated significantly across the measurement period, resulting in a low effect size ($Eta^2 = .411$).

The participant's responses to the Self-Report item measuring global level of functioning would suggest that there was not a statistically significant change in the angle of trajectory across phases (see Figure 12). This result was most reflected in the GLM analysis of the difference between the trajectory of the overall trend line when

compared to that of phase B only (Beta Weight = - 0.08). It should be noted, however, that there is a clear upward trend across both phases, suggesting a continuing improvement in emotional and physical functioning. Due to the fact that there was no statistically significant finding upon the analysis of the change in slope variable, that component was removed from the analysis of the change in phase variable.

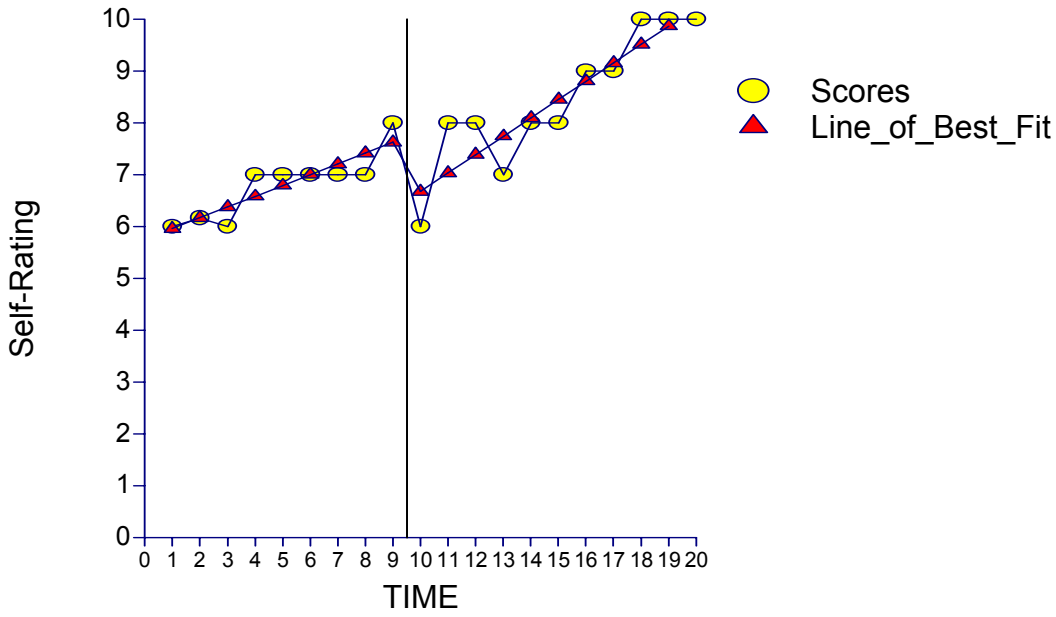


Figure 12. Analysis of Self-Rating Item – Participant H2

The results showed that there was a statistically significant change in the overall responses on the Self-Report item across phases (Beta Weight = -1.371; t-statistic = -3.014; p>.008). When examined graphically, it is evident that there was a significant upward change in the participant's overall average responses to the Self-Report item. This would suggest that the participant viewed herself as improving both physically and

mentally following her discharge from the rehabilitation unit. The participant's responses were also stable across both phases, as evidenced by the effect size statistic ($Eta^2 = .868$).

There was a small positive correlation between the participant's scores on the Geriatric Depression Scale and the Self-Report Item, but this finding was not statistically significant (Spearman's Rho Correlation Coefficient = .145; Pearson r Correlation Coefficient = .107). There was also a small positive correlation between the participant's GDS scores and their performance in rehabilitation, but this finding also failed to achieve statistical significance (Spearman's Rho Correlation Coefficient = .209; Pearson r Correlation Coefficient = .254). There was a statistically significant relationship between the participant's scores on the Self-Report Item and their performance in rehabilitation therapy ($p > .001$). This finding indicates a positive correlation between the participant's performance in rehabilitation and her scores on the Self-Report Item (Spearman's Rho Correlation Coefficient = .888; Pearson r Correlation Coefficient = .888). This would suggest that as the participant's performance in rehabilitation improved, so did her perceived emotional and physical functioning.

Summary and Interpretation of Findings

When taken as a whole, the current results would appear to suggest that the participant's level of depressive symptoms declined after being discharged to the nursing home facility. Reports from the participant and her family members would suggest this could be the result of a combination of factors. The participant reported a satisfactory experience at the nursing home care setting, highlighted by extensive rehabilitation

opportunities. This was a major point of concern for the patient, as evidenced by the high correlation between rehabilitation scores and the Self-Report Item. It is also significant to note that the participant reported improved relations with her children. Towards the end of the course of the study, the participant reported that plans had been made for her to move out of the nursing home and into her daughter's home. Both of these issues could have contributed to the significant improvements towards the end of phase B. It should also be noted that the participant had a slight drop at the intercept between phase A and phase B, immediately after she was transferred to the nursing home care setting. This would appear to reflect a brief period of adjustment after being discharged from the rehabilitation unit, but ultimately her scores on the Self-Report item continued to increase and would suggest that she viewed her level of functioning as satisfactory.

**Participant R1 Case Study Summary**

Relevant Background History

The participant is a 67 year-old Hispanic female, who was admitted to the rehabilitation unit in May 2003 after she noted slurring of speech and gradual right upper extremity weakness and parathesis. She presented with a significant right sided facial droop and slurring of speech upon initial interview. She was diagnosed with a cerebrovascular accident in the left middle cerebral artery. She has a significant medical history of hypertension, diabetes, and obesity. During the interview, the participant stated that prior to the stroke she was experiencing difficulty moving around her home, but that this was mostly due to her weight and her limited range of movement. She

denied any serious medical problems prior to the stroke. She was administered the COGNISTAT exam, which is a measure of awareness and cognitive ability that is frequently used on the rehabilitation unit. Her scores would suggest that she demonstrated mild to severe impairment across several of the areas measured including attention, memory, and reasoning skills. Despite her scores, she demonstrated a good awareness and orientation to her surroundings and was deemed to be cognitively intact by the examiner.

Prior to her admission to the rehabilitation unit, the participant was living with two of her sons in a single level home in Bryan, TX. She had been previously employed as a cook in a restaurant, but stated that she had not been working recently due to her health. She stated that she has eight children, and that many of them live in and around Bryan. She was observed to have a good support system and to frequently have visitors while she was on the unit. She was very interactive with family, but was quiet with the researcher, as well as with nurses and rehabilitation staff. The nurses reported that the participant's son was very ill and had been diagnosed with cancer. She had mentioned to the nurse that she was very concerned about his health and whether he would improve or not. Despite her conversations with the nurse on this subject, the participant did not mention this topic with the researcher at this time.

St. Joseph's Rehabilitation and Medical Progress

During her stay on the rehabilitation unit, the participant was very cooperative with medical and therapy staff members. There were several times that she denied therapy due to illness, and when asked about this the staff had some question as to

whether there was a valid reason for this. It is also important to notice that this occurred most frequently close to the time her son was diagnosed with cancer, and could be a normal grief reaction to the situation. She was very quiet and did not seek out social contact, but she would interact with others if the opportunity were available. She attended a stroke support group several times while she was on the rehabilitation unit, and this appeared to help her cope with her current situation. Throughout her stay on the unit, the participant was able to recognize that she was sad, but was not willing to discuss the reasons for her sadness with the examiner, social work staff, or medical and therapy personnel. Several of the nurses did mention that she discussed her feelings on the matter with other family members, but that she did not appear comfortable discussing these issues with strangers.

Discharge & Follow-up Information

The participant was discharged to her home, under the care of her two sons who live in the house with her. A few days prior to her discharge, the participant shared that she was worried and anxious about returning home because she was not sure whether she would be able to care for herself. She also stated that she did not know whether someone would be able to stay at home with her during this time, and was nervous about being home by herself. Up until this time on the rehabilitation unit, the participant had been very upbeat and positive about her discharge home. The day of her discharge, the participant stated that she felt better about going home and that she felt more confident that she could care for herself and that her family would be present for support.

The participant continued to make good progress with rehabilitation after she was discharged home. She stated that she was able to improve her ability to walk by herself and manage her daily activities and grooming tasks more effectively also. In conversations with the participant's daughter, it was stated that the participant was very upbeat to be back home, but that she still had some sadness about her son's condition. Although the daughter stated that the participant did not discuss these feelings very often, it was clear to her that they were still very present. The participant also stated in conversations that it had been difficult for her to change her role within the household. She reported that traditionally, she had been the caretaker for her family and that she was not accustomed to others caring for her. She stated that this was difficult for her to adjust to, but that her family had been very supportive of her. The participant also described periods of increased emotionality when she was at home. She stated that innocuous things, such as commercials or trivial difficulties could trigger these episodes. These reports continued throughout the follow-up period, but the participant stated that they she did not consider them to have a significant effect on her level of functioning.

Overall Clinical Impressions

Several themes appeared throughout the assessment and follow-up period for the participant that could be relevant to her current level of depressive symptoms. She exhibited a very quiet and shy demeanor, which appeared to limit her sharing emotional items or things that were bothering her. She appeared to deny these problems when asked about them, and instead reflect these issues in physical illness or medical concerns. However, it did appear that this was only true with people who she was

unfamiliar with. She was very open with her family and she appeared to be very comfortable sharing these issues with them. The participant had a very supportive family system, which could have been very helpful in aiding her to cope with the many stressors that she faced during this time in her life. It is difficult to analyze how much effect the illness of the participant's son had on her during the current research study, given the normal grief reaction and the participant's tendency to deny these feelings to outsiders.

Statistical Analysis

The participant's responses on the Geriatric Depression Scale would appear to indicate that her level of depression was below the clinically significant range while she was on the rehabilitation unit, but it did have a slight upward trend (Beta Weight = .146). The trend continued throughout phase A, but dropped slightly after she was discharged home (see Figure 13). There was not a statistically significant difference between the slope of the trend lines for the overall data set and that for phase B only (Beta Weight = -0.123). This variable was removed from the analysis for the phase variable and a statistically significant change was noted (Beta Weight = -3.240; t-statistic = -2.566; $p>.01$).

When this finding is examined graphically, it is clear that there is a slight increase in depressive symptoms following discharge from the rehabilitation unit ($Eta^2 = .230$). It should also be noted that the participant's responses demonstrated some instability through the course of the study, as reflected by the trend fit statistic ($Eta^2 = 0.488$). This finding was consistent with the interview results, which suggested that the

patient was easily flustered by outside issues and her mood fluctuated significantly during these periods.

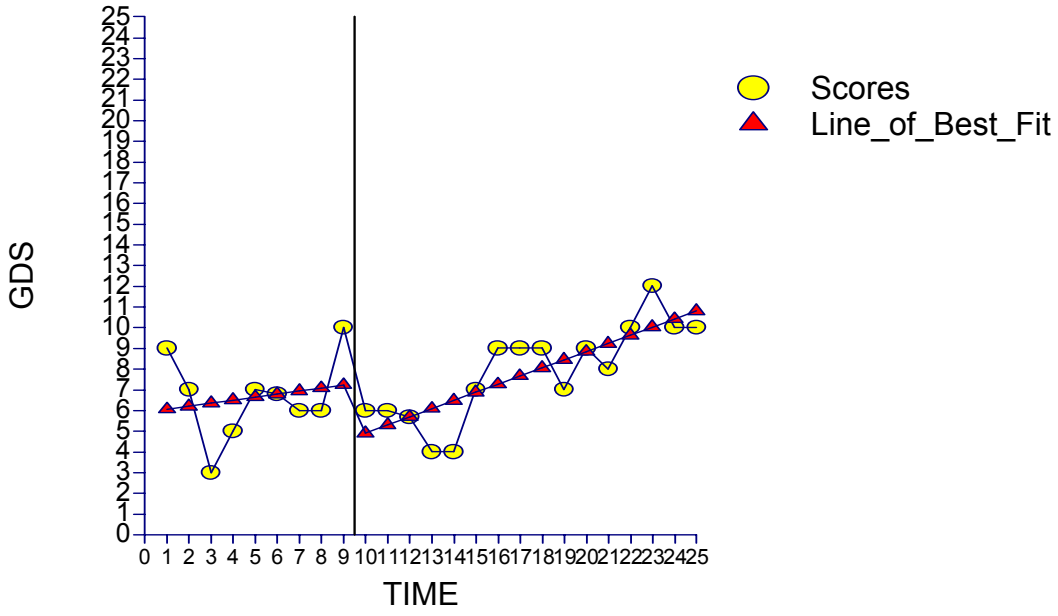


*Figure 13*. Analysis of Depressive Symptoms – Participant R1

The participant's responses on the Self-Report Item indicated a statistically significant increase in the perception of her overall level of functioning (Beta Weight = -.135; $Eta^2$ = .355). This was evidenced by a statistically significant increase between phases (t-statistic = 3.397; p > .003). This would appear to suggest that the participant's overall level of physical and emotional functioning increased from the time she was on the rehabilitation unit to after she was discharged home (see Figure 14). There was also a statistically significant change in the slope of the trend line when the overall trend was compared with that of phase B only (t-statistic = -3.137; p > .005). Upon viewing the

graph, it is clear that the participant's perception of her functioning had a more significant upward trend after she was discharged home, when compared to the slightly downward trend when she was on the rehabilitation unit (Beta Weight = -0.135; $Eta^2$ = .319). Although there was some fluctuation in the participant's responses, the trend line fit statistic would suggest the scores were stable over the course of the study ($Eta^2$ = .719).

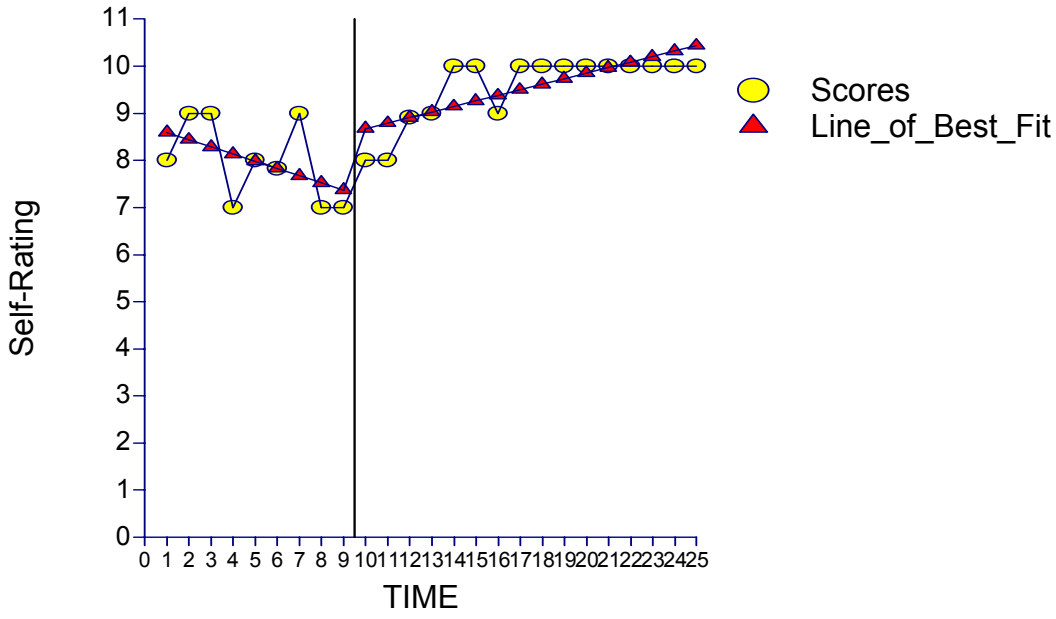


*Figure 14*. Analysis of Self-Rating Item – Participant R1

When the participant's responses to the GDS and the Self-Report Item were correlated with one another, there was a statistically significant positive relationship ($p > .05$). This would suggest that as the participant's scores on the depression measure increased, so did her scores on the item measuring overall physical and emotional

functioning (Spearman Rho Correlation Coefficient = .410; Pearson r Correlation Coefficient = .315). There was not a statistically significant relationship between the participant's scores on the depression measure and her performance in rehabilitation (Spearman Rho Correlation Coefficient = .001; Pearson r Correlation Coefficient = .139). However, there was a statistically significant negative relationship between the participant's responses on the Self-Report Item and her performance in rehabilitation therapy (Spearman Rho Correlation Coefficient = -.806; $p > .001$; Pearson r Correlation Coefficient = -.771). This would appear to indicate that as the participant's performance in rehabilitation declined, her perception of overall level of physical and emotional functioning improved.

Summary and Interpretation of Findings

When considered as a whole, it is also worth noting that there was a clear drop in depressive symptoms from the last point in phase A to the first point in phase B. This is likely due to the participant's stated concerns over going back home and her worries that she would be a burden on her children. In phone conversations following the participant's discharge, however, she stated that she was adjusting well to living with her daughter and that she felt supported. It is also interesting to note that the participant's level of depressive symptoms increased at a steeper rate in phase B than in phase A. It is hypothesized that this could partly be due to the participant's stated concerns about becoming a nuisance to her family after she had been discharged.

Another interesting finding from the data is the relationship between the participant's performance in rehabilitation, the responses to the Self-Report Item, and

her level of depression. The results indicate that there was a statistically significant negative relationship between her performance in rehabilitation and her responses on the Self-Report Item. Although this is counterintuitive, it does make sense for this individual participant because of information gathered from the rehabilitation staff. It was noted that the participant did not like rehabilitation and would often refuse the services, resulting in a lower rating in rehabilitation.

However, this decreased participation in rehabilitation increased her overall perception of physical and emotional functioning because she was not forced to do something that she did not enjoy. In other words, in her own way she was able to do the things she wanted to do, which mainly consisted of staying in her room watching television or reading a book. This also could possibly explain the positive correlation and similar pattern of trajectory in the participant's responses to the depression rating scale and the Self-Report Item. This relationship would suggest that although she felt that she was feeling better physically and emotionally, these same behaviors were perpetuating her depressive symptoms. This relationship between these variables would lead to an increase in both and the observed positive correlation.

**Participant S2 Case Study Summary**

Relevant Background History

The participant is a 69 year-old African American female who was initially admitted to the unit after demonstrating exaggerated left-side weakness in June 2003. A computed tomography (CT) scan was performed and indicated an acute right middle

cerebral artery distribution cerebrovascular accident. She had a significant medical history including diagnoses of hemiplegia, diabetes mellitus, hypertension, and obesity.

Prior to the recent hospitalization, the participant lived alone in a single level home in Caldwell. She was able to function and care for herself satisfactorily, but her daughter had been given power of attorney due to the participant's increasing age and declining health. She described a very supportive family system, complete with her seven children and thirty grandchildren. She had many visitors during her stay on the rehabilitation unit and it was rare to see her without a close family member nearby. Her interactions with these individuals were positive, and she interacted with them well. Her records would also indicate that while she was on the unit, she was checked out by family members almost every weekend so that she could travel to Caldwell and attend her regular church. The participant reported that she had been a housewife for the majority of her life and her main task was caring for her children. She had been married to the same man for fifty years, until he passed away seven years ago after being diagnosed with cancer. The participant described a happy life, mainly due to her involvement with her children. She was very cooperative during the majority of the sessions, and appeared upbeat the majority of the time.

St. Joseph's Rehabilitation and Medical Progress

During the participant's stay on the rehabilitation unit, she was very involved in therapy sessions and cooperated well with the nursing and rehabilitation staff. In conversations with the family, they did state that they had noticed that she had been quieter since her recent stroke and that she was much more talkative and outgoing prior

to the incident. The rehabilitation staff also noticed that the participant was very quiet during the beginning of her stay on the unit, but that she became more talkative and interacted more with staff as time progressed. Towards the end of her stay, the rehabilitation and nursing staff stated that they saw more of her personality come out during therapy and group work. The reported that she became more involved in discussions that occurred in therapy and that she would often joke with the other residents.

The participant was very willing to participate in the current study, but sometimes withdrew from the questions. If she did not feel like participating during a particular day, she would sometimes close her eyes during the interview, as if she were falling asleep. When asked about this, the family members stated that in the past if she did not feel like doing something or talking with someone, she would pretend that she had fallen asleep and close her eyes and not respond. This behavior was only observed a few times during interviews, and overall the participant demonstrated good participation.

Discharge & Follow-up Information

The participant was discharged to her home after three weeks on the rehabilitation unit. One of her daughters had moved into her home with her, in order to assume caretaking responsibilities and make sure the adjustment went smoothly for the participant. Upon telephone follow-up, the participant reported that she had been having some difficulty with her adjustment back home, mainly due to the difficulty she experienced in attempting to maneuver herself within her home. This frustration is reflected in the participant's early scores on the GDS after returning home. Family

members reported that she had been doing well and that her mood had improved significantly since she had been home. She was observed to be more talkative and energetic since returning home. This pattern continued as time progressed, and the family was very impressed with the advancements that she had made in outpatient rehabilitation. The participant's family was very supportive during the follow-up phone conversations and there were always several relatives visiting when the researchers contacted her.

Overall Clinical Impressions

The participant was mainly observed to be very cooperative during the interview sessions and appeared to respond well to the rehabilitation and discharge process. It was very apparent that the participant had a very supportive family and that they were an integral component in her progression post-stroke. The participant was also observed to increasingly become more open during her stay on the rehabilitation unit, and this continued through her discharge home.

Statistical Analysis

The participant's responses on the Geriatric Depression Scale (GDS) would suggest that she did not experience a clinically significant level of depressive symptoms during the course of the study. It is worth noting, however, that there was a large increase in depressive symptoms immediately following discharge from the rehabilitation unit, but this would not be considered clinically significant (see Figure 15). There was no statistically significant difference in the change in slope when the trend for the overall data set was compared to that of phase B only (Beta Weight = -0.240; $Eta^2$ =

.049). As is evident from the graph, there was a similar downward trend across the entire data set.

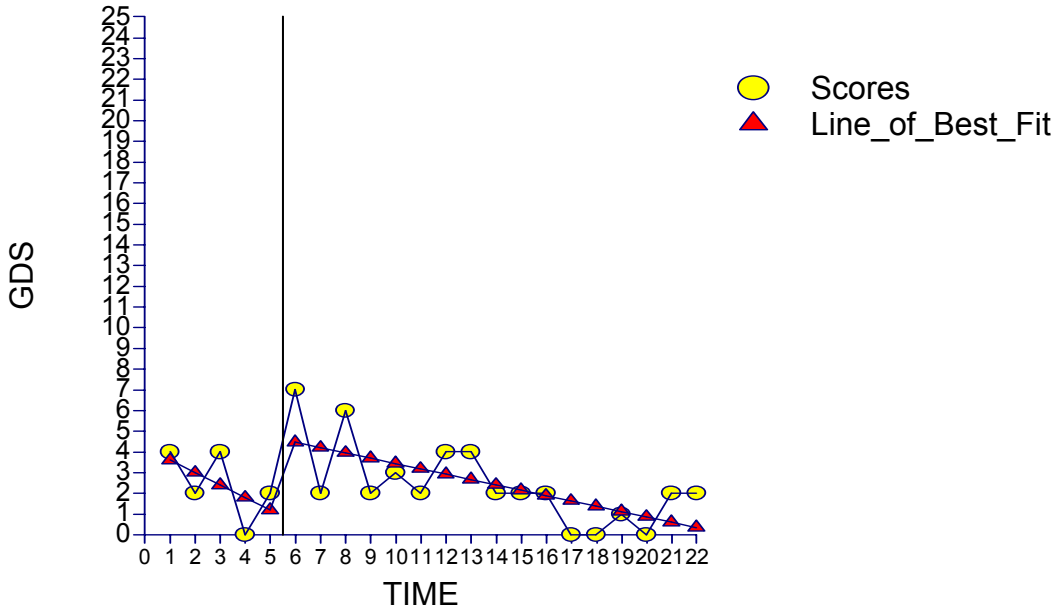


*Figure 15*. Analysis of Depressive Symptoms – Participant S2

Due to the fact that the variable did not have a statistically significant impact on the analysis, the variable was removed from the analysis of the phase variable. There was a statistically significant difference between the overall average of depressive symptoms when phase A was compared to phase B (Beta Weight = 2.933; $Eta^2$ = .273). This finding would suggest that there was a small decrease in the level of depressive symptoms from phase A to phase B (t-statistic = 2.669; p>.01). The participant's responses were somewhat stable across both phases, but there was some significant fluctuations as evidenced by the small measure of fit for the trend line ($Eta^2$ = .442).

The participant's responses on the Self-Report Item demonstrated a significant upward trend during phase A, but leveled out in phase B (see Figure 16). This was mainly due to the fact that at the end of phase A and at every administration of phase B, the participant responded with an answer of "10". As a result, the statistical analysis appears to be somewhat misleading. The analysis of overall change across phases indicated that there was a statistically significant increase in perceived level of physical and emotional functioning from phase A to phase B (Beta Weight = -6.809; t-statistic = -3.258; $p > .004$; $Eta^2 = .371$). It is also worth noting that the analysis found a statistically significant difference when the overall slope was compared to that in phase B only (t-statistic = 3.825; $p > .001$).

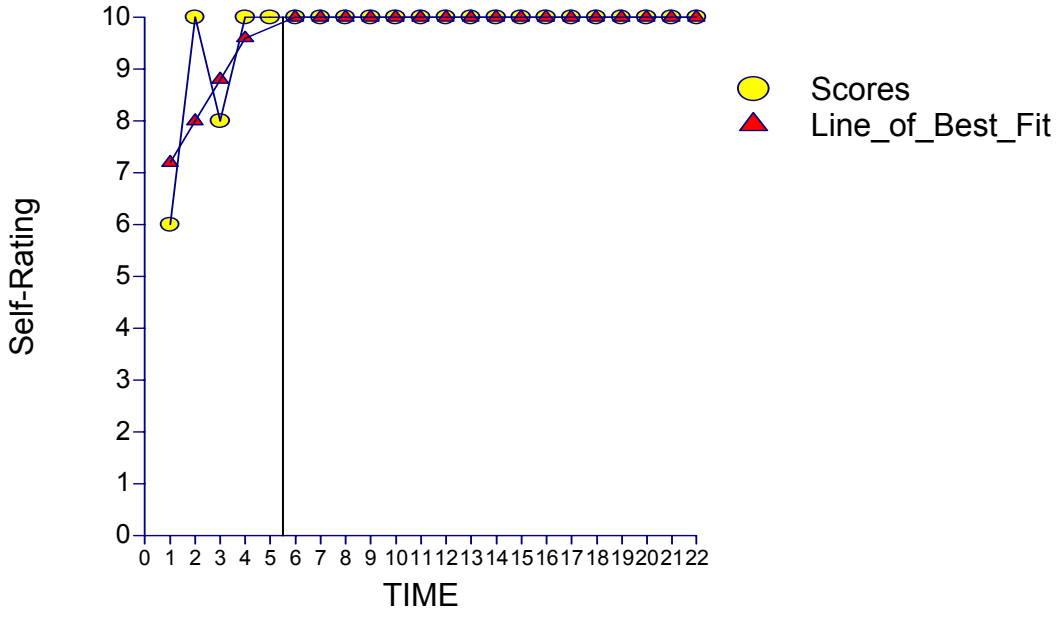


*Figure 16*. Analysis of Self-Rating Item – Participant S2

The overall change in the slope was exhibited by the slope coefficient for this analysis (Beta Weight = 0.398; $Eta^2$ = .448). This is misleading because although there was a statistically significant change in the slope, all of the participant's answers in phase B were at the highest level. Because of this, there was no possibility of an upward trend because the participant answered each time that she was at a level of "10". It should also be noted that the participant's pattern of responses was stable across time and this was reflected in the trend line fit statistic ($Eta^2$ = .620).

There was a small negative correlation between the participant's responses on the Geriatric Depression Scale and the Self-Rating Item (Spearman Rho Correlation Coefficient = -0.368; Pearson r Correlation Coefficient = -.264). This finding, however, was not statistically significant. There was also a small negative correlation between the participant's responses on the Geriatric Depression Scale and her performance in rehabilitation therapy (Spearman Rho Correlation Coefficient = -0.406; Pearson r Correlation Coefficient = -.428). This finding also did not reach statistical significance. Finally, there was a small positive correlation between the participant's responses on the Self-Report Item and her performance in rehabilitation (Spearman Rho Correlation Coefficient = .574; Pearson r Correlation Coefficient = .704). Although this finding did not reach statistical significance, it would suggest that as performance in rehabilitation improved, so did the participant's rating of overall emotional and physical functioning.

Summary and Interpretation of Findings

When considered as a whole, the results of the data for this individual participant would suggest that her depressive scores had a downward trend across both phases, with

a slight increase immediately following discharge. This finding was congruent with the participant's report that she was having difficulty adjusting back to her home environment because her daughter moved in and it was a significant change for her. She had previously lived alone and was more accustomed to that style of life. It should also be noted that the participant's responses to the Self-Report Item should be interpreted with caution due to a possible bias to overreport her level of well-being. When her children were asked about this, they reported that she was normally reluctant to complain about herself and her level of functioning and preferred to "put up a front" that everything was fine when asked by others.

**Participant S3 Case Study Summary**

Relevant Background History

The participant is an 88 year-old Caucasian widowed female, who was admitted to the skilled rehabilitation unit in July 2003. She presented with extreme right side weakness and complaints of dizziness. She was transferred to the rehabilitation unit after a brief stay at Scott & White Hospital Acute care in Temple, TX. She was treated at the hospital for severe chest pains, but she declined surgery or any aggressive treatment at this time for her medical concerns. After she was stabilized at Scott & White Hospital, she was transferred to the skilled rehabilitation unit at St. Joseph's. She had a significant medical history that was positive for hypertension, congestive heart failure, hyperlipidemia, osteoporosis, and stress urinary incontinence.

Prior to her admission to the skilled rehabilitation unit, the participant was residing in an apartment located in an assisted living facility. She was independent in

her daily functioning and used a scooter for increased mobility. She has been widowed since 1999, when her husband passed away suddenly after a heart attack. She described a good relationship with her husband and stated that they were very supportive of one another. She and her husband had only one child, a son who remains very involved in her care. She was employed as a school nurses' aid at a junior high school in Texas for the majority of her life. She described a strong social network of friends and she remains very involved in her church.

St. Joseph's Rehabilitation and Medical Progress

The participant presented with severe medical concerns that often limited her ability to participate in therapy services through the unit. She would often refuse therapy due to the fact that she was ill and did not feel up to the task. The participant also demonstrated a very worried and depressed mood during interviews and data collection. Although the interactions with the participant were pleasant, she seemed to be noticeably concerned about how she was progressing physically and often appeared overwhelmed by the issues she was confronted with. She slept for the majority of the day during her rehabilitation stay, but enjoyed watching religious programs and talking with family and friends on the telephone. Prior to her discharge, the participant stated that she was somewhat nervous about living in the new setting, but that she felt confident that she would be able to adapt well.

Discharge & Follow-up Information

Due to the participant's problematic medical status, she was discharged to a nursing home facility that was able to address these issues appropriately. During the

follow-up interview in the nursing home, the participant stated that the facility she was currently in was much different from the rehabilitation at St. Joseph's. She reported that she did not feel as though the nursing staff was as attentive to her individual needs and that she felt as though she had to be more independent in her daily functioning. She also stated that she did not feel as though she was given the opportunity to make as many choices concerning her activities in her current setting as she was provided with at St. Joseph's. Overall, the participant did express an increase in depressed symptoms during this period, which would largely appear to be due to the drastic change in her environment. The participant did, however, state that she was feeling better physically and that she was continuing with her rehabilitation treatment in the nursing home. She also reported that her family had been to visit her frequently and that she felt very supported by them.

Overall Clinical Impressions

The participant's progression through the rehabilitation and discharge phase of treatment was severely complicated by the numerous medical problems and the difficulty she demonstrated in adjusting to the changing surroundings. The participant's attitude fluctuated severely throughout data collection, often mediated by her level of functioning in rehabilitation therapy and her current medical status. The participant also appeared at times to use the physical complaints that she had to limit her participation in activities that she disliked. This was particularly noticed in the area of rehabilitation, where the participant often noted that she would prefer to stay in her room and watch her television programs, rather than take part in therapy. She was not observed to be

resistant to therapy sessions or interactions with nursing staff, but there did appear to be a significant correlation between her complaints regarding physical functioning and her participation in rehabilitation therapy.

Statistical Analysis

The participant's responses to the Geriatric Depression Scale (GDS) would suggest that she experienced a clinically significant level of depression throughout the course of the study (see Figure 17).

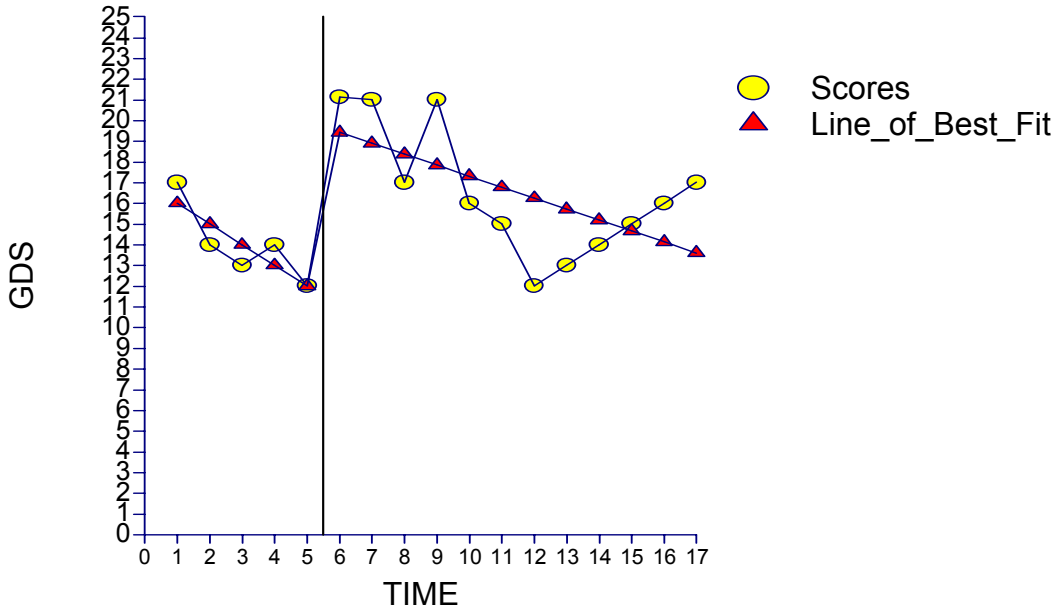


*Figure 17*. Analysis of Depressive Symptoms – Participant S3

When her responses were analyzed statistically, the results indicated that there was not a statistically significant change in the slope of the trend line for the overall data set when compared with that of phase B only (Beta Weight = -0.235; $Eta^2 = .029$). This

variable was removed from the analysis that was conducted for the phase variable in order to ensure proper representation of the data. The results showed that there was a statistically significant change in average level of depressive symptoms across phases (t-statistic = 3.685; p>.002). Upon visual analysis, it is clear that there was a significant upward shift in average level of depressive symptoms across phases (Beta Weight = 7.272; $Eta^2$ = .492). It is also worth noting that upon visual analysis of the graph, there was a noticeable downward trend in her responses. It was also interesting that there was a large increase from the last data point in phase A to the first data point in phase B. This was congruent with information that was gathered during the follow-up interviews that suggested she had difficulty adjusting to her new placement in an intensive care setting. There was some fluctuation in the participant's answers across time, and this was reflected in the statistic measuring trend fit ($Eta^2$ = .789).

The participant's responses regarding her overall level of physical and emotional functioning demonstrated a similar pattern (see Figure 18). There was a statistically significant difference between the slopes of the trend for the overall data set and for that of phase B only (t-statistic = -4.487; p > .001; Beta Weight = -0.536; $Eta^2$ = .608). This is also reflected in the graph where there is a clear change in direction of her responses. During phase A, it appears as though the participant's report of overall functioning was declining, but following discharge her perception of her functioning changed and took a noticeable upward trend. Despite these significant changes, there was no statistically significant change between phases. It is also worth noting that there was a significant drop from the last data point in phase A to the first data point in phase B. This would

support the previous finding that the participant had a difficult time adjusting to her surroundings in the intensive care setting.

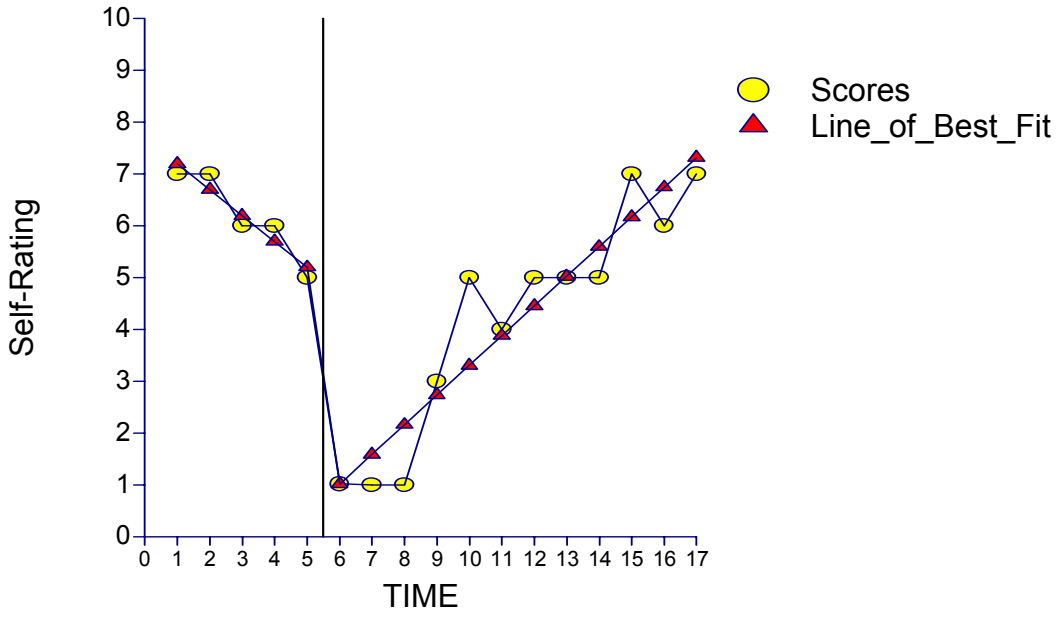


*Figure 18*. Analysis of Self-Rating Item – Participant S3

There was a small negative correlation between the participant's responses on the GDS and the Self-Report Item, but this finding did not reach statistical significance (Spearman Rho Correlation Coefficient = -.321; Pearson r Correlation Coefficient = -.610). However, after examining the graphs, it is clear that as depression ratings decreased, her reports of overall level of functioning increased. There was a statistically significant negative relationship between the participant's scores on the GDS and her performance in rehabilitation therapy (Spearman Rho Correlation Coefficient = -.975; Pearson r Correlation Coefficient = -.877). This would indicate that as her performance

in physical therapy improved, her overall level of depressive symptoms decreased. Finally, there was also a statistically significant negative correlation between the participant's responses on the Self-Report Item and her performance in physical therapy (Spearman Rho Correlation Coefficient = -.949; Pearson r Correlation Coefficient = -.937). This would suggest that as the participant's report of overall level of physical and emotional functioning declined during phase A, her performance in rehabilitation improved.

Summary and Interpretation of Findings

When considered as a whole, the information gathered from the participant would suggest that her responses on both the GDS and the Self-Report item decreased while she was on the rehabilitation unit. Although this appears as though it is counterintuitive, it does make sense when considered in conjunction with the qualitative information that was gathered. The participant stated several times during the course of the study that she did not enjoy the therapy portion of her rehabilitation, primarily because she did not like the physical exertion that was required. In several conversations with the nursing and rehabilitation therapists, it was reported that the participant declined to participate in rehabilitation and was very negative about the possibility of regaining her previous level of physical functioning. In a review of the participant's chart history, it indicated that she had a significant history of medical problems and had assumed a stance that was very passive in treatment. This appears to have continued through her stay on the rehabilitation unit and after discharge to the intensive care setting, which is

reflected in the negative correlations between her performance in rehabilitation therapy and her perception of overall physical and emotional functioning.

It is also interesting that on both the GDS and the Self-Report Item that was administered, there was a significant change in both immediately following discharge from the rehabilitation unit. Both findings would suggest that the participant had difficulty adjusting to her new environment and suffered negative emotions because of the change. Despite this initial finding, the participant did respond positively to the treatment that was administered and both measures showed positive improvement after the initial fluctuation following discharge from the rehabilitation unit.

**Participant A1 Case Study Summary**

Relevant Background History

The participant is a 70-year-old, African American male, who was first admitted to the Rehabilitation Unit in March 2003. The participant reported that he initially noticed left side weakness and light-headedness a few days prior to his admission to the unit, while he was working on the roof of his home. Upon admission to the unit, he was given an MRI and the results indicated a cerebrovascular accident in the right middle cerebral artery.

A review of the participant's records show that he has a history of hyperlipidemia and tobacco abuse. He stated that he smoked about a pack a week for approximately 30 years before he decided to quit. The participant reported that his family medical history is negative for strokes, but that his father died of a heart attack approximately 30 years ago. The participant described a good relationship with his family and stated that he

remains very close to his siblings and extended family. He did not talk much about his relationships with his parents, only stating that they were supportive of him in his endeavors and that he felt as though he was fortunate to grow up in a very loving household.

The participant has been married for approximately 35 years to the same woman, who is a retired schoolteacher. The participant's wife came to visit several times and the observed interactions between the couple appeared to be very warm and constructive. The participant and his wife do not have any children, and when asked about this he stated that this was something that he does regret. He is currently employed as a minister at a small Baptist church. The participant was very open about his faith and talked at great lengths about how his relationship with God had been a source of great strength for him during his current medical problems. He stated that one of his main goals was to return to preaching as soon as possible and he used this as a main motivating factor during his recovery.

St. Joseph's Rehabilitation and Medical Progress

The participant was active in the rehabilitation process and seemed very motivated to make as much progress as possible during his inpatient stay. He was observed to be very cooperative with the nursing and rehabilitation staff, and was very talkative during many of his sessions. Conversations with the nurses and rehabilitation staff would also appear to suggest that the participant had a positive outlook on the recovery process and worked hard during sessions. The participant's medical doctor did report that the participant was having difficulty sleeping and was also experiencing some

problems with feelings of anxiety and worry. When the participant was asked about this, he stated that he had problems with this issue prior to his stroke, but that since the stroke the feelings of worry had increased. He stated that he felt as though this was mainly due to the severe changes that had occurred in his life and the fact that it was going to be a difficult adjustment to his new level of functioning.

Discharge & Follow-up Information

The participant was discharged to his home, under the care and supervision of his spouse. In follow – up conversations with the participant and his wife, it was clear that the participant was glad to be home but that the situation provided several problems. The participant reported difficulty navigating through his home in his wheelchair and stated that he also experienced problems with transfers from his wheelchair to other areas (couch, chair, bed). The participant did report that many of his friends and extended family members had been by to visit and this had made the adjustment process easier. He also reported that he been able to attend his church again regularly and this had helped to improve his mood since returning. He stated that he had been resting better since his return home and he attributed this to being in a familiar surrounding without the many distractions that were present on the rehabilitation unit. Participant also described several projects that he had begun since returning home and that this had helped to "keep him busy" and made him feel as though he was useful around his home.

Overall Clinical Impressions

The participant was somewhat hesitant to participate in the current study initially, but became very cooperative and open as the data collection process progressed. He

would often ask detailed questions about the process of the study and what the goal of the research was, as well as emphatically denying that he was experiencing any mood problems after his stroke. He was observed to be very sensitive to the questionnaire, often asking for clarification on the questions and being somewhat resistant to provide a solid answer, preferring to talk about situation specific occurrences rather than give responses reflecting global feelings.

Statistical Analysis

The participant's responses on the Geriatric Depression Scale (GDS) demonstrated a statistically significant difference in the amount of slope between the trend for the overall data set and that for phase B only (t-statistic = -6.769; $p > .01$; Beta Weight = -1.067; $Eta^2 = .729$). It is also clear on visual analysis that the participant's level of depressive symptoms was decreasing rapidly while he was on the rehabilitation unit, but this rate of decline slowed following his discharge (see Figure 19). This finding was also apparent during the interviews with the participant following his discharge when he mentioned several times the problems he was experiencing and how he was managing these issues with the help of his wife. He reported that he was very happy to be home, but there were some understandable adjustments that had to be made following his return. These mostly included his ability to maneuver around his home and his inability to be as active as he was prior to his stroke. However, his ability to function at home improved significantly over the course of the study from his own report.

This is also reflected in the steady decline of the reported depressive symptoms across phase B. It should be noted, however, that the initial level of depressive

symptoms that is present in the graph could be due to the significant period of adjustment that many individuals experience following a stroke. As the participant became more adjusted to his situation, it is possible that his ability to cope with these issues improved and that is reflected in the trend of the data set.

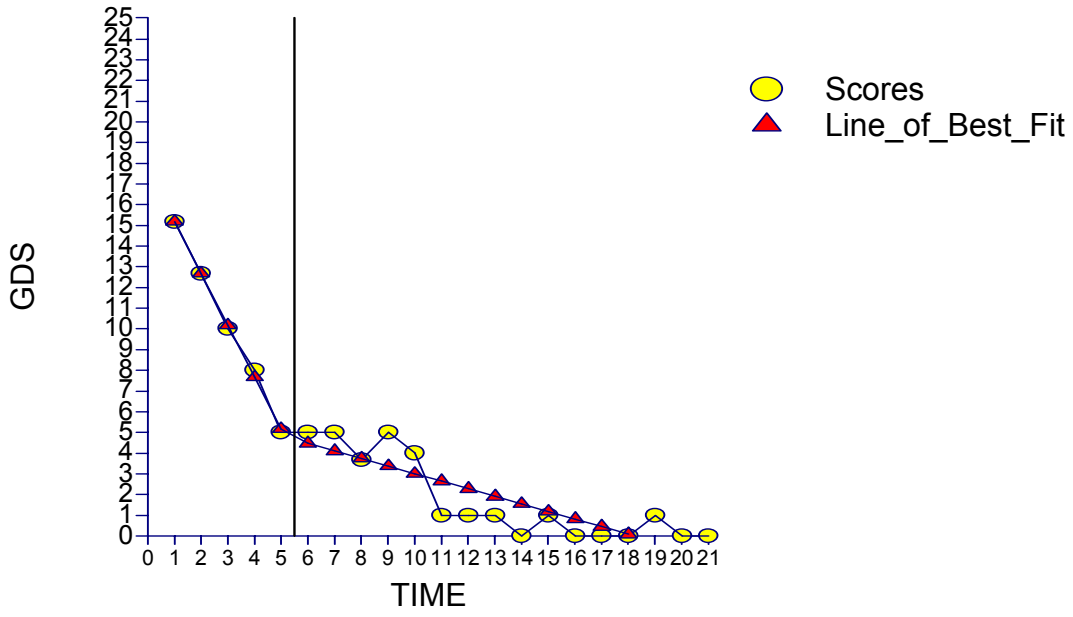


*Figure 19*. Analysis of Depressive Symptoms – Participant A1

The overall level of depressive symptoms also decreased significantly from phase A to phase B (t-statistic = 5.394; p>.001; Beta Weight = 17.813; $Eta^2$ = .631). This is congruent with the information that was presented earlier that although the patient experienced some difficulty adjusting back to his home setting, he experienced a significant decline in the overall level of depressive symptoms. The participant's

responses were also observed to be stable across both phases, resulting in a high fit statistic for the trend line ($Eta^2$ = .958).

The participant's responses to the Self-Rating Item also provided valuable information related to his rate of recovery across both phases (see Figure 20). There was a statistically significant change in the slope when the trend line for the overall data set was compared to that of phase B only (t-statistic = 2.594; p > .01; Beta Weight = .199; $Eta^2$ = .284). The participant's responses had a very significant upward trend while he was on the rehabilitation unit, and while this trend continued through phase B, it did not retain this slope.

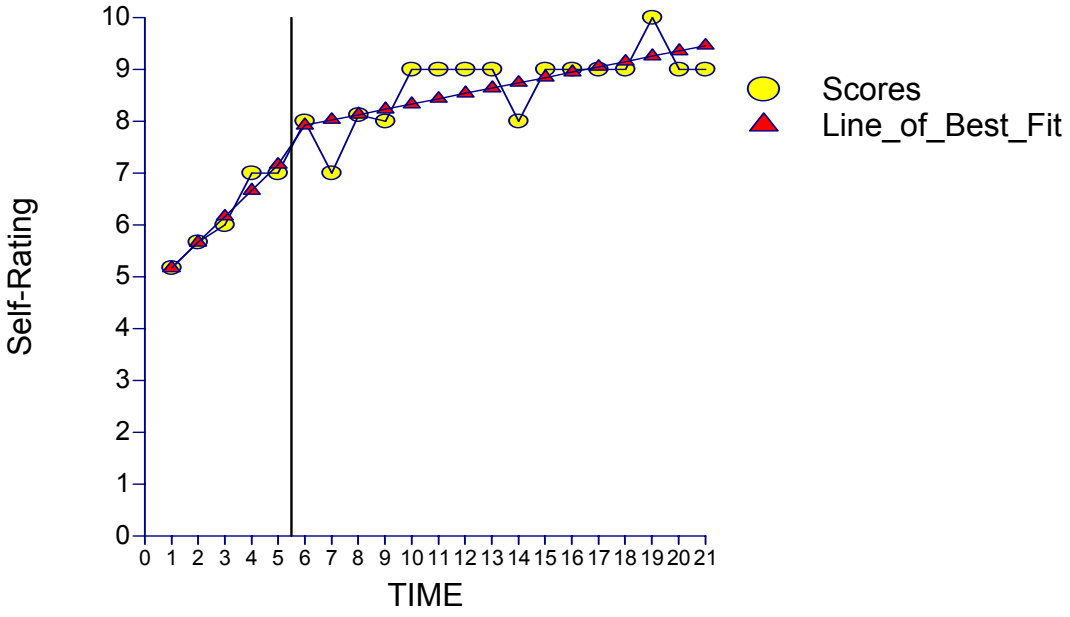


*Figure 20*. Analysis of Self-Rating Item – Participant A1

There was a significant decrease in the slope of the phase B trend line, when compared to the overall trend line. Although there was an observable change in the participant's overall level of emotional and physical functioning across phases, this difference was not statistically significant (Beta Weight = -2.721; $Eta^2$ = .145). The participant's responses were stable across time, resulting in a high effect size for the trend line fit statistic ($Eta^2$ = .887).

The participant's responses on the GDS and the Self-Rating Item exhibited a strong negative correlation (Spearman Rho Correlation Coefficient = -0.792; Pearson r Correlation Coefficient = -.922), which was statistically significant ($p > .01$). This finding, along with the graphical information collected, indicates that as the participant's report of depressive symptoms decreased, his overall rating of physical and emotional functioning increased. This relationship was further expounded upon by the statistically significant negative correlation ($p > .001$) between the participant's scores on the GDS and his performance in rehabilitation (Spearman Rho Correlation Coefficient = -1.00; Pearson r Correlation Coefficient = -.937). This finding indicates that as the participant's depressive symptoms decreased, his performance in physical therapy increased. This was also reflected in reports from the rehabilitation and nursing staff, who reported that the participant was very involved in the rehabilitation program and that he would often go the rehabilitation facility and continue to work on his exercises by himself. There was also a statistically significant positive correlation ($p > .01$) between the participant's scores on the Self-Rating Item and his performance in rehabilitation (Spearman Rho Correlation Coefficient = .975; Pearson r Correlation Coefficient =

.902). Once again, it would appear that as the participant made improvements in his physical level of functioning, his overall perception of physical and emotional functioning improved as well.

Summary and Interpretation of Findings

When considered as a whole, this participant's collective data would appear to reflect the close relationship between his physical recovery and his psychological well-being. This is most reflected in the fact that as the participant continued to make physical progress throughout the course of the study, his level of reported depressive symptoms decreased and his overall perception of his physical and emotional functioning increased. The trajectory of the participant's responses on the GDS and the Self-Report Item are also worthy of notice. It was clear that there was a statistically change in the trajectory of both, with the participant making more significant gains while he was on the rehabilitation unit. However, after discharge these trends both slowed, although they continued to move in the desired direction. This would appear to provide more support for the close relationship between physical and psychological functioning, given the fact that the participant was not able to make as significant of improvements following his discharge because the intensive level of rehabilitation therapy that he was receiving on the unit was not available after he was discharged home.

**Participant H1 Case Study Summary**

Relevant Background History

The participant is a married 73-year-old Caucasian female who was first admitted to the Rehabilitation Unit in April 2003 for noticeable right-sided weakness, dizziness,

and slurring of speech. Upon her admission, she was given a MRI and the resulting diagnosis was that of a probable left brain stem CVA. An electrocardiogram of her head showed that there were no other current bleeds. She does have a previous history of tobacco abuse, during which she smoked approximately a pack of cigarettes a day for 10 years. Her father died secondary to surgical complications when he was in his late 50's. She stated that he passed away shortly after undergoing an operation on his heart. She described a good relationship with him and stated that she was about 35 years old when he passed away. She reported that her mother passed away shortly after her father died. Her mother suffered from bouts of depression periodically throughout her life, and as a result the participant stated that she always felt that her mother was somewhat distant and withdrawn from her. She reported that she has received medication for depressive symptoms previously, but denied any current depressive symptoms, nor did she report any prior to her stroke.

The participant has been married for 43 years to her current husband, who is a retired engineer who was previously employed at NASA in Houston. The observed interactions between she and her husband were very warm and constructive. It appeared that they were very close with one another and were supportive in their relationship. They remained very active in their lives, enjoying such hobbies as flying, gardening, and receiving training as certified food tasters. The participant was employed as a 2$^{nd}$ grade teacher for most of her early life, but that she began teaching English classes at a local college later. She worked for approximately 10 years at the local college and reported that she enjoyed it very much. When asked what she enjoyed the most, she stated that

she liked the interactions with the students and she enjoyed the idea of making a difference in someone's life through education. She stated that she has three children, one living in the Bryan / College Station area, and the others living out of state. She stated that they visit often, but also reported that "they have their own lives to live."

St. Joseph's Rehabilitation and Medical Progress

The participant was active in the rehabilitation process, but at times she appeared to be frustrated with the time it took to fulfill the rehabilitation requirements. During some conversations, it appeared that she was frustrated with the fact that there were so many demands placed on her time by the rehabilitation and medical team. She often stated that she would like to rest more in order to regain her energy, but the rehabilitation team did not allow this as much as she would have preferred. Interviews with the rehabilitation staff suggested that she was cooperative with the treatments that were given, but that she sometimes lacked putting forth enough effort in order to reap the full benefits of the rehabilitation treatment. At times, the rehabilitation therapists would state that she was difficult to motivate about the treatments and that she would become resistant if she did not feel like participating at the time. Despite these issues, the participant made good physical progress while on the rehabilitation unit.

Discharge & Follow-up Information

The participant was discharged to her previous independent home setting, under the supervision of her husband. In follow-up conversations with her, she stated that she had some difficulty adjusting back to living at home due to her physical limitations. She stated that her husband was very helpful in managing her physical problems, but that this

was also a big adjustment for her because she was very independent in her daily activities prior to the stroke. The adjustment was also very stressful for her husband, as he reported in several phone conversations after discharge. He stated that he found himself very busy in taking care of the majority of the household duties, as well as fulfilling the role of primary caretaker for his wife.

Overall Clinical Impressions

The participant was mainly cooperative during the data gathering process and was talkative and responsive during most of the sessions that were held on the rehabilitation unit and in follow-up, but she also was resistive at times as well. She would often answer the questions that were asked of her in a short manner, and would sometimes portray the process as being an inconvenience to her and her husband. Her husband was also cooperative during the process, but he would not hesitate to communicate to the primary investigator if it was not a good time for them or if he or his wife did not feel like participating at that time. He was very protective of his wife during some of the sessions, often answering questions for her and sometimes downplaying any difficulties that she was experiencing.

The participant discontinued the data gathering process after several follow-up phone calls, stating that she did not want to participate anymore and would rather focus on “getting on with her life.” The participant's husband was very involved in his wife’s rehabilitation and treatment while she was located on the unit, often attending therapy sessions and speaking with nurses and doctors. He would visit the rehabilitation unit everyday and would eat lunch with his wife on the unit frequently. Despite these

demands on his time, he maintained many of his outside interests and activities. He continued to be very active in the Lion's Club and visiting many of his friends while his wife was on the unit. At times, he did appear frustrated with the situation and his wife's limitations, but it was never demonstrated openly to his wife.

Statistical Analysis

The participant's responses on the Geriatric Depression Scale (GDS) would suggest that there was not a statistically significant change between levels of depression in phase A and phase B (Beta Weight = 2.236; $Eta^2$ = .036) (see Figure 21).

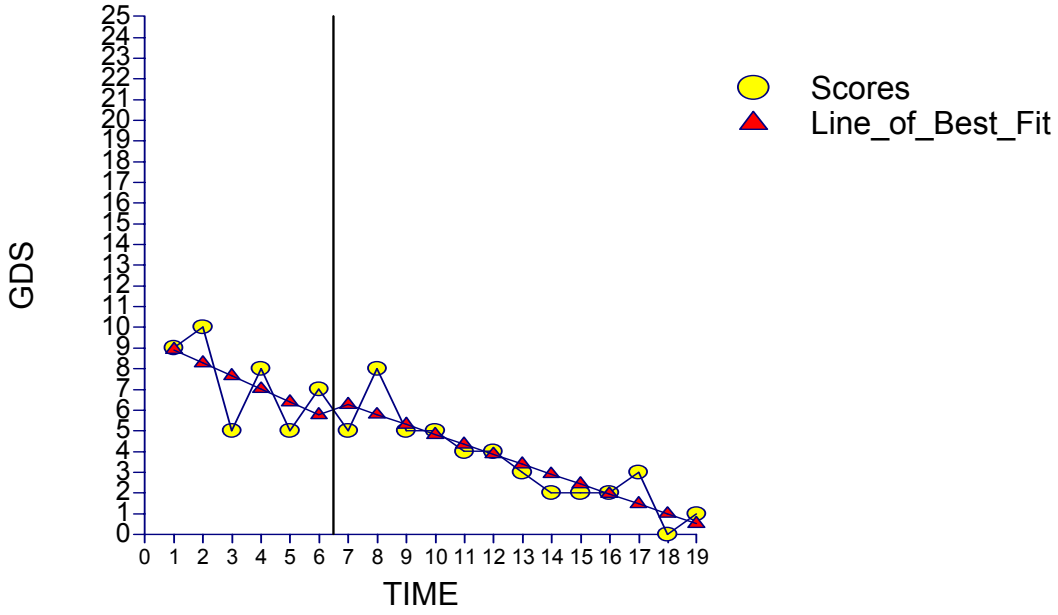


*Figure 21*. Analysis of Depressive Symptoms – Participant H1

The results were also not indicative of a statistically significant change in slope when the overall trend of the data was compared with that of phase B only (Beta Weight

= -0.09; $Eta^2$ = .020). However, upon visual analysis of the results, there was a steady trend downwards across both phases and this trend was maintained throughout the course of the study. Also, the level of depressive symptoms remained below the clinically significant cut off level as designated by the GDS, suggesting that the participant was able to maintain a normal level of symptoms throughout the study. There were some slight fluctuations during the transition period from phase A to phase B, which could be suggestive of some adjustment following discharge. Despite these changes, the findings would not be considered statistically significant because of their mild nature. The participant's responses were stable over time, as demonstrated by the statistic measuring trend line fit ($Eta^2$ = .814).

The participant's responses to the overall measure of physical and emotional functioning also provided some interesting information (see Figure 22). Specifically, there was a statistically significant increase in the participant's perception of physical and emotional functioning from phase A to phase B (Beta Weight = -5.004; t-statistic = -3.465; p > .003; $Eta^2$ = .445). This would appear to indicate that her overall level of functioning improved following her discharge home. Similar results were found in relation to the slope of the responses. There was a statistically significant drop in the slope of the participant's responses when the trend for the overall data set was compared to that of phase B only (Beta Weight = .394; t-statistic = 4.495; p > .001; $Eta^2$ = .574). Upon visual analysis, it becomes clear that there was a significant upward trend in her perception of physical and emotional well-being during phase A, but this trend decreased significantly following discharge from the rehabilitation unit. It also appears that the

participant's responses had a slight downward trend during phase B, suggesting a decline in overall physical and emotional functioning following discharge.

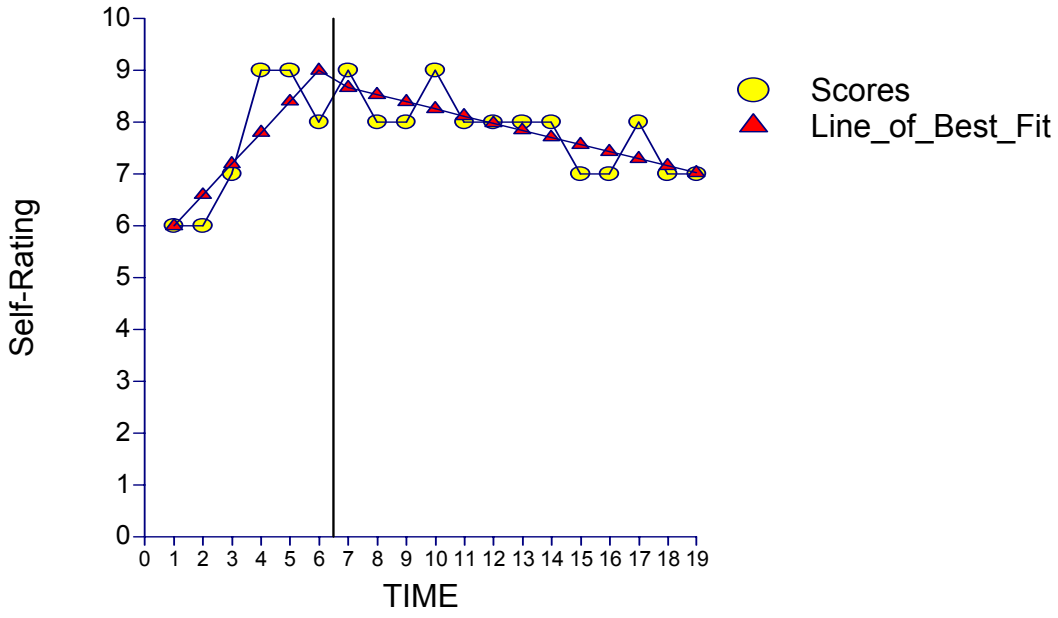


*Figure 22*. Analysis of Self-Rating Item – Participant H1

This was also reflected in information that was gathered during interviews with the participant's husband. He stated that she had not seemed as motivated to continue with rehabilitation during this phase and she seemed discouraged by the limited improvement in functioning during this period. This change of attitude could have been one possible explanation for the trend change in the participant's responses during this time. The participant's responses were stable across both phases of the study, resulting in a medium trend line fit statistic ($Eta^2 = .616$).

The participant's responses on the Geriatric Depression Scale and the Self-Report Item demonstrated a small positive correlation (Spearman Rho Correlation Coefficient = .151; Pearson r Correlation Coefficient = -.040), but this finding was not statistically significant. Further analysis also showed that there was a small negative correlation between the participant's scores on the GDS and her performance in physical therapy (Spearman Rho Correlation Coefficient = -.464; Pearson r Correlation Coefficient = -.277), but this finding was also not statistically significant. Finally, there was a statistically significant positive correlation between the participant's responses on the Self-Rating Item and her performance in rehabilitation therapy (Spearman Rho Correlation Coefficient = .794; Pearson r Correlation Coefficient = .617). This finding would suggest that as her performance in physical therapy improved in phase A, her perception of physical and emotional well-being also improved.

Summary and Interpretation of Findings

When considered as a whole, the participant's collective data would indicate that her level of depressive symptoms decreased throughout the course of the study, despite the fact that this pattern did not achieve statistical significance. It is also worthy to note that the trend for the participant's responses on the Self-Report Item declined significantly following discharge from the rehabilitation unit. This finding was supported in several reports from her husband that she had lost motivation after discharge from the rehabilitation unit and had become less active in her treatment. This could be a result of the limited gains that were being made during this period of time in

rehabilitation therapy. However, it is also important to consider that this pattern was not reflected in the participant's scores on the GDS.

**Participant S1 Case Study Summary**

Relevant Background History

The participant is an 82-year-old Caucasian female who was originally admitted to the inpatient rehabilitation unit in May 2003. A review of the case notes would indicate that the participant was admitted to the hospital after she noticed a sudden onset of right lower extremity weakness. A computed tomography (CT) scan was performed and showed cerebral cortical atrophy. She was subsequently diagnosed with a cerebrovascular accident in the left anterior cerebral artery distribution. The medical intake report indicated that the participant's history was negative for tobacco or alcohol abuse, although she did report enjoying an "occasional beer." She had undergone several surgeries in the past, including a lumbar laminectomy, an upper lobectomy after cancer had been discovered, and placement of a pacemaker due to atrial fibrillation.

Prior to her most recent admission to the inpatient rehabilitation unit, the participant stated that she lived alone in a single level home in Caldwell. She was ambulatory and had no difficulty managing her normal daily activities. She described a good support system, the primary caretaker being one of her grandchildren who lived close to her home in Caldwell. The participant reported some disagreements with her other grandchildren and stated that that she does not speak much with her own biological children. She stated that they all live close to her home in Caldwell, but that they "do not visit much because they are so busy." The participant is currently retired, having

worked most of her life as a secretary in Caldwell, TX. She stated that she had been married twice previously, the first ending in divorce shortly after they were married, and the second husband passing away fifteen years ago after being diagnosed with cancer. She described a good relationship with her second husband.

St. Joseph's Rehabilitation and Medical Progress

Upon her admission, the participant presented with some confusion and was very resistant to several of the nursing and rehabilitation staff. Her oppositional behavior at this time included denying treatment, accusing staff members of conspiring against her, and severe feelings of anxiety. Although this behavior continued through the first two days of the participant's stay on the unit, her demeanor changed dramatically after her medications became stabilized and she was able to adjust to her surroundings. At the researcher's first meeting with the participant, she was observed to be cognitively intact and aware of her surroundings. She was very cooperative and open during the initial interview and mentioned that she felt embarrassed because she had been so problematic on the previous two nights. Despite her early problems on the rehabilitation unit, she participated fully in the course of rehabilitation therapy and stated that she felt very "energized" from the treatments. She was observed to be very upbeat during the time she was on the unit, interacting well with the nurses and staff. The participant was scheduled to be discharged from the rehabilitation unit in late May 2003, but shared some mixed emotions about the issue leading up to her discharge. During some of the visits with the client, she stated that she was concerned about how she would be able to function physically after her discharge and if she would be able to care for herself. She

stated that she was also unsure if her grandchildren would be able to care for her in a way that would meet her needs, and yet not impose too much on their everyday life. The participant was discharged as scheduled and the observed interactions with her family during this process appeared to be largely positive and constructive.

Discharge & Follow-up Information

The participant was discharged home in late May 2003, and follow up phone interviews were conducted in order to monitor mood changes and level of functioning. During the first conversation, the participant stated that she was glad to be home and felt as though she was adjusting well back to her home environment. Throughout the first several follow-up calls, the participant stated that she had not stayed overnight by herself in her home and that family members had been present to help with any problems that had occurred. She stated that she had been continuing with her exercises that she had learned on the rehabilitation unit, even though her formal outpatient therapy program had not started yet. She noted a few minor sicknesses during the second week that she was home, but repeated that these were not disruptive in nature and that she felt as though she was steadily improving in her level of functioning. After the third week post-discharge, the participant's physical complaints increased during interviews and she described feeling more difficulty maneuvering around her home, and more difficulty sleeping. She stated that her relatives were no longer staying overnight and that she had been more anxious due to their departure.

The participant's scores on the depression inventory continued to increase during the fourth week post-discharge. She reported that she had been more frustrated recently

by her inability to manage her daily activities alone and that she had grown increasingly nervous and anxious about her health and her future. When asked about this, the participant did not feel as confident about her ability to manage herself alone and was concerned that she would be unable to continue to function in her home and she was upset about the possibility of having to move into a more intensive care facility. She stated that she no longer wanted to participate in the research study after the fourth week post-discharge. She stated that she did not feel as though this was helping her improve physically or mentally and she would no longer like to participate.

Overall Clinical Impressions

When considered as a whole, the participant was very cooperative and open during the assessment period. She was very talkative and appeared to enjoy the conversations that occurred. She was observed to be very social with the nurses and staff members at times, but was also very nervous and anxious throughout several of the interviews. She would often state that she was not sure how things would work out and displayed genuine concern over her level of functioning.

The participant also appeared to be easily overwhelmed by tasks, and would often request the help of staff to aid her in even the smallest duties such as changing the television channels or adjusting her bed. This aspect of the participant's personality could have been very troublesome when she was discharged home, given the level of independence that would be required to manage her own life. She appeared to be functioning well during the early stages of her discharge home, but after the initial intense supervision that was offered by her family members, her ability to manage her

own affairs appeared to decrease significantly. This decrease was accompanied by significant fluctuations in her reported level of depressive symptoms.

Statistical Analysis

The participant's responses on the Geriatric Depression Scale (GDS) would suggest that she was experiencing a very high level of depressive symptoms after she was initially transferred to the rehabilitation unit (see Figure 23).

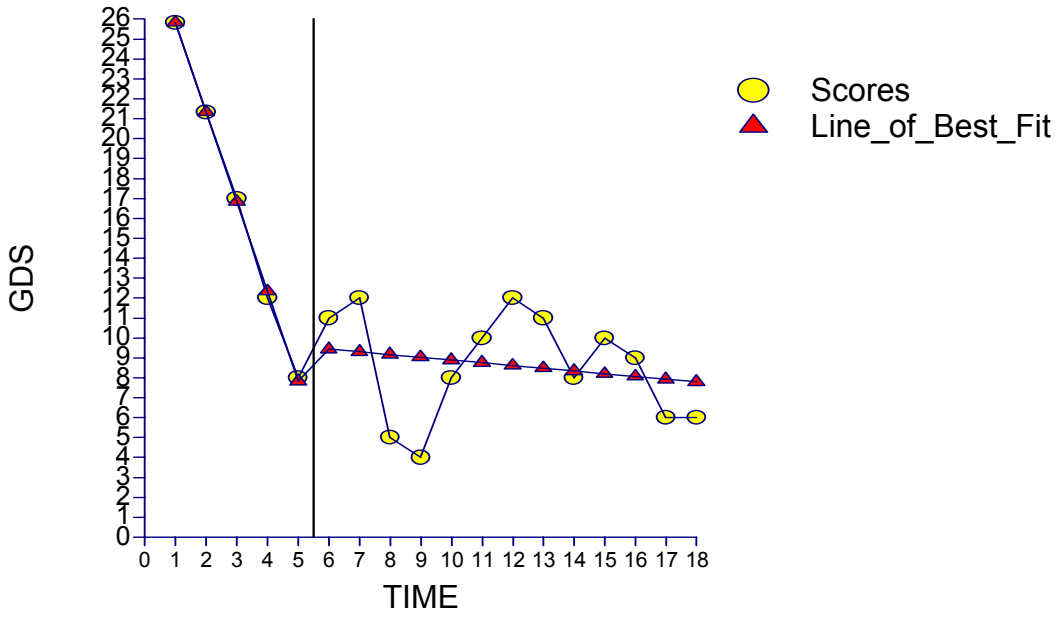


*Figure 23*. Analysis of Depressive Symptoms – Participant S1

These symptoms decreased dramatically over the first several measurement periods of her stay. There was a statistically significant change in the slope when the trend line for the overall data set was compared to that of phase B (t-statistic = -4.034; $p > .001$). This finding resulted in a significant increase in the Beta Weight, which was used to measure

the angle of the trend line for both phases (Beta Weight = -2.107; $Eta^2$ = .538). There was also a statistically significant decrease in the level of overall depressive symptoms from phase A to phase B (t-statistic = 3.252; p > .006). This decrease resulted in a large shift downward when the overall average of depressive symptoms was measured between phases (Beta Weight = 26.873; $Eta^2$ = .430). There was some observable fluctuations in the participant's response pattern, which is reflected in the fit statistic for the trend line ($Eta^2$ = .771).

The results from the Self-Report Item that was administered would suggest there were also some significant changes across the phases on the participant's perception of overall physical and emotional functioning (see Figure 24).

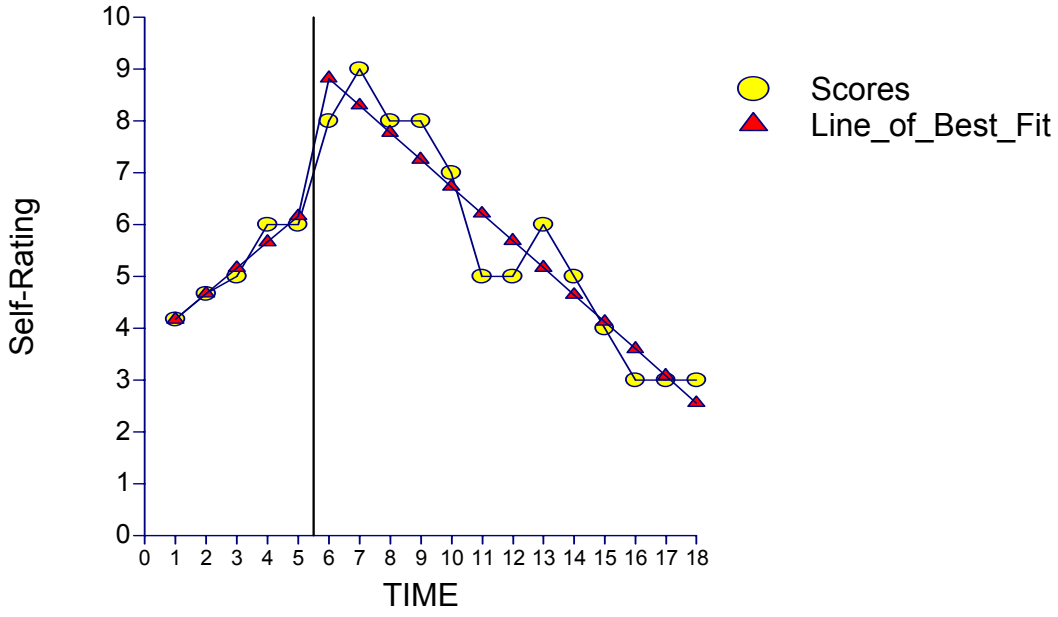


*Figure 24*. Analysis of Self-Rating Item – Participant S1

This is reflected first in the statistically significant change in the slope when the overall trend line was compared to that of phase B only (t-statistic = 5.320; $p > .05$). Upon visual analysis, it is clear that there was a steady increase in the participant's self-report of global functioning, but upon discharge it shifted and took on a significant downward trend resulting in a change of slope (Beta Weight = 0.565; $Eta^2 = .669$).

Another noticeable feature of the graph is the definite shift upwards from the last point in phase A to the first point in phase B. This change is congruent with the participant's report that initially she was very glad to be home, but after several weeks time she began to have an increasing number of arguments with her family members and felt as though they resented the tasks required in her care. There was also a statistically significant overall change between phases with the Self-Report Item, with phase B exhibiting a higher level than phase A (t-statistic = -2.252; $p > .04$). This is somewhat misleading because of the definite trend downward in phase B, despite the overall increase from phase A (Beta Weight = -3.781; $Eta^2 = .266$).

Correlational analyses were also computed in order to better define the relationships between the variables that were investigated. There was a small negative correlation between the GDS and the Self-Rating Item (Spearman Rho Correlation Coefficient = -0.067; Pearson r Correlation Coefficient = -.186), but this finding was not statistically significant. There was a very strong negative correlation (Spearman Rho Correlation Coefficient = -0.989; Pearson r Correlation Coefficient = -.951) between the GDS and the participant's performance in rehabilitation. This finding was statistically significant ($p > .0001$). This result would suggest that as the participant's GDS score

decreased, her performance in rehabilitation therapy increased significantly. Finally, there was a strong positive correlation between the participant's responses on the Self-Rating Item and her performance in rehabilitation (Spearman Rho Correlation Coefficient = .975; Pearson r Correlation Coefficient = .942). This finding was statistically significant and would suggest that as the participant's performance in rehabilitation increased, then there was a similar improvement in her responses related to her global level of physical and emotional functioning ($p > .005$).

Summary and Interpretation of Findings

When examined as a whole, the results for this individual would suggest that she made significant improvements related to her responses on the Self-Rating Item and the GDS, but these were not consistent following her discharge from the unit. On both measures, there was a statistically significant change in the slope of the trend lines after the participant's discharge from the rehabilitation unit. Also, in both cases this shift in the trend resulted in a more negative interpretation (more depressive symptoms and a poorer rating on physical and emotional functioning). This information should be interpreted in the context of the relationship with her family. As mentioned previously, it is important to recognize that the participant reported several times that she had difficulty adjusting back to her home environment because of the stress that she perceived from her relationships with several of her family members. It is possible that this issue resulted in significant changes in her perception of well-being and also in her perceived support during this period of time.

# CHAPTER V

# DISCUSSION AND CONCLUSIONS

This chapter presents a discussion of the results generated by this study. This section outlines the research questions that were formed prior to the study and the resulting information that was gathered related to each. It also includes a discussion of the limitations of this study and recommendations for future research. It is important to understand that the majority of the information listed below involves an examination of the overall performance of the groups as a whole. Although this is an important part of the current research, it is also vital that the information be examined on an individual basis by examining the case study materials that have been presented thus far.

## Summary of Results

The current study attempted to intensively examine the progression of depressive symptoms following a stroke using both qualitative and quantitative means. The following research questions were developed based on the past research in this area and current hypotheses formed prior to the study. Each research question is listed below, with the corresponding data and results that were gathered related to each.

**1. What is the overall course of depressive symptoms following a stroke?**

This research question was answered through an overall GLM analysis of the average responses attained from all nine participants (see Appendix B). Results indicated that there was not a statistically significant change on measures of depression when the overall trend was compared to the phase B only trend for all nine individuals. This finding would suggest that when examined as a whole, there was no significant

change in the slope of the trend line for depressive symptoms across time. It should be noted, however, that there was a negative slope to the trend line that was fit to the overall data set. This finding indicates that there was a significant downward trend for depressive symptoms across both phases. This finding is congruent with the previous research that has shown that depression is most prevalent in the period of time shortly following the stroke. The current pattern that is demonstrated could be due to several possible issues. These include the positive impact of rehabilitation therapy provided for the participants on the unit, the high degree of social contact that was available, or the improvement that was seen in both physical and emotional functioning during this time. A summary of the results for the overall analysis of the change in slope variable on both the Global Self-Report Item and the GDS can be found in Appendix B.

**2. Does the degree of post-stroke depression increase or decrease after medical discharge from the rehabilitation unit?**

This research question also involves the analysis of the overall level of depressive symptoms across all nine individuals (see Appendix B). As was stated previously, there was not a statistically significant change in the overall slope of the depressive symptoms following discharge from the rehabilitation unit when the participants were analyzed as a whole. In addition to this finding, there were no statistically significant changes when the participant's responses were analyzed based on phase. It is important to note, however, that this finding only included the overall average of depressive symptoms for all nine individuals. This finding fluctuated significantly when the individual participants were analyzed separately and when the

data was broken down based on discharge site. A summary of the results for the overall analysis of the change in slope and the change in phase variable on both the Global Self-Report Item and the GDS can be found in Appendix B.

**3. What is the difference in progression of depressive symptoms in those that are discharged home vs. those that are discharged to an outside care facility (nursing home, intensive care unit)?**

The progression of depressive symptoms following a stroke varied significantly based on discharge location. For those individuals who were discharged to a home care setting, there was a statistically significant change in the data slope when the overall trend was compared to that in phase B only. This finding indicated that although there was a significant downward trend across the entire data set, there was a statistically significant increase in the trend for phase B. This resulted in a "leveling off" of the decline that was very clear in phase A as well as in the overall trend. For those participants who were discharged to an intensive care setting, there was not a statistically significant change in the amount of slope when the overall trend was compared to that in phase B only.

The findings mentioned above would suggest that there was a significant period of adjustment for both groups following discharge. For those that were discharged home, there was a stable level of depressive symptoms following discharge, which was significantly different from the downward slope that was evident in the overall trend. This finding is somewhat surprising because it was hypothesized that for those who were discharged home, the adjustment process would be easier given the familiar

surroundings and a return to some normalcy. However, the current data would suggest that distress continued after discharge and that it was stable across time.

The overall change in depressive symptoms across phases was also important in answering this question. For those individuals who were discharged to home care settings, the change in depressive symptoms across phases was found to be statistically significant. Upon visual analysis, it is clear that there was a significant drop in the level of depressive symptoms following discharge from the rehabilitation unit.

Similarly, for those who were discharged to more intensive care settings, the change in depressive symptoms across phases was found to be statistically significant. However, upon further analysis it is clear that there was a significant increase in depressive symptoms for those who were discharged to intensive care settings. This finding is significant because is supports the idea that those individuals who were discharged to home environments experienced an overall decrease in depressive symptoms, while those who were discharged to intensive care settings demonstrated a significant increase in depressive symptoms. This finding could possibly be due to the familiarity of being home or the idea that they can return to more of their previous level of functioning in their original environment, or to the disappointment that is associated with not being able to return home for those who could not.

It is also interesting to note that those individuals who were discharged home demonstrated a higher level of depression at the first measurement of phase A. This was also not expected, given the fact that it was hypothesized that those discharged home would demonstrate fewer depressive symptoms than those discharged to intensive care

settings because they were returning to a more familiar environment. It should also be noted that those individuals who were discharged home demonstrated a lower level of depression at the first measurement of phase B. This was expected, due to the fact that those discharged to intensive care settings probably experienced some difficulty adjusting to their new surroundings whereas those discharged home were able to return to a more familiar environment. A summary of the results for the overall analysis, as well as those for individual participants, of the change in slope and change in phase variable for the Global Self-Report Item and the GDS can be found in Appendices B-D.

**4. What is the relationship between level of depressive symptoms and performance in rehabilitation therapy?**

Across all individuals, the results would indicate that the majority of participant's showed a strong negative correlation between level of depressive symptoms and performance in rehabilitation therapy. This would indicate that as performance in rehabilitation improved, depressive symptoms declined. In total, six of the nine participants demonstrated a negative relationship between performance in rehabilitation therapy and depressive symptoms. Of these six, three resulted in a statistically significant finding. Of the three that did demonstrate a negative relationship between these two variables, all of them showed either a very small positive relationship to a neutral relationship between the variables. This finding would appear to support the original hypothesis that as performance in rehabilitation therapy improves, depressive symptoms decline. This is in line with previous research findings that found that performance in rehabilitation therapy is a major indicator for recovery from stroke. The

researchers believed that the process of improving physically in rehabilitation would lead to better motivation and a more significant recovery of previous level of functioning.

**5. What role do depressive symptoms play in a participant's perceived overall level of functioning during the recovery phase following stroke?**

This research question was answered through the use of the Self-Report Item that has been previously discussed. The main goal of this portion of the research project was to better define the relationship between the individual's physical and emotional recovery from the stroke and the level of depressive symptoms. Of the nine individuals included in the study, a total of six demonstrated a negative relationship between the perceived level of functioning and the presence of depressive symptoms. Of these six, two were found to be in the statistically significant range. For those who did not demonstrate a negative relationship between perceived overall level of functioning and level of depressive symptoms, it was found that the correlations were either very small or neutral in nature. This finding would support the hypothesis that as a person's perceived level of physical and emotional functioning improves, the result will be a lower level of depressive symptoms.

**6. To what extent does the current samples presentation of symptoms agree with past research on the relationship between location of Cerebrovascular Accident (CVA) and depressed mood?**

This research question was mainly formed out of the multitude of previous research that has been collected in order to establish a relationship between location of

the lesion and depressive symptoms. Prior research has found that lesions located in the left hemisphere have been found to demonstrate more significant depressive symptoms than those found in the right hemisphere. This research has been largely debated in the recent years due to more intensive investigation measures and the ability to more acutely identify the location of the lesion. The goal of the current research study was not to state definitively what the correct assumption for this theory is, but rather to determine how the current data fits with the research that has been done in this area.

Of the nine participants in the current study five had lesions in the left hemisphere and four had lesions in the right hemisphere. For those with lesions in the left hemisphere, the average GDS measure for phase A was 9.883 and the average GDS measure for phase B was 9.013. For those with lesions in the right hemisphere, the average GDS measure for phase A was 9.56 and the average GDS measure for phase B was 9.375. Although this finding would appear to support the previous research finding that there was no significant pattern in location of lesion and depressive symptoms, it should be recognized that this is only a small sample and no broad generalizations should be drawn from this finding. It is also interesting to note that across all of these individuals, despite the location of the lesion, the progression of the depressive symptoms was variable with no common identifiable trend.

## Limitations of the Current Study

There are several limitations to the current study and issues that should be considered when interpreting the information that has been presented thus far. First, it is important to note that the sample that was included in this study was cognitively intact

and functioned at a high intellectual level. This was one of the initial criteria that was used for the selection of participants due to the involved nature of collecting single case data and the intense measurement principles that were used. Individuals who were functioning at an impaired level cognitively were not thought to be able to complete the tasks as they were set forth in the process of collecting data and therefore were excluded from the research study altogether. The result of this procedure is that the findings in this study will not generalize to all individuals who have suffered stroke, given the fact that cognitive status is affected at varying levels following this disorder.

Another limitation of the current study is the fact that data was only collected for nine participants. This was largely due to the intense design that was used to study this issue and the fact that including more participants would not have been feasible, given the amount of time that was needed to collect the information from each individual participant. Larger scale studies would be helpful for a further clarification of the present findings, but that was beyond the scope of the current research project.

A final limitation of the current study was the fact that rehabilitation therapy data was only collected during phase A. This was dictated by the inability of the researcher to collect data from outpatient therapy services and the differing methods that were used to chart individual progress in therapy by these institutions. It would have been interesting to collect more information related to the individual participant's level of rehabilitation performance following discharge from the unit, but due to the varying nature of this treatment, it was not feasible during the current study.

## Recommendations for Future Research

Possible directions for future research could include a similar research design, but with the implementation of a larger sample size, it could allow for more stable findings and an ability to generalize those to a broader population. Another possible direction for research would be to examine the role of resilience in the progression of depressive symptoms. As the current data was being collected, it became clear that some individuals had a greater capacity to deal with hardships and difficulty than others. Those who were able to cope more effectively with problems when they arose appeared to recover more quickly from depressive symptoms and had a more positive outlook on the recovery process. It is difficult to know exactly how these variables affected the progression of depressive symptoms, but a closer examination of this variable in future research is recommended.

Finally, it would be interesting to use a strict measure of perceived level of physical functioning only throughout the course of a longitudinal design. The current Self-Report Item that was used was meant to measure global physical and emotional well-being. For this reason, it is impossible to portion out exactly how much of the participant's response to this item was due to perceived emotional functioning and what was due to strictly physical level of functioning. During the study, it became increasingly clear that there was a significant relationship to performance in rehabilitation therapy as a mediating factor in the analysis of the progression of depressive symptoms, and further research into this area is recommended.

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# APPENDIX A

Classifications for Levels of Assistance in Rehabilitation Ratings

1) Total Assistance: The participant contributes less than 25% during a functional activity.
2) Maximum Assistance: The participant contributes 25 – 5-% during a functional activity.
3) Moderate Assistance: The participant contributes 50 – 75% during a functional activity.
4) Minimal Assistance / Contact Guard Assistance: The participant contributes greater than 75% during a functional activity.
5) Stand-by Assistance / Supervision: The participant performs a functional activity without any assistance and without hands-on contact, however, safety requires a person close by the participant during the activity.
6) Modified Independent: The participant performs a functional activity without any assistance at all, however, requires an assistive device for that activity.
7) Independent: The participant performs a functional activity without any assistance or assistive device.

# APPENDIX B

## Summary Statistics for Overall Analysis

### Summary Statistics for Change in Phase for GDS

| | Beta Weight | t-statistic | $Eta^2$ |
|---|---|---|---|
| ICS Discharge | 4.518 | 7.433 | .697 |
| Home Discharge | 13.537 | 10.850 | .837 |
| Overall Analysis | .07 | .078 | .01 |

### Summary Statistics for Change in Slope for GDS

| | Beta Weight | t-statistic | $Eta^2$ |
|---|---|---|---|
| ICS Discharge | .06 | 1.026 | .044 |
| Home Discharge | -.653 | -13.689 | .891 |
| Overall Analysis | -.415 | -1.162 | .044 |

### Summary Statistics for Change in Phase for Global Self-Report Item

| | Beta Weight | t-statistic | $Eta^2$ |
|---|---|---|---|
| ICS Discharge | 2.179 | 4.535 | .472 |
| Home Discharge | -3.533 | -8.810 | .771 |
| Overall Analysis | -1.629 | -5.193 | .540 |

### Summary Statistics for Change in Slope for Global Self-Report Item

| | Beta Weight | t-statistic | $Eta^2$ |
|---|---|---|---|
| ICS Discharge | -.206 | -11.213 | .845 |
| Home Discharge | .218 | 14.206 | .898 |
| Overall Analysis | .07 | 6.383 | .639 |

# APPENDIX C

## Summary Statistics for Individual GDS Analyses

### Summary Statistics for Change in Phase for GDS

| | Beta Weight | t-statistic | $Eta^2$ |
|---|---|---|---|
| A1 | 17.813 | 5.394 | .631 |
| S3 | 7.272 | 3.685 | .492 |
| S2 | 2.933 | 2.669 | .273 |
| R1 | -3.240 | -2.566 | .230 |
| H2 | -.754 | -.429 | .011 |
| F1 | 8.423 | 2.180 | .185 |
| C1 | 1.057 | .162 | .001 |
| S1 | 26.873 | 3.252 | .430 |
| H1 | 2.236 | .749 | .036 |

### Summary Statistics for Change in Slope for GDS

| | Beta Weight | t-statistic | $Eta^2$ |
|---|---|---|---|
| A1 | -1.067 | -6.769 | .729 |
| S3 | -.235 | -.620 | .029 |
| S2 | -.240 | -.964 | .049 |
| R1 | -.123 | -1.051 | .050 |
| H2 | .245 | 2.066 | .210 |
| F1 | -.286 | -1.764 | .129 |
| C1 | -.016 | -.060 | .001 |
| S1 | -2.107 | -4.034 | .538 |
| H1 | -.09 | -.546 | .020 |

# APPENDIX D

## Summary Statistics for Individual Global Self-Report Item Analysis

### Summary Statistics for Change in Phase for Global Self-Report Item

| | Beta Weight | t-statistic | $Eta^2$ |
|---|---|---|---|
| A1 | -2.721 | -1.695 | .145 |
| S3 | 2.218 | 1.108 | .086 |
| S2 | -6.809 | -3.258 | .371 |
| R1 | 3.487 | 3.397 | .355 |
| H2 | -1.371 | -3.014 | .348 |
| F1 | -.186 | -.104 | .001 |
| C1 | 1.115 | .350 | .006 |
| S1 | -3.781 | -2.252 | .266 |
| H1 | -5.004 | -3.465 | .445 |

### Summary Statistics for Change in Slope for Global Self-Report Item

| | Beta Weight | t-statistic | $Eta^2$ |
|---|---|---|---|
| A1 | .199 | 2.594 | .284 |
| S3 | -.536 | -4.487 | .608 |
| S2 | .398 | 3.825 | .448 |
| R1 | -.135 | -3.137 | .319 |
| H2 | -.08 | -1.817 | .171 |
| F1 | -.03 | -.486 | .011 |
| C1 | -.01 | -.072 | .001 |
| S1 | .565 | 5.320 | .669 |
| H1 | .394 | 4.495 | .574 |

# VITA

James R. Long was born in Monticello, AR, May 9, 1975, the son of James Raymond Long and Judy Carol Long. He graduated from Monticello High School in 1993 with honors. Following graduation, he attended the University of Arkansas – Monticello, where he earned a Bachelor of Science degree in Psychology with a minor in Social Work. Immediately after graduation, he enrolled at the University of Central Arkansas where he was awarded a Master's degree in Counseling Psychology in the fall of 1999.

After graduating from UCA, James was employed with a rural community mental health clinic, at which time his duties primarily consisted of working with children and adolescents on an outpatient basis and with the chronically mentally ill in a transitional care facility. He was accepted into the Counseling Psychology doctoral program at Texas A&M University and began attending classes in the fall of 2000. He completed his coursework in the summer of 2003 and was accepted into the APA-accredited internship program at the Central Arkansas Veterans Healthcare System in Little Rock, AR, where he specialized in Health Psychology. After being awarded a doctorate in Counseling Psychology, James was granted and completed a Postdoctoral Fellowship position in the area of Geropsychology with the Palo Alto VA Healthcare System in Palo Alto, CA.

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