The Effects of a Cognitive Behavioral Computer Based

Program on Depressed Inpatients

by

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ABSTRACT OF THE DISSERTATION

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Major depression is a serious medical illness affecting millions of American adults in a given year. Often anxiety as well as negative automatic thoughts co-occurs in individuals with depression. Although a significant problem, few have access to effective treatments for depression. One solution that has the potential to be disseminated on a large scale in a cost effective manner is a computerized cognitive behavioral therapy program. Cognitive Therapy: A Multimedia Learning Program (CTMP) is the first designed and tested multimedia program for computer assisted therapy (Wright & Wright, 1997).

The purpose of this study was to examine the effects of a computerized based cognitive behavioral therapy program, Cognitive Therapy: A Multimedia Learning Program, for the symptoms of depression, anxiety, and automatic thoughts in a select population of depressed hospitalized psychiatric patients. It was hypothesized that subjects who participate in this computerized intervention would have a greater decrease in symptoms of depression, anxiety, automatic thoughts and shorter length of stay compared to the depressed usual treatment group.

A sample of 86 subjects were recruited and randomized into either the usual treatment group or the computerized cognitive behavioral therapy group. A demographic data questionnaire, medication questionnaire, Beck Depression Inventory-II, Beck Anxiety Inventory, and Automatic Thoughts Questionnaire were utilized. A multivariate analysis of covariance (MANCOVA), independent sample t-test, and paired-sample t-test analyses were used to test the research hypotheses.

The results did not support the Cognitive Therapy: A Multimedia Learning Program to be more effective than the usual treatment group. However, the results supported that this program was effective in the reduction of depressive symptoms, anxiety, and negative automatic thoughts at the time of discharge. There are several explanations related to the research design that could have accounted for this outcome.

The results of this study have significant implications for the future within the context of the Affordable Care Act. The Cognitive Therapy: A Multimedia Learning Program has the potential to improve the quality of care, ensure access to care via new technologies and be cost effective for a vulnerable population such as psychiatric patients. Nurses will have an essential role in furthering this research as well as integrating this program into their professional practice.

Dedication

This dissertation is dedicated to my husband Linton and my daughter Samantha Lynn. Linton, you are my best friend, partner and co-parent to our beautiful daughter. You have always been my cheerleader in life even during times of uncertainty. Linton, you push me to be the best person I can be and for that I thank you. I love you.

To my beautiful daughter, Samantha Lynn, who was born on December 31, 2011. You are my miracle and little angel. You have been patient participant of this research journey while I was pregnant with you. I thank you for giving me the strength to continue with the long hours put in for data collection while I was pregnant. I love you.

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Chapter I

The Problem

Depression

Major depression is a serious medical illness that affects 15 million American adults in a given year (National Alliance of Mental Illness, 2009). Unlike normal emotional experiences of sadness, loss or passing mood states, major depression is persistent and can significantly interfere with an individual's thoughts, behavior, mood, activity and physical health. Among all medical illnesses, major depression is one of leading causes of disability in the United States (Merikangas et al., 2007; NAMI, 2009).

Although disagreement exists about the degree of interdependence between physical, psychological and sociocultural variables, people with depression are more likely to engage in behaviors such as smoking, drug use, overuse of alcohol and inadequate nutrition (Sederer et al., 2007). Consequently, the prevalence of depression in the United States surpasses medical disorders such as ischemic heart disease, diabetes mellitus and lower respiratory disorders (Uston, Ayusi-Mateos, Chatterji, Mathers, & Murray, 2004).

More than one-half of those who experience a single episode of depression will continue to have episodes that occur as frequently as once or even twice a year. Without treatment, both the frequency of depression and the severity of depressive symptoms tends to increase over time. Left untreated, depression can even lead to suicide (NAMI, 2009).

Suicide is one of the top ten leading causes of death in the United States for individuals between the ages of 10 and 64 years (Center for Disease Control, 2005).

Researchers have found that 90% of individuals who commit suicide are depressed and 50% of depressed persons report feelings of wanting to die, 33% consider suicide, and 8.8% attempt suicide (Gaynes et al., 2004; Hasin, Goodwin, Stinson, & Grant, 2005).

Anxiety

Anxiety disorders commonly co-occur in individuals with depression. In a given year, approximately 18.1 percent of Americans are diagnosed with an anxiety disorder (Kessler, Chiu, Demler, & Walters, 2005). The symptoms denoting an anxiety disorder may be divided into cognitive, affective, behavioral, and physiological.

Cognitive symptoms can include hypervigilence, inability to recall important things, confusion, distractibility, loss of objectivity, cognitive distortion, or repetitive fearful ideation. Individuals with affective symptoms can exhibit impatience, tension, feeling frightened or alarmed. Behavioral symptoms can be illustrated by inhibition, tonic immobility, speech dysfluency, impaired coordination, restlessness, or hyperventilation. Physiological symptoms can present as palpitations, heart racing, increased blood pressure, pressure on the chest, rapid breathing, startle reaction, insomnia, tremors, loss of appetite, abdominal discomfort, nausea, flushed face, or sweating (Beck, Emery, & Greenberg, 1985).

Automatic Thoughts

Automatic thoughts consist of interpretations of events or experiences that are spontaneous, appear valid, and associated with problematic behavior or disturbing emotions. These thoughts occur in shorthand and are often composed of one word or a short phrase which can function as a label for a group of painful memories or fears (Beck, 1976).

Automatic thoughts are spontaneous thus the individual believes the automatic thought because of its reflexive nature. These thoughts are often unconscious, persistent and self perpetuating as automatic thoughts are hard to turn off or change because they are ingrained into an individual's thinking. Automatic thoughts are relatively idiosyncratic, unique to the individual's view of the stimulus event, and generally involve a distortion of reality that is repetitive. Subsequently, the result is an intense emotional response to the underlying distorted thought (Beck, 1976).

Automatic thoughts are almost always believed no matter how illogical the thought appears. These thoughts occur despite the fact that they are contrary to objective and reasonable evidence. Automatic thoughts have the same believable quality as direct sense impressions thus the depressed individual attaches the same truth to automatic thoughts as to sights and sounds of the real world without question. Unfortunately, this individual continues to have automatic thoughts no matter how many times these thoughts are invalidated by external experience or solid evidence (Beck, 1976).

Length of Stay

Long length of stays for inpatient hospitalization is a significant contributor to the costly treatment for depression (Greenberg et al., 2003; United States Department of Health & Human Services, 2001). One possible solution to this economic burden is Cognitive Behavioral Treatment (CBT) as this treatment approach has been supported in the literature to be effective in treating depressed individuals (Butler, Chapman, Forman, & Beck, 2006; Gloaguen, Cottraux, Cucherat, & Blackburn, 1998).

Cognitive Behavioral Therapy

The formula for cognitive behavioral therapy consists of the therapist helping the individual to identify distorted thinking and learn more realistic ways to conceptualize experiences. The correction of an individual's distortions and negative thinking alters excessive and distressing emotional reactions (Beck, 1976). The therapist assists the individual to identify misconceptions, test their validity of the thought, and substitute with more appropriate thoughts which includes several steps. First, individuals develop an awareness of what they are thinking. Second, the individual recognizes what thoughts are negative or distorted and then substitutes accurate judgments for inaccurate judgments. Finally, the therapist provides feedback to the individual to confirm whether the changes in thinking are more reality based and positive (Beck, 1976).

Although this treatment approach has been supported to be clinically effective, fewer than 25% of those affected with depression have access to effective treatments (World Health Organization, 2000). This is in direct conflict with the Healthy People 2010 objective to increase the availability of effective treatment for depressed Americans (U.S. Department of Health and Human Services, 2000). One problem is the paucity of trained therapists to provide cognitive behavioral therapy (Office of the Surgeon General, 1999; Wright et al., 2005). One solution that has the potential to be disseminated on a large scale in a cost effective manner is a computerized cognitive behavioral therapy program.

Cognitive Therapy: A Multimedia Learning Program

Cognitive Therapy: A Multimedia Learning Program (CTMP) is the first designed and tested multimedia program for computer assisted therapy (Wright & Wright, 1997). This program is intended to be used easily by depressed and anxious individuals who have no

previous computer experience (Wright et al., 2002). The software for the Cognitive

Therapy: A Multimedia Learning Program does not attempt to substitute the critical

features of clinician-administered therapy, such as rapport, empathy, or clinical judgment.

The researchers designed this program as an adjunct to treatment for depression and

anxiety under the supervision of a clinician. This computer program socializes the patient

to cognitive and behavioral treatment methods, offers psychoeducation, reinforces the

utility of self-help exercises, and increases the clinicians' time for interventions that

require the sensitivity and expertise of a human therapist (Wright et al., 2002).

The Cognitive Therapy: A Multimedia Learning Program has five modules that

present basic methods of cognitive therapy, including identifying and modifying

automatic thoughts, using behavioral interventions such as activity scheduling and graded

task assignments, and altering underlying schemas. An interactive video format is used to

illustrate the use of cognitive therapy in managing commonly encountered problems

(Wright & Wright, 1997). The modules contain guidance from a narrator who is an

experienced clinician, videos of individuals (portrayed by professional actors and

actresses) who are using cognitive therapy skills to cope with depression or anxiety,

interactive learning exercises, and review questions to assess progress in understanding

the program content. Homework is assigned for completion in a companion workbook

between computer sessions (Wright et al., 2002).

The program was designed so that the average patient can complete the program in

approximately four hours. The depressed individual's responses to computer-generated

questions are stored and available to the clinician in a progress report. This report

contains information on subjective responses to the program, self-report of depression and anxiety, and comprehension of lesson material (Wright & Wright, 1997).

A disadvantage to the Cognitive Therapy: A Multimedia Learning Program is the lack of independent evaluation studies. Program developers traditionally conducted the research trials examining the effectiveness of their computerized cognitive behavioral therapy program (MacGregor, Hayward, Peck, & Wilkes, 2008; Kaltenthaler et al., 2008). Specifically, two research studies were conducted by the developers of the Cognitive Therapy: A Multimedia Learning Program. This is a limitation as the developers had a vested interest in determining the success of the program (Wright et al., 2005; Wright et al., 2002).

Another limitation is the two studies conducted did not measure if Cognitive Therapy: A Multimedia Learning Program reduced the length of stay for patients who received this intervention. From a financial standpoint, a shortened length of stay often equates to reduced hospital expenditures (Wright & Wright, 1997). The cost effectiveness of this program is important to measure given that cost reduction is a major focus in the American health care system. The Cognitive Therapy: A Multimedia Learning Program has the potential to be a clinically sound as well as cost effective treatment for depression using health information technology. Therefore, the purpose of this study is to evaluate the effectiveness of the Cognitive Therapy: A Multimedia Learning Program in alleviating symptoms of depression, anxiety, negative thoughts, and reducing length of stay in hospitalized psychiatric patients.

Statement of the Problem

This study examined the effects of a computerized cognitive behavioral therapy program, Cognitive Therapy: A Multimedia Learning Program, for the symptoms of depression, anxiety, and automatic thoughts in a select population of depressed hospitalized psychiatric patients.

Research Questions

1. What are the effects, in hospitalized psychiatric patients, of a computerized cognitive behavioral therapy program, Cognitive Therapy: A Multimedia Learning Program, as an adjunct to usual treatment for symptoms of depression as compared to usual treatment?

2. What are the effects, in hospitalized psychiatric patients, of a computerized cognitive behavioral therapy program, Cognitive Therapy: A Multimedia Learning Program, as an adjunct to usual treatment for symptoms of anxiety as compared to usual treatment?

3. What are the effects, in hospitalized psychiatric patients, of a computerized cognitive behavioral therapy program, Cognitive Therapy: A Multimedia Learning Program, as an adjunct to usual treatment for automatic thoughts as compared to usual treatment?

4. What are the effects, in hospitalized psychiatric patients, of a computerized cognitive behavioral therapy program, Cognitive Therapy: A Multimedia Learning Program, as adjunct to usual treatment for length of stay as compared to usual treatment?

Hypothesis

The main hypothesis for this study was: Depressed hospitalized patients who receive the Cognitive Therapy: A Multimedia Learning Program intervention will have a greater decrease in symptoms of depression, anxiety, negative automatic thoughts and shorter length of stay compared to a usual treatment group. The subjects who receive the CTMP intervention will report the following: 1) a greater decrease in symptoms of depression compared to the depressed usual treatment group; 2) a greater decrease in symptoms of anxiety compared to the anxious usual treatment group; and 3) a greater decrease in negative automatic thoughts compared to the usual treatment group with negative automatic thoughts. The sub-hypothesis for this study are the following:

1. Depressed hospitalized patients who receive the CTMP intervention will report significantly fewer symptoms of depression than those depressed hospitalized patients who do not receive this intervention.

2. Depressed hospitalized patients who receive the CTMP intervention will report significantly fewer symptoms of anxiety than those depressed hospitalized patients who do not receive this intervention.

3. Depressed hospitalized patients who receive the CTMP intervention will report significantly fewer negative automatic thoughts than those depressed hospitalized patients who do not receive this intervention.

4. Depressed hospitalized patients who receive the CTMP intervention will have a significantly shorter length of stay than those depressed hospitalized patients who do not receive this intervention.

5. Depressed hospitalized patients who receive the CTMP intervention will report significant post-treatment decreases in symptoms of depression, anxiety, and automatic thoughts.

Definition of Terms

Depression

For the purpose of this research study, depression was conceptually defined as a period for at least 2 weeks during which the individual either has a depressed mood, loss of interest or pleasure in nearly all activities. Depression was accompanied with significant distress or impairment in social, occupational, or other important areas of functioning. Five or more of the following symptoms need to be present during the same two week period and represent a change from previous functioning to be diagnosed with depression: 1) depressed mood most of the day and nearly every day, 2) diminished interest or pleasure in all or almost all activities, 3) significant weight loss when not dieting or weight gain, or a decrease or increase in appetite, 4) insomnia or hypersomnia, 5) psychomotor agitation or retardation, 6) fatigue or loss of energy, 7) feelings of worthlessness or excessive or inappropriate guilt, 8) diminished ability to think or concentrate, 9) recurrent thoughts of death. These symptoms were not due to physiological effects of a substance, general medical condition or bereavement (American Psychiatric Association, 1994). This study operationalized depression with the Beck Depression Inventory-II (Beck, Steer, & Brown, 1996).

Anxiety

Anxiety was conceptually defined as excessive worry occurring more days than not for at least 6 months. This worry was associated with three or more of the following six symptoms: restlessness, easily fatigued, difficulty concentrating, irritability, muscle tension and sleep disturbance. The anxiety, worry, or physical symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning. Anxiety was not due to the direct physiological effects of a substance or a general medical condition (American Psychiatric Association, 1994). This study operationalized anxiety with the Beck Anxiety Inventory (Beck & Steer, 1993).

Automatic Thoughts

Automatic Thoughts can be conceptually defined as negative or distorted thinking process found in depressed individuals. These thoughts often result in an intense or undesirable emotional response (Beck, 1976). This study operationalized automatic thoughts with the Automatic Thoughts Questionnaire (Hollon & Kendall, 1980).

Length of Stay

Length of Stay was conceptually defined as the number of days admitted in a hospital setting. The total continuous days of admission in a psychiatric inpatient setting accounted for the length of stay for this study.

Usual Treatment

Usual treatment was conceptually defined as prevailing treatment and nursing care received without manipulation. This included routine pharmacotherapy and group psychotherapy (Wright et al., 2002). There were no efforts to control or manipulate usual treatment.

Delimitations

The sample for this study was limited to psychiatric inpatients with a Diagnostic and

Statistical Manual of Mental Disorders-IV (DSM-IV) (American Psychiatric Association,

1994) diagnosis of depression. Exclusion criteria includes: 1) DSM-IV diagnosis of

schizophrenia, bipolar disorder (manic phase), dementia, mental retardation, borderline

personality disorder, antisocial personality disorder; 2) inability to read; 3) inability to

speak English; 4) electroconvulsive therapy within the previous six months and 5)

pregnancy.

Significance and Justification of the Problem

A Healthy People 2020 objective is to increase the proportion of providers who use

health information technology to improve individual and population health (U.S.

Department of Health and Human Services, 2000). Computerized cognitive behavioral

programs have the potential to improve access to care due to the technological advances

in computer hardware and software, increased use of computers in society and

effectiveness of computer based cognitive behavioral programs (Wright & Wright 1997).

There is preliminary support that these programs are helpful in treating people with

depression (Anderson et al., 2005; Cavanagh et al., 2006; Craske et al., 2009; Kenwright,

Marks, Gega, & Mataix-Cols, 2004; Learmonth & Rai,2008; Marks et al., 2003;

Proudfoot et al., 2004; Van Den Berg, Shapiro, Bickerstffe, & Cavanagh, 2004; Wright

et al., 2005; Wright et al., 2002).

Computerized cognitive behavioral programs also have the potential to be cost

effective treatments for depression when compared to standardized treatments. This is a

significant advantage as the total cost of depression in the United States is estimated to be 83 billion dollars when treatment costs and human costs such as lost worker productivity and suicide are factored (NIMH, 2006). The cost-utility analysis for a CCBT program indicates a highly competitive cost per quality adjusted life year relative to other interventions recommended for use in the National Health Service (McCrone et al., 2004). Significant productivity increases as indicated by a reduction in lost employment has been associated with computerized cognitive behavioral programs (McCrone et al., 2004) This is a significant advantage as lost worker productivity accounts for 51.5 billion dollars of the 83 billion total burden of depression (Greenberg et al., 2003).

Another advantage is that CCBT programs can serve as an adjunct to usual treatment in an effort to reduce length of stay. The researchers who conducted the two studies for Cognitive Therapy: A Multimedia Learning Program did not evaluate the program's effectiveness in reducing length of stay. This is a major limitation as this program has the potential to improve care while reducing hospital expenditures.

Summary

The purpose of this study was to determine if the symptoms attributable to depression in a selected group of hospitalized psychiatric patients would be decreased by the implementation of a computerized cognitive therapy program called Cognitive Therapy: A Multimedia Learning Program. Specifically, this study examined whether symptoms of depression, anxiety, and negative automatic thoughts improve with this adjunct intervention. A shortened length of stay in a psychiatric inpatient setting is an expected outcome. Beck's (1967) theory provided the framework for this experimental research study.

Chapter II

Review of Literature

This chapter presents a review of the theoretical and empirical literature relevant to the effects of a computerized cognitive behavioral intervention to treat depression. The literature that is supportive of this study includes Beck's theory of depression and anxiety.

Depression Theory

Beck's theory of depression (1967) was based on the premise that thoughts cause feelings. In other words, events by themselves have no emotional content but the interpretation of the event, an individual's thought, causes the emotions. Beck (1967) labeled all thoughts as automatic thoughts which consist of interpretations of events or experiences.

The depressed individual often focuses on the theme of loss as he or she incorrectly perceives something essential to happiness has been lost. This individual anticipates negative outcomes from an important undertaking and regards oneself as deficient. Preoccupation with repetitive themes creates a kind of tunnel vision in the depressed individual's thinking called selective abstraction. This individual focuses on a detail taken out of context, ignores more salient features of the situation, and conceptualizes the whole experience on the basis of this element. The individual often jumps to a conclusion when evidence is lacking or is actually contrary to the conclusion. Sometimes the individual over-generalizes based on a single incident or small piece of evidence. These

thoughts are often in the form of absolute statements with a disregard for the need to be flexible in one's thinking. The individual's thinking becomes one dimensional and stereotypical (Beck, 1967).

The depressed individual magnifies the intensity and significance of events. Minor mistakes become tragic failures, supportive suggestions become scathing criticism and slight obstacles become overwhelming barriers. The initial reaction to an uncomfortable minor event is to regard it as major catastrophe. Upon further evaluation the perceived catastrophic disaster is often a relatively minor problem that was magnified into a major event (Beck, 1967).

A depressed individual has been conditioned to interpret events a certain way by family, friends, and the media since childhood. Depressed individuals have learned and practiced automatic thoughts which are difficult to detect, evaluate and change. Change is possible as the individual is able to monitor, evaluate, and reconsider his or her own thoughts and inclinations, thereby activating alternative, more constructive modes of thinking (Clark, Beck, & Alford, 1999). Subsequently, depression improves as negative, unproductive thoughts are unlearned and changed with cognitive behavioral therapy (Beck, Rush, Shaw, & Emery, 1979).

Anxiety Theory

Metaphorically, an anxiety disorder can be conceptualized as a hypersensitive alarm system. The anxious individual is highly sensitive to stimuli and is vigilant about potential or perceived dangers. This individual experiences innumerable false alarms which keep him or her in a constant state of emotional stress and turmoil. This preoccupation with danger is manifested by the involuntary intrusion of automatic

thoughts whose content involves possible physical or mental harm. These thoughts tend to occur repetitively and rapidly and seem completely plausible at the time of their occurrence. Many times a thought is so fleeting that the individual is aware only of the anxiety it has generated. While the individual may agree that these fearful thoughts are illogical, his or her ability to view them objectively without help is limited. The individual behaves as though he or she believes in the validity of one's misinterpretations (Beck, Emery, & Greenberg, 1985).

Another characteristic of anxious thinking is its involuntary nature. Automatic thoughts exert a continuous pressure even though an individual has already determined that they are invalid and would like to be rid of them. The involuntary character of the anxious thinking and the other mechanisms may lead the individual to think he or she has lost control of their mind (Beck, Emery, & Greenberg, 1985).

One type of faulty thinking which is characteristic of many anxious patients is catastrophizing. Individuals who castatrophize tend to dwell on the worst possible outcome of any situation in which there is a possibility for an unpleasant outcome. The individual overemphasizes the probability of a catastrophic outcome or exaggerates the possible consequences of its occurrence. The anxious individual has no patience for uncertainty or ambiguity and views possible dangers in absolute, extreme terms which only increases anxiety as one approaches the danger situation. This anxiety can be manifested in numerous ways such as sweating, difficulty breathing, hands trembling, heart racing and wobbliness in legs. To alleviate the anxiety the individual can be trained to rewind and recover the automatic thought preceding the affect. Subsequently,

according to Beck's cognitive behavioral theory, anxiety should improve as these

thoughts are unlearned and changed (Beck, Emery, & Greenberg, 1985).

Cognitive Behavioral Theory

Cognitive therapy is an active, directive, time limited structured approach used to treat

depression and anxiety. Cognitive Therapy is based on an underlying theoretical rationale

that an individual's affect and behavior are largely determined by the way in which he or

she structures the world (Beck, 1967). The individual's cognitions are based on attitudes

or assumptions (schemas), developed from previous experiences (Beck, Rush, Shaw, &

Emery, 1979).

The therapeutic techniques are designed to identify, reality test, and correct distorted

conceptualizations as well as the dysfunctional beliefs (schemas) underlying these

cognitions. The individual learns to master problems and situations which he or she

previously considered impossible by re-evaluating and correcting his or her thinking. The

cognitive therapist assists the individual to both think and act more realistically and

adaptively about his or her psychological problems and thus reduce symptoms (Beck,

Rush, Shaw, & Emery, 1979).

A variety of cognitive and behavioral strategies are utilized in cognitive therapy.

Cognitive techniques are aimed at delineating and testing the individual's specific

misconceptions and maladaptive assumptions. This approach consists of highly specific

learning experiences designed to teach the individual the following operations: (1) to

monitor negative, automatic thoughts (cognitions); (2) to recognize the connections

between cognition, affect, and behavior; (3) to examine the evidence for and against

distorted thoughts; (4) to substitute more reality-orientated interpretations for these biased

cognitions; and (5) to learn to identify and alter the dysfunctional beliefs which predispose him or her to distort experiences (Beck, Rush, Shaw, & Emery, 1979).

Various verbal techniques are used to explore the logic behind and basis for specific cognitions and assumptions. The individual is initially given an explanation of the rationale of cognitive therapy. Next, he or she learns to recognize, monitor, and record one's negative thoughts on the Daily Record of Dysfunctional Thoughts. The cognitions and underlying assumptions are discussed and examined for logic, validity, adaptiveness, and enhancement of positive behavior versus maintenance of pathology (Beck, Rush, Shaw, & Emery, 1979). Behavioral techniques are used with more severely depressed individuals not only to change behavior, but also to elicit cognitions associated with specific behaviors. A sampling of these behavioral strategies include a Weekly Activity Schedule in which the individual logs his or her hourly activities; a Mastery and Pleasure Schedule, in which the individual rates the activities listed in his or her log; and Graded Task Assignments in which the individual undertakes a sequence of tasks to reach a goal which he or she considers difficult or impossible. Furthermore, behavioral assignments are designed to help the patient test certain maladaptive cognitions and assumptions (Beck, Rush, Shaw, & Emery, 1979).

Therapy generally consists of 15-25 sessions at weekly intervals. The moderately to severely depressed individual usually requires therapy on a twice-weekly basis for at least 4 to 5 weeks and then weekly for 10-15 weeks. The frequency of therapy is tapered to once every 2 weeks for the last few visits and booster therapy is recommended after the completion of the regular course of treatment. These follow up visits may be scheduled

on a regular basis or may be left to the discretion of the individual (Beck, Rush, Shaw, &

Emery, 1979).

Empirical Evidence for Depression and Anxiety

Kovacs and associates (1981) conducted a study with people aged 18 to 65 years with

moderate depression. The 17 men and 27 women who entered the clinical trial had a

median age of 33 years old. Nineteen patients were assigned to cognitive therapy and 25

to pharmacotherapy. The 12 week clinical trial involved as a maximum, 20 individual 50

minute cognitive therapy sessions or 12 individual 20 minute pharmacotherapy sessions.

Cognitive therapy patients received no psychotropic medication. Pharmacotherapy

consisted of Imipramine Hydrochloride in a flexible, single dose, 75 to 250 mg at

bedtime, which was increased to 150 mg by week 2 and either stabilized or further

increased as clinically indicated. The maximal dose was maintained up to week 10;

weeks 11 and 12 were used to taper and discontinue the medication regime. Each

pharmacotherapy session involved a check of medication side effects and nonspecific

supportive therapy.

Both interventions led to a marked reduction in depressive symptomatology and

decreased levels of anxiety. However, according to both self and evaluator rated

depressive symptom scales, cognitive therapy was associated with consistently better

results than was pharmacotherapy. The cognitive therapy group did significantly better on

two measures of depression for the Beck Depression Inventory, $F[1, 32] = 6.67$, $P < .02$;

for the clinician rated Hamilton Psychiatric Rating Scale for Depression, $F[1, 25] = 5.83$,

$P < .02$) and approached significance on the therapist completed Raskin Three Area

Depression Scale ($F\{1,27\} = 3.89$, $P < .06$). The decrease in levels of anxiety also

showed a trend in favor of the cognitive therapy patients ($F[1,23] = 3.75$, $P < .07$). The Minnesota Multiphasic Personality Inventory indicated the pharmacotherapy group showed more residual depressive and psychopathological symptoms than those treated with cognitive therapy (F scale, $P < .02$; D scale, $P < .02$; Sc scale, $P < .04$). These results support that cognitive behavioral therapy is effective in treating patients who are depressed and anxious (Kovacs, Rush, Beck, & Hollon, 1981).

Beck and associates (1985) conducted a study with a sample that consisted of nine men and 24 women between the ages of 20 and 65 years old. The patients had a minimum score of 20 or above on the self rated Beck Depression Inventory (BDI). The patients were randomly assigned to treatment groups: 18 to cognitive therapy alone and 15 to combined cognitive therapy and pharmacotherapy. The research protocol called for 20 therapy sessions during a 12 week period. The patients who completed cognitive therapy alone averaged 11.57 weeks in treatment with a mean of 13.64 sessions; the patients who completed cognitive therapy plus Amitriptyline therapy averaged 12.36 weeks with a mean of 16.19 sessions.

Beck Depression Inventory for cognitive therapy: Pretreatment $M = 31.00$, $STD = 7.63$ and post-treatment $M = 8.64$, $STD = 8.45$. Beck Depression Inventory for cognitive therapy with Amitriptyline Hydrochloride: Pretreatment $M = 30.00$, $STD = 7.81$ and post-treatment $M = 10.0$, $STD = 6.32$. Both cognitive therapy alone and combined cognitive therapy with Amitriptyline were found to be associated with significant reductions in depressive symptoms in outpatients with non-bipolar depression. Neither treatment proved superior to the other with regard to the magnitude of symptom reduction. This

study supported cognitive therapy with or without Amitriptyline was effective in treating depression (Beck, Hollon, Young, Bedrosian, & Budenx, 1985).

Thase, Bowler, and Harden (1991) reported on the use of cognitive therapy with a series of 16 medication-free depressed inpatients with major depression. Overall, the sample was moderate to severely depressed and at mid-life ($M = 35.2$ years). Patients received daily individual cognitive therapy sessions for up to 4 weeks (average number of sessions = 12.8). Thirteen of 16 patients (81%) met criteria for treatment response (Hamilton Rating Scale for Depression score < 10) at discharge. Mean Hamilton Rating Scale scores decreased from 21.7 to 7.7, and mean Beck Depression Inventory (BDI) scores decreased from 32.4 to 6.9. All p's < 0.001. The study results support that cognitive therapy is effective in treating depression.

Chen, Lu, Chang, Chu & Chou (2006) conducted a study with subjects who were psychiatric outpatients in a major medical center. These subjects had a score of 17 points on the BDI and at least 24 points on the Mini Mental Status Examination (MMSE). Patients in the experimental group received up to 12 weeks of cognitive behavioral group therapy. The comparison group started cognitive behavioral group therapy after the experimental group had completed therapy. The patients in the experimental group experienced a gradual decrease in depression level from the start of group therapy compared to the comparison group. The BDI decreased from 40.15 to 9.42. Immediately after cognitive behavioral group therapy and 1 month after completing therapy, the experimental group showed lower levels of depression than did the comparison group. Evaluation time showed statistical significance ($Z = -17.88$, $P < .0001$; $Z = -17.8$, P

<.0001). These study results support that cognitive behavioral therapy is effective in treating depressed patients.

Kehle (2008) conducted a study with patients experiencing debilitating worry. The treatment consisted of eight 50 minute sessions of individual CBT for generalized anxiety disorder. Treatment completers ($n = 8$) demonstrated a significant difference from pretreatment ($M = 67.13$, $SD = 7.30$) to post-treatment ($M = 60.13$, $SD = 9.83$), $t(7) = 2.48$, $p = .043$, on the Penn State Worry Questionnaire (PSWQ). The results also showed a significant difference between pre-treatment ($M = 21.13$, $SD = 10.49$) and post-treatment ($M = 13.13$, $SD = 9.06$) scores on the BDI, $t(7) = 2.45$, $p = .044$. Effect sizes were large for the PSWQ (.96) and medium for the BDI (.76). CBT for generalized anxiety disorder produced a moderate to large decrease in symptoms of worry and depression among those who completed the treatment.

Stanly and associates (2009) conducted a study with patients who had a DSM-IV principal or co-principal diagnosis of generalized anxiety disorder. Therapists provided CBT for a maximum of 10 individual sessions over 12 weeks. Patients randomized to enhanced usual care were telephoned biweekly during the first 3 months of the study by the same therapists to provide support and ensure patient safety. Patients randomized to receive CBT completed a mean of 7.4, ($SD = 1.91$) sessions in the primary care clinic. Patient randomized to receive enhanced usual care received a mean of 4.3, ($SD = 1.26$) telephone check ins.

The Penn State Worry Questionnaire (PSWQ) assessed patients completing CBT compared to those in the enhanced usual care group. Results were (45.6 [95% CI, 43.4-47.8] vs 54.4 [95% CI, 51.4-57.3], $P < .001$) with a mean change of 7.7 points in the

CBT group and 3.2 points in the enhanced usual care group. The Beck Depression

Inventory-II for patients who completed CBT compared to enhanced usual care was (10.2

[95% CI, 8.5-11.9] vs 12.8 [95% CI, 10.5-15.1], *P* = .02. The results supported that

cognitive behavioral therapy improved anxiety and depression (Stanley et al., 2009).

Computerized Cognitive Behavioral Therapy Programs

Cognitive behavior therapy is highly effective for adult depressed individuals

compared to other psychotherapies such as psychodynamic, interpersonal, non-directive

and supportive therapies (Butler, Chapman, Forman, & Beck, 2006; Gloaguen, Cottraux,

Cucherat, & Blackburn, 1998). The paucity of trained cognitive behavioral therapists to

treat individuals with depression continues to be a barrier for improved outcomes (Office

of Surgeon General, 1999; Wright et al., 2005). A possible solution is a computerized

cognitive behavioral therapy program which has the potential to be disseminated on a

large scale in a cost effective manner.

The first computer program for depression was developed in the 1980's by Selmi and

colleagues for mild to moderate depression. This software, a breakthrough in the

development of computer assisted therapy, incorporated multiple choice questions, case

vignettes, and self monitoring in an effort to teach patients how to use cognitive therapy

principles to reduce symptoms (Wright & Wright, 1997). Teaching texts were augmented

by tests, exercises, homework and role plays to ensure comprehension. The program

presented psychoeducational material, allowed users to work at their own pace and

recorded patient responses (Wright & Wright, 1997).

To determine the effectiveness of this program a total of 36 outpatients with a

depression diagnosis were recruited either for the computer administered, the therapist

administered or the wait list control group intervention. In the computer condition, the patients had only minimal contact with the experimenter who helped start and end the sessions. Post hoc analysis of simple effects indicated that group differences were significant at week 6 ($F = 4.55$, $df = 2,31$, $p < 0.02$), after treatment ($F = 4.66$, $df = 2,31$, $p < 0.02$), and at follow up ($F = 3.34$, $df = 2,31$, $p < 0.0001$). The subject's Beck Depression Inventory score before and after the computerized administered therapy was respectively $M = 21.2$, $SD = 3.96$; $M = 10.33$, $SD = 5.18$. The therapist administered pre-treatment and post-treatment score was $M = 23.18$, $SD = 7.19$; $M = 11.64$, $SD = 8.20$. The control group pre-treatment and post-treatment score was $M = 22.92$, $SD = 5.02$; $M = 18.50$, $SD = 9.32$ (Selmi, Klein,Greist, Sorrel, & Erdman, 1990).

The subject's Automatic Thoughts Questionnaire score before and after the computerized administered therapy was respectively $M = 78.75$, $SD = 20.27$; $M = 54.33$, $SD = 18.03$. The therapist administered therapy score before and after treatment was respectively $M = 90.73$, $SD = 25.20$; $M = 62.73$, $SD = 23.53$. The control group pre-treatment and post-treatment scores was $M = 82.08$, $SD = 17.30$; $M = 84.17$, $SD = 32.73$. There was no significant difference in the Automatic Thoughts Questionnaire scores at pre-treatment ($F = 0.699$, $df = 2, 33$, $p < 0.50$). Both treatment groups had significantly lower Automatic thoughts Questionnaire scores after treatment and at follow up than the control subjects group $F = 11.75$, $df = 2,31$, $p < 0.0002$ (Selmi, Klein, Greist, Sorrel, & Erdman, 1990).

These results indicated that the Selmi program was just as effective in the treatment of highly educated mild to moderately depressed outpatients as compared to a cognitive behavioral therapist. Comparison of group means showed that both treated groups had

lower Beck Depression Inventory scores than did control subjects. It is uncertain if similar results would be found with another population of depressed patients who might be severely depressed or have less than college credits (Selmi, Klein, Greist, Sorrel, & Erdman, 1990). Therefore, the generalizability of this study is limited to mildly to moderately depressed college educated individuals.

A computerized cognitive behavioral program called Overcoming Depression was developed in response to the Selmi's program sole reliance on written text. Overcoming Depression uses written text to provide information on depression and a module that simulates dialogue between a therapist and a patient. This program enables the patient to express himself or herself in his or her own words while the computer responds accordingly in natural language.

To determine the effectiveness of Overcoming Depression program, a total of 22 depressed inpatients were randomly assigned to usual treatment as the control condition, usual treatment plus therapist delivered cognitive behavioral therapy and usual treatment plus computer assisted cognitive behavioral therapy. The usual treatment component of each of the treatments included participation in the activities of the inpatient ward (milieu therapy, occupational therapy, vocational rehabilitation and informal talks with the staff) and use of antidepressant medication. Patients in the therapist delivered cognitive behavioral treatment group received cognitive behavioral therapy according to the Beck manual (Bowers, Stuart, MacFarlane, & Gorman, 1993).

The average number of days spent in the hospital did not differ between groups ($F =$ 1.060, $df = 2$, $P < 0.336$) although subjects who were treated by a therapist were significantly less depressed than those who received computerized cognitive behavioral

therapy. This conclusion was based on post-treatment BDI ($P < 0.049$) at discharge and post-treatment HRSD ($P < 0.005$) scores. The depressed inpatients had a higher response rate to therapist delivered cognitive behavioral therapy as evidenced with pre-treatment $M = 32.9$, $SD = 12.8$; post-treatment $M = 9.0$, $SD = 6.1$ in comparison to computer assisted cognitive behavioral therapy pre-treatment $M = 32.0$ $SD = 11.2$; post-treatment $M = 16.8$, $SD = 3.8$ (Bowers, Stuart, MacFarlane, & Gorman, 1993).

Significant post-treatment differences between groups were found for both the BDI ($F = 3.672$, $df = 2$, $p < 0.046$) and for the HRSD ($F = 6.418$, $df = 2$, $P < 0.007$). This outcome suggested that therapist delivered cognitive behavioral therapy is more effective than computer assisted cognitive therapy for hospitalized clients (Bowers et al., 1993). These findings are in sharp contrast to Selmi and associates (1990) research results. A factor that may have accounted for the differences in outcomes was the inpatients in this study were more severely depressed than the outpatients in the Selmi study (Bowers et al., 1993).

The researchers reported a number of conceptual issues that may have accounted for this outcome. First, Overcoming Depression focused primarily on cognitive interventions to decrease the symptoms of depression. In contrast, therapist delivered cognitive behavioral therapy not only focused on the cognitive changes which accompany depression, but also on specific behavioral modifications which were used to begin to change patients' behaviors. These behavioral interventions set the stage for subsequent cognitive interventions and increased patients' understanding of the interaction of their thoughts, feelings, and behavior. Second, the computer assisted cognitive behavioral program also lacked the capacity to develop individualized homework assignments and

deal with issues of noncompliance related to homework assignments. This was a significant limitation to this computerized cognitive behavioral program as regular homework assignments in cognitive behavioral treatment are an important component of treatment (Beck, Rush, Shaw & Emery, 1979). Third, a human therapist is capable of attending to and addressing a number of non-verbal cues, such as facial expressions, posture, and psychomotor movement in contrast to a computer. Human therapists can attend to variations in tone, latency of speech and changes in clinical presentation which is unrecognizable to a computer (Bowers et al., 1993).

Another conceptual issue was the program's inability to understand the patient's communication in an appropriate context as it often misinterpreted a phrase or focused on an irrelevant word, consequently redirecting the entire conversation and creating confusion for the user. Lowered energy and physical problems also interfered with use of this program that requires the patient to read large amounts of text, type responses, and understand computerized feedback that can be ambiguous or confusing (Stuart & LaRue, 1996).

Another consideration is the small sample size ($n = 22$) could have attributed to the outcome as three of the patients originally recruited for the study dropped out of treatment after being assigned to computer assisted CBT. These recruits withdrew from the study because they did not wish to be involved in treatment with a computer. Two additional patients withdrew from the computer assisted CBT treatment after completing two sessions, which eliminated them from the final data analysis. The result was a small sample of 6 assigned to the computer assisted cognitive behavioral treatment. Thus, the researchers concluded that therapist delivered CBT should remain the standard of care for

depressed inpatients until programming and implementation issues with the Overcoming

Depression program were corrected (Bowers et al., 1993).

Cognitive Therapy: A Multimedia Learning Program

In response to the issues with Overcoming Depression program, Wright and

colleagues developed Cognitive Therapy: A Multimedia Learning Program (CTMP). This

program is the first designed and tested multimedia program for computer assisted

therapy (Wright & Wright, 1997). A study of the Cognitive Therapy: A Multimedia

Learning Program was conducted with 40 inpatients and 56 outpatients at the Norton

Psychiatric Center in Louisville, Kentucky. In this uncontrolled, preliminary trial,

subjects used Cognitive Therapy: A Multimedia Learning Program along with usual

treatment which consisted of pharmacotherapy and psychotherapy such as supportive

therapy, cognitive-behavioral therapy, and psychodynamic therapy. The research design

was naturalistic as the subjects were permitted to use the computer program at their own

pace as no attempt was made to control the frequency of use of the computer program.

Subjects completed the Automatic Thoughts Questionnaire (ATQ) (Hollon & Kendall,

1980), Beck Depression Inventory (BDI) (Beck, Steer, & Brown 1996), and Beck

Anxiety Inventory (BAI) (Beck & Steer, 1993) prior to the beginning of the computer

program, at midpoint, and immediately after finishing the program. The subjects' primary

diagnoses were major depression (86.4%), bipolar disorder (6.3%), anxiety disorder

(5.2%), and dysthymia (2.1%). The sample included 67.7% females and 41.7% of the

subjects were inpatients. Over three quarters of the subjects completed the entire

computer program and 94% completed at least the first three modules. Mean scores on

measures of depression pre and post-treatment respectively $M = 25.2$, $SD = 10.5$; M

=11.6., *SD* = 10, anxiety *M* = 20.7, *SD* = 12.1; *M* = 10.5, *SD* =10.0, and automatic

thoughts *M* = 66.6, *SD* =27.3; *M* = 27.3, *SD*= 25.3 (Wright et al., 2002).

There were several limitations to this study which included the following: First, there

was no comparison group comparing the effectiveness of this program as an adjunct to

usual treatment compared to usual stand alone treatment. Thus, it is unclear if the

outcome is attributed to usual treatment or the CTMP. Second, the researchers did not

measure whether this program along with usual treatment was effective in reducing

length of stay. A reduction in length of stay would indicate the program was a cost

effective intervention. Third, the study was uncontrolled as no attempt was made to

control or monitor the frequency of the CTMP intervention. Thus, it is unclear if the

subject's exposure to this program affected the outcome. Fourth, the sample consisted of

subjects who had mild anxiety thus the extent to which the findings can be generalized to

a broader or more moderately to severely anxious population remains open to further

study (Wright et al., 2002). Lastly, this study was conducted by the developers of the

program who have vested interests in the success of the program. There are no

independent studies evaluating the effectiveness of this program.

Wright and associates (2005) conducted a second study that evaluated the

effectiveness of the Cognitive Therapy: A Multimedia Learning Program with 45

medication free non-psychotic depressed outpatients. These subjects were randomly

assigned to 8 weeks of the CTMP, plus to standard cognitive therapy, or to a wait list

control group. Treatment with this program included nine sessions with a therapist (first

session = 50 minutes, subsequent sessions = 25 minutes) and eight 20-30 minute

computer sessions that followed immediately after sessions with the therapist. Standard

cognitive behavioral therapy was delivered in nine sessions with a therapist for 50 minutes over eight weeks. The patients assigned to the wait list received no treatment during the 8 week waiting period which impacted the results.

Patients treated with the Cognitive Therapy: A Multimedia Learning Program and standard cognitive behavioral therapy achieved significantly more improvement in depression severity than the patients on the wait list condition as assessed by both the Hamilton Depression Rating Scale and the Beck Depression Inventory. At week 8, both active treatment groups improved significantly more than the wait list control group ($p <$ 0.05) on the Hamilton Depression Rating Scale and Beck Depression Inventory ($p =$ 0.001). This program was associated with significant improvement in dysfunctional attitudes such as negative core beliefs and automatic thoughts (Wright et al., 2005).

The findings suggested that a computer adjunct has several advantages in teaching patients basic cognitive therapy methods to reduce negative automatic thoughts. First, the multimedia format uses video, audio, and interactive exercises to engage the patient and reinforce learning. These methods could help users better understand cognitive therapy principles and gain practice in building skills. Second, the computer program is designed to reliably deliver educational content every time it is used, whereas clinicians may chose to pay more or less attention to teaching skills for modifying dysfunctional thinking. Third, the computer program directly targets underlying schemas and dysfunctional attitudes for change which is an advantage (Wright et al., 2005).

The findings also have implications for issues of treatment access and cost. Clinicians offering the Cognitive Therapy: Multimedia Program were able to reduce treatment time by almost half while maintaining efficacy. This program along with therapist contact was

associated with effect sizes comparable to those observed in face to face therapy. The effect sizes without therapist contact was considerably more modest and reflect lower completion rates probably due to the absence of a therapist that would help motivate a client and reinforce his or her progress (Titov, 2007). The strengths of the Cognitive Therapy: Multimedia Program was a high completion rate, a reduction in clinician time and efficacy in treating depression.

An additional strength was fidelity measures indicated that Cognitive Therapy: Multimedia Program was offered with a high level of precision. The ability to standardize aspects of treatment with this program offers a strategy for aiding dissemination of cognitive behavioral therapy on a larger scale. This implication has the potential to improve timely access to cognitive behavioral therapy for individuals who might be placed on a wait list due to the paucity of trained cognitive therapists (Wright et al., 2005).

Despite these advantages there are several limitations to this program. One limitation is the researchers did not attempt to control or monitor whether patients had sought additional treatment. Thus, a maintained response during the follow up phase cannot be attributed unambiguously to the effects of acute therapy with the Cognitive Therapy: A Multimedia Learning Program. Second, the sample consisted of subjects who had moderately often negative thoughts thus the extent to which the findings can be generalized to a broader or more severely distorted population remains open to further study (Wright et al., 2005). Finally, the researchers who are the developers of the program have an inherent bias and interest in the success of the program. Independent

research trials need to be conducted to determine the effectiveness of the program for depression.

Therefore, this study proposed an independent scientific determination with regard to the effectiveness of the Cognitive Therapy: A Multimedia Program in treating depression, anxiety, and automatic thoughts. Length of stay was evaluated to determine if this program had an impact on treatment costs for depressed hospitalized individuals.

Chapter III

Methods

This chapter will describe the research design, setting, sampling methods, the instruments and procedures for data collection and analysis. This study used an experimental research design to investigate the effects of the Cognitive Therapy: A Multimedia Learning Program on depressed psychiatric inpatients.

Research Setting

The subjects for this study were recruited from a behavioral health hospital that treats various psychiatric diagnoses. According to US News World Report (2012), this hospital is ranked fourth in psychiatry across the nation and number one in the state of New York.

Sample

The sample was recruited from the adult behavioral health inpatient units. All subjects who participated in the study met the established criteria of a DSM-IV (American Psychiatric Association, 1994) diagnosis of major depression and were psychiatric inpatients who were at least 18 years of age or older. Exclusion criteria included: 1) DSM-IV primary diagnoses of schizophrenia, bipolar disorder (manic phase), dementia, mental retardation, borderline personality disorder, antisocial personality disorder; 2) inability to read; 3) inability to speak English: 4) electroconvulsive therapy within the previous six months and 5) pregnancy.

The magnitude of the effect of the therapy was taken into consideration to determine the sample size. Glass's effect size is the mean difference between the treated and control subjects divided by the standard deviation of the control group (Smith & Glass, 1977). In Wright and associates (2005) study, the effect size for the Beck Depression Inventory

(Beck, Steer, & Brown 1996) was 0.71 and for the Automatic Thoughts Questionnaire (Hollon & Kendall, 1980) 1.05. A required sample size of 43 subjects for each group was calculated as necessary to fulfill the power requirement based upon a statistical power of .70 with a population eta squared at a .05 alpha (Cohen, 1992).

Sampling Methods

An IRB-approved flyer was placed at the nursing station and patient bulletin board on the inpatient unit (Appendix F). The investigator requested personnel on the inpatient units to identify potential subjects for the study. The investigator asked the staff nurses on the unit to speak with potential subjects to determine subject interest and possible study participation. Potential subjects who expressed interest in learning more about the study were educated by the investigator regarding the purpose of the study and the risks versus benefits of participation. Questions about the study were addressed prior to obtaining written informed consent.

Beck Depression Inventory-II

The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item self-report tool designed to measure the extent to which respondents experience symptoms of major depressive disorder such as sadness, self criticism, loss of interest, and worthlessness (Appendix A). Examples of items include: "I am so sad or unhappy that I can't stand it" and "I blame myself for everything bad that happens." Each item consists of four statements reflecting varying degrees of symptom severity. The respondents are instructed to circle the number which ranges from 0 to 3 that corresponds to the statement that best applies to them. A rating of 0 indicates an absence of a symptom where as a rating of 3 is indicative of a severe symptom. The total score for the

BDI-II ranges from 0 to 63. Scores of 0 to13 are suggestive of minimal depression; scores 14 to19 are suggestive of mild depression; scores of 20 to 28 are indicative of moderate depression; and scores of 29 or greater are suggestive of severe depression. The completion time for this measurement tool is largely dependent on severity of depression and the ability to concentrate. Beck and associates (1996) suggest the completion time for the BDI-II is approximately 10-15 minutes.

Beck and colleagues (1996) indicated that the item development for the BDI-II was based on the Diagnostic and Statistical Manual of Mental Disorders-IV (American Psychiatric Association, 1994) and does not reflect a particular theory. The indicators for depression for the DSM-IV were obtained from literature reviews, clinical studies and field studies. Content experts validated the indicators of depression for the DSM-IV.

Beck and colleagues (1996) investigated the psychometric properties of the BDI-II. An exploratory factor analysis was conducted with the responses from psychiatric outpatients diagnosed with various psychiatric disorders. The outpatient sample included men and women from various ethnic backgrounds who were between the ages of 13 to 86 years old. There were two factors that emerged with an eigenvalue greater than one. These two factors represent a Somatic-Affective and Cognitive dimension of self reported depression. Steer, Rissmiller, and Beck (2000) also found the same two factor structure as Beck and colleagues (1996) in male and female geriatric depressed inpatients.

Beck and colleagues (1996) administered at the same time the BDI-II and Amended Beck Depression Inventory (BDI-IA) to 191 outpatients. These researchers found the

mean BDI-IA and BDI-II scores were respectively 18.92 (*SD* = 11.32) and 21.88 (*SD* = 12.69). The BDI-II had a higher sensitivity to self reported depression than the BDI-IA.

Beck, Steer, Ball, and Ranieri (1996) conducted a study with psychiatric outpatients that included both men and women from diverse ethic backgrounds with a mean age of 38 years old. The mean BDI-II total scores were 2.01 points higher compared to the BDI-IA total scores. The researchers suggested rewording of several items in the BDI-II detected more potentially depressed outpatients than the former wording in the BDI-IA.

Beck and colleagues (1996) administered the BDI-IA one week apart from the BDI-II to the same outpatients. The mean BDI-II score was 21.3 (*SD* = 11.50) which is significantly greater than the BDI-IA total score 18.15 (*SD* = 9.99). This result reaffirms the BDI-II is a highly sensitive instrument that measures depression. Beck and colleagues (1996) established convergent validity with the Hamilton Psychiatric Rating Scale for Depression (.71) and the Beck Hopelessness Scale (*r* = .68).

Dutton and colleagues (2004) supported concurrent validity with African American primary outpatients. Patients with a diagnosis of current major depression had significantly greater BDI-II total scores (*M* = 23.12, *SD* = 8.66) compared to patients without this diagnosis (*M* = 8.23, *SD* = 7.50) *t*(218) = 12.83, *p* < .001). According to Beck and colleagues (1996), patients with major depression have higher BDI-II scores than patients without this diagnosis.

Grothe and colleagues (2005) provided further support for concurrent validity in a study with low income African Americans who were recruited from medical outpatient clinics. The sample consisted of both men and women who ranged in age from 20 to 81 years old. Participants with a diagnosis of current major depression had significantly

greater BDI-II total scores (*M* = 23.12, *SD* = 8.66) compared with patients without this diagnosis (*M* = 8.23, *SD* = 8.66) *t*(218) = 12.83, *p* < .01).

Beck and colleagues (1996) reported evidence of reliability of the BDI-II with a coefficient alpha of .92 for outpatients and .93 for college students. The stability of the BDI-II over time was based on outpatients who were administered the BDI-II their first and second therapy sessions which was approximately one week apart. The BDI-II was deemed stable as the test-retest correlation was .93 (*p* < .001) and the coefficient alpha was .91.

Steer and colleagues (2000) provided further support that the BDI-II is reliable with a coefficient alpha 0.89 in Caucasian and African American clinically depressed geriatric inpatients with a mean age of 75 years old. In a subsequent study, Dutton and colleagues (2004) presented evidence that the BDI-II was reliable in African American primary care patients as the coefficient alpha was .90 and the corrected item total correlations for the BDI-II ranged from .35 to .67 which indicates good index similarity (Brink & Wood, 1998). Grothe and colleagues (2005) reported the BDI-II to be reliable with an alpha coefficient of .90 in low income depressed African Americans.

Beck Anxiety Inventory

The Beck Anxiety Inventory (BAI) (Beck & Steer, 1993) is a 21- item self-report questionnaire measuring symptoms of clinical anxiety (Appendix B). The respondents indicate the degree to which they are bothered by each symptom on a four point scale ranging from 0 (not at all) to 3 (severely, I could barely stand it). The total scores can range from 0 to 63 with higher scores corresponding to higher levels of anxiety. A total sum between 0 and 21 indicates very low anxiety, a total sum between 22 and 35

indicates moderate anxiety, and a total sum that exceeds 36 indicates a high level of

anxiety. Thirteen items assess physiological symptoms, five describe cognitive aspects,

and three represent both somatic and cognitive symptoms (Beck, Brown, Epstein, &

Steer, 1988).

The Beck Anxiety Inventory has a coefficient alpha greater than or equal to 0.91 in

adult depressed non-psychotic outpatients, affective and anxious psychiatric outpatients,

psychiatric inpatients and medical patients (Beck, Brown, Epstein, & Steer; 1998; Enns,

Cox, Parker, & Guertin, 1998; Fyrich, Dowdall, & Chambless, 1992; Hewitt & Norton,

1993; Kabacoff, Segal, Hersen, & Hasselt, 1997; Steer, Clark, Beck, & Ranieri; 1998;

Wetherall & Arean, 1997).The BAI is a reliable instrument to measure anxiety as the

coefficient alpha is .80 or above (Brink & Wood, 1988).

Inter-item correlations between .30 and .70 indicate significant index stability between

items (Brink and Wood, 1998). The BAI item correlations ranged from 0.37 to 0.69 in

psychiatric outpatients ages 55 years and older (Kabacoff et al., 1997). In adult medical

patients the BAI total correlation ranged from .48 to .70 (Wetherall & Arean, 1997). The

BAI item total correlations ranged from .30 to .71 in psychiatric patients with a

predominantly affective and anxiety disorder (Beck, Brown, Epstein, & Steer, 1998). The

test-retest correlation of .75 in this population was strong and significant indicating the

BAI is a stable instrument (Munro, 2005).

Kabacoff and colleagues (1997) administered the BAI to psychiatric outpatients ages

55 years and older. These researchers found a significant mean total difference between

patients with an anxiety disorder ($M = 21.75$, $SD =13.11$) and patients without an anxiety

disorder ($M = 14.44$, $SD = 10.93$) $t(215) = 4.38$, $p < .00001$).

In psychiatric outpatients, the BAI correlation with the Cognition Checklist-Depression subscale was .22 ($df = 150$) and Cognition Checklist- Anxiety subscale was .51 ($df = 151$). Similarly, the BAI correlation with the Hamilton Depression Rating Scale was .15 ($df = 158$) compared to the Hamilton Anxiety Rating Scale was .56 ($p < .001$) in the same sample (Beck et al., 1988).These results support that the BAI has good discriminant validity (Brink & Wood, 1998).

In support of discriminant validity, Hewitt and Norton (1993) used a principal component factor analysis to factor all of the BAI items and BDI items for psychiatric inpatients and outpatients. After Varimax rotation it was found that all of the BDI items except item Item19 (weight loss) loaded highest on Factor 1 (cognitive) with loading ranging between .27 and .75. Moreover, all BAI items loaded highest on Factor 2 (somatic) with loadings range between .41 and .69. Item 19 from the BDI loaded .26 on this second factor. Thus, it appears that items from the BAI and from the BDI are distinguishable from one another, which provides some additional support for the discriminant validity of the BAI.

Automatic Thoughts Questionnaire

The Automatic Thoughts Questionnaire (ATQ-30) (Hollon & Kendall, 1980) was developed to measure the frequency of occurrence of automatic negative statements about self associated with depression (Appendix C). The ATQ-30 focuses on four aspects of automatic thoughts: personal maladjustment and desire for change, negative self concepts and negative expectations, low self esteem and helplessness. Items are rated on the frequency of occurrence from "not at all" to "all the time." Total scores are the summation of all 30 items. The total scores can range from 30 to 150 with higher scores

corresponding to more pervasive negative automatic thoughts. This instrument was designed to measure change in cognition due to clinical interventions (Hollon & Kendall, 1980).

An initial pool of items was generated by asking 788 male and female undergraduate students to recall an experience in their lives that they had found to be depressing. Subjects were instructed to record whatever thoughts had "popped into their head" in that situation. A total of 100 self reported self statements were selected for subsequent use, forming the initial automatic thoughts questionnaire (Hollon & Kendall, 1980).

The ATQ-30 was tested on a sample of 312 undergraduates with a mean age of 20 years old. Using the item selection sample data, 30 of the original 100 ATQ items were found to significantly discriminate between the depressed and non-depressed criterion groups at the .01 level. An independent t test indicated significantly higher scores, $t(17) = 4.85$, $p < .001$, for the depressed subjects. The mean ATQ-30 for the depressed subjects was 79.64 ($SD = 22.29$) while the mean ATQ-30 for the non-depressed subjects was 48.57 ($SD = 10.89$) (Hollon & Kendall, 1980).

The ATQ-30 in this population yielded a coefficient alpha of α= .96 which indicates it is a highly reliable instrument (Brink & Wood, 1998; Hollon & Kendall, 1980). All ATQ-30 item total correlations were significant at or beyond the .001 level. Individual item total correlations ranged from $r = .47$ ("I've let people down") to $r = .78$ ("My life's not going the way I want it to"). These consistently moderate to strong correlations indicate that each item is significantly related to the total score (Hollon & Kendall, 1980). The State Trait Anxiety Inventory (STAI) also correlated with the ATQ-30 ($r = .79$) which indicated highly significant convergent validity (Munro, 2005).

In a subsequent study with 114 male and female clients from a local mental health center and two physician private practices, the ATQ-30 demonstrated higher scores for the depressed subjects $F(2,58) = 78.20$, $p < .001$). The mean for this group was 88.90 (*SD* = 21.15), whereas the mean for the non-depressed medical patients averaged 38.35 (*SD* = 8.17) (Harrel & Ryon, 1983).

Reliability measures for the depressed cases revealed a coefficient alpha of $\alpha = .94$ (*p* < .001) further supporting the instrument's strong reliability (Brink & Wood, 1998; Harrel & Ryon, 1983). All the ATQ-30 item total correlations for the criterion groups sample and for the total sample were significant at the .001 level. Correlations ranged from .56 to .91 which indicates significant index stability between items (Brink & Wood, 1998).

Chioqueta and Stiles (2006) conducted a study with a sample of 289 male military recruits. The coefficient alpha was $\alpha = .94$ which indicated the ATQ-30 is a reliable instrument (Brink & Wood, 1998). Moderate to strong item-total correlations were found with values that ranged from .38 to .73 which further supports the index stability between items.

Demographic Questionnaire

The Study Inclusion/ Demographic Questionnaire were used to collect data on the participants. Participants' age, gender, ethnicity marital status, education, occupation, current employment, income level and past history with CBT were collected (Appendix D).

Procedure for Data Collection and Analysis

The personnel on the inpatient units at the behavioral health hospital identified potential subjects for the study. An IRB approved recruitment flyer that briefly described the study and gave information on how to contact the principal investigator was posted on the patient bulletin boards and at the nursing station (Appendix F). In order to facilitate recruitment into the study, the research investigator made daily contact with unit personnel. Recruitment took place on the unit that potential subjects are assigned to for treatment.

The research investigator met with potential study subjects in a private conference room at the recruitment site to discuss the purpose of the study and risks versus benefits. The investigator asked the study subjects to repeat back and discuss their level of understanding of the information provided to determine their comprehension level prior to obtaining consent (Appendix G). The subjects were given a packet to complete that contains the demographic questionnaire, the BDI-II (Beck, Steer, & Brown 1996), BAI (Beck & Steer, 1993), and ATQ-30 (Hollon & Kendall, 1980). The investigator reviewed each instrument with the subject and was available to answer questions while the subject completed the instruments. The packet included a card that indicated either assignment to the usual treatment or the computerized cognitive behavioral therapy intervention.

Usual Treatment Group

The usual treatment group received the prevailing treatment and nursing care received without manipulation. This included routine pharmacotherapy and group psychotherapy. The subjects were randomized to the usual treatment group and asked to complete upon admission the demographic questionnaire, BDI-II, BAI, and ATQ-30. These three

instruments and a medication questionnaire (Appendix E) were administered for a second time the day prior or on day of the subjects' discharge. There were two affirmative answers to the question "I have thoughts of killing myself, but I would not carry them out" on the discharge BDI-II. These affirmative answers required the investigator to immediately inform the subject's therapist.

Computerized Cognitive Behavioral Therapy Group

The computerized cognitive behavioral therapy group received the computerized intervention along with usual treatment. The investigator met with subjects in a private conference room at the hospital. The subjects were asked to complete prior to the computerized cognitive intervention a demographic questionnaire, the BDI-II (Beck, Steer, & Brown 1996), BAI (Beck & Steer, 1993), and ATQ-30 (Hollon & Kendall, 1980). The computerized cognitive behavioral intervention was delivered via a desk top computer on wheels.

The program was password protected and individualized as the subject's response was stored in the computer. The program took approximately four hours to complete. An appointment was made each time with the subject to schedule a date and time for the intervention. The investigator was available for the sole purpose of answering questions about the program throughout the intervention. A total of four one-hour sessions were scheduled and delivered over a one week period. All the subjects (*n=43*) in this group completed the four hours of the computerized intervention. The BDI-II (Beck, Steer, & Brown 1996), BAI (Beck & Steer, 1993), and ATQ-30 (Hollon & Kendall, 1980) and medication questionnaire was administered one day prior to or on the day of discharge. There was six affirmative answers to the question "I have thoughts of killing myself, but I

would not carry them out" on the discharge BDI-II. These affirmative answers required the investigator to immediately inform the subject's therapist.

Human Subjects Protection

This study was submitted to the Institutional Review Board of Rutgers, The State University of New Jersey and the behavioral health hospital to ensure that the rights of human subjects were protected prior to data collection. There was minimal risk to subjects participating in this research and the treatment was noninvasive. The study was voluntary and confidential with minimal risks involved which was explained prior to obtaining informed consent. There was one unexpected emotional response where the subject was upset as he felt that he was not prepared to be discharged from the hospital. The investigator informed the subject's individual therapist which resulted in the subject's discharge being cancelled as per his request. There were no adverse events that needed to be reported to the IRB.

The investigator maintained a list of the names of the research subjects and their corresponding code numbers in a password protected computer. Only the investigator had access to the password. The research instruments were labeled with a code number and not the study subjects' name. The data were coded and entered into a password protected computer using the Statistical Package for the Social Sciences (SPSS) version 17. The computer files were backed up onto a USB flash drive that was maintained in a locked cabinet. The investigator only had access to the cabinet.

Data were obtained for research purposes and no reference to a specific individual will be made in any published reports or presentations. Computer files and the back up USB

flash drive will be destroyed after completion of the research study and the third year of the mandatory IRB data maintenance period.

Data Analysis Plan

Inferential statistics was used to draw conclusions from the sample population tested. The Statistical Package for the Social Sciences (SPSS) version 17 was used to code and tabulate scores and provide summarized values where applicable. Descriptive statistics including frequency counts and percent statistics were computed for the demographic variables. Multivariate analysis of covariance (MANCOVA), independent sample t-test, and paired-sample t-test analyses were used to test the research hypotheses. Prior to analysis, the data was screened for missing data and outliers and the assumptions of MANCOVA (normality, linearity, homogeneity of variance-covariance matrices, multicollinearity and homogeneity of regression slopes), and t-test (normality and homogeneity of variance) was evaluated.

Chapter IV

Analysis of the Data

Major depression is a serious medical illness affecting 15 million American adults in a given year (NAMI, 2009). The purpose of this study was to determine if the symptoms attributable to depression in a selected group of hospitalized psychiatric patients would be decreased by the implementation of a computerized cognitive therapy program called Cognitive Therapy: A Multimedia Learning Program. Specifically, this study examined if symptoms of depression, anxiety, and negative automatic thoughts improved with this adjunct intervention.

Data collection for this study was conducted over a 12 month period. Variables studied included depression, anxiety, negative automatic thoughts and length of stay. Depression was measured using the Beck Depression Inventory-II (Beck, Steer, & Brown 1996). Anxiety was measured using the Beck Anxiety Inventory (Beck & Steer, 1993). Automatic thoughts was measured using the Automatic Thoughts Questionnaire (Hollon & Kendall, 1980). Length of stay was measured from the point of admission into the hospital until discharge. The results of the analysis of the data for this study are presented in this chapter.

Research Questions and Hypotheses

The following five hypotheses were developed based on Beck's theory of depression and existing empirical literature.

Table 1 breaks down each hypothesis in terms of the variables, technique used to test the hypothesis and significance level of the results.

1. Depressed hospitalized patients who receive the CTMP intervention will report significantly fewer symptoms of depression than those depressed hospitalized patients who do not receive this intervention.

2. Depressed hospitalized patients who receive the CTMP intervention will report significantly fewer symptoms of anxiety than those depressed hospitalized patients who do not receive this intervention.

3. Depressed hospitalized patients who receive the CTMP intervention will report significantly fewer negative automatic thoughts than those depressed hospitalized patients who do not receive this intervention.

4. Depressed hospitalized patients who receive the CTMP intervention will have a significantly shorter length of stay than those depressed hospitalized patients who do not receive this intervention.

5. Depressed hospitalized patients who receive the CTMP intervention will report significant post-treatment decreases in symptoms of depression, anxiety, and automatic thoughts.

Table 1.

Independent Variables, Dependent Variables, Statistical Techniques and Significance Level of Results for Hypotheses 1-5

Hyp.	Independent Variable	Dependent Variable	Control	Statistical Technique	*p*
1	Group	Post-Depression	Pre-Depression	MANCOVA	.006*
2	Group	Post-Anxiety	Pre-Anxiety	MANCOVA	.146
3	Group	Post- Automatic Thoughts Scores	Pre-Automatic Thoughts	MANCOVA	.111
4	Group	Length of Stay	N/A	Independent Samples T-Test	.093
5	Time Point	Depression Scores Anxiety Scores Automatic Thoughts Scores	N/A	Paired-Sample T-Tests (1) Wilcoxin-Signed Rank (2)	< .001 < .001 < .001

Note. Group = Treatment or Control. Asterisks indicate that the relationship was significant at *p* < .05.

Data Analysis Procedure

Inferential statistics were used to draw conclusions from the sample population tested. The Statistical Package for the Social Sciences (SPSS) version 17 was used to code and tabulate scores and provide summarized values where applicable. Descriptive statistics including frequency counts and percent statistics were computed for the demographic variables. MANCOVA, independent sample t-test, and paired-sample t-test analyses were used to test the research hypotheses. Prior to analysis, the data were screened for missing data and outliers and the assumptions of MANCOVA (normality, linearity, homogeneity of variance-covariance matrices, multicollinearity and homogeneity of regression slopes), and t-test (normality and homogeneity of variance) were evaluated. If the assumptions were met, the proposed analysis was conducted. If the assumptions were not met the appropriate steps were taken.

Sample

Ninety-one subjects expressed interest in the study. A total of five subjects were withdrawn from the study. Three subjects from the usual treatment group were

withdrawn from the study for various reasons. One subject received electroconvulsive treatment which met the criteria for exclusion for this study. Another agreed to participate although was discharged the same day she signed the consent forms. The third subject became notably overtly psychotic during the course of her hospitalization.

Two subjects from the computerized cognitive behavioral therapy group were withdrawn from the study. One subject decided she was no longer interested in participating in the study. The other subject left the hospital earlier than planned at the subject's request. The remaining 86 subjects were randomized either into the usual treatment group ($n = 43$) or computerized cognitive behavioral therapy group ($n = 43$).

Demographics

The average age for the subjects included in the current study was 37.47 years (ranging from 18 to 62 years of age). The majority of the subjects were Caucasian (48%), female (93%), single (50%) and had some college (41%). Most subjects were not currently working (58%) which reflected an annual income range of 0 to 10,000 dollars (51%). Most participants were diagnosed with depression (73%) and had no previous exposure to cognitive behavioral therapy (63%). The subjects who had previous exposure to cognitive behavioral therapy (37%) were exposed to mostly group therapy (41%). Baseline sample characteristics for all of the subjects in this study are shown in Table 2. The most significant between group differences was previous exposure to cognitive behavioral therapy. The computerized cognitive therapy group had more (41.9%) previous exposure to cognitive therapy than the (32.6%) control group as shown in Table 3.

Table 2

Count and Percent Statistics for Demographic Variables

Variable		Frequency	Percent
Gender	Female	80	93.00
	Male	6	7.00
	Total	86	100.00
Ethnicity	Caucasian	41	47.70
	Black	16	18.60
	Hispanic	21	24.40
	Asian	2	2.30
	Other	6	7.00
	Total	86	100.00
Psychiatric Diagnosis	Bipolar (Depressed & PTSD)	2	2.44
	Bipolar (Depressed)	14	17.07
	Depression	60	73.17
	Depression (Anxiety)	5	6.10
	Depression/Bipolar Disorder/ADD	1	1.22
	Total	82	100.00
Marital Status	Single	43	50.00
	Married	21	24.40
	Divorced	12	14.00
Variable		Frequency	Percent
	Separated	5	5.80
	Widowed	4	4.70
	Other	1	1.20
	Total	86	100.00
Highest Education	High school drop out	11	12.80
	High school graduate	8	9.30
	Some college	35	40.70
	College graduate	19	22.10
	Other	13	15.10
	Total	86	100.00
Currently Working	Yes	36	41.90
	No	50	58.10
	Total	86	100.00
Income	0 - 10,000	44	51.20
	10,000 - 20,000	12	14.00
	20,000 - 30,000	8	9.30
	30,000 -40,000	6	7.00
	40,000-50,000	4	4.70

	Other	12	14.00
	Total	86	100.00
Previous Exposure to Cognitive Therapy	Yes	32	37.20
	No	54	62.80
	Total	86	100.00
Level of exposure of Cognitive Behavioral Therapy	Individual	6	18.80
	Group	13	40.60
	Books	3	9.40
	Groups and Books	2	6.30
	Individual, Groups and Books	3	9.40
	Books and Seminars	1	3.10
	Individual and Groups	4	12.50
	Total	32	100.00

Table 3

Previous Exposure to Cognitive Behavioral Therapy

Variable	Previous Exposure To Cognitive Behavioral Therapy	Frequency	Percent
Control	Yes	18	41.9
	No	25	58.1
	Total	43	100.0
Intervention	Yes	14	32.6
	No	29	67.4
	Total	43	100.0

Psychometric Properties of Instruments

The depression, anxiety and automatic thought scales were assessed for reliability at both time points using Cronbach's alpha statistic. Cronbach's alpha is a measure of internal consistency. Conceptually, Cronbach's alpha, is the average of each item correlated with every other item (Furr & Bacharach, 2008). Cronbach's alpha estimates above .70 were considered adequate. All of the alpha statistics were above .80 indicating

the items for each scale at both time points were highly consistent with each other (see

Table 4 below).

Table 4

Cronbach's Alpha for Depression, Anxiety and Automatic Thoughts Scales at Time 1 and

Time 2

Scale	# of Items	Cronbach's Alpha
Depression T1	21	.897
Anxiety T1	21	.911
Automatic Thoughts T1	30	.969
Depression T2	21	.893
Anxiety T2	21	.892
Automatic Thoughts T2	30	.974

Note. n = 85-86

Data Management

Prior to analysis of Hypotheses 1-5, the data were screened for missing data and

outliers, by group, if applicable. Missing data was evaluated using frequencies and

univariate outliers were evaluated by transforming raw scores on the DV to z-scores and

comparing the z-scores to a criterion of +/- 3.29, $p < .001$ (Tabachnik & Fidell, 2007).

Scores that exceed this critical value are considered extreme and should not be included

in the analysis. For hypotheses 1-3, multivariate outliers were evaluated using

Mahalanobis distance scores. The critical value for Mahalanobis distance with three

variables is 22.458. Cases with Mahalanobis distance scores above the critical value were

removed.

For Hypotheses 1-3, the assumptions of MANCOVA (normality, linearity,

homogeneity of variance-covariance matrices, multicollinearity and homogeneity of

regression slopes) were evaluated. Normality was evaluated using histograms, skewness

and kurtosis statistics. To determine if a variable was significantly skewed, the skewness

statistic was divided by the standard error of skewness and the resulting coefficient was compared to the critical value of +/- 3.29, $p < .001$. If a variable was non-normal, the variable was transformed in an attempt to normalize the distribution. If the variable was negatively skewed, it was reflected prior to transformation (Tabachnik & Fidell, 2007). Linearity was evaluated using scatterplots between each covariate-dependent variable and dependent variable-dependent variable pair, by group. Homogeneity of variance-covariance matrices were evaluated using Box's M Test of Equality of Covariance Matrices. Multicollinearity was evaluated by computing bivariate correlation coefficients for each pair of dependent variables. If the correlations exceeded .90, multicollinearity was an issue. Homogeneity of regression slopes was evaluated by testing if the interaction of the independent variable and the covariate was significant in the MANCOVA. If the interaction was significant, it means that the relationship between the covariate and the dependent variable was different depending on group (i.e. level of the independent variable). When the assumption of homogeneity of regression slopes is violated, the equation used to adjust mean scores on the dependent variable, depending on the covariate, is not accurate and MANCOVA is not appropriate. If the assumption was violated, difference scores were computed by subtracting pre-test scores from post-test scores for the offending variable and this new variable was used in an ANOVA.

For Hypotheses 4 and 5, the assumptions of t-test were evaluated (normality and homogeneity of variance). Normality was evaluated using the process described above. Homogeneity of variance was evaluated using Levene's test.

Multivariate Analysis of Covariance: Hypotheses 1-3

A multivariate analysis of covariance was used to test Hypotheses 1-3. Prior to

analysis the data were screened for missing data and outliers and the assumptions of

MANCOVA were tested. There was no missing data or multivariate outliers; however

two univariate outliers were identified and removed. After the univariate outliers were

removed the sample sizes were $n = 41$ for the control group and $n = 43$ for the treatment

group. None of the variables were significantly skewed at Time 1 (admission); however,

both anxiety and automatic thoughts were significantly positively skewed at Time 2

(discharge) for one or both groups. There were more low scores than high scores on the

anxiety and automatic thoughts variables. A square root transformation was performed on

the anxiety variable and an inverse transformation was performed on the automatic

thoughts variable to attempt to normalize the distributions. Although, the transformations

were successful in normalizing the distributions, the results of the MANCOVA were the

same regardless of whether the transformed or non-transformed variables were used. The

results using the non-transformed variables are reported to aid understanding. The

assumptions of linearity, multicollinearity and homogeneity of regression slopes were

met. The assumption of homogeneity of variance-covariance matrices was also met at $p <$

.001(Tabachnik & Fidell, 2007; Box's M = 14.964, F (6, 48408.356) = 2.395, $p = .026$).

Descriptive statistics for the three dependent variables by group are provided in Table 5

below.

Table 5

Descriptive Statistics for Covariates and Dependent Variables Included in Hypotheses 1-

3

Group	Variable	n	Range	Minimum	Maximum	Mean	Std. Deviation
Control	T1 Anxiety	41	56	1	57	26.683	13.466
	T1 Depression	41	44	8	52	31.268	11.728
	T1 Automatic Thoughts	41	107	43	150	101.756	32.434
	T2Anxiety	41	25	0	25	6.756	5.407
	T2 Depression	41	23	0	23	8.220	5.575
	T2Automatic Thoughts	41	70	32	102	46.732	15.555
Intervention	T1Anxiety	43	47	8	55	29.279	12.066
	T1 Depression	43	42	13	55	32.837	9.464
	T1 Automatic Thoughts	43	95	53	148	102.930	27.938
	T2 Anxiety	43	34	0	34	9.442	7.875
	T2 Depression	43	31	1	32	13.209	9.536
	T2AutomaticThoughts	43	90	30	120	53.047	23.378

Of the three covariates included in the model, only the multivariate main effect of

anxiety was statistically significant (Wilk's Lambda = .766, F (3, 77) = 7.855, $p < .001$,

partial eta squared = .234). Approximately 23% of the variance in the composite

dependent variable scores was explained by pre-anxiety scores (compared to 24% when

transformed variables were used). The multivariate main effect of treatment group

(treatment or control) bordered on significance (Wilk's Lambda = 0.905, F (3, 77) =

2.698, $p = 0.052$, partial eta squared = 0.095). Approximately 10% of the variance in the

composite dependent variable scores was explained by treatment group after controlling

for pre-test scores on anxiety, depression and automatic thoughts (compared to 12%

when the transformed variables were used). The multivariate model summary is provided

in Table 6 below.

Table 6

Multivariate Model Summary for MANCOVA for Hypotheses 1-3

Effect	Wilk's Lambda	*F*	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	0.674	12.438	3	77	0.000	0.326
T1 Anxiety	0.766	7.855	3	77	0.000	0.234
T1 Depression	0.917	2.335	3	77	0.080	0.083
T1 Automatic Thoughts	0.915	2.392	3	77	0.075	0.085
Treatment	0.905	2.698	3	77	0.052	0.095

Note. DV = Linear composite of Post-Test Anxiety, Depression and Automatic Thoughts Scores, *n* = 41 for Control Group and *n* = 43 for Treatment group.

Hypothesis 1 Findings

Hypothesis 1 stated: Depressed hospitalized patients who receive the CTMP intervention will report significantly fewer symptoms of depression than those depressed hospitalized patients who do not receive this intervention. The univariate main effect of treatment was significant for depression (*F* (1, 79) = 7.829, *p* = .006, partial eta squared = .090; see Table 7 below). Approximately 9% of the variance in depression scores was explained by group (treatment or control), after controlling for pre-test scores on anxiety, depression and automatic thoughts. After controlling for pre-test anxiety, depression and automatic thoughts scores, the intervention group had significantly higher post-test depression scores (*M* = 13.072) than the control group (*M* = 8.364; see Figure 1 below). Based on this information, the hypothesis that depressed hospitalized patients who receive the CTMP intervention will report significantly fewer symptoms of depression than those depressed hospitalized patients who do not receive this intervention was not accepted.

Table 7

Univariate Model Summary for Hypothesis 1

Source	SS	df	MS	*F*	Sig.	Partial Eta Squared
Corrected Model	973.730b	4	243.432	4.171	0.004	0.174
Intercept	217.366	1	217.366	3.724	0.057	0.045
T1Anxiety	36.028	1	36.028	0.617	0.434	0.008
T1Depression	323.117	1	323.117	5.536	0.021	0.065
T1AutomaticThoughts	27.258	1	27.258	0.467	0.496	0.006
T1_Treatment	456.942	1	456.942	7.829	0.006	0.090
Error	4610.972	79	58.367			
Total	15335	84				
Corrected Total	5584.702	83				

Note. DV = Post-Depression Scores, $n = 41$ for Control Group and $n = 43$ for Treatment Group

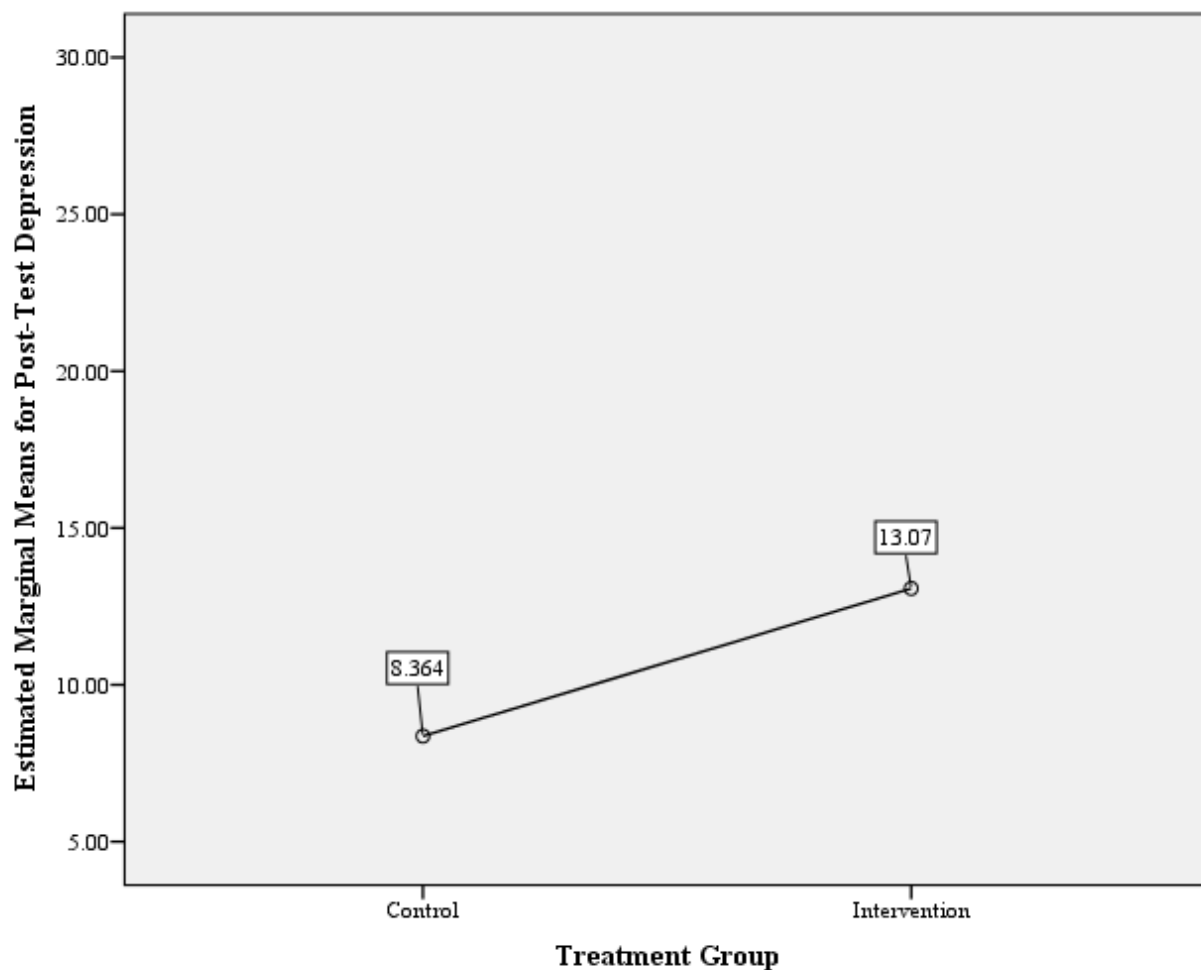Figure 1. Plot of mean post-test depression scores, by group, after controlling for pre-test anxiety, depression and automatic thoughts.

Hypothesis 2 Findings

Hypothesis 2 stated: Depressed hospitalized patients who receive the CTMP intervention will report significantly fewer symptoms of anxiety than those depressed hospitalized patients who do not receive this intervention. The univariate main effect of

treatment was not significant for anxiety (F (1, 79) = 2.156, p = .146, partial eta squared

= .027; see Table 7 below). Only 3% of the variance in anxiety scores was explained by

group (treatment or control), after controlling for pre-test scores on anxiety, depression

and automatic thoughts. After controlling for pre-test anxiety, depression and automatic

thoughts scores, there was not a significant difference in mean post-test anxiety scores

depending on group (M = 7.050 and 9.1662 for control and treatment groups,

respectively; see Table 8 below). Based on this information, the hypothesis that depressed

hospitalized patients who receive the CTMP intervention will report significantly fewer

symptoms of anxiety than those depressed hospitalized patients who do not receive this

intervention was not accepted.

Table 8

Univariate Model Summary for Hypothesis 2

Source	SS	df	MS	F	Sig.	Partial Eta Squared
Corrected Model	558.105a	4	139.526	3.273	0.015	0.142
Intercept	162.676	1	162.676	3.816	0.054	0.046
T1 Anxiety	283.438	1	283.438	6.649	0.012	0.078
T1 Depression	61.777	1	61.777	1.449	0.232	0.018
T1 Automatic Thoughts	93.878	1	93.878	2.202	0.142	0.027
T1 Treatment	91.915	1	91.915	2.156	0.146	0.027
Error	3367.455	79	42.626			
Total	9479	84				
Corrected Total	3925.56	83				

Note. DV = Post-Anxiety Scores, n = 41 for Control Group and n = 43 for Treatment Group

Hypothesis 3 Findings

Hypothesis 3 stated: Depressed hospitalized patients who receive the CTMP

intervention will report significantly fewer negative automatic thoughts than those

depressed hospitalized patients who do not receive this intervention. The univariate main

effect of treatment was not significant for automatic thoughts (F (1, 79) = 2.598, p = .111,

partial eta squared = .032; see Table 9 below). Only 3% of the variance in automatic

thoughts was explained by group (treatment or control), after controlling for pre-test

scores on anxiety, depression and automatic thoughts. After controlling for pre-test

anxiety, depression and automatic thoughts scores, there was not a significant difference

in mean post-test automatic thoughts scores depending on group (M = 46.432 and 53.332,

for control and treatment groups, respectively; see Figure 2 below). Based on this

information, the hypothesis that depressed hospitalized patients who receive the CTMP

intervention will report significantly fewer negative automatic thoughts than those

depressed hospitalized patients who do not receive this intervention was not accepted.

Table 9

Univariate Model Summary for Hypothesis 3

Source	SS	df	MS	F	Sig.	Partial Eta Squared
Corrected Model	3619.128c	4.000	904.782	2.395	0.057	0.108
Intercept	11076.77	1.000	11076.774	29.316	0.000	0.271
T1 Anxiety	1981.143	1.000	1981.143	5.243	0.025	0.062
T1 Depression	274.296	1.000	274.296	0.726	0.397	0.009
T1 Automatic Thoughts	337.904	1.000	337.904	0.894	0.347	0.011
T1 Treatment	981.505	1.000	981.505	2.598	0.111	0.032
Error	29849.77	79.000	377.845			
Total	243169	84.000				
Corrected Total	33468.89	83.000				

Note. DV = Post-Automatic Thoughts Scores, n = 41 for Control Group and n = 43 for Treatment Group

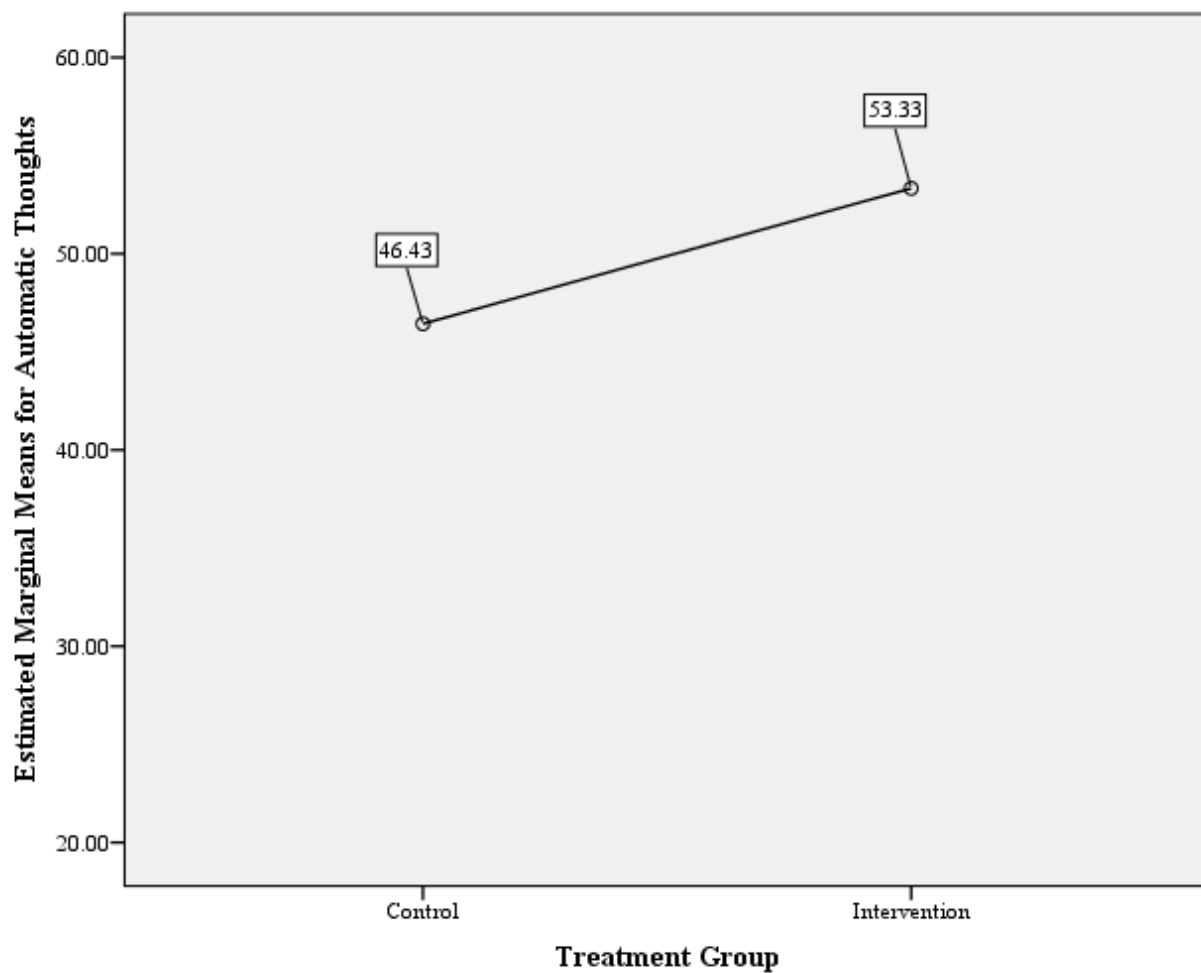Figure 2. Plot of mean post-test automatic thoughts scores, by group, after controlling for pre-test

anxiety, depression and automatic thoughts.

Hypothesis 4 Findings

Hypothesis 4 stated: Depressed hospitalized patients who receive the CTMP

intervention will have a significantly shorter length of stay than those depressed

hospitalized patients who do not receive this intervention. An independent samples t-test

was used to test Hypothesis 4. Prior to analysis the data were screened for missing data

and univariate outliers. No missing data was identified; however, two cases were

identified as univariate outliers and were removed from the data set. After the univariate

outliers were removed, the sample sizes were $n = 42$ for both the treatment group and the

control group. Levene's test was not significant ($F = 1.649$, $p = .203$), thus the

assumption of homogeneity of variance was met. Descriptive statistics for length of stay,

by group is provided in Table 10 below.

Table 10

Descriptive Statistics for Length of Stay, by Group

Group	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Control	42	14	5	19	9.86	3.22	10.37
Intervention	42	22	5	27	11.36	4.74	22.43

The independent samples t-test was not significant (t (82) = -1.697, $p = 0.093$, eta

squared = .034). There was not a significant mean difference in length of stay depending

on group (M = 9.86 and 11.36 for the control and treatment groups respectively). Based

on this information, the hypothesis that depressed hospitalized patients who receive the

CTMP intervention will have a significantly shorter length of stay than those depressed

hospitalized patients who do not receive this intervention was not accepted.

Hypothesis 5 Findings

Hypothesis 5 stated: Depressed hospitalized patients who receive the CTMP

intervention will report significant post-treatment decreases in symptoms of depression,

anxiety, and automatic thoughts. One paired sample t-tests, and two Wilcoxon Signed

Rank tests, were used to test Hypothesis 5. The assumptions of normality were tested

prior to the analysis. The assumption was violated for both anxiety and automatic

thoughts so the Wilcoxon-Signed Rank test (the non-parametric alternative to the paired samples t-test) was used instead. Non-parametric tests do not require that the distribution be normal.

The paired sample t-test comparing mean depression scores at Time 1 and Time 2 was significant (t (42) = 11.950, p < .001, eta squared = .773). The mean depression score at Time 1 (M = 32.84) was significantly higher than the mean depression score at Time 2 (M = 13.21). According to Cohen (1988), this is a large effect (eta squared = .773). Based on this assumption, the hypothesis that depressed hospitalized patients who receive the CTMP intervention will report significant post-treatment decreases in symptoms of depression was accepted.

The Wilcoxon-Signed Rank test comparing anxiety scores at Time 1 and Time 2 was significant (z = -5.544, p < .001, r = -.599). The median anxiety score at Time 1 ($\bar{\alpha}$ = 30.00) was significantly higher than the median anxiety score at Time 2 ($\bar{\alpha}$ = 8.00). According to Cohen (1988), this is a large effect (r = -.599). Based on this information, the hypothesis that depressed hospitalized patients who receive the CTMP intervention will report significant post-treatment decreases in symptoms of anxiety was accepted.

The Wilcoxon-Signed Rank test comparing automatic thoughts scores at Time 1 and Time 2 was significant (z = -5.652, p < .001, r = -.609). The median automatic thoughts score at Time 1 ($\bar{\alpha}$ = 104.00) was significantly higher than the median automatic thoughts score at Time 2 ($\bar{\alpha}$ = 43.00). According to Cohen (1988), this is a large effect (r = -.609). Based on this information, the hypothesis that depressed hospitalized patients who receive the CTMP intervention will report significant post-treatment decreases in

negative thoughts was accepted.

Additional Findings

In this study, approximately 85.7% subjects were prescribed antidepressant medications upon discharge from the hospital. The most common antidepressant medication that subjects were prescribed was Bupropion. Desyrel, also known for its antidepressant properties, was often prescribed for insomnia. An additional finding was 27.5% subjects were prescribed medications for anxiety upon discharge. The most common medication for anxiety that subjects were prescribed was Clonazepam.

Summary

The purpose of this study was to determine if the symptoms attributable to depression in a selected group of hospitalized psychiatric patients would be decreased by the implementation of a computerized cognitive therapy program called Cognitive Therapy: A Multimedia Learning Program (CTMP). It was hypothesized that subjects who participated in the CTMP would have significantly fewer symptoms of depression, anxiety, negative automatic thoughts as well as shorter length of stay as compared to the usual treatment group.

The subjects in the computerized cognitive therapy group reported significantly less depressive symptoms, anxiety, and negative automatic thought scores at discharge. However, these same subjects did not report fewer symptoms of depression, anxiety, and negative automatic thoughts compared to the usual treatment group. Additionally, there was not a significant mean difference in length of stay depending on whether subjects received the additional computerized cognitive behavior therapy, or not. The following

chapter will provide a more detailed discussion of the findings with regard to the hypotheses.

Chapter V

Discussion of the Findings

The purpose of this study was to determine if the symptoms attributable to depression in a selected group of hospitalized psychiatric patients would be decreased by the implementation of the computerized cognitive therapy program, called Cognitive Therapy: A Multimedia Learning Program. Beck's (1967) theory of depression provided the framework for this experimental research. This chapter presents the investigator's interpretation of the findings of the data in light of the theoretical framework and past empirical studies from which the hypotheses were derived.

Discussion of Hypothesis 1

Hypothesis 1 stated: Depressed hospitalized patients who receive the CTMP intervention will report significantly fewer symptoms of depression than those depressed hospitalized patients who do not receive this intervention. This hypothesis was derived from Beck's Theory of Depression (1967), which stated events by themselves have no emotional content but the interpretation of the event, an individual's thought, causes the emotions. Depression improves as negative, unproductive thoughts are unlearned and changed with cognitive behavioral therapy.

In the present study, the computerized intervention group had a significantly higher post-test depression score than the control group. Based on this information, the hypothesis that depressed hospitalized patients who receive the CTMP intervention will report significantly fewer symptoms of depression than those depressed hospitalized patients who do not receive this intervention was not accepted. There are several possible explanations for the lack of support of this hypothesis.

One explanation entails the differences in dose of the intervention between this study and Wright and associates (2005) study whose subjects received nine individual sessions with a therapist along with eight computer sessions. This is in sharp contrast to this study where the subjects did not receive individual sessions with a therapist along with the computerized sessions. The investigator was present during the delivery of the computerized intervention for the sole purpose to answer questions. It is possible in Wright and associates (2005) study that the nine individual therapy sessions could have potentially served to enhance the therapeutic effect of the computerized treatment. Therefore, the differences in the dose of the intervention may have accounted for the differences in the outcome between these two studies.

Another explanation is both groups in this study had access to usual treatment which included cognitive behavioral groups. The attendance at these groups was not measured thus it is unknown how frequent the subjects attended these groups. There is a possibility that the control group attended more of the cognitive behavioral groups than the computerized intervention group which could have potentially served to enhance the treatment response for the control group. Therefore, similar to Wright and associates

(2005) study, the differences in the dose of the intervention may have accounted for the subjects in the computerized group not reporting fewer symptoms of depression, anxiety and negative thoughts as compared to the control group.

   A third explanation is the control group in this study had more previous exposure to cognitive behavioral therapy than the computerized group. Therefore, the control group had a foundation or familiarity with cognitive behavioral therapy which could have

facilitated learning as well as attendance to the cognitive therapy groups. There is a possibility that previous exposure to cognitive therapy could have positively impacted the control group thus resulting in a greater decrease in depression, anxiety and negative automatic thought scores than the computerized intervention group.

   Another possible explanation for lack of support of this hypothesis entails the differences between studies with regard to the timing of the delivery of the computerized program. In Wright and associates (2005) study, the outpatient subjects were able complete eight 20-30 minute computer sessions over an eight week period. In comparison, the subjects in this study completed four one-hour computerized sessions over approximately a one week period. The computerized program was delivered over a one week period or less to ensure all four sessions were completed due to the short length of inpatient hospital admissions. The problem with this delivery time is acutely depressed inpatients often experience a diminished cognitive ability which could make it a challenge to fully comprehend the computerized treatment sessions. Thus, the timing of the implementation of the computerized program could have accounted for the CTMP intervention not having a greater decrease in symptoms of depression, anxiety, and negative thoughts as compared to the usual treatment group.

Another explanation for differences in outcomes between this study and Wright and

associates (2005) study is this study delivered the computerized intervention in a

controlled manner where all the subjects in the computerized group received all four

sessions just once along with usual treatment. There was no additional treatment

delivered or sought outside the routine usual treatment for inpatients. This is in sharp

contrast to Wright and associates (2005) study as there was no attempt to control

treatment or monitor whether patients had sought additional treatment. Thus, a

maintained response during the follow up phase in Wright and associates (2005) study

cannot be attributed unambiguously to the effects of the computerized intervention.

Therefore, not controlling for outside treatment could have accounted for the differences

in outcomes between these two studies.

Lastly, another explanation for the lack of support of this hypothesis is the possibility

that therapist delivered treatment for moderately to severely depressed inpatients is more

effective than a computerized intervention The CTMP might not be the most appropriate

initial treatment compared to a human therapist who is capable of attending to and

addressing a number of non-verbal cues such as facial expressions. Human therapists can

also attend to variations in tone, latency of speech and changes in clinical presentation

which is unrecognizable to a computer (Bowers et al., 1993). This limitation is significant

as hospitalized patients are more ill then ever.

Bowers and associates (1993) reported that severely depressed inpatients had a higher

response rate to therapist delivered cognitive behavioral therapy as evidenced with pre-

treatment $M = 32.9$, $SD = 12.8$; post-treatment $M = 9.0$, $SD = 6.1$ in comparison to

computer assisted cognitive behavioral therapy pre-treatment $M = 32.0$ $SD = 11.2$; post-

treatment $M = 16.8$, $SD = 3.8$. Similar to the results in Bowers and associates (1993)

study, the subjects in this study might have been too acutely ill during their brief inpatient

hospitalization to respond to the computerized program.

Discussion of Hypothesis 2

Hypothesis 2 stated: Depressed hospitalized patients who receive the CTMP

intervention will report significantly fewer symptoms of anxiety than those depressed

hospitalized patients who do not receive this intervention. This hypothesis is derived

from Beck's Theory of Cognitive Behavioral Therapy (1985), which states anxious

individuals experience an involuntary intrusion of automatic thoughts whose content

involves possible physical or mental harm. The individual can be trained to rewind and

recover the automatic thought preceding the affect. Subsequently, anxiety improves as

these thoughts are unlearned and changed with cognitive behavioral therapy (Beck,

Emery, & Greenberg, 1985).

In the present study, this hypothesis was not supported as there was not a significant

difference in mean post-test anxiety scores depending on group. The following are

several possible explanations that may account for this outcome: dose of intervention, the

timing of the delivery of the computerized program, control for additional treatment,

previous exposure to cognitive therapy, access to cognitive therapy groups and severity

of anxiety. Similar to the discussion for hypothesis 1, dose of intervention, the timing of

the delivery of the computerized program, control for additional treatment, previous

exposure to cognitive therapy, and access to cognitive therapy groups could have

accounted for the non-significant difference in the mean post-test anxiety scores depending on group.

Another possible explanation is baseline anxiety level as the subjects in both groups in this study had moderate anxiety where as the subjects in Wright and associates (2002) study reported mild levels of anxiety at baseline. Subsequently, in this study moderately anxious subjects received the computerized program over one week or less to ensure all four sessions were completed due to the short length of inpatient hospital admissions. The problem with this delivery time is acutely anxious inpatients often experience cognitive

symptoms such as inability to recall important things, confusion, distractibility, and cognitive distortion (Beck, Emery, & Greenberg, 1985). These cognitive symptoms in moderately anxious subjects have the potential to interfere with their ability to think or concentrate which would make it a challenge to fully comprehend the computerized modules which require concentration. Therefore, severity of anxiety compounded with the timing of the delivery of the intervention could have accounted for the differences in outcomes between these two studies (See Table 11 below).

Table 11

Comparison of Baseline Anxiety for Hypothesis 2

Studies	Measure	Baseline
Wright et al., 2002	BAI	Mean = 20.27, SD = 12.1
Present Study Control T1	BAI	Mean = 26.68, SD = 13.5
Intervention T1	BAI	Mean = 29.28, SD = 12.1

Discussion of Hypothesis 3

Hypothesis 3 stated: Depressed hospitalized patients who receive the CTMP intervention will report significantly fewer negative automatic thoughts than those

depressed hospitalized patients who do not receive this intervention. According to Beck (1976), automatic thoughts consist of events or experiences that are spontaneous, appear valid, and associated with problematic behavior or disturbing emotions. Negative, unproductive, pervasive automatic thoughts can be unlearned and changed with cognitive behavioral therapy (Beck, Rush, Shaw, & Emery, 1979).

In this study, there was not a significant difference in mean post-test automatic thoughts scores depending on group. The following are several possible explanations that may account for this outcome: dose of intervention, delivery time of computerized

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program, control for additional treatment, previous exposure to cognitive behavioral therapy, access to cognitive therapy groups and severity of negative thoughts. Similar to the discussion for hypothesis 1, dose of intervention, delivery time of the computerized program, control for additional treatment, previous exposure to cognitive therapy and access to cognitive therapy groups could have accounted for the non-significant difference in mean post-test automatic thought scores depending on group.

Another possible explanation is the inpatient subjects in this study had severely pervasive negative thoughts. This is in sharp contrast to the 45 medication-free outpatient subjects who reported less severe negative thoughts in Wright and associates (2005) study. Subsequently, in this study depressed subjects with severe negative thoughts received the computerized program over one week or less to ensure all four sessions were completed due to the short length of inpatient hospital admissions. The problem with this delivery time is acutely depressed inpatients with severe negative thoughts often experience cognitive symptoms such as persistent, distorted, and self-perpetuating negative automatic thoughts that are hard to turn off or change because they are ingrained

into the thinking of individuals (Beck, 1976). These cognitive symptoms in depressed

subjects with severe negative thoughts have the potential to interfere with the ability to

think or concentrate which could make it a challenge to fully comprehend the

computerized modules which requires cognitive concentration. Therefore, severity of

negative thoughts compounded with delivery time of the intervention could have

accounted for the differences in outcomes between these two studies (See Table 12

below).

Table 12

Comparison of Baseline Automatic Thoughts for Hypothesis 3

Studies	Measure	Baseline
Wright et al., 2005 Computer Assisted	ATQ	Mean = 58.3, SD = 20.7
Standard cognitive therapy	ATQ	Mean = 41.9, SD = 16.0
Wait list condition	ATQ	Mean = 61.9, SD = 22.6
Present Study Control T1	ATQ	Mean = 101.8, SD = 32.4
Intervention T1	ATQ	Mean = 102.9, SD = 27.9

Discussion of Hypothesis 4

Hypothesis 4 stated: Depressed hospitalized patients who receive the CTMP

intervention will have a shorter length of stay than those depressed hospitalized patients

who do not receive this intervention. It was hypothesized that subjects in the

computerized therapy group would have a greater decrease in symptoms of depression,

anxiety and automatic thoughts thus prompting an earlier discharge date. In Beck's

Theory of Depression (1967), depression as well as anxiety improve as negative thoughts

are changed with cognitive behavioral therapy. Additionally, the empirical literature

supports the efficacy of the CTMP with improving symptoms of depression, anxiety and

automatic thoughts (Wright et al., 2005; Wright et al., 2002).

In the present study, there was not a significant mean difference in length of stay

depending on group. One explanation is the subject's insurance company has a significant role in determining the length of inpatient hospital admission. The insurance companies prefer brief inpatient admissions as longer admissions are quite costly (Greenberg et al., 2003; United States Department of Health & Human Services, 2001). Insurance is a variable that was not measured nor controlled for in this study although it could have accounted for the outcome.

Another explanation is the challenge to ascertain outpatient hospital provider appointments. It is the practice of the setting where the research was conducted that each patient has an appointment with an outpatient provider within five days of discharge. Sometimes discharges are rescheduled to a later date due to failure to secure an outpatient hospital provider appointment. This is a variable that was not measured as well as not controlled for in this study and it could have accounted for the outcome.

Discussion of Hypothesis 5

Hypothesis 5 stated: Depressed hospitalized patients who receive the CTMP intervention will report significant post-treatment decreases in symptoms of depression, anxiety, and automatic thoughts. The Cognitive Therapy: A Multimedia Learning Program was developed based on Beck's Theory (1967) of Depression. This computerized program was developed to assist the individual to identify misconceptions, test the validity of the thought, and substitute with more appropriate thoughts which are expected to reduce symptoms of depression, anxiety, and pervasive negative thoughts. Additionally, the literature also supported the efficacy of this computerized program with regard to improving depression, anxiety, and automatic thoughts (Wright et al. 2005;

Wright et al. 2002).

In this study, depressed hospitalized patients who received the CTMP intervention reported significant post-treatment decreases in symptoms of depression, anxiety, and automatic thoughts. In fact, subjects in this study reported far more improvement in anxiety and automatic thoughts as compared to the two previous CTMP studies (See Table 12). This outcome could be attributed to the design of this study.

This study addressed several limitations that were identified in the two previous studies conducted by the developers (Wright et al., 2005; Wright et al., 2002). These limitations include the following: First, there was no comparison group comparing the effectiveness of computerized cognitive behavioral therapy as an adjunct to usual treatment compared to usual stand alone treatment. Thus, it is unclear if the outcome is attributed to usual treatment or the computerized intervention. Second, the developers did not measure whether computerized cognitive behavioral therapy along with usual treatment was effective in reducing length of stay. A reduction in length of stay would indicate the program was a cost effective intervention. Third, the study was uncontrolled as no attempt was made to control or monitor the frequency of the computerized intervention. Thus, it is unclear whether the subject's exposure to the computerized cognitive behavioral therapy program affected the outcome. Fourth, the developers did not attempt to control or monitor whether patients had sought additional treatment. Thus, a maintained response during the follow up phase cannot be attributed unambiguously to the effects of the computerized intervention. Fifth, the sample consisted primarily of mildly anxious subjects with moderately negative thoughts. Thus, the extent to which the

findings can be generalized to a broader or more severely anxious and negatively

distorted population remained open to further study. Finally, the developers of the

program who have vested interests in the success of the program conducted the two

previous studies. There were no independent studies evaluating the effectiveness of this

CTMP program.

In this study, the depressed subjects were moderately anxious with severely distorted

negative thoughts. All the subjects were inpatients who were randomized into the usual

treatment group for comparative purposes or the computerized group. The subjects in the

computerized group completed all the modules once under the supervision of the

investigator. Subjects did not have independent access to the computerized program

which might have encouraged subjects to complete the modules more than once or not

complete them at all. Subjects did not have access to additional treatment outside of the

controlled parameters of this study. To determine if the computerized program was cost

effective the subject's length of stay was measured.

Table 13

Pre and Post Computerized Program Intervention

Studies	Measure	Pre Computerized	Post Computerized	Mean Difference
Wright et al., 2002	BDI	Mean = 25.2, SD = 10.5	Mean = 11.6, SD = 10.0	13.6
	BAI	Mean = 20.7, SD = 12.1	Mean = 10.5, SD = 10.0	10.2
	ATQ	Mean = 66.6, SD = 27.3	Mean = 27.3, SD = 25.3	39.3
Wright et al., 2005	BDI	Mean = 31.4, SD = 8.2	Mean = 10.7, SD = 8.1	20.7
	ATQ	Mean = 58.3, SD = 20.7	Mean = 22.4, SD = 14.4	35.9
Present Study	BDI	Mean = 32.8, SD = 9.5	Mean = 13.2, SD = 9.5	19.6
	BAI	Mean = 29.3, SD = 12.1	Mean = 9.4, SD = 7.9	28.9
	ATQ	Mean = 102.9, SD = 27.9	Mean = 53.0, SD = 23.4	49.9

Chapter VI

Summary

This study proposed an independent scientific determination with regard to the effectiveness of the CTMP in alleviating symptoms of depression, anxiety, and negative thoughts in hospitalized psychiatric patients. Length of stay was evaluated to determine if this program had an impact on treatment costs for depressed hospitalized individuals. The findings from this study have the potential to change the delivery of treatment for depressed individuals.

This study was based on Beck's Theory of Depression (1967) which asserts events by themselves have no emotional content but the interpretation of the event, an individual's thought, causes the emotions. Change is possible as the individual is able to monitor, evaluate, and reconsider his or her own thoughts and inclinations, thereby activating alternative, more constructive modes of thinking (Clark, Beck, & Alford, 1999). Subsequently, depression as well as anxiety improves as negative, unproductive thoughts are unlearned and changed with cognitive behavioral therapy (Beck, Rush, Shaw, Emery, 1979).

Based on theoretical and empirical findings, hypotheses were developed for this study. It was hypothesized that depressed hospitalized patients who receive the Cognitive Therapy: A Multimedia Learning Program intervention will have a greater decrease in symptoms of depression, anxiety, negative automatic thoughts and shorter length of stay compared to a usual treatment group. It was also hypothesized that depressed hospitalized patients who receive the CTMP intervention will report significant post-treatment decreases in symptoms of depression, anxiety, and automatic thoughts.

The study's sample comprised of 86 depressed inpatient subjects with an average age of 37.47 years (ranging from 18 to 62 years of age). The majority of the subjects were single Caucasian women who had some college. Most subjects were not currently working which reflected an annual income range of 0 to 10,000 dollars. Subjects were asked to complete upon admission a demographic questionnaire, BDI-II (Beck, Steer, & Brown 1996), BAI (Beck & Steer, 1993), and ATQ-30 (Hollon & Kendall, 1980). These three instruments and a medication questionnaire were administered for a second time the day prior or on day the subject was discharged from the hospital.

Hypotheses 1 through 3 were tested using multivariate analysis of covariance (MANCOVA). Hypothesis 4, a measurement of length of stay, was tested using independent sample t-test. A paired sample t-test was used to measure Hypothesis 5.

In testing Hypothesis 1, the intervention group had significantly higher post-test depression scores ($M = 13.072$) than the control group ($M = 8.364$) after controlling for pre-test anxiety, depression and automatic thoughts scores. Therefore, Hypothesis 1 was not supported.

In testing Hypothesis 2, there was not a significant difference in mean post-test anxiety scores depending on group ($M = 7.050$ and 9.1662 for control and treatment groups, respectively) after controlling for pre-test anxiety, depression and automatic thoughts scores. Therefore, Hypothesis 2 was not supported.

In testing Hypothesis 3, there was not a significant difference in mean post-test automatic thoughts scores depending on group ($M = 46.432$ and 53.332, for control and treatment groups, respectively) after controlling for pre-test anxiety, depression and automatic thoughts scores. Therefore, Hypothesis 3 was not supported.

In testing Hypothesis 4, there was not a significant mean difference in length of stay depending on group ($M = 9.86$ and 11.36 for the control and treatment groups respectively). Therefore, Hypothesis 4 was not supported.

In testing Hypothesis 5, the mean depression score at Time 1 ($M = 32.837$) was significantly higher than the mean depression score at Time 2 ($M = 13.201$); the median anxiety score at Time 1 ($\alpha^- = 30.00$) was significantly higher than the median anxiety score at Time 2 ($\alpha^- = 8.00$); the median automatic thoughts score at Time 1 ($\alpha^- = 104.00$) was significantly higher than the median automatic thoughts score at Time 2 ($\alpha^- = 43.00$). Therefore, Hypothesis 5 was supported.

Conclusions

Depressed hospitalized patients who received the CTMP intervention did not report significantly fewer symptoms of depression, anxiety and negative thoughts than those depressed hospitalized patients who did not receive this intervention. There are several explanations for these findings which will be discussed in an effort to guide further

research.

One explanation entails the differences in dose of the intervention between this study and Wright and associates (2005) study whose subjects received nine individual sessions with a therapist along with eight computer sessions. This is in sharp contrast to this study where the subjects did not receive individual sessions with a therapist along with the computerized sessions. The investigator was present during the delivery of the computerized intervention for the sole purpose to answer questions. It is possible in Wright and associates (2005) study that the nine individual therapy sessions could have

potentially served to enhance the therapeutic effect of the computerized treatment. Therefore, the differences in the dose of the intervention may have accounted for the differences in the outcome between these two studies.

Another explanation is both groups in this study had access to usual treatment which included cognitive behavioral groups. The attendance at these groups was not measured thus it is unknown how frequent the subjects attended these groups. There is a possibility that the control group attended more of the cognitive behavioral groups than the computerized intervention group which could have potentially served to enhance the treatment response for the control group. Therefore, similar to Wright and associates (2005) study, the differences in the dose of the intervention may have accounted for the subjects in the computerized group not reporting fewer symptoms of depression, anxiety and negative thoughts compared to the control group.

A third explanation is the control group in this study had more previous exposure to cognitive behavioral therapy than the computerized group. Therefore, the control group

had a foundation or familiarity with cognitive behavioral therapy which could have facilitated learning as well as attendance to the cognitive therapy groups. There is a possibility that previous exposure to cognitive therapy could have positively impacted the control group thus resulting in a greater decrease in depression, anxiety and negative automatic thought scores than the computerized intervention group. Therefore, additional research is needed to determine the effectiveness of the CTMP program as stand alone therapy treatment. A recommended research design would not include cognitive behavioral therapy groups or individual cognitive behavioral therapy sessions as part of usual treatment. Another recommendation would be to exclude subjects who have had

previous exposure to cognitive behavioral therapy. This design would provide more accurate information as it would eliminate the potential for the dose as well as the familiarity of the intervention to confound the results.

Another possible explanation entails the differences between studies with regard to the timing of the delivery of the computerized program. In Wright and associates (2005) study, the outpatient subjects were able complete eight 20-30 minute computer sessions over an eight week period. Where as, the subjects in this study completed four one-hour computerized sessions over approximately a one week period. The computerized program was delivered over a one week period or less to ensure all four sessions were completed due to the short length of inpatient hospital admissions. The problem with this delivery time is acutely depressed inpatients often experience a diminished cognitive ability which could make it a challenge to fully comprehend the computerized treatment sessions. Thus, the timing of the implementation of the computerized program could have accounted for the CTMP intervention not having a greater decrease in symptoms of

depression, anxiety, and negative thoughts as compared to the usual treatment group.

Therefore, additional research is needed to determine the effectiveness of the CTMP

program with acutely ill inpatients. A recommended research design would be to begin

the computerized intervention during inpatient hospitalization when the subject's clinical

presentation is less acute and continue the computerized sessions one month post-

discharge. A subject who is less acute most often would have an improved concentration

and improved cognitive capacity to comprehend the computerized treatment sessions.

Another recommendation would be to administer the BDI-II (Beck, Steer, & Brown

1996), BAI (Beck & Steer, 1993), and ATQ-30 (Hollon & Kendall, 1980) at 1month and

again at 6 months post-discharge to determine the intended therapeutic effect. Therefore,

this design would eliminate the potential for the time of delivery of the intervention to

confound the results.

A fifth explanation for differences in outcomes between this study and Wright and

associates (2005) study is this study delivered the computerized intervention in a

controlled manner where all the subjects in the computerized group received all four

sessions just once along with usual treatment. There was no additional treatment

delivered or sought outside the routine usual treatment for inpatients. This is in sharp

contrast to Wright and associates (2005) study as there was no attempt to control

treatment or monitor whether patients had sought additional treatment. Thus, a

maintained response during the follow up phase in Wright and associates (2005) study

cannot be attributed unambiguously to the effects of the computerized intervention.

Therefore, not controlling for outside treatment could have accounted for the differences

in outcomes between these two studies. A recommendation for future research is to

require subjects to agree to not seek additional treatment post-discharge for 6 months as part of the consent process. The criteria for withdrawal from the study should include a subject who receives additional treatment because of relapse or if a subject discloses that he or she sought additional treatment on their own. Therefore, a maintained response during the follow up phase could then be attributed to the CTMP intervention.

Another explanation is the possibility that therapist delivered treatment for moderately to severely depressed patients is more effective than computer assisted cognitive therapy for hospitalized inpatients. The CTMP might not be the most appropriate initial treatment compared to a human therapist who is capable of attending to and addressing a number of

non-verbal cues such as facial expressions (Bowers et al., 1993). This limitation is significant as hospitalized patients are more ill then ever. The subjects in this study might have been too acutely ill during their brief inpatient hospitalization to respond to the computerized program. Therefore, additional research is needed to determine when is the CTMP most effective. These studies should be conducted in primary care settings, acute inpatient settings, and tertiary settings.

It was hypothesized that subjects in the computerized therapy group would have a greater decrease in symptoms of depression, anxiety and automatic thoughts thus prompting an earlier discharge date. As discussed earlier, the subjects in the computerized group did not have a greater decrease in symptoms which may have accounted for a non-significant mean difference in length of stay depending on group. This result coincides with Bowers and associates (1993) study where the average number of days spent in the hospital did not differ between groups ($F = 1.060$, $df = 2$, $P < 0.336$). Two other potential explanations for this length of stay outcome were the impact of

insurance coverage and failure to ascertain outpatient hospital provider appointments in a

timely fashion. These two variables could have impacted the results of this study as both

variables play a significant role in length of stay. Additional research that includes

the measurement of these potentially confounding variables is needed to determine

whether this program is effective for reducing length of stay. A variable that could be

better controlled is healthcare provider appointments for discharge. One recommendation

is to develop a protocol for the purposes of attaining health care provider appointments

earlier which would result in less frequent discharge cancellations. This protocol would

provide more control over this variable which would assist in determining if the CTMP is

effective in reducing length of stay in future research studies.

Although there were no significant results for length of stay, the subjects in the

treatment group did have fewer symptoms of depression, anxiety, and automatic thought

at discharge than they did at admittance. In fact, the subjects reported far more

improvement in anxiety and automatic thoughts as compared to the two previous CTMP

studies. This outcome could be attributed to this study's design where the subjects in the

computerized group completed all the modules once under the investigator's supervision.

Subjects did not have independent access to the computerized program which might have

encouraged subjects to not complete all the modules. It is feasible that a subject who did

not complete all the modules would experience less improvement as compared to a

subject who completed all the modules.

Implications for Knowledge Generation and Practice

President Obama signed the Affordable Care Act into law on March 23, 2010. One

objective of the Affordable Care Act is to improve health care quality for vulnerable

populations. The findings from this study support the Cognitive Therapy: A Multimedia

Learning Program to be effective in decreasing symptoms of depression, anxiety, and

automatic thoughts post-treatment. These findings suggest that this program is effective

in providing quality treatment for depressed psychiatric patients who are considered a

vulnerable population.

Another objective of the Affordable Care Act is to ensure access to quality health care.

The Affordable Care Act recommends the adoption and meaningful use of health

information technology to assist with access to care (U.S. Department of Health and

Human Services, 2010). This is an important objective as fewer than 25% of those

affected with depression have access to effective treatments (World Health Organization,

2000). The CTMP has the potential to improve access to care due to the technological

advances in computer software and increased use of computers in society (Wright &

Wright 1997). The advances in technology, according to Levin and associates (2011), can

allow for more efficient delivery of treatment via live media (telephone, videoconference,

online chat), electronic messaging (voicemail, email, testing) and web based social media

(via computer or mobile device).

The benefits to using mobile technology include the following: highly portable,

information can be entered directly on the screen, and has an interactive voice response

system. Mobile technology can also provide tailored messages at specific times when the

individual is in the most need (Heron & Smyth, 2010). Additionally, there is a 76%

acceptability of using mobile technology to monitor and manage mood, anxiety, or health

(Proudfoot, et al., 2010).

Similar to the acceptability of mobile technology for mental health needs, subjects in

O'Reilly and associates' (2007) study found video conferencing equally satisfying as compared to in person treatment. Psychiatric consultation and follow up via interactive videoconferencing produced clinical outcomes that were the equivalent to those achieved when patients were assessed and followed in person. In addition, the interactive teleconferencing was found to be less expensive than when provided in person. This is a significant finding as the Affordable Care Act recommends a reduction in the growth of health care costs while promoting high value, effective care (U.S. Department of Health and Human Services, 2010). The Cognitive Therapy: A Multimedia Learning Program has the potential to be delivered via these new technologies which could be very cost

effective.

Although promising, the use of these relatively new technologies in mental health is still in its infancy. Future research is needed to determine if the various technologies used to deliver this program produce positive outcomes. It is also equally important to determine the minimum therapist contact required for depressed individuals as these technologies become integrated into treatment for depression in the future (O'Reilly et al., 2007).

The Affordable Care Act also emphasizes that primary and preventive care be linked with community prevention services. This legislation supports a shift towards preventive care and away from inpatient hospitalization which is much more cost prohibitive (U.S. Department of Health and Human Services, 2010). Subsequently, more moderately to severely depressed patients will most likely be treated on an outpatient basis. This shift has significant implications for nurses in primary care settings especially in rural areas as this setting often has a paucity of certified cognitive behavioral therapists. Timely

treatment with a cognitive therapist is a challenge for depressed patients in rural areas as these patients often receive no treatment at all or placed on a long wait list. This is a problematic issue as 90% of individuals who commit suicide are depressed (Gaynes et al., 2004; Hasin, Goodwin, Stinson, & Grant, 2005). Treatment that is accessible and effective is critical to prevent loss of life.

The Cognitive Therapy: A Multimedia Learning Program via new technologies could be the answer to no treatment all or wait lists. This program could have a significant role in treating these patients on an outpatient basis as the findings of this study support the effectiveness of this program in moderately depressed patients. Nurses can serve as

health care change agents as nurses are in a unique position to assess, diagnose, recommend and treat depressed patients in primary care settings. Nurses can incorporate this program into their primary care practice via new technologies while their patients await treatment from a cognitive therapist. This nursing intervention far surpasses no treatment at all or being placed on a long wait list therefore becoming progressively more symptomatic. This nursing intervention could be critical in preventing loss of life related to suicide.

<div align="center">**Limitations and Strengths**</div>

Limitations of this study include a study design where usual treatment included cognitive behavioral groups. Insurance coverage and timeliness of discharge appointments were not measured. The short delivery time of the intervention compounded with a diminished cognitive ability is another identified limitation. The control group had more previous exposure to cognitive behavioral therapy prior to admission than the treatment group. Lastly, there was no follow up after discharge.

Despite these limitations, there are several strengths in this study, including the use of robust quantitative measures, sound theoretical model to guide the research, large sample size, and subjects who had moderate to severe depression, anxiety and negative thoughts.

Recommendations

The theoretical basis and empirical findings of this study suggest further research is needed. The recommendations for further study are as follows:

1. Additional research is needed to determine if the Cognitive Therapy: A Multimedia Learning Program is effective in moderately to severely depressed patients.

   a. To conduct research on a non-cognitive behavioral unit where cognitive therapy groups or individual cognitive therapy sessions are not considered usual treatment.

   b. To exclude subjects who have had previous exposure to cognitive behavioral therapy.

2. Additional randomized controlled trials are necessary to determine the efficacy of the Cognitive Therapy: A Multimedia Learning Program for moderately to severely anxious individuals.

3. Future research should include additional randomized control trials with depressed subjects who have moderate to severe negative thoughts.

4. Additional research that includes the measurement of insurance coverage and timeliness of outpatient provider appointments to determine whether this program is effective for reducing length of stay.

5. More research needs to be conducted to determine when the Cognitive Therapy: A Multimedia Learning Program is most effective (preventive, acute active symptoms, or

tertiary delivery).

6. Additional research is needed to determine if this program is effective 1 month and 6 months post-discharge.

   a. To begin the computerized intervention during inpatient hospitalization and continue the computerized sessions one month post discharge.

7. Future research needs to be conducted to determine if the Cognitive Therapy: A Multimedia Learning Program can be effectively delivered via new technologies (palmtop computers, mobile phones, or video conference).

The recommendations provided earlier are designed to improve upon this research which already has significant implications for the future within the context of the Affordable Care Act. The Cognitive Therapy: A Multimedia Learning Program has the potential to improve the quality of care, ensure access to care via new technologies and be cost effective. Nurses will have an essential role in furthering this research as well as integrating this program into their professional practice.

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Appendix A

Beck Depression Inventory-II

Please read each group of statements carefully, then pick out the one statement in each group which best describes the way you have been feeling during the past week including today! Fill in the circle beside the statement you have picked. Do not leave any statements blank.

If several statements in the group seem to apply equally well, simply fill in the circle for the statement which has the largest number. Be sure that you do not mark more than one statement for item 16 (change in sleeping pattern and Item 18 (change in appetite).

1. Sadness

      0   I do not feel sad

      0   I feel sad much of the time

      0   I am sad all the time

      0   I am so sad or unhappy that I can't stand it

2. Pessimism

      0   I am not discouraged about my future

0   I feel more discouraged about my future than I used to be

0   I do not expect things to work out for me

0   I feel my future is hopeless and will only get worse

3. Past Failure

0   I do not feel like a failure

0   I have failed more than I should have

0   As I look back, I see a lot of failures

0   I feel that I am a total failure as a person

4. Loss of Pleasure

0   I get as much pleasure as I ever did from the things I enjoy

0   I don't enjoy things as much as I used to

0   I get very little pleasure from the things I used to enjoy

0   I can't get any pleasure from the things I used to enjoy

5. Guilty Feelings

0   I don't feel particular guilty

0   I feel guilty over many things I have done or should have done

0   I feel quite guilty most of the time

0   I feel guilty all of the time

6. Punishment Feelings

0   I don't feel I am being punished

0   I feel I may be punished

0   I expect to be punished

0   I feel I am being punished

7. Self Dislike

0   I feel the same about myself as ever

0   I have a lot confidence in myself

0   I am disappointed in myself

0   I dislike myself

8. Self Criticism

0   I don't criticize or blame myself more than usual

0   I am more critical of myself than I used to be

0   I criticize myself for all my faults

0   I blame myself for everything bad that happens

9. Suicidal Thoughts and Dying

0   I don't have ant thoughts of killing myself

0   I have thoughts of killing myself, but I would not carry them out

0   I would like to kill myself

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0   I would kill myself if I had the chance

10. Crying

0   I don't cry anymore than I used to

0   I cry more than I used to

0   I cry over every little thing

0   I feel like crying but I can't

11. Agitation

0   I am no restless or wound up than usual

0   I feel more restless or wound up than usual

0   I am so restless or agitated that it's hard to stay still

0   I am so restless or agitated I have to keep moving or doing something

12. Loss of Interest

0   I have not lost interest in other people or activities

0   I am less interested in other people or things than before

0   I have lost most of my interest in other people or things

0   It's hard to get interested in anything

13. Indecisiveness

    0   I make decisions about as well as ever

    0   I find it more difficult to make decisions than usual

    0   I have much greater than difficulty in making decisions than I used to

    0   I have trouble making any decisions

14. Worthlessness

    0   I do not feel I am worthless

    0   I don't consider myself as worthless or useful as I used to

    0   I feel more worthless compared to other people

    0   I feel utterly worthless

15. Loss of Energy

    0   I have as much energy as ever

    0   I have less energy than I used to have

    0   I don't have enough energy to do very much

    0   I don't have enough energy to do anything

16. Change in Sleeping in Pattern

    0   I have not experienced any change in my sleeping pattern

    0   I sleep somewhat more than usual

    0   I sleep somewhat less than usual

    0   I sleep a lot more than usual

    0   I sleep a lot less than usual

    0   I sleep most of the day

    0   I wake up 1-2 hours early and can't get back to sleep

17. Irritability

    0   I am no more irritable than usual

    0   I am more irritable than usual

0   I am much more irritable than usual

0   I am irritable all the time

18. Change in Appetite

0   I have not experienced any changes in my appetite

0   My appetite is somewhat less than usual

0   My appetite is somewhat greater than usual

0   My appetite is much less than before

0   My appetite is much greater than usual

0   I have no appetite at all

0   I crave food all the time

19. Concentration Difficulty

   I can concentrate as well as ever

0   I can't concentrate as well as usual

0   It's hard to keep my mind on anything for very long

0   I find I can't concentrate on anything

20. Tiredness or Fatigue

0   I am no more tired than usual

0   I get more tired or fatigued more easily than usual

0   I am too tired or fatigued to do a lot of the things I used to

0   I am too tired or fatigued to do most of the things I used to

21. Loss of Interest in Sex

0   I have not noticed any recent changes in my interest in sex

0   I am less interested in sex than I used to be

0   I am much less interested in sex now

0   I have lost interest in sex completely

Appendix B

Beck Anxiety Inventory

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate

how much you have been bothered by that symptom during the past month, including today, by circling the

number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3

Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3
Column Sum				

Scoring - ***Sum each column.   Then sum the column totals to achieve a grand score. Write that score here _____***

Interpretation: A total sum between **0 – 21** indicates very low anxiety, a total sum between **22 – 35** indicates moderate anxiety, and a total sum that **exceeds 36** is high anxiety.

Appendix C

Automatic Thoughts Questionnaire

Listed below are a variety of thoughts that pop into people's heads. Please read each though and indicate how frequently, if at all, the though occurred to you over *the last week.* Please read each item carefully and fill in the blank with the appropriate number, using the following scale:

0   Not at all
1   Sometimes
2   Moderately Often
3   Often
4   All the time

_____1. I feel like I'm up against the world

_____2. I'm no good

_____3. Why can't I ever succeed?

_____4. No one understands me.

_____5. I've let people down.

_____6. I don't think I can go on.

_____7. I wish I were a better person

_____8. I'm so weak

_____9. My life's not going the way I want it to.

_____10. I'm so disappointed in myself

_____11. Nothing feels good anymore.

_____12. I can't stand this anymore.

_____13. I can't get started.

_____14. What's wrong with me.

_____15. I wish I were somewhere else.

_____16. I can't get things together.

_____17. I hate myself.

_____18. I'm worthless.

_____19. Wish I could just disappear.

_____20. What's the matter with me.

_____21. I'm loser.

_____22. My life is a mess.

_____23. I'm a failure.

_____24. I'll never make it.

_____25. I feel so helpless.

_____26. Something has to change.

_____27. There must be something wrong with me.

_____28. My future is bleak.

_____29. It's just not worth it.

_____30. I can't finish anything.

Appendix D

Demographic Information

This section is general questions about you and your background. Please circle the correct response or fill

in the blank.

1. **Please indicate your age?** _____

2. **Please indicate your gender?**

   a) Male
   b) Female

3. **Please indicate your ethnicity?**

   a) Caucasian
   b) Black
   c) Hispanic
   d) Asian
   e) Other_____

4. **Please indicate your psychiatric diagnosis?** _____

5. **Please indicate your marital status?**

    a. Single
    b. Married
    c. Divorced
    d. Separated
    e. Widowed
    f. Other_____

6. **Please indicate you level of highest education.**

    a. High school drop out
    b. High school graduate
    c. Some college
    d. College graduate
    e. Other _____

7. **Please indicate your occupation _____**

8. **Are you currently working?**

    a) Yes

    b) No

9. **What is your level of income?**

    a. 0 dollars – 10,000 dollars
    b. 10,000 dollars-20,000 dollars
    c. 20,000 dollars-30,000 dollars
    d. 30,000 dollars-40,000 dollars
    e. 40,000 dollars-50,000 dollars
    f. Other_____

10. **Previous exposure to Cognitive Behavioral Therapy?**

    a) Yes
    b) No - Skip question 11-12

11. **Please indicate the last time you received Cognitive Behavioral Therapy?**

    _____

12. **What was your level of exposure to Cognitive Behavioral Therapy**?

a) Individual Therapy
b) Group Therapy
c) Books
d) Other_____

Appendix E

Discharge Medication Questionnaire

Please list all your psychotropic medications including name, dose and frequency.

Name	Dose	Frequency

Appendix F

Recruitment Flyer

University of Rutgers and Payne Whitney Westchester

Volunteers Wanted for a Research Study

Title: The Effects of a Cognitive Behavioral Computer Based Program on Depressed Inpatients

Purpose: To determine if a computer based cognitive behavioral program is helpful for depression, anxiety, and negative thoughts.

Procedure: The non-intervention group will receive standard treatment. The computerized intervention group will receive the computerized intervention in addition to standard treatment.

Duration: Filling out the forms will take 2 hours total. The computerized intervention will take 4 hours.

Eligibility: A diagnosis of depression

Exclusions: A diagnosis of schizophrenia, bipolar disorder (manic phase), dementia, mental retardation, borderline personality disorder, antisocial personality disorder; pregnant; inability to

read; inability to speak English; electroconvulsive therapy within the past six months and experience with Good Days Ahead: The Multimedia Program for Cognitive Therapy.

Benefits: Subjects may or may not receive any direct benefit from this study. The results may provide information on the helpfulness of the computerized program. Subjects may learn more about cognitive behavioral techniques if in the computerized intervention group.

To learn more about this research contact Lisette Dorfman, MS, APRN, Rutgers Doctoral Candidate, Payne Whitney Westchester, 21 Bloomingdale Road, White Plains, NY 10605. Phone (914) 682-9100 ext. 2456

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Appendix G

Consent Letter

Date (M D Y)	Location Service	
Age	Doctor	If No Plate, Print Name, Sex, and History No.

WEILL CORNELL MEDICAL COLLEGE

Consent Form for Clinical Investigation

(If necessary, translate into language of subject)

The Effects of a Cognitive Behavioral Computer Based Program on Depressed

Project Title: Inpatients

Research Project #:	Cornell IRB # 1008011224 Rutgers IRB # 10-693R
Principal Investigator:	**Steven D. Roth, J.D., MD**

INSTITUTION: Weill Cornell Medical College and Rutgers University

INTRODUCTION

You are invited to consider participating in a research study. The study is called The Effects of a Cognitive Behavioral Computer Based Program on Depressed Inpatients. You were selected as a possible participant in this study because you are a psychiatric inpatient with a DSM-IV diagnosis of major depression and at least 18 years of age or older.

Please take your time to make your decision. It is important that you read and understand several general principles that apply to all who take part in our studies:

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(a) Taking part in the study is entirely voluntary.

(b) Personal benefit to you may or may not result from taking part in the study, but knowledge gained from your participation may benefit others.

(c) You may decide not to participate in the study or you may decide to stop participating in the study at any time without loss of any benefits to which you are entitled.

The purpose and nature of the study, possible benefits, risks, and discomforts, other options, your rights as a participant, and other information about the study are discussed below. Any new information discovered which might affect your decision to participate or remain in the study will be provided to you. You are urged to ask any questions you have about this study with members of the research team. You should take whatever time you need to discuss the study with your physician and family. The decision to participate or not to participate is yours. If you decide to participate, please sign and date where indicated at the end of this form.

The study will take place at Payne Whitney Westchester. The study will take place at the facilities of New York Presbyterian Hospital, where the researchers are a member of the nursing staff. New York Presbyterian Hospital is neither a sponsor nor an investigator for this study.

WHY IS THE STUDY BEING DONE?

The purpose of this study is to determine the effectiveness of a computerized cognitive behavioral program on depression, anxiety, and automatic thoughts. Study findings will provide information with regard to the effectiveness of a computerized cognitive behavioral intervention in treating depressed inpatients. Length of stay will be evaluated to determine if this program has an impact on treatment costs for depressed hospitalized individuals.

There will be two groups that will be compared. You will be "randomized" into one of the study groups: usual treatment group or the computerized cognitive behavioral therapy group. Randomization means that you are put into a group by chance. It is like flipping a coin. Neither you nor the researchers will choose what group you will be in. You will have an equal chance of being placed in any group.

The usual treatment group will receive the standard treatment and nursing care including medication and group psychotherapy. The computerized cognitive behavioral therapy group will receive the computerized intervention along with usual treatment. You will be given an instrument packet that will have a card indicating the random assignment of the usual treatment group or computerized cognitive behavioral therapy intervention.

HOW MANY PEOPLE WILL TAKE PART IN THE STUDY?

Participants in the study are referred to as subjects. About 86 subjects will be recruited at this site. You should not participate in this study with a primary DSM-IV diagnosis of schizophrenia, bipolar disorder (manic phase), dementia, mental retardation, borderline personality disorder, antisocial personality disorder; pregnant; inability to read; inability to speak English;

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electroconvulsive therapy within the previous six months and previous experience with the computerized intervention.

WHAT IS INVOLVED IN THE STUDY?

Filling out the forms at the beginning and end of the study will take about 1 hour each time. The computerized intervention will take approximately a total of 4 hours. The researcher will make an appointment with you to deliver the computerized intervention in four 1 hour sessions over one week. If you take part in this study, you will have the following tests and procedures:

Usual Treatment Group

The usual treatment group will receive standard treatment and nursing care including medication and group psychotherapy. The usual treatment group will be asked to complete upon admission the demographic questionnaire, Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), and Automatic Thoughts Questionnaire (ATQ-30). These three instruments and a medication questionnaire will be administered for a second time the day prior or on the day of your discharge. The unit personnel will inform the researcher of your scheduled discharge date to facilitate distribution of the instruments. An affirmative answer to the question about suicidal thoughts and dying on the BDI-II will require the researcher to immediately inform your therapist and psychiatrist.

Computerized Cognitive Behavioral Therapy Group

The computerized cognitive behavioral therapy group will receive the computerized intervention along with usual treatment. You will be asked to complete prior to the computerized cognitive

intervention a demographic questionnaire, BDI-II, BAI, and ATQ-30. The computerized cognitive behavioral intervention will be delivered via lap top. The program is password protected and individualized as your response is stored in the computer. The program takes approximately four hours to complete. A total of four one hour sessions will be scheduled with you to complete the computerized intervention. This computerized intervention will be delivered over a one week period. An appointment will be made each time with you to schedule a date and time for the intervention. The researcher will also be available for the sole purpose to answer questions about the program throughout the intervention.

The BDI-II, BAI, ATQ-30 and medication questionnaire will be administered one day prior to or on the day of discharge. The unit personnel will inform the researcher of your scheduled discharge date to facilitate distribution of the instruments. An affirmative answer to the question about suicidal thoughts and dying on the BDI-II will require the researcher to immediately inform your therapist and psychiatrist.

HOW LONG WILL I BE IN THE STUDY?

You will be in the study for the duration of your admission in the hospital. Filling out the forms at the beginning and end of the study will take about 1 hour each time. The computerized

intervention will take approximately a total of 4 hours. The researcher will make an appointment with you to deliver the computerized intervention in four 1 hour sessions over one week.

You can stop participating at any time. However, if you decide to stop participating in the study, we encourage you to talk to the researcher and your regular doctor first. You will be asked to submit the reason for your decision to discontinue participation in the study in writing to the researcher.

Your refusal or discontinuation to participate will not affect your length of stay in the hospital. The researcher has the right to withdraw you from the study if your treatment team deems that you are no longer clinically appropriate to participate in the study. The researcher will keep all of the information collected before your withdrawal as part of the permanent files of the research study.

Withdrawal by investigator, physician, or sponsor

The researchers or physicians may stop the study or take you out of the study at any time should they judge that it is in your best interest to do so, if you experience a study-related injury, if you need additional or different medication, or if you do not comply with the study plan. They may remove you from the study for various other administrative and medical reasons. They can do this without your consent.

WHAT ARE THE RISKS OF THE STUDY?

It is highly unlikely that you will experience psychological discomfort as a result of participating in this study with the possible exception of an unexpected emotional response. The researcher will contact your therapist and psychiatrist immediately should you experience this problem.

ARE THERE ANY BENEFITS TO TAKING PART IN THE STUDY?

We cannot and do not guarantee that you will receive any benefits from this study. You may or may not receive any direct benefit from this study. However, the results of this study may benefit others by providing information on the effectiveness of a computerized cognitive behavioral program on depression. You may benefit from the study by becoming more knowledgeable regarding cognitive behavioral techniques if you are randomized to the computerized intervention.

Another advantage is this program has the potential to address the shortage of cognitive behavioral therapists in non metropolitan areas as there is a wait list for patients to receive treatment. This program, if proven to be effective, has the potential to be administered to patients on a wait list. The result would be patients receiving cognitive behavioral treatment earlier versus continuing to wait on a waiting list with no treatment at all.

Your participation in the study will not equate to an automatic reduction in your length of stay as your length of stay is determined by your treatment team.

WHAT OTHER OPTIONS ARE THERE?

Instead of being in this study, you can choose not to participate.

WHAT ABOUT CONFIDENTIALITY?

Efforts will be made to protect your medical records and other personal information to the extent allowed by law. However, we cannot guarantee absolute confidentiality. Records of research study participants are stored and kept according to legal requirements and then destroyed. You will not be identified personally in any reports or publications resulting from this study. If a report of this study is published, or the results are presented at a professional conference, only group results will be stated. Organizations that may request to inspect and/or copy your research and medical records for quality assurance and data analysis include groups such as: Weill Cornell Medical College, New York Presbyterian Hospital and Rutgers University Institutional Review Board (IRB) and all appropriate federal research oversight agencies.

If information about your participation in this study is stored in a computer, we will take the following precautions to protect it from unauthorized disclosure, tampering, or damage: Your responses to the questionnaires you will complete will be numerically coded and will be linked to a master list that links your code to your identity. Some of the information collected includes age, marital status, diagnosis, education, occupation and income. All information will be kept confidential by limiting individual's access to the research data and keeping it in a locked file cabinet.

The researcher will maintain a list of names of the research subjects and their corresponding code numbers in a password protected computer. The researcher will only have access to the password. The research instruments will be labeled with a code number and not your name. The data will be coded and entered into a password protected computer. The computer files will be backed up onto a CD and the CD will be maintained in a locked file cabinet. The researcher will only have access to the locked file cabinet.

WHAT ARE THE COSTS?

There will be no additional cost to you for participation in this study. You or your insurance company will be charged for continuing medical care and/or hospitalization that is not part of the research study.

POLICY/PROCEDURES FOR RESEARCH RELATED INJURY

The Policy and Procedure for Weill Cornell Medical College are as follows:

In accordance with Federal regulations, we are obligated to inform you about WCMC's policy in the event injury occurs. If, as a result of your participation, you experience injury from known or unknown risks of the research procedures as described, immediate medical care and treatment, including hospitalization, if necessary, will be available at the usual charge for such treatment. No monetary compensation is available from WCMC, New York Presbyterian Hospital or Rutgers University. Further information can be obtained by calling the Institutional Review Board at (646) 962-8200 or Sponsored Programs Administrator at Rutgers (732) 932 -0150 ext. 2104.

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COMPENSATION FOR PARTICIPATION

You will not receive compensation for participating in this study. You should not expect anyone to pay you for pain, worry, lost income, or non-medical care costs that occur from taking part in this research study.

WHAT ARE MY RIGHTS AS A PARTICIPANT?

Taking part in this study is voluntary. You may choose to not take part in the study or to leave the study at any time. If you choose to not participate in the study or to leave the study, your regular care will not be affected nor will your relations with the Weill Cornell Medical College, your physicians, or other personnel. In addition, you will not lose any of the benefits to which you are entitled. We will tell you about new information that may affect your health, welfare, or participation in this study.

WHOM DO I CALL IF I HAVE QUESTIONS OR PROBLEMS?

For questions about the study or a research-related injury, any problems, unexpected physical or psychological discomforts, or if you think that something unusual or unexpected is happening, you may contact Lisette Dorfman's Faculty Advisor, Dr. Marlene Rankin at 609 462 4666 or mrankin@rutgers.edu Be sure to inform the physician of your participation in this study.
If you have questions about your rights as a research participant, contact the WCMC IRB
Office. Direct your questions to:

Institutional Review Board at:
    Address: 407 East 61st Street, First Floor   Telephone: (646) 962-8200
            New York, New York 10065

Office of Research and Sponsored Programs   Telephone: (732) 932-0150
      Address: The State University of New Jersey
          3 Rutgers Plaza
          New Brunswick, New Jersey 08901

RESEARCHER'S STATEMENT

I have fully explained this study to you. As a representative of this study, I have explained the purpose, the procedures, the benefits and risks that are involved in this research study. Any questions that have been raised have been answered to your satisfaction.

_____   _____   _____

Signature of person obtaining the consent   Print Name of Person   Date / Time
(Principal Investigator or Co-investigator)

<u>SUBJECT'S STATEMENT</u>

I, the undersigned, have been informed about this study's purpose, procedures, possible benefits and risks, and I have received a copy of this consent. I have been given the opportunity to ask questions before I sign, and I have been told that I can ask other questions at any time. I voluntarily agree to participate in this study. I am free to withdraw from the study at any time without need to justify my decision. This withdrawal will not in any way affect my future treatment or medical management and I

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will not lose any benefits to which I otherwise am entitled. I agree to cooperate with the research staff and to inform them immediately if I experience any unexpected or unusual symptoms.

_____   _____   _____

Signature of Subject   Print Name of Subject   Date / Time

Appendix H

Cornell IRB No.: _100801124__

Rutgers IRB No.: 10-693R

AUTHORIZATION TO USE or DISCLOSE

PROTECTED HEALTH INFORMATION FOR RESEARCH

An additional informed consent document for research participation is also required.

Title of Research Project: The Effects of a Cognitive Behavioral Computer Based Program on Depressed Inpatients

Leader of Research Team: Steven D. Roth, J.D., MD

Address: 21 Bloomingdale Road

White Plains, New York 10605

Phone Number: 914-997-5720

Purposes for Using or Sharing Protected Health Information: The purpose of this research study is to determine the effectiveness of a computerized cognitive behavioral program on depression, anxiety, and automatic thoughts. If a report of this study is published, or the results are presented at a professional conference, only group results will be stated.

If you give permission, Weill Cornell Medical College (WCMC), New York Presbyterian Hospital (NYPH) and/or Rutgers University researchers led by Steven D. Roth, J.D., MD may use or share (disclose) information about you for their research that is considered to be protected health information. The health information that may be used or disclosed (release) for this research includes group results from the demographic questionnaire, Beck Depression Inventory-II, Beck Anxiety Inventory, Automatic Thoughts Questionnaire and medication questionnaire.

Voluntary Choice: The choice to give WCMC, NYPH and/or Rutgers researcher's permission to use or share your protected health information for their research is voluntary. It is completely up to you. No one can force you to give permission. However, you must give permission for WCMC, NYPH, and/or Rutgers researchers to use or share your protected health information if you want to participate in the research. If you decline to sign this form, you cannot participate in this research study, because the researchers will not be able to obtain and/or use the information they need in order to conduct their research. Refusing to give permission will not affect your ability to get usual treatment, or health care from WCMC and/or NYPH.

Protected Health Information to Be Used or Shared: Government rules require that researchers get your permission (authorization) to use or share your protected health information. Your medical information may be disclosed to authorized public health or government officials

for public health activities when required or authorized by law. If you give permission, the researchers could use or share with the people identified in this authorization any protected health information related to this research from your medical records.

Other Use and Sharing of Protected Health Information: If you give permission, the researchers could also use your protected health information to develop new procedures or commercial products. They could share your protected health information with WCMC-NYPH Institutional Review Board, inspectors who check the research, government agencies and research staff. The researchers could also share your protected health information with Rutgers University.

The information that may be shared with the sponsor and/or government agencies could include your medical record and your research record related to this study. They may not be considered covered entities under the Privacy Rule and your information would not be subject to protections under the Privacy Rule.

Confidentiality: Although the researchers may report their findings in scientific journals or meetings, they will not identify you in their reports. Also, the researchers will try to keep your information confidential, but this cannot be guaranteed. The government does not require everyone who might see your information to keep it confidential, so it might not remain private.

Canceling Permission: If you give the WCMC, NYPH and/or Rutgers researchers permission to use or share your protected health information, you have the right to cancel your permission whenever you want. However, canceling your permission will not apply to information that the researchers have already used or shared.

End of Permission: Unless you cancel it, permission for WCMC, NYPH, Rutgers researchers to use or share your protected health information for their research will never end.

Contacting WCMC: If you have questions about this research study or how your information will be used or disclosed, contact the Steven D. Roth, J.D., MD on page one of this form. If you wish to revoke your

'Authorization to Use or Disclose Your Protected Health Information' in this study you may do so at any time by writing to:

Privacy Officer

1300 York Avenue, Box 303

 New York, NY 10065

 If you have questions call: (212) 746-1179 or e-mail: privacy@med.cornell.edu

Access to Research Records

During the course of this research study, you will have access to see or copy your protected health information as described in this authorization form in accordance with Weill Cornell Medical College (WCMC), New York Presbyterian Hospital (NYPH) and/or Rutgers policies. During your participation in this study, you will have access to your research record and any study information that is part of that record.

Giving Permission: By signing this form, you give Weill Cornell Medical College (WCMC), New York Presbyterian Hospital (NYPH), Rutgers University and its researchers led by Steven D. Roth, J.D., MD

permission (authorization) to use or disclose (share) your protected health information as indicated on this form for the research project called: The Effects of a Computer Based Program on Depressed Inpatients.

Subject Name:	_____

_____	_____

       Signature of Subject	Date

       OR

_____	_____

  Signature of Legally Authorized Representative**	Date

**If signed by a Legally Authorized Representative of the Subject, provide a description of the relationship to the Subject:

WCMC and/or NYPH may ask you to produce evidence of your relationship.

A signed copy of this form must be given to the Subject or the Legally Authorized Representative.

Appendix I

Curriculum Vitae

<u>Personal Data</u>

Birth Date   March 28, 1974, Manhattan, New York

Work   New York Presbyterian Hospital

Office Telephone   (914) 682-9100 ext. 2456

Email: ljr9002@nyp.org

Marital Status   Married

<u>Education</u>

1997   Bachelor of Nursing Science, Dominican College

2001   Master's of Science in Nursing, Pace University

2006-2012   Doctor of Philosophy, Rutgers The State University of NJ

<u>Post Graduate Education</u>

2005- 2006   Beck Institute Extramural Training Program

<u>Licensure</u>

1997-Present	New York Registered Professional Nurse
2001-Present	New York Nurse Practitioner in Family Health

Certification

2006-Present	Certified Beck Cognitive Therapist

Present Position **14+ Years at New York Presbyterian Hospital**

2002-Present	Patient Care Director, Women's Program
1999-2002	Patient Care Manager, Eating Disorder's Program
1998-1999	Senior Staff Nurse, Adolescent Program
1997-1998	Staff Nurse, Rotating Units

Scholastic Honors and Awards

1997	Selected: Who's Who Among Students in American Universities and Colleges
	Dominican College: Program Honors Certificate

2004	Planetree/Retreat Facilitator Group: Payne Whitney Westchester Service Excellence Team
2006	The Business Council of Westchester: Rising Stars- Westchester's Forty Under Forty
2010	Payne Whitney Westchester Nursing Leadership Award

Professional Organizations

1997-Present	Member of Sigma Theta Tau International
2007- Present	Member of the Academy of Cognitive Therapy
2008- Present	Member of the American Nurses Association

Intramural Appointments and Activities:

- Member, Pastoral Care Committee

- Member, Referral and Development Committee

- Member, Status Utilization Committee

- Member, Cross Campus Hand Off Committee

- Member, Cultural Diversity Committee