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# Promoting Self-Determined Motivation For Exercise In Stroke Rehabilitation: The Role Of Autonomy Support

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# PROMOTING SELF-DETERMINED MOTIVATION FOR EXERCISE IN STROKE REHABILITATION: THE ROLE OF AUTONOMY SUPPORT

By

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This thesis, submitted by Emmanuel Afawuah Akowuah in partial fulfillment of the requirements for the Degree of Master of Science from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done, and is hereby approved.

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Emmanuel Afawuah Akowuah

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## ABSTRACT

Rehabilitation Interventionists (RIs) usually spend a great deal of time and effort trying to improve the functional abilities of stroke patients. Stroke rehabilitation through current studies has been recognized as an important and effective modality in the treatment of stroke. Despite the known benefits of SR to stroke patients, a number of them drop out resulting in a decline the benefits from the program.

**Objective**: To examine the predictive relationship between perceived autonomy support provided by Stroke Rehabilitation Interventionists, and the participants' subsequent stroke rehabilitation program attendance rate. The study also examines the predictive relationship between participants' perceived autonomy support and their motivation to exercise, which in turn, would predict higher stroke rehabilitation program attendance rate.

**Research Method:** Stroke rehabilitation outpatients ($N$ = 35; *Male* = 20; *Female* = 15; $M_{age}$ = 52.79 years: SD = 12.16). This study examined the predictive relationship between participants' perceived autonomy support and motivation for exercise at weeks 2 and 3 of stroke rehabilitation participation. It also examined the predictive relationship between participants' perceived autonomy support and stroke rehabilitation attendance rate. Stroke rehabilitation attendance was tracked for a period of 5 weeks. Descriptive statistics, bivariate correlations and hierarchical linear regression were calculated to assess the

predictive relationships between perceived autonomy support, self-determined motivation and stroke rehabilitation program attendance rate.

**Results:** Perceived autonomy support was not positively correlated with relative autonomy index, $r(35) = .13$, $p > .05$. The relationship between perceived autonomy support and all other forms of controlled motivation was also not significant. The regression model predicting program attendance showed significant positive effect for perceived autonomy support ($\beta = .56$, $R^2 = .32$, $p < .001$). However, the regression model predicting program attendance showed a non-significant effect for self-determined motivation ($\beta = .56$, $R^2 = .32$, $p$ = NS).

**Conclusion**: Results supports Self-Determination Theory in predicting the attendance rate of participants in SR. The higher the perceived autonomy support provided by RI to stroke patients, the higher their attendance rate in a stroke rehabilitation program. RIs supporting stroke patients' autonomy support rather than interfering with their autonomy or neglecting them during the SR process helps create an environment where stroke patients can feel an engagement-fostering balance between what they want to do and what they are actually told to do.

# CHAPTER I

## INTRODUCTION

Stroke is a serious and life threatening condition in which blood vessels that supply blood to the brain are blocked or ruptured causing the sudden death of some brain cells due to lack of oxygen or inadequate blood supply. According to the American Stroke Association (2005), stroke is the leading cause of death and disability in adults in the world. The risk factors associated with stroke include smoking, high blood pressure, diabetes, heart diseases, heavy alcohol use and obesity. Family history of stroke and age also increases the likelihood of a person getting stroke.

From the Center for Disease Control (2013), stroke kills almost 130,000 Americans each year. That is 1 out of every 19 deaths. On average, one American dies from stroke every four minutes. Every year, more than 795,000 people in the United States have a stroke of which 610,000 of these are first or new strokes and about 185,000 strokes that is nearly one of four are in people who have has a previous stroke.

According to the Stroke Network (1996), there are two types of stroke namely ischemic and hemorrhagic strokes. Ischemic stroke is the most common type of stroke. It occurs when a blood clot blocks an artery leading to or in the brain. Ischemic stroke can either be thrombotic or embolic. Thrombotic stroke occurs when a clot is formed in the

brain and blocks an artery while embolic stroke occurs when a clot formed elsewhere in the body travels to the brain and blocks an artery there. Hemorrhagic stroke on the other hand is caused by the bleeding of a ruptured blood vessel near or in the brain.

According to the American Stroke Association (2005), around 25% of people die in the first one month following an ischemic stroke and up to 75% after a hemorrhagic stroke. Ten percent (10%) of stroke survivors recover almost completely, twenty five percent (25%) recover with minor impairments and forty (40%) experience moderate to severe impairment requiring special care. Ten percent (10%) of stroke survivors require care in a nursing home or other long-term care facility and fifteen percent (15%) die shortly after a stroke. Immediate mortality of stroke is high and approximately 20% of stroke patients die within 30 days (Scottish Intercollegiate Guideline Network, 2002).

The onset of stroke provides a lot of challenge to already active people. As Van den Berg (1987) suggested, the whole experience of 'being ill' does require the acceptance and management of a new status, and this status is one that requires a new way of viewing all that some people normally take for granted. Most people who suffer from stroke usually have to make changes to their lifestyle and adapt to their disabilities for the rest of their lives, and this adaptation can usually be challenging. Being supported and accepted by family during this time goes a long way to psychologically motivate stroke victims to fight hard against the stroke.

Stroke rehabilitation (SR) has been recognized as an important and effective modality in the treatment of stroke. SR is a well supervised program aimed at improving the neurological and psychosocial factors resulting from stroke. According to Gresham et al. (1997), the threshold criteria for admission to a comprehensive rehabilitation program

include medical stability, the presence of a functional deficit, the ability to learn, and enough physical endurance to sit unsupported and to participate actively in rehabilitation.

According to Gresham et al (1997), SR is an active process that begins from acute hospitalization, progressing for those with residual impairments to a systematic program of rehabilitation services, and continuing after the individual returns to the community. The rehabilitation process is made up of a team of health professionals. The team may include physical, occupational and recreational therapists, speech language pathologist, psychologist and social workers.

The SR process involves six major areas of focus: (1) preventing, recognizing and managing comorbid illness and medical complications; (2) training for maximum independence; (3) facilitating maximum psychosocial coping and adaptation by patient and family (4) preventing secondary disability by promoting community reintegration, including resumption of home, family, recreational, and vocational activities; (5) enhancing quality of life in view of residual disability; and (6) preventing recurrent stroke and other vascular conditions such as myocardial infarction that occur with increased frequency in patients with stroke. To attain these goals, rehabilitation interventions should assist the patient in achieving and preserving maximum feasibility functional independence (Gresham et al., 1997). However, these major areas vary for each stroke patient depending on the severity of the stroke.

To achieve the greatest success in the rehabilitation of stroke patients, it is always advisable to individualize the rehabilitation program. In the rehabilitation of stroke patients, it is usually important to pay attention to the kind of activity set for them, the

goals set with each patients, and how the activities set out are paced since they play a key role in the success of the rehabilitation program.

According to the International Association for The Study of Pain (1998), exercise regimens should be regular, and gradually increase in duration and intensity. Adherence is greatest with exercises that are easily incorporated into a patient's routine. Patients are also more likely to participate in exercises or activities that they find interesting, especially if others are involved.

Despite the known benefits of SR to stroke patients, a number of them still drop out from the program. According to the Scottish Intercollegiate Guideline Network (2002), one in every ten stroke patients drops out of a stroke rehabilitation program. These trends therefore call for the need to find out the variables that affect exercises participation among people with stroke in a SR program.

Rehabilitation Interventionists (RIs) plays a vital role in the SR process. They provide instructional and personal support to stroke patients that help facilitate the rehabilitation process. The lack of a diagnosis or a failure of rehabilitation professionals to explain some key terms to patients may confuse patients which could influence the psychological consequences resulting from stroke (International Association for The Study of Pain, 1998).

Some experts recommend that it is advisable to let stroke patients feel part of the decision making process when it comes to setting goals and designing activities for the rehabilitation. Setting goals with the patients and monitoring their achievement is a core practice within most rehabilitation program. Setting goals with patients allows them to feel they are in control of their own health, and are not forced to do what they don’t want

to do. The goals set should be specific, realistic, measurable, challenging but attainable. Setting unrealistic goals and imposing them on stroke patients usually results in decreased motivation as a result of patients not being able to achieve the set goals (Wade, D. T. 2009).

Similarly, experts in applied human motivation caution that using pressurizing language might get stroke patients to start a rehabilitation program, but might not be enough to motivate them to stay in the program to the end. Being able to explain to them each step of the way the benefits of the rehabilitation, acknowledging their views, showing care and encouraging them, helps motivate them to see the need to work hard. The motivation built in these ways usually last for a longer period of time, and stroke patients are less likely to drop out of rehabilitation programs (Williams et al 1999).

There are many studies that are concerned with motivation and how it affects exercise participation. Many studies have attempted to use Self-Determination Theory (SDT) which seeks to unravel individuals' goal directed behavior to find the relationship between motivation and exercise adherence.

In 1998, Williams et al used SDT to explore the motivational basis of adherence to long term medication prescription. Autonomous regulation of behavior was hypothesized to be a unique psychological predictor of adherence beyond any variance accounted for by demographics, health status, or health expectancies. Their results indicated that autonomous self-regulation is strongly related to self-report of adherence and pill counts. Perceived autonomy support was also found to be associated with adherence, and its effects were mediated through autonomous regulation.

In 1999 and 2004, Williams et al. again applied the SDT to access the degree to which patients' perception of autonomy supportiveness affects their autonomous motivation to refrain from smoking, or regulating their glucose levels respectively. The results from both studies showed that when patients care was perceived as autonomy supportive, then they will have more autonomous motivation to either continue to engage or refrain from that particular behavior.

Amotivation, self-determined and controlling types of motivation have been shown to predict a range of exercise-related behaviors, cognitions and physical self-evaluations. Promoting self-determine motivation in exercise is known to improve the quality of their experiences as well as fostering exercise behavior (Thøgersen-Ntoumani & Ntoumanis, 2006).

Russell & Bray (2010) conducted a research study to examine the relationships between cardiac rehabilitation (CR) participants' perceived autonomy support, motivation for exercise, and exercise behavior. In their study, perceived autonomy support was correlated with self-determined motivation and self-determined motivation predicted total exercise volume at follow-up. The results supported SDT, and showed the potential for autonomy support from interventionists to affect self-determined motivation and exercise behavior of participants involved in CR.

**Theory**

This study is based on Self-determination Theory (SDT; Deci & Ryan 1985; Ryan & Deci, 2002). SDT seeks to explain individuals' goal-directed behavior. According to

SDT, types of human motivation lie on a continuum ranging from intrinsic motivation on one hand, extrinsic motivation in the middle and amotivation on the other extreme.

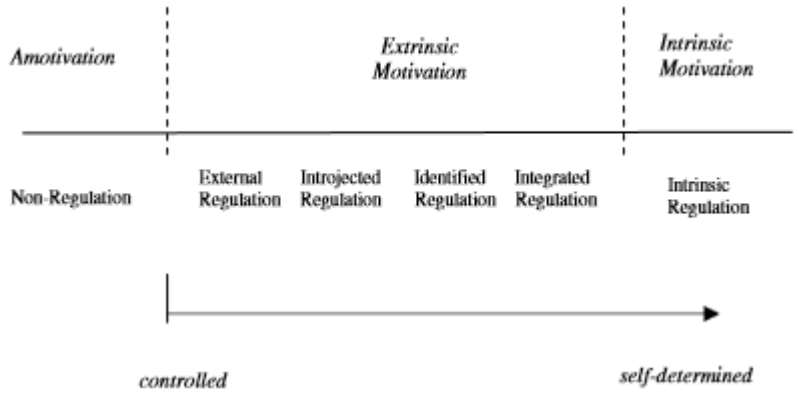


Figure 1. Continuum of Self-determination (Ryan & Deci, 2002b)

Deci & Ryan (1985), proposed that people who are intrinsically motivated to engage in an activity because of internal factors are usually likely to sustain their activities for their own personal reasons. Extrinsic motivation, on the other hand, takes effect where an individual engages in an activity based on external forces such as a reward or a punishment. Amotivation is considered as the complete absence of motivation. Self-determined motivation in the exercise domain has shown positive correlation with self-reported exercise from a community based study (Wilson, Rodgers, Blanchards, & Gessell, 2003).

SDT places motivation into two types: Self determined and controlled motivation (Deci & Ryan, 2008). Self-determined motivation arises from a person's natural tendency to take an active role in controlling his or her behavior. Controlled motivation on the other hand, has to do with one's interest to engage in a behavior or activity to receive a reward, or to avoide punishment. The reward could be external (e.g. to gain promotion)

or internal (e.g., to avoid feeling guilty; Deci & Ryan, 2008). Human behavior is affected by both types of motivation but self-determination is known to be associated with greater success in maintaining a behavior in the long term (Deci & Ryan, 2008).

SDT might play an important role in stroke rehabilitation because there are constant interactions between stroke patients and rehabilitation professionals. This suggests a need to provide an environment that can support patients' autonomous self-regulation of exercise. Autonomy support in stroke rehabilitation can be embodied by involving patients in the rehabilitation process. Rehabilitation professionals should individualize their rehabilitation programs to meet the needs of the individual patient. Providing important information regarding the benefits and expectation of rehabilitation to patients, displaying understanding of the challenges they face as a result of their disability and encouraging patients to ask questions and get involved their heath behaviors also help to promote autonomy support (Russell & Bray, 2010).

Self-determined motivation has been found to be associated with self-reported exercise behavior in exercise domain (Wilson et al. 2008). Competence and autonomy are positively correlated with more self-determined exercise regulations, which in turn were are positively related to exercise behavior, attitudes, and physical fitness. Exercise behavior mediates the relationship between self-determined motives and physical fitness, and both identified and intrinsic exercise regulations contribute significantly to the prediction of attitudes (Wilson et al., 2003).

Perceptions of autonomy and competence are promoted by perceived autonomy support, and changes in perceptions of autonomy and competence, in turn, predict change

in behavior control. Self-management behaviors mediate the relation between change in perceived competence and change in behavior control (Williams et al., 2004).

To date, no literature examining perceived autonomy support in stroke rehabilitation could be found. The purpose of the present study was to examine the predictive relationship between perceived autonomy support provided by Stroke Rehabilitation Interventionists, and the participants' subsequent stroke rehabilitation program attendance rate. This present study also examined the predictive relationship between participants' perceived autonomy support and their motivation to exercise, which in turn, would predict higher stroke rehabilitation program attendance rate

The present study hypothesized that stroke patients who report higher levels of perceived autonomy support from their RIs would subsequently have higher stroke rehabilitation program attendance rate. Also, stroke patients who report higher levels of perceived autonomy support from their RIs will have higher self-determined motivation to exercise, which in turn, would predict higher stroke rehabilitation program attendance rate.

The results of this study may help promote exercise adherence, help RIs to be cognizant of their behavior when interacting with stroke patients, and may help modify behavior to support stroke participants' autonomy, and develop greater self-determination and adherence to stroke rehabilitation programs.

# CHAPTER II

# METHOD

The potential participants of this study were already enrolled in an established and well supervised rehabilitation program at the hospital. They were well monitored by qualified team of rehabilitation professionals at each session. The only extra task for those who agreed to participate in this study filled out two questionnaires which tapped their perceptions of autonomy support from the program staff, and their motivation for engaging in exercise. The study is based on Self-determination Theory (SDT) which posits that self-determined motivation is associated with greater success in maintaing a behavior in the long term (Deci & Ryan, 2008). This study hypothesized that, a stroke patient who reported higher levels of autonomy support from their exercise interventionist would have higher self-determined motivation to exercise, and better adherence to their rehabilitation program.

## Study Design

This present study was a prospective cohort study assessing the relationship between perceived autonomy support provided by stroke rehabilitation interventionists and participants' motivation to exercise and its effect on stroke rehabilitation attendance

among stroke outpatients at two different physiotherapy departments in Ghana. The data were collected from March to April 2014.

## Participants

All stroke outpatients enrolled in a rehabilitation program in their first week at St. John of God Hospital, and Nkawie-Toase Government Hospital both were invited to participate in the study. Potential participants who could not communicate or had a cognitive deficit that interfered with their ability to give informed consent or to understand and participate in the study were excluded. The sample comprised 35 stroke outpatient participants. There were 15 women (42.9%) and 20 men (57.1%) aged 32-75 years (Mean age = 52.69 years; SD = 12.16) with approximately 14.3% aged 30-39 years, 22.9% aged 40-49 years and 62.9% aged 50 years or older. The severity of participants' stroke ranged from maximal assistance to complete independence. Two informed consent forms (See Appendix A) were signed by each participant: One for their records and one for the records of the principal investigator. Participants were assured of the confidentiality of their responses.

## Measures

### Perceived Autonomy Support:

The participants' perception of the degree to which their exercise leaders are autonomy supportive (versus controlling) for engaging in exercise was assessed using a shortened six-item version of the original 15-item Health Care Climate Questionnaire (Williams et al., 1996). The 6-item version used items # 1, 2, 4, 7, 10, and 14 of the original scale. Participants responded to each item on a 7-point Likert-type scale

(1=strongly disagree to 7=strongly agree). This questionnaire was self-administered. The six-item scale was used by Williams et al., (1996) and had an internal consistency of $\alpha$ = .82 and has been shown to have good psychometric characteristics. Scores were calculated by averaging the individual item scores with higher scores representing a higher level of perceived autonomy support. Example of an item on this questionnaire is "I feel that my health care practitioner has provided me choices and options about my health" (See Appendix B).

**Motivation for Exercise:**

Participants' autonomous and controlled motivation for exercise was assessed using the Behavioral Regulation in Exercise Questionnaire (Markland & Tobin, 2004). The BREQ-2 is a widely used measure of the continuum of behavior regulation in exercise psychology. The BREQ-2 has five subscales: Amotivation with 4 items (e.g., "I don't see the point in exercising"), external regulation with 4 items (e.g., "I feel under pressure from my friends/family to exercise"), introjected regulation with 3 items (e.g., "I feel ashamed when I miss an exercise session"), identified regulation with 4 items (e.g., "I value the benefits of exercise"), and intrinsic motivation with 4 items(e.g., "I exercise because it's fun"). Participants responded to each question on a 5-point Likert-type scale which ranged from 0 (definitely no) to 4 (definitely yes) (Moustaka et al 2010) (See Appendix C).

The relative autonomy index (RAI), which is the overall degree to which participants felt self-determined, was derived from the subscales of the BREQ-2. RAI was obtained by multiplying each subscale score by its weighting and then summing the

weighted scores [Intrinsic regulation (+3); Identified regulation (+2); Introjected regulation (-1); External regulation (-2) and Amotivation (-3)].

**Stroke Rehabilitation Program Attendance:**

The hospital records for the SR program were used to determine the participants' attendance. The hospital kept records of each stroke patient everyday they visited the hospital for rehabilitation. The rehabilitation program for participants lasted for a period of eight weeks and each stroke patient was expected to attend 15 sessions. Each session lasted for an hour and thirty minutes.

**The Stroke Rehabilitation Program:**

The blood pressures of participants were first checked before they were allowed to begin each session. Depending on the severity of the stroke, several electrical stimulation methods were usually first applied to help generate an action potential in nerve tissue causing a muscle contraction which allowed for isometric activation. This played a vital role in the treatment of muscle spasm or atrophy and for strengthening muscles before participants engaged in therapeutic exercises. In some cases, electrical stimulation methods were also applied after the exercise session to help reduce pain and inflammation.

After electrical stimulation methods were employed, participants engaged in therapeutic exercises to help improve mobility, function and strength. The therapeutic exercises were individualized to meet the specific physical needs of each participant. The following are the types of therapeutic exercises participants performed during their stroke rehabilitation program:

**Passive range of motion (PROM):** This type of exercise is where an external force is applied to move a body part without its conscious volition. Examples include a RI moving the affected limb of a stroke patient or the stroke patient taking his or her strong arm and moving the weak or paralyzed arm. PROM helps in the maintaining joint flexibility and preventing joint contracture.

**Active range of motion (AROM):** This type of exercise is where stroke patients are made to move a body part on their own without any external help. This type of exercise helps in increasing muscle endurance, strength and joint flexibility.

**Resistance or strengthening exercise**. This type of exercise involves moving a body part against resistance. The goal of the resistance or strengthening exercise is to make the weaker muscles stronger by gradually and progressively overloading them. Examples of these exercises include the use of bands, dumbbells, exercise machines and putty.

**Aerobic exercise:** This type of exercise is usually beneficial to people who have mild to moderate disability after suffering a stroke. Aerobic exercises help in improving endurance and balance. Examples include cycling, walking, rowing and stepping.

**Coordination Exercises:** These exercises are very important in stroke rehabilitation since stroke usually affects balance and coordination. Examples of these exercises include walking, sitting, standing, squatting and picking up an object.

Depending on participant's condition, therapeutic ultrasound was employed to help provide local effects on tissues, treat tendon injuries and relief short-term pain.

Ultrasound in some cases was also employed to help promote healing of some acute bone fractures. Each session ended with therapeutic massage to help relax the muscles.

**Procedures**

Approval for this study was sought from the University of North Dakota IRB, and the Research Ethics Boards of St. John of God Hospital and Nkawie-toase Government Hospital in Ghana. The eligibility criteria and study procedures were then explained to the rehabilitation interventionists and participants by the project assistants at both hospital. For the sake of confidentiality, each participant was identified by a study identification number. Participants were then asked to sign two consent forms of which one was to be kept for their own personal records and the other for the records of the principal investigator. Participants were assured of the confidentiality of their responses. The Health Care Climate Questionnaire which accesses patients perceived autonomy support was administered during the second week of the study. During the third week of the study, the Behavioral Regulation in Exercise Questionnaire was administered to assess patients' motivation for exercise. The stroke rehabilitation program attendance was then tracked from week four to week eight. Participants were then debriefed about the objectives of the study and incentives were provided to them. The study lasted for a period of eight weeks which was the ideal duration of rehabilitation for participants at both hospitals.

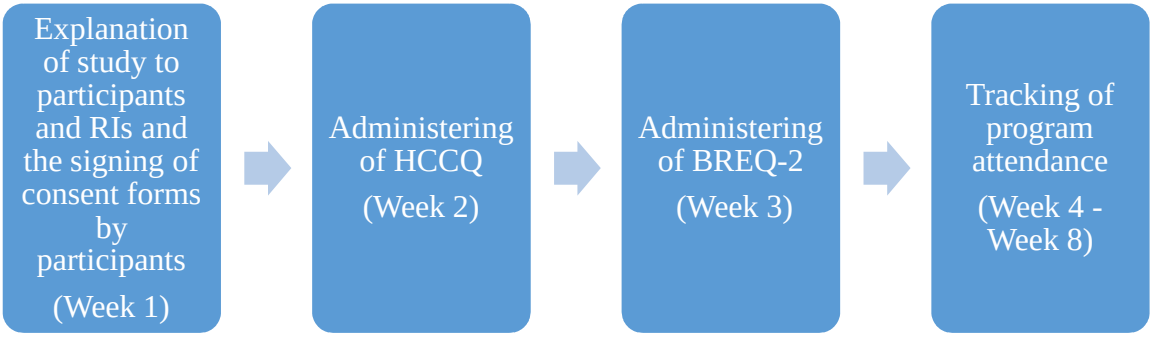


Figure 2. : Procedure flowchart

**Data Analysis**

Descriptive statistics and bivariate correlations were calculated to assess the relationship between perceived autonomy support and self-determined motivation. Hierarchical linear regression analysis was used to predict program attendance by first using perceived autonomy support as a predictor and then using relative autonomy index from the BREQ-2 scales as a second predictor after autonomy support was controlled for. These analysis were carried out using IBM SPSS Advanced Statistics software Version 21.

# CHAPTER III

# RESULTS

## Introduction

This study investigated how the perceived autonomy support provided by rehabilitation interventionists affects stroke patients' motivation and adherence to their rehabilitation program. The Healthcare Climate Questionnaire was administered in the second week of participants' stroke rehabilitation to assess participants' perceived autonomy support. The Behavioral Regulation for Exercise Questionnaire was administered a week after to assess participants' motivation for exercise. Participants' stroke program attendance was recorded over a five week period using hospital records. There were no dropouts during the study. Descriptive statistics and bivariate correlation was used to assess the relationship between perceived autonomy support, amotivation, controlled and self-determined motivation. (Table 1 & Table 2).

## Scale Psychometrics

To check the internal consistency of items in the Healthcare Climate Questionnaire, and the Behavioral Regulation of Exercise Questionnaire, a Cronbach's alpha reliability analysis was calculated. The Cronbach's alpha for items in the Healthcare Climate Questionnaire was $\alpha = .61$ (in no case, removal of any individual

items would not have substantively raised the alpha) whiles the chronbach's alpha for items in the Behavioral Regulation for Exercise Questionnaire ranged from .74 to .89.

**Descriptive Statistics**

In general participants reported strong perception of autonomy support received from their SR interventionists, with a mean of 6.61 (*SD* = .31) on the 1-7 scale. Participants reported relatively low level of amotivation (*M* = .49, *SD* = .77) and high levels of self-determined motivation for exercise (*M* = 4.38, *SD* = 6.13). Overall participants attended 81.43% of their clinical supervised SR sessions during the five weeks of recording attendance.

Table 1. Descriptive Statistics and Relationships Between Perceived Autonomy Support, Motivation and Program Attendance

| Variable | Mean | Std. Deviation | Range | Scale Alpha |
|---|---|---|---|---|
| Attendance (%) | 81.43 | 16.81 | 50.00 - 100.00 | - |
| HCCQAVG | 6.61 | .31 | 6.00 - 7.00 | .61 |
| Relative Autonomy Index | 4.38 | 6.13 | -12.00 - 14.50 | - |
| Intrinsic Regulation | 2.24 | 1.04 | .50 - 4.00 | .89 |
| Identified Regulation | 2.59 | .79 | 1.50 - 4.00 | .85 |
| Introjected Regulation | 1.49 | .89 | .00 - 3.33 | .78 |
| External Regulation | 2.28 | .94 | .00 - 4.00 | .74 |
| Amotivation | .49 | .77 | .00 - 2.50 | .85 |

## Bivariate Correlations

There was a significant positive correlation between perceived autonomy support and stroke rehabilitation attendance, $r(35) = .56$, $p < .001$. Contrary to the hypothesis, there was no significant positive correlation between perceived autonomy support and self-determined motivation as measured by the RAI, $r(35) = .13$, $p > .05$. The relationships between autonomy support and all forms of controlled motivation were also not significant.

Table 2. Bivariate Correlations and Relationship between Perceived Autonomy Support, Motivation and Program Attendance

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1. Attn (%) | 1 | .56**** | .21 | .21 | .29 | .33 | .33 | .48**** |
| 2. HCQAVG | | 1 | .13 | .14 | .21 | .13 | .28 | -.30 |
| 3. RA1 | | | 1 | .88**** | .92**** | .62**** | -.59**** | -.59**** |
| 4. INTRIN | | | | 1 | .84**** | .66**** | -.41* | -.35* |
| 5. IDENT | | | | | 1 | .63**** | -.46*** | -.51**** |
| 6. INTROJ | | | | | | 1 | -.19 | -.54**** |
| 7. EXREG | | | | | | | 1 | -.05 |
| 8. AMOT | | | | | | | | 1 |

*$p < .05$. **$p < .01$. ***$p < .005$. ****$p < .001$

## Prediction of Attendance

The regression analysis showed that program attendance was positively predicted by perceived autonomy support ($\beta = .56$, $R^2 = .32$, $p < .001$). However, with perceived

autonomy support controlled for, RAI did not add to the prediction of attendance. ($R^2$ = .32, $p$ = NS).

Table 3. Hierarchical Regression Analysis Predicting Attendance

| **Predictor** | ***β*** | **$\Delta R^2$** | ***p*** |
|---|---|---|---|
| Step 1 Perceived Autonomy Support | .56 | .32 | < .001 |
| Step 2 Relative Autonomy Index | .14 | .01 | NS |
| TOTAL = | | .33 ($R^2Adj$ = .29) | |

# CHAPTER IV

## DISCUSSION AND CONCLUSION

This study had two main objectives. The first objective was to examine the predictive relationship between perceived autonomy support provided by Stroke Rehabilitation Interventionists, and the participants' subsequent stroke rehabilitation program attendance rate. The second objective was also to examine the predictive relationship between participants' perceived autonomy support and their motivation to exercise, which in turn, would predict higher stroke rehabilitation program attendance rate. From the results, perceived autonomy support positively predicted SR program attendance. However, perceived autonomy support and self-determined motivation for exercise were not positively correlated.

The study first hypothesized that, stroke patients who reported higher levels of perceived autonomy support from their RIs would have a higher program attendance rate. The results from the study supported this hypothesis. This finding supports previous studies done by other researchers in examining perceived autonomy support in both symptomatic and asymptomatic participants in the exercise domain (e.g., Russell & Bray, 2010; Edmunds, Ntoumanis & Duda, 2007; Silva et al., 2008) and in the school domain (e.g., Black, & Deci, 2000).

The study further hypothesized that, stroke patients who report higher levels of perceived autonomy support from their RI will have higher self-determined motivation to exercise. The results from the study did not support this hypothesis. However, this result supported previous study conducted by Edmunds, Ntoumanis, and Duda (2008). From the results of their study, there was no effect for autonomy support on the rate of change in participants' self-determined motivation for exercise. On the other hand a similar study conducted by Russell & Bray, (2010) showed a positive correlation between autonomy support and self-determined motion for exercise. This therefore calls for more studies in this area before a firm conclusion is drawn.

SDT hypothesizes that the development of self-determination is dependent on the fulfillment of needs for autonomy, competence, and relatedness (Ryan & Deci, 2000; Ryan & Deci, 2008; Deci & Ryan, 2010). The finding that perceived autonomy support did not predict participants' motivation for exercise could possibly be a result of cultural difference, although Deci and Ryan (2000) suggested that the need for autonomy in motivation is cross-cultural. However, the study of Iyengar and Lepper in 1999, suggested that motivation in Chinese children is more associated with relatedness, rather than autonomy, since the choices they make is usually determined by parents. This is similar for some Ghanaians although there has not been any evidence to support this. Iyengar and Lepper (1999) further suggested that, for non-western cultures, relatedness takes precedence over autonomy. This suggests that the definition or need for autonomy support may differ among cultures.

The time interval in administering the Healthcare Climate Questionnaire and the Behavioral Regulation for Exercise Questionnaire could have been another possible reason why ~~there was~~ no predictive relationship was found between the participants' perceived autonomy support, and their motivation to exercise. Both questionnaires were administered a week apart (second & third Weeks) possibly resulting in insufficient interactions between the RIs and participants to maintain the level of perceived autonomy support experienced during the initial weeks of the stroke rehabilitation program.

Considered together, the results of the present study provide evidence that higher levels of autonomy support are linked to higher levels of SR attendance. However, some study limitations should be noted. The first limitation relates to the relatively small convenience sample of SR participants involved in the study. This constrains the generalizability of the study's findings. It is therefore important for future research examining perceived autonomy support, self-determined motivation and SR attendance to have larger sample size involving both males and females to increase the confidence in the generalization of results.

The second limitation of the study was related the time interval between the administering of the Healthcare Climate Questionnaire and Behavioral Regulation for Exercise Questionnaire. Since they were administered a week apart, it is possible participants did not have enough interactions with their RI therefore not being able to maintain the level of perceived autonomy support experienced during the initial weeks of the stroke rehabilitation program. This therefore might have been a reason why the second hypothesis was not supported by the findings of this study. Future studies should

therefore at least allow about two weeks interval between the administration of the Healthcare Climate Questionnaire and the Behavioral Regulation for Exercise Questionnaire to allow sufficient interaction between participants and their RIs. This will help in maintaining the level of perceived autonomy support experienced during the initial stages of stroke rehabilitation.

Despite these limitations, this study has added to the results of other researchers regarding autonomy support in the exercise domain. This study may be the first in trying to understand the relationship between perceived autonomy support, self-determined motivation for exercise and stroke program attendance in stroke rehabilitation. It may therefore serve as a framework for other researchers who might want to conduct similar studies in the future. The findings of this study may also help promote stroke rehabilitation by helping RIs to be cognizant of their behavior when interacting with stroke patients and may help modify behavior to support stroke participants' autonomy and develop greater self-determination and adherence to stroke rehabilitation programs.

The implication for RIs is that, supporting stroke patients' autonomy support rather than interfering with their autonomy or neglecting them during the SR process helps create an environment where stroke patients can feel an engagement fostering balance between what they want to do and what they are actually told to do.

The findings of the present study, partially supports the framework of SDT for predicting the attendance rate of participants in SR. It was found that, stroke patients who reported higher levels of perceived autonomy support from their RI had higher program

attendance rate. The findings of this study therefore suggest that, the interaction between stroke patients and their RI can play an important role in promoting exercise adherence.

# APPENDICES

**APPENDIX A**

# INFORMATION FOR SUBJECTS AND CONSENT CERTIFICATION

## DEPARTMENT OF KINESIOLOGY AND PUBLIC HEALTH EDUCATION, UNIVERSITY OF NORTH DAKOTA

**PROJECT**: Promoting Self-Determined motivation for exercise in stroke rehabilitation.

**PRINCIPAL INVESTIGATOR**: Emmanuel Akowuah

**PROJECT ASSISTANT:** Lord Osei Kweku

### Project Description

This study is an investigation factors which may affect the motivation of stroke patients to successfully participate in, and complete their rehabilitation program. You are being asked to participate in the study. If you agree to do so, you will be ask to fill out two questionnaires which ask about the support you receive from your program staff, and your motivation for engaging in exercise. The questionnaires will take approximately 15mins to complete. You will be ask to sign two consent forms where you will be given a copy to keep for your records while the PI keeps the other copy. Data sheets and consent forms will be kept in separate locked file cabinets in my supervisor's office and only the PI and supervisor will have access to them.

### Potential Benefits

The results of this study may provide evidence that will help hospitals to provide more effective rehabilitation programs to patients like you.

### Risk and Discomfort.

As a patient who is already in a rehabilitation program, your participation in this study will only require the extra task of completing two questionnaires about your perception of the program. If completing the questionnaires creates any feelings of discomfort you are free to decline further participation.

### Confidentiality

No identifying information including your name will appear on any of the questionnaires or in any written report on the study. All data will be coded with numbers and/or letters. The records of this study will be kept private to the extent permitted by law. In any report about this study that might be published, you will not be identified. Your study record may be reviewed by Government agencies, the UND Research Development and Compliance office, and the University of North Dakota Institutional Review Board.

Any information that is obtained in this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.

If we write a report or article about this study, we will describe the study results in a summarized manner so that you cannot be identified.

**Compensation**

You will be given an amount of 10 Ghana Cedis for your participation at the end of the study

**Subjects' Rights**

You have the right to ask questions at any time. Also, you may refuse to participate or withdraw your consent and stop taking part in the research at any time without penalty or prejudice of any kind.

If you have any questions about the research, please feel free to ask or call the Principal Investigator, Emmanuel Akowuah at (701) 610-3083 or his project assistant in Ghana, Lord Osei Kweku at (024) 402-7948. If you fail to reach them, or if you wish to talk to someone else, call the University of North Dakota Institutional Review Board, at (701) 777-4279. You may also report any complaints or concerns that you might have about the research to this office**.**

**Documentation of Subject Consent**

What you are being asked to sign below is a confirmation that you have read and understood the procedures involved in this research project, and that your questions have been answered satisfactorily. You therefore wish to participate in this research study voluntarily. Nothing in this consent form is intended to replace applicable federal, state, or local laws.

| _____ | _____ | _____ |
|---|---|---|
| Name of Subject | Signature | Date |

**APPENDIX B**

# EXERCISE REGULATIONS QUESTIONNAIRE (BREQ-2)

**Age: _____ years** **Sex: male female (please circle)**

***WHY DO YOU ENGAGE IN EXERCISE?***

**We are interested in the reasons underlying peoples' decisions to engage, or not engage in physical exercise. Using the scale below, please indicate to what extent each of the following items is true for you. Please note that there are no right or wrong answers and no trick questions. We simply want to know how you personally feel about exercise. Your responses will be held in confidence and only used for our research purposes.**

| | | **Not true for me** | | **Sometimes true for me** | | **Very true for me** |
|---|---|---|---|---|---|---|
| 1 | I exercise because other people say I should | 0 | 1 | 2 | 3 | 4 |
| 2 | I feel guilty when I don't exercise | 0 | 1 | 2 | 3 | 4 |
| 3 | I value the benefits of exercise | 0 | 1 | 2 | 3 | 4 |
| 4 | I exercise because it's fun | 0 | 1 | 2 | 3 | 4 |
| 5 | I don't see why I should have to exercise | 0 | 1 | 2 | 3 | 4 |
| 6 | I take part in exercise because my friends/family/partner say I should | 0 | 1 | 2 | 3 | 4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 7 | I feel ashamed when I miss an exercise session | 0 | 1 | 2 | 3 | 4 |
| 8 | It's important to me to exercise regularly | 0 | 1 | 2 | 3 | 4 |
| 9 | I can't see why I should bother exercising | 0 | 1 | 2 | 3 | 4 |
| 10 | I enjoy my exercise sessions | 0 | 1 | 2 | 3 | 4 |
| 11 | I exercise because others will not be pleased with me if I don't | 0 | 1 | 2 | 3 | 4 |
| 12 | I don't see the point in exercising | 0 | 1 | 2 | 3 | 4 |
| 13 | I feel like a failure when I haven't exercised in a while | 0 | 1 | 2 | 3 | 4 |
| 14 | I think it is important to make the effort to exercise regularly | 0 | 1 | 2 | 3 | 4 |
| 15 | I find exercise a pleasurable activity | 0 | 1 | 2 | 3 | 4 |
| 16 | I feel under pressure from my friends/family to exercise | 0 | 1 | 2 | 3 | 4 |
| 17 | I get restless if I don't exercise regularly | 0 | 1 | 2 | 3 | 4 |
| 18 | I get pleasure and satisfaction from participating in exercise | 0 | 1 | 2 | 3 | 4 |
| 19 | I think exercising is a waste of time | 0 | 1 | 2 | 3 | 4 |

**Thank you for taking part in our research**

# APPENDIX C

## Health Care Climate Questionnaire

Perceived Autonomy Support

Please answer the questions below **regarding your relationship with your Physical Therapist/Exercise Therapist about stroke rehabilitation**. Physical Therapist/Exercise Therapist have different styles in dealing with patients. Your responses will be kept confidential. Please be honest and candid. Choose your answers using the scale below for each question by filling in the blank after each question with a number from **1 to 7.**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly disagree | Moderately disagree | Slightly disagree | Neutral | Slightly agree | Moderately agree | Strongly agree |

1. I feel that my health care practitioner has provided me choices and options about my health. _____
2. I feel my health care practitioner understands how I see things with respect to my health. _____
3. My health care practitioner conveys confidence in my ability to make changes regarding my health. _____
4. My health care practitioner encourages me to ask question. _____
5. My health care practitioner listens to how I would like to do things regarding my health. _____
6. My health care practitioner tries to understand how I see my health before suggesting any changes. _____

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