THE EFFECTIVENESS OF ELECTROCONVULSIVE THERAPY FOR MAJOR DEPRESSIVE DISORDER ACCORDING TO PATIENT SELF-REPORT

APPROVED BY SUPERVISORY COMMITTEE

Chung-Yi Chiu, Ph.D., CRC Chung-Yi Chiu

Shawn McClintock, Ph. D.

Karen Brewer-Mixon, Ph.D. Karen Brewer-Mixon, PhD

DEDICATION

I would like to thank the members of my Thesis Committee, my supportive parents and grandmother, Willie C. Jackson

THE EFFECTIVENESS OF ELECTROCONVULSIVE THERAPY FOR MAJOR DEPRESSIVE DISORDER ACCORDING TO PATIENT SELF-REPORT

by

MELISSA C. METOYER

THESIS

Presented to the Faculty of the School of Health Professions

The University of Texas Southwestern Medical Center

In Partial Fulfillment of the Requirements

For the Degree of

MASTER OF REHABILITATION COUNSELING

Abstract

BACKGROUND: Major depressive disorder (MDD) is a common, typically recurrent, often chronic, and disabling disorder affecting approximately 14 million adults in the United States (US) each year. Electroconvulsive therapy (ECT) is a neurostimulation therapeutic intervention that is highly effective and most often used to treat certain psychiatric conditions, in particular MDD. Despite the proven effectiveness of using ECT to treat MDD there have been no other studies that have addressed methods of assessing the severity of depressive symptoms using patient self report instrument.

SUBJECTS: Ninety-four participants, comprised of 58 (61.7%) females and 36 (38.3%) males who ranged from 20 to 85 years of age (*M*=51.76, *SD*=15.19) participated in this study. All subjects had a diagnosis of MDD and were treated with ECT over an average of 11 sessions on an inpatient or outpatient basis at the UT Southwestern Medical Center Zale Lipshy University Hospital (ZLUH, Dallas, TX).

METHOD: The 16-item self-report version of the Quick Inventory of Depressive Symptomatology (QIDS-SR_{16}) measure was used to determine the effectiveness of ECT in treating MDD. Data was acquired at baseline and after the end of the acute ECT treatment course. Paired *t*-tests were applied to determine if there were significant depression improvements and effect size (r) was calculated ($\sqrt{t\text{^}2/(t\text{^}2+df)}$)to determine the effect size between pre- and post- treatment scores on the Quick Inventory of Depressive Symptomatology-Self $Report_{16}$ total score and each domain score.

RESULTS: The overall baseline average total score of QIDS-SR_{16} (*M*=18, *SD*=4.34) for the study sample was in the severe range. After completion of the acute ECT course, the QIDS-SR_{16}

total score on average significantly decreased to the mild range (M=7.18, SD=4.74). The overall total QIDS-SR_{16} score had a large effect size (E.S.) (E.S. (*r)* =.91; *t* = 20.98, *df* = 93, *p* =. 000). Consistent with this, the domain scores also had a large effect size. The E.S. (*r)*-scores from greatest to the least for the domain scores are mood (E.S. (*r)* =.88; *t* = 17.58, *df* = 93, *p* =.000), suicide (E.S. (*r)* =.83; *t* = 9.19, *df* = 93, *p* =.000), fatigue (E.S. (*r)* =.78; *t* = 12.13, *df* = 93, *p*=.000), self-outlook (E.S. (*r)* =.75; *t* = 11.07, *df* = 93, *p* =.000), concentration (E.S. (*r)* =.72; *t* = 10.03, *df* = 93, *p* =.000), sleep (E.S. (*r)* =.68; *t* = 8.96, *df* = 93, *p* =.000), loss of interest (E.S. (*r)* =.68; *t* = 14.58, *df* = 93, *p* = .000), psychomotor(E.S. (*r)* =.65; *t* = 8.35, *df* = 93, *p* = .000), and appetite change (E.S. (*r)* =.62; *t* = 7.74, *df* = 93, *p* = .000).

Data revealed few differences between electrode configuration placements. The sad mood and suicide domains resulted in a greater decline in symptom ratings than the remaining seven domains over the course of an acute ECT treatment.

DISCUSSION: The findings of the study are consistent with prior research suggesting that ECT is an effective treatment for MDD. Specifically, depressive symptoms as rated by self report showed a significant decrease from baseline to completion of the acute ECT course. The data from the QIDS-SR_{16} revealed an overall marked improvement in total depression severity, and in specific depressive domains including mood, suicidal ideation, energy, self-outlook and concentration/decision making.

IMPLICATIONS: The research has some limitations. the present study only recruited patients from one hospital, which may limit the generalizability of the findings. This was a naturalistic study based on a clinical database. There could have been possible comorbidities (both medical

and neuropsychiatric) that could have affected outcome. The switch of electrode placement was non-systematic and based on physician judgment and not based on the study's criteria.

Keywords: Electroconvulsive Therapy, Major Depressive Disorder, Depression, Quick Inventory of Depressive Symptomatology, Self Report

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

(MDD) - Major Depressive Disorder

(APA) - American Psychiatric Association

(ECT) - Electroconvulsive Therapy

(QIDS-SR_{16}) - 16 item-Quick Inventory of Depressive Symptomatology –Self Report

(DSM-IV-TR) - Diagnostic and Statistical Manual of Mental Disorders Fourth Edition Text Revised

(WHO) - World Health Organization

(IID) - Integral Inventory for Depression

(MDE) - Major Depressive Episode

(GABA) - cortical y-aminobutyric acid

(CORE) - Consortium for Research in ECT

(NIMH) - National Institute of Mental Health

(QIDS-CR_{16}) - 16 item-Quick Inventory of Depressive Symptomatology –Clinician Rated

(HRSD) - Hamilton Rating Scale for Depression

(MADRS) - Montgomery-Asberg Depression Rating Scale

(STAR*D) - Sequenced Treatment Alternatives to Relieve Depression

(VR-36) - Veteran's Rand 36-Item Health Survey

(ZLUH) - Zale Lipshy University Hospital

(RUL) - Right Unilateral

(BT) **-** Bitemporal

CHAPTER ONE

Introduction

Major depressive disorder (MDD) is one of the most prevalent psychiatric disorders (Kessler et al., 2003) and foremost public health threats of the 21st century (Judd, 2000). Current estimates suggest MDD affects 151 million individuals worldwide, with a 16.2 % lifetime prevalence (Reinhold, 2008). According to the American Psychiatric Association (APA), depressed mood is central to the diagnosis of MDD. This neuropsychiatric disease is characterized by a complex constellation of cognitive, behavioral, and physical symptoms that can impair normal and instrumental activities of daily living. The cardinal symptoms are depressed mood, sadness, hopelessness, sleep disturbance, changes in appetite and weight, loss of interest, guilt, difficulty concentrating and suicidal ideation (Reinhold, 2008). According to Rubio et al. (2011), MDD carries a burden that creates a need to understand the condition and areas of alleviating its symptoms. Major depressive disorder manifests most commonly as a disturbance in emotion (depressed mood) with a ratio of high negative and low positive emotions. With its chronic nature and propensity to remit and relapse depending on life circumstances and treatment, MDD results in functional impairment in numerous life domains and is a leading predictor of increased morbidity and mortality (Rubio et al., 2011).

Electroconvulsive therapy (ECT) is a neurostimulation therapeutic intervention that is highly effective and most often used to treat certain psychiatric conditions, in particular MDD (Trevino, McClintock & Husain, 2010). The clinical literature establishing the efficacy of ECT in specific neuropsychiatric disorders is among the most substantial for any medical treatment. Various sources of evidence support the efficacy of ECT in the treatment of MDD. The decision

to recommend the use of ECT derives from a risk/benefit analysis for the specific patient. This analysis takes into consideration the diagnosis of the patient, severity of the presenting illness, the patient's treatment history, medical risks and anticipated adverse effects, and the likely speed of action, efficacy, and safety of alternative treatments (Fink, 2001).

Electroconvulsive therapy is considered a first-line treatment when medical or psychiatric factors require a rapid and robust clinical response, when ECT poses less risk to a patient than medication (e.g., during pregnancy or in elderly patients), when there is a clear history of medication resistance or a history of favorable response to ECT, or when the patient prefers ECT to other psychotropic treatments. The intervention involves the application of a mild electrical current in specific cortical areas for the purpose of inducing a therapeutic generalized seizure. Commonly, ECT is administered two to three times per week, with an electrode configuration of right unilateral placement and an ultra-brief pulse width (Lisanby, 2007).

To determine the impact of ECT treatment, it is necessary to evaluate outcome in terms of change in depressive symptoms. The growing importance of symptom reduction in managing MDD has been recognized for several years (Rush et al., 2003). Although the effectiveness of ECT for patients with MDD has been controversial (Lisanby, Pallanti, & Schlaepfer, 2009), there is a need to better understand how many treatments and which electrode configuration (right unilateral, bitemporal, bifrontal) would be most effective and efficient for patients with MDD. Thus, the current study proposes to use the 16 item-Quick Inventory of Depressive Symptomatology –Self Report (QIDS-SR_{16}) (Rush, Trivedi, Ibrahim, et al., 2003) to exam the effectiveness of ECT.

The QIDS-SR_{16} is a brief, reliable, and valid measure of the DSM-IV-TR symptom criteria for MDD (Rush et al., 2003). The QIDS-SR_{16} was created to match the symptom profile construction included in the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition Text Revised (DSM-IV-TR) and to provide a measure of depression severity that could be completed in a time-efficient manner (Rush et al., 2003).

The purpose of this study is to contribute to the outcome studies in ECT for MDD, and specifically, for the first time use a patient self-report instrument (i.e., QIDS-SR_{16}) to determine treatment-related outcome. Although, ECT has gained popularity for the treatment for MDD, to our knowledge, there have been no studies that examined its effectiveness per a self-report depression severity measure. In this study we want to examine those depressive symptoms that are codified in the DSM-IV-TR. Shared decision making between the patient and clinicians that has been advocated in the medical community is important since clinicians rely on patients' self report of their symptoms to inform the proper treatment course.

The rationale for using QIDS-SR_{16} is that self report scales are free of clinician bias and are therefore free from clinician over estimation of patient improvement (Zimmerman et al., 2012) and the measurement includes all nine DSM-IV-TR criterion for depression. QIDS-SR_{16} has been translated into multiple languages and gained international respect that furthers its utility.

The researchers examined the improvements from pre- to post- treatment scores on the QIDS-SR_{16} in a clinical cohort of patients with MDD treated with ECT. Given the findings from previous studies (Husain et al., 2004; 2008; Lisanby, 2007; Trevino et al., 2010), the researchers hypothesized that (1) the total score of the QIDS-SR_{16} in people with a diagnosis of MDD

would be lessened after an acute ECT course; (2) the mood domain would have a greater effect size than the other symptom domains as measured by the QIDS-SR_{16}; and (3) the suicide domain would have a greater effect size than the other symptom domains as measured by the QIDS-SR_{16}.

CHAPTER TWO

Review of the Literature

Major Depressive Disorder (MDD)

Major depressive disorder (MDD) is a common, typically recurrent, often chronic, and very disabling disorder affecting approximately 14 million adults in the United States (US) each year. When left untreated or inadequately treated, there is substantial societal cost and personal morbidity. Society as a whole is heavily burdened by depressive illness. The annual financial cost of effective illness has been estimated at 44 billion dollars in total costs (Reddy, 2010). The World Health Organization (WHO) estimates that at its current rate, MDD will be the second only to ischemic heart disease with regard to the most common cause of disability worldwide by 2020. Major depressive disorder in the U.S. has a lifetime prevalence of 4.9-16.2%. Severe depression can impair the quality of life and lead to death by suicide. Indeed, the lifetime risk of suicide among patients with affective disorders is 6 to 15% (Lisanby, 2007).

Epidemiology

Usually, MDD is an episodic disorder with on average one episode every five years (Rush et al., 2004). Of persons with MDD in the U.S., 20-35% experience a chronic unremitting course (Rush et al., 2004). Long episodes of MDD appear to be more difficult to treat (Rush et al., 2004). Major depressive disorder occurs more frequently among young and elderly adults and those with general medical conditions. Depressed adults have nearly twice the annual health care costs of those without depression (Reddy, 2010).

Epidemiological studies related to MDD found that women have greater prevalence of MDD compared to men, which has been a conclusive finding over time since 1977 (Romans,

Tyas, Cohen, & Silverstone, 2007). Despite the conclusive nature of this finding, researchers and clinicians have yet to explain the reason for the gender disparity. Romans et al. (2007) posted several probable reasons gained from literature synthesis including differences in social roles, artifacts derived from measurements, and biological differences.

A recent research study qualifying the gender differences by Lai (2011) through 16-item Quick Inventory of Depressive Symptomatology-Self Report ($QIDS\text{-}SR_{16}$), Integral Inventory for Depression (IID), and EuroQol life quality scale, showed that female participants had higher scores on all three scales. Significant gender differences of sadness, sleep, appetite, painful symptoms, and sexual functioning were observed. The MDD episodes were related to the EuroQol life quality scale and the Sheehan disability scale. Interepisode years were associated with the IID. In conclusion, patients with MDD showed a correlation between symptoms and functional impairment. Female patients might be more sexually impaired, more vegetative, more depressed, and experiencing more sadness and physical pain (Lai, 2011).

Epidemiological studies (Rubio et al., 2011) estimate 12-month and lifetime prevalence for MDD in the United States to be 5.3% and 13.2%, respectively. According to Rubio et al. (2011), studies of clinical samples suggest that 10-30% of individuals with MDD develop a chronic course despite adequate treatment, indicating that MDD is a major public health problem. When the lifetime risk of MDD was examined across sociodemographic population subgroups, significant higher rates of MDD were found among women. And among race and ethnic groups, the odds of MDD were higher in Native Americans and significantly lower among Asians, Hispanics, and African Americans compared to Caucasians. The risk of MDD was

greater in respondents who were middle aged (45 to 64 years of age) widowed, separated, or divorced than among those that were married or cohabitating. The lower income levels had the higher rates of MDD. For each successively lower category of income, risk of MDD weakly increased, although only the lowest category (<$19,999/y) differed significantly from the highest category. Risk of MDD did not differ by urbanicity, region, or education (Rubio et al., 2011).

Symptoms and Treatments

Major depressive disorder is the fourth most disabling medical condition worldwide based on disability-adjusted life years (years of life lost due to premature death and years lived with a disability of specified severity and duration) (Grosse, Lollar, Campbell, & Chamie, 2009). During a major depressive episode (MDE), normal mood usually changes to depressed or anhedonic, which is reflected in all areas including family, social, and work. The definition of MDD according to the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition Text Revised (DSM-IV-TR), states that a person must have depressed mood or anhedonia, and at least five other depressive symptoms present during the same 2-week period that represents a change from prior function. At least one of the symptoms is either depressed mood or loss of interest or pleasure.

The nine symptom criteria are:

1. depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad or empty) or observation made by others (e.g., appears tearful);

2. markedly diminished interest or pleasure in all or almost all, activities most of the day, nearly every day, (as indicated by either subjective account or observation made by others);
3. significant weight loss when not dieting or weight gain (e.g., a change in more than 5% of the body weight in a month), or a decrease or increase in appetite nearly every day;
4. insomnia or hypersomnia nearly every day;
5. psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down);
6. fatigue or loss of energy nearly every day;
7. feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick);
8. diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others); and
9. recurrent thoughts of death (not just a fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.

Per the DSM-IVTR criteria, for depressive episodes to qualify as MDEs they cannot be better accounted for by schizophrenic, delusional, or psychotic disorders. Also, the depressive symptoms cannot meet criteria for a mixed episode and are not due to the direct physiological effects of a substance or general medical condition. MDD has been found to be comorbid with nicotine dependence (Fink, 2001), alcoholism (Reinhold, 2008), anxiety (Judd et al., 2000), and

other psychological illnesses. Those diagnosed with MDD may suffer from the disease throughout their lifetime.

Major depressive disorder is a complex and heterogeneous disorder that is comprised of three broad domains of clinical symptoms: mood, cognitive function, and neurovegetative symptoms. The cause of depression is thought to be complex, including various genetic, developmental, and environmental factors (Lisanby, 2007). It is distinct from normal sadness by its persistence for longer than two weeks and concordance with other depressive symptoms (Howland, 2008).

There are several approaches to diagnosing MDD that rely on various neuropsychiatric diagnostic instruments, such as, the Mini International Neuropsychiatric Interview (MINI (Kessler et al., 2003). The relationship between MDD and increased disability and reduced quality of life is well established in the literature (Langlieb & Guico-Pabia, 2010). Even with systematic antidepressant strategies, MDD is a debilitating disease that is difficult to treat (McClintock et al., 2011). Severe depression can be a life threatening illness and is associated with a high suicide rate.

Electroconvulsive Therapy

Electroconvulsive therapy (ECT) is a highly effective treatment for patients with severe or medication-resistant depression (Lisanby, 2007). Per the American Psychiatric Association (APA), ECT is a treatment option that may be useful in those cases where the MDE was resistant to psychotherapy and medication (NIMH, 2011c). For example, the Sequenced Treatment Alternatives to Relieve Depression (STAR*D) trial showed MDD in a majority of the patients was unresponsive to treatment with single or combined psychotropic medications. Further,

clinical outcomes of treatment with antidepressant medications in the elderly may be suboptimal in part because of intolerance or side effects to antidepressant agents (Rush, 2006). There are many types of psychotherapy; the most common approaches are cognitive-behavioral, interpersonal, and psychodynamic therapies (Schulberg, Katon, Simon, & Rush, 1998). The role of psychotherapy in treating MDD is to aid the patient in developing good coping strategies for handling daily stressors. On its own, psychotherapy may not be enough to resolve severe depression (Schulberg, et al., 1998). Because of the limitations of medication and psychotherapy in treating severe MDD, ECT may play an important role in treating depression.

History of Electroconvulsive Therapy

The use of electricity as a treatment for medical disorders has a long and enduring history (Abrams, 2002). Historical accounts estimate the use of electricity dates back to at least 1470 (Endler & Persad, 1988). Before electric generators were developed in the 18th century, electric eels or electric catfish were sometimes applied to the head to treat psychiatric illness. One such report indicated that such treatment could cure psychogenic blindness (Endler & Persad, 1988). The use of electricity to treat medical disorders during the 18th century was short-lived though due to the underdevelopment and lack of available electrical devices (Abrams, 2002).

Medical interest was renewed beginning in the middle of the 19th century due to advances in technology that produced devices with newer technical parameters (Endler & Persad, 1988). In 1868, a two-volume work titled *Elektrotherapie* (Benedikt, 1868) on electrical treatment for medical disorders was published. *Elektrotherapie* provided physicians with instructions for treating various illnesses. The treatise included a recommendation to discontinue the use of electricity for treating neurological conditions because of its transient nature and because

patients' treatment responses to electricity varied greatly, attesting to a lack of credible evidence to continue the practice (Fink, 2001).

Evolution of Electroconvulsive Therapy

When ECT was first introduced in the 1930s as a treatment for neuropsychiatric disorders, early experience with the treatment raised concerns about serious side effects, including fractures (before the use of neuromuscular blocking agents) and cognitive impairment (in part related to the dose and technique). Consequently, the use of ECT declined due to its adverse effects and the introduction of antidepressant pharmacologic agents. In recent decades though, further research and methodological advances have led to renewed interest in the role of ECT for the treatment MDD. Its main use is in the treatment of treatment-resistant MDD or in conditions related to severe depression such as catatonia, emerging suicidal lethality, and psychosis.

The second edition of the guidelines of the American Psychiatric Association (APA) Task Force on Electroconvulsive Therapy, which was published in 2001, includes a complete description of the current clinical use of ECT. Briefly, the primary indications for ECT include a MDE that is unresponsive or intolerant to antidepressant treatment, good response to prior ECT, and the need for a rapid clinical response. The decision to use ECT depends on several factors, including the severity and chronicity of the MDE, the likelihood that alternative treatments would be ineffective, preferences of the treatment team and patient, and a weighing of the risks and benefits (Lisanby, 2007).

The administration of ECT has significantly changed since its first introduction. In the last 35 years, refinements of ECT instruments and procedures have decreased many of the side

effects believed to be associated with memory loss while increasing the efficacy of ECT (Lisanby, 2007). The administration of ECT was improved by use of the constant medical monitoring (e.g., EKG and EEG monitoring) (Lisanby, 2007) and muscle relaxants and short-acting anesthesia. Regarding the ECT technique, current standards recommend the use of brief or ultra-brief pulse wave forms, empirical dose titration, and unilateral electrode configuration (Kellner, 2010). Given the many refinements to the administration of ECT, some (Prudic et al., 1996) have suggested earlier clinical trials did not accurately depict its efficacy and incidence of cognitive side effects.

Electroconvulsive Therapy Procedure

Modern ECT includes the routine use of oxygenation, anesthesia, and continuous physiologic monitoring. These advancements have made ECT more effective and much safer than in the past. There are no absolute contraindications to ECT, but factors that have been associated with reduced efficacy including a prolonged MDE, lack of response to medication, and coexisting psychiatric diagnoses such as a personality disorder. Persons with unstable cardiac disease such as ischemia or arrhythmias, cerebrovascular disease such as recent cerebral hemorrhage or stroke, or increased intracranial pressure may be at increased risk for ECT-associated complications. Practically speaking, cerebral aneurysm or related conditions would likely increase risk as well. When considering the risk/benefit, it is the patient's decision as well as that of the treatment team. The pre-ECT workup therefore should include a complete medical and neurological evaluation to detect and manage such conditions (Husain et al., 2004). For at-risk populations such as elderly adults, persons with cardiac problems, and pregnant women, ECT can be a safe and effective treatment.

Common electrode positions include bitemporal, right unilateral, and bifrontal. Right unilateral and bifrontal placements may be selected to reduce the burden of side effects, whereas bitemporal placement may be selected if the other electrode configurations are unlikely to be effective (e.g., in patients in whom previous ECT treatment with the latter positions has failed) (The UK ECT Review Group, 2003).

Electroconvulsive therapy has a range of effects on the neurobiological features of depression. According to Lisanby (2007), ECT increases cortical y-aminobutyric acid (GABA) concentrations and enhances serotonergic function that may influence cortical processes and lead to decreased MDD. Indeed, the Consortium for Research in ECT (CORE) trial reported a 75% remission rate among 217 patients who completed a short course of ECT during an acute episode of depression (Kellner et al., 2006). The number of sessions of ECT will depend on the severity of the MDE and the clinical response during the course of treatment. ECT is accomplished by placing an electrode(s) on the forehead, temporal region, or crown of the head of an individual, depending on employed ECT method. Specific and controlled amounts of electricity are then administered to the brain (Fink, 2001). Seizures are hypermetabolic states accomplished by a large group of neurons firing at once. As a result of the seizure, marked transformations occur in cerebral blood flow, cerebral oxygen consumption, and cerebral metabolic rate (Sackeim et al., 2001). Concluding the seizure, neuronal firing and cerebral blood flow drop below normal levels due to its natural inclination to return to homeostasis. Research also suggests seizures alter biochemical compounds in the brain such as enzymes, proteins, and neurotransmitters, thus resulting in reduced depressive symptoms (Kellner et al., 2010). The electroencephalogram is monitored during ECT to confirm seizure activity and to document seizure duration. In addition,

the medical team monitors seizure motor activity. This technique involves the placement of a tourniquet around an ankle before the administration of the muscle relaxant so that there is maintenance of the potential for muscle contraction in the foot. Oxygen saturation and cardiac rhythm are monitored during the procedure.

Effectiveness of Electroconvulsive Therapy

Agreement on the effectiveness of ECT in treating MDD is undisputed; however, controversies exist on administration of treatment. This is especially true with regard to electrode placement, specifically the anatomic location of the stimulus electrodes on the individual's scalp (Kellner et al., 2010). The contention in ECT is on the balance of antidepressant efficacy of treatment compared to its cognitive effect on the patient. An acute course of ECT is assigned through bifrontal, bitemporal, and right unilateral electrode placement, and as shown in findings by Kellner et al. (2010), these electrode configurations have different efficacies. Seizure threshold is a measure of the minimum electrical energy necessary to induce a generalized seizure (Fink et al., 2008). Bifrontal placement is to one and a half times seizure threshold, while bitemporal is similar, and unilateral is at six times seizure threshold. The findings showed that bitemporal placement had greater efficacy with more rapid symptom reduction and could be the better placement for urgent clinical situations. Other findings have shown that right unilateral ECT placement is less effective compared to bitemporal ECT and could be a cause for fewer cognitive effects. However, a recent study suggested that right unilateral electrode placement must be delivered at multiples of seizure threshold to be maximally effective resulting in the same cognitive effects as bifrontal and bitemporal electrode placement (Kellner, Tobias, & Wiegand, 2010). Other studies have tried multiple placements of electrodes in unilateral, finding

that multiple placements have greater efficacy compared to the traditional placements. The bifrontal placement has been reported to have similar efficacy to the bitemporal placement although it has fewer cognitive effects. Despite the controversies in electrode placement, the use of ECT in alleviating the debilitating effects of MDD remains an attractive option in using the treatment. Sackeim et al. (2008) found ultra-brief bitemporal ECT to have markedly inferior antidepressant efficacy than ultra-brief unilateral ECT. However, the Sienaert, Vansteelandt, Demyttenaere, and Peuskens (2009) study reported an advantage to the use of ultrabrief unilateral ECT, when speed of response is concerned. The study found patients that were treated with unilateral ECT met response criteria after a significantly lower number of treatment sessions. Furthermore, the estimated odds of achieving response and remission criteria were higher for patients receiving unilateral ECT as compared to patients receiving bifrontal.

Electroconvulsive Therapy Dosage

The ECT dose is measured in millicoulombs of charge delivered and the dose administered must be sufficient to induce seizure activity. One approach, called the empirical seizure-threshold titration, involves giving progressively higher doses during the initial ECT session until the seizure threshold is reached, and then selecting a dose at various percentages above the seizure threshold during subsequent treatment sessions. Another accepted approach involves the use of an age-based or half-age based dosing algorithm, although this technique has some limitations, since age accounts for only a small percentage of the variance in the seizure threshold (Husain et al., 2004).

The efficacy of ECT is highly dependent on technique, with remission rates ranging between 20% and 80%, depending on how the treatment is performed (Lisanby, 2007). Double-

blind, randomized, controlled clinical investigations have shown interactions between electrode placement and dosage (relative to seizure threshold) in the efficacy and side effects of ECT (Lisanby, 2007). In a review of 22 trials that involved 1408 patients, the United Kingdom ECT Review Group (Lisanby, 2007) reported that bilateral electrode placement was moderately more effective than right unilateral placement, but the efficacy of right unilateral ECT was dose-sensitive, and several of the included trials in that analysis may have used insufficient doses. Several studies have not shown a difference in efficacy between high-dose right unilateral and bilateral ECT, and these studies (McCall, Reboussin, Weiner, & Sackeim, 2000; Sackeim et al., 2000) have indicated that unilateral electrode placement on the right side was associated with a lower incidence of memory loss, especially at long-term follow-up.

The results of studies that compared different schedules of ECT administration suggested that, for patients in whom ECT was indicated, a three times a week ECT conferred greater antidepressant effect than one time a week ECT. Furthermore, there was consistent evidence that the two times a week and three times a week ECT schedules were comparable in antidepressant efficacy. However, the results were conflicting in the speed of antidepressant effect (Gangadhar & Thirthalli, 2010). Although, Gangadhar et al. (1982) reported no advantage for the three times a week ECT, Kellner et al. (2010), and Sackeim et al. (2000) showed that the three times a week schedule was associated with faster clinical response. However, the three times a week schedule also resulted in increased cognitive impairment that subsided one month after treatment.

Overall, it seems that for treating depression on an outpatient or inpatient basis, a typical course of ECT involves between six and twelve treatments, depending on the severity of the depressive symptoms and the rapidity of the response (Gangadhar & Thirthalli, 2010).

Electroconvulsive therapy is generally administered three times per week (Husain, et al., 2004). Psychotropic medication may be instituted for the purpose of continuation treatment to maintain the ECT clinical response. Since premature discontinuation of ECT can predispose the patient to relapse of depressive symptoms, it is important to monitor the efficacy of the treatment in a systematic fashion. Some patients may need maintenance ECT to avoid relapse. Maintenance ECT is administered generally at a rate of one treatment weekly then reduced to bi-weekly to monthly for up to one year (National Institute of Mental Health, 2003). Efficacy can be monitored by using standardized rating scales for depression or by keeping track of the severity of selected targeted symptoms. Importantly, the medical team should track the side effects that emerge during treatment, such as amnesia, with the use of neuropsychological tests to assess cognitive performance and memory.

Review of the 16-item Quick Inventory of Depressive Symptomatology –Self-Report (QIDS-SR$_{16}$)

The QIDS-SR$_{16}$ (Rush et al., 2003) is a 5-7 minute self-report measure that assesses symptom severity and symptomatic change. The item content was designed to cover all diagnostic criteria for major depressive disorder outlined by the *DSM*-IV-TR (APA, 2010).

Self-report measures have an advantage over clinician-rated instruments in medical settings because they do not require staff time or training to administer, and can be completed in the waiting room by patient. In research settings self-report measures are free from clinician overestimation of patient improvement, which might occur when there are some incentives to document treatment success (Zimmerman et al., 2012). The measurement is a cost-effective option because it is inexpensive in terms of professional time needed for administration. In the

Greenberg, Bornstein, Greenberg, and Fisher (1992) study the authors stated that clinicians involved in placebo-controlled medication random controlled trials may detect subtle cues, "knowing" which patients were on active medication (Hughes & Krahn, 1985; Rabkin et al., 1986). They supported this finding by the fact that in other studies, the clinician report, but not the self-report, distinguished active medication from placebos (Edwards et al., 1984; Lambert et al., 1986). These findings suggested that self report measures could be free from expectation bias.

To reduce the time needed to appraise depressive symptom severity, the 16-item Quick Inventory of Depressive Symptomatology ($QIDS_{16}$) was developed (Rush et al., 2003; Trivedi et al., 2004) in both a clinician-rated ($QIDS\text{-}CR_{16}$) and self-report ($QIDS\text{-}SR_{16}$) version to improve on the available clinician and patient ratings by providing equivalent weightings (range 0-3) for each symptom item along with provide clearly stated anchors that estimate the frequency and severity of symptoms. The $QIDS\text{-}SR_{16}$ scales are based on the 16 QIDS items that convert responses and obtain ratings (range 0–3) concerning all nine criterion symptom domains (Rush et al., 2003; Trivedi et al., 2004). The questions are identical for the $QIDS\text{-}CR_{16}$ and the $QIDS\text{-}SR_{16}$. For both versions of the QIDS, four items are used to assess the sleep domain (initial, middle, and late insomnia, as well as hypersomnia). Two items are used to gauge psychomotor activity (agitation and retardation). Four items assess the appetite/weight domain (i.e., appetite increase and decrease, weight increase and decrease). For each of these three domains, the highest rating on any one relevant item is used to score the domain (range 0 –3). Only one item is used to score the remaining six criterion domains (each rated 0 –3) (sad mood, concentration, energy, interest, guilt, suicidal ideation/plans).

The total score is obtained by adding scores for each of the nine domains. Scores are classified as the following: scores between 0-5 were considered normal; 6-10 were considered mild; 11- 15 were classified as moderate; 16-20 were considered moderate to severe; and 21+ were classified as severely depressed.

The QIDS-SR_{16} has been shown to have a sensitivity to change and is capable of rapidly and reliably defining response and remission. It closely parallels results obtained with the longer commonly used clinician ratings such as the Hamilton Rating Scale for Depression (HRSD) (Hamilton, 1960;1967) and the Montgomery-Asberg Depression Rating Scale (MADRS) (Montgomery & Asberg, 1979) in outpatients treated for chronic, nonpsychotic major depressive disorder (Rush et al., 2004). These clinician rating scales mentioned above do not specifically identify and weigh each of the diagnostic criterion symptoms specified by DSM-IV-TR equally. Rush et al. (2006) suggested that common symptoms (e.g. sad mood) should contribute to a greater degree to the total severity. However, the inherent limitations in the original clinician ratings likely apply to the self report versions (Rush et al., 1996). The authors suggested that the QIDS-SR_{16} may be helpful in monitoring symptom outcome changes during treatment for patients and for health care systems (Rush et al., 2004).

In studies (Rush et al., 2004) comparing the QIDS-SR_{16} with the $HRSD_{17}$ in a group of depressed outpatients, the QIDS-SR_{16} had acceptable test homogeneity at exit. The QIDS-SR_{16} seemed to measure a single construct more effectively than the $HRSD_{17}$ in the study, this may have been due to the fact that the QIDS-SR_{16} measures only the nine core DSM-IV-TR diagnostic criteria and therefore, adheres more closely to the central concept of depression whereas the $HRSD_{17}$ includes anxiety items. The QIDS-SR_{16} may show greater sensitivity to

changes in depression in patients with MDD than does the $HRSD_{17}$ (Brown et al., 2008). Thus, the QIDS-SR_{16} seemed to be an acceptable tool for the evaluation of depressive symptoms and for monitoring of depressive response to treatment in patients.

In a study conducted through Sequenced Treatment Alternatives to Relieve Depression (STAR*D), Howland (2008) compared the efficacy and tolerability of various antidepressant therapies in four sequential levels of treatment. While the study focused on pharmacological treatment, it provided justification to use self-report measures as a primary outcome and predictor measure. Among the measures used to access secondary outcomes the QIDS-SR_{16} score was obtained at baseline and during each treatment visit.

The QIDS-SR_{16} has been used in a variety of research and clinical settings, including inpatient and outpatient psychiatric clinics and primary care settings. Rush et al. (2004) states that clinical practice and clinical trial research would benefit greatly if a self-report rating of depression severity and specific depressive symptoms could be found that reasonably reflects findings obtained from more time-consuming clinician ratings.

Several types of validity and reliability have been established for the QIDS-SR_{16} (Rush, 2004). Information regarding internal consistency and validity of this measure has been gathered. The QIDS-SR_{16} scores were compared to depression diagnoses in participants' medical charts as external criteria. For construct validity, the QIDS-SR_{16} scores were compared to the scores on the Veteran's Rand 36-Item Health Survey (VR-36). Internal consistencies ranged from 0.81 to 0.94 for QIDS-SR_{16} (Trivedi et al., 2004). Therefore, the QIDS-SR_{16} was found to have good reliability and impressive construct validity. Rush et al. (2004) found the QIDS-SR_{16} to be generally as sensitive to change over time and to the differences between

treatment cells as was the HRDS-24 rating. In addition, the QISD-SR_{16} confirmed response and remission rates obtained using the HRDS-24. Strong psychometric properties of the brief self report format and its sensitivity to treatment change suggest that the QIDS-SR_{16} is a valuable clinical tool (Brown et al., 2007).

CHAPTER THREE

Methodology

Participants

Participants were 94 patients treated with ECT that were clinically followed on an inpatient or outpatient basis at UT Southwestern Medical Center University Hospital - Zale Lipshy (ZLUH) in Dallas, Texas. The ZLUH ECT unit follows the APA ECT guidelines (2001). Consent was obtained prior to treatment and the informed consent process was continued across the complete ECT course. In order to receive ECT at ZLUH, the patient needed to have a psychiatric diagnosis of mood disorder, the most typical being MDD. Appropriateness for electrode configuration was determined by the psychiatrist. The patient had to be cleared by medical and anesthesiology teams prior to beginning ECT. The researcher reviewed each subject's medical chart to obtain demographic information, including the variables of psychiatric diagnosis, age and gender.

Electroconvulsive Therapy and QIDS-SR_{16} Administration Procedure

The standard procedure for ECT is right unilateral (RUL) electrode configuration, ultra-brief pulse-width, and use of the empirical titration method for establishing the therapeutic dose. The initial treatment is the titration session and subsequent treatments are provided at six times the seizure threshold. The electrode configuration was switched to bitemporal (BT) around the eighth treatment if there was suboptimal response by the physician's judgment, which increased the number of treatment sessions. Treatments are typically administered three times a week for inpatients and two times a week for outpatients over an average of 12 weeks. However, variances in the outpatient frequency occurred.

Once a patient was cleared to receive ECT, the procedure began with monitoring sensors being placed on the patient's head and other parts of the body. A blood pressure cuff was placed on one of his/her limbs to monitor blood pressure, brain waves and the heart. After the patient was under anesthesia, a controlled amount of electricity was passed between two electrodes that were placed on the patient's scalp. Typically, the dose used was one and a half to two and a half times the seizure threshold for BT ECT, and six times the seizure threshold for RUL. A therapeutic, generalized seizure was generated in the brain. The device used at ZLUH was the Mecta SPECTRUM. Upon completion of treatment, the patient was taken to a recovery room and monitored until he/she left the ECT area.

A medical student or resident gave each subject a QIDS-SR_{16} in the morning before his/her ECT treatment and asked him/her to complete it before the treatment session. The QIDS-SR_{16} was administered before each ECT session.

Data Analysis

IBM SPSS Statistics (version 19) was used for paired *t*-test analyses.

Descriptive Data Analysis

All demographic information and QIDS-SR_{16} testing scores were reported. Continuous/scale data were analyzed for mean and standard deviations. Nominal/categorical data were analyzed for frequency. Demographic variables include group placement (i.e. electrode configuration [right unilateral electrode placement or bitemporal electrode placement]), age, gender, diagnosis, and length of treatment (i.e. how many ECT treatments).

Primary Data Analysis

Paired *t*-test analyses were applied to determine if there were significant improvements between pre- and post- treatment scores on the QIDS-$SR_{16.}$ Total scores and each domain score were analyzed. In addition, all changed scores of QIDS-SR_{16} domains from the baseline to the post- ECT were ordinally ranked from high to low order. The effect size (r) was calculated ($\sqrt{t\text{^}_2/(t\text{^}_2+df)}$ to determine the effect size of the pre- and post- treatment scores on the QIDS-SR_{16} total and individual domain scores. The effect size (r) is generally classified into small (.1), medium (.3), or large (.5). The rejection level of type I error was set at α =.05. The analyses for this study were applied in the following:

In order to test pre-and-post treatment effects of ECT, a paired *t*-test was used to compare the pre-ECT treatment and post-ECT treatment of the total QIDS-SR_{16} and its domain scores. The effect sizes of the total QIDS-SR_{16} and all domain values were reported. The researchers hypothesized that QIDS-SR_{16} scores would decrease from severe depressive symptoms toward minor depressive symptoms after receiving ECT treatment. Also, the researchers expected the effect size of the sad mood and suicidal ideation domains to be greater than the remaining seven symptom domains. Specifically, the present study hypothesized that:

1. Participants who received ECT would show improved depression symptoms after treatment as measured on the QIDS-SR_{16}.
2. The effect size of the sad mood domain would be greater than the other symptom domains as measured on the QIDS-SR_{16}.
3. The effect size of the suicidal ideation domain would be greater than the other symptom domains as measured on the QIDS-SR_{16}.

CHAPTER FOUR

Results

Subject Characteristics

The total sample consisted of 58 (61.7%) females and 36 (38.3%) males who ranged between 20 to 85 years of age (*M*=51.76, *SD*=15.19). All subjects had a diagnosis of MDD. Within this sample, RUL electrode placement was used at the start of treatment for majority of ECT sessions and BT was rarely used at the start. Following standard ECT practice at ZLUH, the patients in this study started ECT with RUL and later switched to BT after the eighth session if they experienced suboptimal changes in their depression. The frequency of subjects changing electrode placement during the treatment from RUL to BT occurred in 22 (23.4%) patients. The number of ECT sessions that the participants received ranged from three to 27 (*M*=10.45, *SD*=4.45).

Hypothesis 1

The pre-treatment QIDS-SR_{16} total scores ranged from 8 (mild) to 27 (severely depressed) (*M*=18 [severe], *SD*=4.34) and the post- treatment scores ranged from zero [normal] to 21[severely depressed] (*M*=7.18 [mild], SD=4.74). The individual pre- and post-treatment domain scores ranged from 0 to 3.

Table 6 shows the pre-treatment descriptive statistical data that includes the QIDS-SR_{16} item range, mean, and standard deviation. The QIDS-SR_{16} results showed that the majority of the subjects reported severe sleep, sad mood, and suicidal ideation symptoms. On the other hand, less severe symptoms were recorded in psychomotor and loss of interest domains. The standard deviation suggested that there was large variability of QIDS-SR_{16} scores in the cohort.

The post treatment scores presented in Table 7 show that depression severity, based on self-report, significantly decreased after an acute course of ECT. A high QIDS-SR_{16} score was only recorded in the sleep domain whereas other domains had significantly reduced to a mild state. In addition, the post-treatment QIDS-SR_{16} total score reduced from 18 (moderate to severe) at the pre-treatment stage to 7.18 (mild) at exit. The overall total QIDS-SR_{16} score had a large effect size (E.S. (*r)* =.91; $t = 20.98$, $df = 93$, p =.000).

There were no significant differences found in any QIDS-SR_{16} scores between participants that switched electrode placement and of those who only had RUL electrode placement. However, there was a significant increase in the amount of treatments received (t= -5.46, df= 25.51, p=.000) when the electrodes were switched from RUL to BT.

Hypothesis 2

The pre- and post-treatment effectiveness is demonstrated in table 5. The effect size for the mood domain (E.S. (*r)* =.88; $t = 17.58$, $df = 93$, p =.000), was large, the highest for all the individual domains. The mood domain yielded the largest effect size, showing that ECT had the most impact on this domain using QIDS-SR_{16} as the measurement.

Hypothesis 3

The individual effect size for the suicide domain (E.S. (*r)* =.83; $t = 9.19$, $df = 93$, p =.000) was large, the second highest of the nine symptom domains. The effectiveness of ECT in the suicide domain was found to be effective according to the QIDS-SR_{16}.

All of the individual domain values in table 8 showed large effect sizes. The E.S. (*r)*-values from greatest to the least for the domain scores are:

mood (E.S. (*r)* =.88; $t = 17.58$, $df = 93$, p =.000),

suicide (E.S. (*r)* =.83; *t* = 9.19, *df* = 93, *p* =.000),

fatigue (E.S. (*r)* =.78; *t* = 12.13, *df* = 93, *p* = .000),

self-outlook (E.S. (*r)* =.75; *t* = 11.07, *df* = 93, *p* = .000),

concentration (E.S. (*r)* =.72; *t* = 10.03, *df* = 93, *p* = .000),

sleep (E.S. (*r)* =.68; *t* = 8.96, *df* = 93, *p* = .000),

loss of interest (E.S.(*r)* =.68; *t* = 14.58, *df* = 93, *p* = .000),

psychomotor(E.S. (*r)* =.65; *t* = 8.35, *df* = 93, *p* = .000),

and appetite change (E.S. (*r)* =.62; *t* = 7.74, *df* = 93, *p* = .000).

CHAPTER FIVE

Discussion

The present study found ECT to have significant positive effects with regard to clinical outcome per patient self report on the QIDS-SR_{16}. First, the post- treatment results showed a significant reduction in the QIDS-SR_{16} total and domain scores from baseline to post acute ECT. This supported prior findings that ECT has substantive clinical benefits for patients with MDD. However, the sleep domain on the QIDS-SR_{16} did not relatively decrease, as compared to the other domains (e.g., mood). Second, the study found relatively higher effect sizes for changes from baseline to post acute ECT in the QIDS-SR_{16} domains of sad mood and suicidal ideation. Third, no significant differences were found in the clinical scores between the participants who had their ECT electrode configuration switched and those who did not during the course of treatment.

Indeed, this provides further support for the clinical efficacy of ECT in the treatment of MDD. Participants had significant reductions on all DSM-IV-TR depressive symptom domains. In particular, the QIDS-SR_{16} total score reduced from a baseline average of 18 (moderate to severe) to an average of 7 (mild) indicating a great reduction in depression severity. This is similar to other ECT findings that used clinician rated outcome measures (Janicak et al., 1995; Kellner et al., 2010). Thus, ECT appears to be an effective antidepressant treatment for depressive disorders as based on both clinician rated and patient rated outcome measures. Previous research studies confirmed that ECT is an effective procedure in the treatment of MDD with different depressive symptom features (Janicak et al., 1995; Kellner et al., 2010).

Twenty-two patients switched from right unilateral (RUL) electrode configuration to bitemporal (BT) around the eighth treatment due to the fact that patients had suboptimal response to RUL electrode configuration as based on physician observation. In addition, the finding showed that there were little or no changes in the QIDS-SR_{16} scores after the switch when compared to the exit scores of those who did not switch electrode placement. Thus, changing electrode placement or staying with RUL over an acute course of ECT treatment does not seem to affect the effectiveness of ECT in reducing depressive symptoms.

This study provided important information to advance clinical care in ECT. The findings corroborated the standing evidence that ECT is an effective treatment for MDD. Specifically, it showed that certain depressive domains responded better than other to ECT. On average the symptoms of depression reduced from the severe/moderate range to mild over a course of an average 11 sessions. The population studied experienced a marked improvement in the domains of mood, suicide, energy, self-outlook, and concentration. When developing an individualized plan of care it is necessary to know which particular symptoms of depression to target. The use of QIDS-SR_{16} to measure depressive symptoms can easily be applied in daily practice that can assist physicians in making decisions regarding treatment efficacy or the need to modify medical interventions as treatment for depression progresses.

This research will help improve the care of patients diagnosed with MDD. The shared decision making between the patient and clinicians has been used as a method to determine the proper treatment course. These results may help provide patients with increased confidence in making an informed decision about a treatment that has sometimes been considered controversial.

Limitations

The research has some limitations. The present study only recruited patients from one hospital, UT Southwestern Medical Center University Hospital-Zale Lipshy, which may limit the generalizability of the findings. This was a naturalistic study based on a clinical database, without research diagnostic criteria to diagnose disorders in which outside variables could not be controlled. There could have been possible comorbidities (both medical and neuropsychiatric) that could have affected outcome. Comorbidities for which medications could have been prescribed, may have affected the presentation of depressive symptoms. The switch of electrode placement was non-systematic and based on physician judgment. Since electrode placement has an impact on the effectiveness of ECT, the switch of the placement was an uncontrolled variable and not based on the study's criteria, which could have affected the findings. The findings from this study are based on ordinal fact which involves minimal quantitative distinctions and are not based on size or statistic comparison. Furthermore, statistical comparison of the results would help to provide more statistically significant results.

Future Research

The QIDS-SR_{16} was the only patient self-report data collection instrument used; therefore, using two self-report measurements for a concordance check would allow for a comparison of other measures in determining the effectiveness of ECT in MDD. In order to offer comparison of self-reported symptomatology data other patient self-reporting instruments such as the Beck Depression Inventory –II (BDI-II), which uses the diagnostic DSM-IV-TR criteria for MDD should be used. To better understand electrode configuration's impact on the effectiveness of ECT it is necessary to have an adequate number of participants who will receive

both configuration types. This knowledge would help researchers discern if certain electrode configurations reduce particular depressive symptoms more than other configurations. Lastly, the research did not critically examine the rate at which symptom reductions happen. For example, it would be beneficial to identify if sad mood decreases before other domains. Additional research should be carried out to understand its impact on the effectiveness and efficacy of ECT.

Conclusion

The aim of this study was to use a patient self- report measurement to determine treatment effectiveness of ECT for MDD for the first time. The QIDS-SR_{16} showed ECT treatment to be effective in treating MDD. The present study's findings illustrate particular depressive symptoms necessary to target during treatment. QIDS-SR_{16} is a valuable clinical tool that can be used as a primary outcome to gauge treatment benefit in routine practice.

References

Aalto, A., Elovainio, M., Kivimaki, M., Uutela, A., & Pirkola, S. (2012). The Beck Depression Inventory and General Health Questionnaire as measures of depression in the general population: A validation study using the Composite International Diagnostic Interview as the gold standard. *Psychiatry Research*, *197(1-2)*, 163-171.

Abrams, R. (2002). *Electroconvulsive therapy*. Oxford: Oxford University Press.

American Psychiatric Association (2001). *The Practice of Electroconvulsive Therapy: Recommendations for Treatment, Training, and Privileging*. Second Edition. Washington, DC: American Psychiatric Association.

Becker, A.T., Steer, R.A., & Carbin, M.G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review*, *8(1)*, 77-100

Benedikt, M. (1868). *Nervenpathlogie und Elektrotherapie*, 2nd edition. Medical Heritage Library.

Bernstein, I. H., Rush, A. J., Trivedi, M. H., Hughes, C. W., Macleod, L., Witte, B. P., …Emslie, G.H., (2010). Psychometric properties of the quick inventory of depressive symptomatology in adolescents. *International Journal of Methods in Psychiatric Research, 19(4),* 185-194.

Brown, E.S., Murray, M., Carmody, J.T., Kennard, D.B., Hughes, C.W., Khan, D.A., & Rush, A.J., (2008). The Quick Inventory of Depressive Symptomatology-asthma and major depressive disorder. *Annals Allergy Asthma Immunology*, *100*, 433-438.

Coryell, W. and Young, A. E. (2005). *Clinical Predictors of Suicide in Primary Major Depressive Disorder*. Physician Postgraduate Press

Department of Veterans Affairs, & Department of Defense. (2009). VA/DoD clinical practice guideline for management of major depressive disorder (MDD). *Clinical Practice Guidelines: Summary.*

Diagnostic and Statistical Manual of Mental Disorder, Fourth Edition (1994). Washington, DC

Edwards, B.C., Lambert, M.J., Moran, P.W., McCully, T., Smith, K.C., & Ellingson, A.G. (1984). A meta-analytic comparison of the Beck Depression Inventory and the Hamilton Rating Scale for Depression as measures of treatment outcome. *British Journal of Clinical Psychology, 23*: 93–99.

Endler, N.S. & Persad, E. (1988). Clinical Trial of the treatment of depression. *British Medicine*, *54(39),* 881-886.

Fink, M. (2000). ECT has proved effective in treating depression. *Nature*, *403*:826.

Fink, M. (2001). *Electroconvulsive therapy in medication-resistant depression. Treatment-Resistant Mood Disorders.* Cambridge University Press. New York, New York.

Fink, M., Abrams, R., Bailine, S., & Jaffe, R., (1996). *Ambulatory electroconvulsive therapy: report of a task force of the association for convulsive therapy.* Association for Convulsive Therapy. Convulsive Therapy.

Fink, M., Petrides, G., Kellner, C., Mueller, M., Knapp, R., …. Husain, M. M. (2008). Change in Seizure Threshold During Electroconvulsive Therapy. *Journal of ECT, 24*,114-116.

Gangadhar, B.N., and Thirthalli, J., 2010. Frequency of Electroconvulsive Therapy Sessions in a Course. *Journal of ECT, 26*(3),181-185

Gangadhar, B.N., Janakiramaiah, N., Subbakrishna, D., Praveen, J., & Reddy, A.K., (1993) Twice versus thrice weekly ECT in melancholia: a double-blind prospective comparison. *Journal of Affective Disorder, 27*, 273-278.

Gangadhar, B.N., Kapur, R.L., Kalyanasundaram, S. (1982). Comparison of electroconvulsive therapy with imipramine in endogenous depression: a double blind study. *British Journal of Psychiatry*, *141*, 367-71.

Gangadhar, B.N., Pradhan, N., & Mayanil, C.S. (1987). Dopamine autoreceptor down-regulation following repeated electroconvulsive shock. *Indian Journal of Medicine, 87,* 787-791.

Greenberg, R.P., Bornstein, R.F., Greenberg, M.D., & Fisher, S. (1992). A meta-analysis of antidepressant outcome under 'blinder' conditions. *Journal Consult Clinical Psychology, 60*, 664–669.

Grosse, D.S., Lollar, J.D., Campbell, A.V. & Chamie, M. (2009). Disability and Disability-Adjusted Life Years:-Not the Same. *Public Health Reports*, *124(2),*197-202.

Gangadhar, B.N. & Thirthalli, J. (2010). Frequency of Electroconvulsive Therapy Sessions in a Course. *Journal of ECT*, 26:3.

Hamilton, M. (1960). A rating scale for depression. *Journal of Neurology Neurosurgery Psychiatry, 23*, 56–62.

Hamilton, M. (1967). Development of a rating scale for primary depressive illness. *British Journal Society of Clinical Psychology, 6*: 278–296.

Hughes, J.R., & Krahn, D. (1985). Blindness and the validity of the double-blind procedure. *Journal of Clinical Psychopharmacology, 5*: 138–142.

Husain, M.M., Rush, A.J., Fink, M., Knapp, R., Petrides, Rummans, T., ...Kellner, C.H. (2004). Speed of Response and Remission in Major Depressive Disorder with Acute Electroconvulsive Therapy (ECT). A Consortium Research in ECT (CORE) Report. *Journal of Clinical Psychology, 65*:485-491.

Husain, M. M., McClintock, M.S., Rush, A.J., Knapp, G.R., Fink, M. Rummans, T.A., …Kellner, C.H. (2008). The Efficacy of Acute Electroconvulsive Therapy in Atypical Depression. Journal of Clinical Psychiatry, *69*, 406-411.

Janicak P. G, Davis J. M, Gibbons R. D, Ericksen, S., Chang, S., & Gallagher, P., (1995). *Efficacy of ECT (A meta-analysis). American Journal of Psychiatry*,*142*, 297–302.

Johnstone, E.C., Deakin, J.F., Lawler, P. Frith, C.D., Stevens, M., McPherson, K., & Crow, T.J., (1980). The Northwick Park electroconvulsive therapy trial. *Lancet*, *2*, 1317-1320

Judd, L.L., Akistal, H.S., Zeller, P.J., Paulus, M., Leon, A.C., Maser, J.D., …Keller, M.B., (2000). Psychosocial disability during the long-term course of unipolar major depressive disorder. *Archives of General Psychiatry*, *57*, 373-380.

Judd, L.L., Paulus, M.J., Schettler, P.J., Akiskal, H.S., Endicott, J., Leon., A.C., …Keller, M.B., (2000). Does incomplete recovery from first lifetime major depressive disorder herald a chronic course of illness? *American Journal of Psychiatry*, *157*, 1501-1504.

Gelhart, P. R. & King, L. H. (2001). The influence of comorbid risk factors on the effectiveness of cognitive-behavioral treatment of depression. *Cognitive and Behavioral Practice*, *8(1),* 18.

Howland, R.H., (2008). Sequenced Treatment Alternatives to Relieve Depression (STAR*D). Part 1: Study design. *Journal of Psychosocial Nursing and mental Health Services, 46*(9):21-4.

Howland, R.H., (2008). Sequenced Treatment Alternatives to Relieve Depression (STAR*D). Part 2: Study outcomes. *Journal of Psychosocial Nursing and mental Health Services, 46*(10):21-4.

Kellner, C. H., Knapp, R., Husain, M. M., Rasmussen, K., Sampson, S., Cullum, M., …Petrides, G., (2010). Bifrontal, Bitemporal, and right unilateral electrode placement in ECT: Randomized trial. *British Journal of Psychiatry, 196*, 226-234.

Kellner, C.H., Knapp, R.G., Petrides, G., Rummans, T.A., Husain, M.M., Rasmussen, K., …Fink, M., (2006). Continuation electroconvulsive therapy vs. pharmacotherapy for relapse prevention in major depression: a multisite study from the Consortium for Research in Electroconvulsive Therapy (CORE). *Archives of General Psychiatry*, *63(12),*1337-1344.

Kellner, C.H., Tobias, K.G., and Wiegand, J., (2010). Electrode placement in Electroconvulsive Therapy. *Journal of ECT*,*26*:175-180.

Kessler, R.C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K.R., …Wang, P.S., (2003). National Comorbidity Survey Replication: the epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). *The Journal of the American Medical Association*, *289*, 3095-3105.

Lai, C. H. (2011). Major depressive disorder: Gender differences in symptoms, life quality and sexual function. *Journal of Clinical Psychopharmacology,* 31(1), 39-44.

Lambert, M.J., Hatch, D.R., Kingston, M.D., Edwards, B.C. (1986). Zung, Beck, and Hamilton rating scales as measures of treatment outcome: A meta-analytic comparison. *Journal Consult Clinical Psychology* ,*54*, 54–59.

Langlieb, M.A., & Guico-Pabia, J.C., (2010). Beyond Symptomatic Improvement: Assessing Real-World Outcomes in Patients with Major Depressive Disorder. *Journal of Clinical Psychiatry*, 12(2).

Lerer, B., Shapira, B., Calev, A., Tubi, N., Drexler, H., Kindler, S., …Schwartz, J.E., (1995). Antidepressant and cognitive effects of twice- versus three-times weekly ECT. *American Journal of Psychiatry*, *152*, 564-570.

Lisanby, S.H. (2007). "Electroconvulsive Therapy for Depression." *The New England Journal of Medicine*, *357*, 1939-1945.

Lisanby, S. H., Pallanti,S. & Schlaepfer, T.E. ,(2009). "FDA considers classification of ECT." CNS Spectra 14(12): 668-670.

McCall, W.W., Reboussin, D.M., Weiner, R.D., and Sackiem, H.A., (2000). Titrated moderately suprathreshold vs. fixed high-dose right unilateral electroconvulsive therapy: acute antidepressant and cognitive effects. *Archives of General Psychiatry*, *57*, 438-444.

McClintock, M.S., Husain, M.M., Wisniewski, R.S., Nierenberg, A.A., Stewart, W.J., Trivedi, M.H.,…Rush, A.J. (2011). Residual Symptoms in Depressed Outpatients Who Respond by 50% But Do Not Remit to Antidepressant Medication. *Journal of Clinical Psychopharmacology, 31*, 180-186.

Montgomery, S.A., Åsberg, M. (1979). A new depression scale designed to be sensitive to change. *British Journal of Psychiatry, 134*, 382–389.

Pakriev, S. Kovalev, J. & Mozhaev, M. (2009). Prevalence of depression in a general hospital in Izhevsk, Russia. *Nordic Journal of Psychiatry. 6(3)*, 469.

Prudic, J., Haskett, R.F., Mulsant, B., Malone, K.M., Pettinati, H.M., Stephens, S., …Sackeim, H.A., (1996) Resistance to antidepressant medications and short-term clinical response to ECT. *American Journal of Psychiatry*, *153*, 985-992.

Psych Central Staff. (2012). *Symptoms of depression (Major depressive disorder).* Psych Central. Retrieved from http://psychcentral.com/disorders/sx22.htm

Rabkin, J.G., McGrath, P., Stewart, J.W., Harrison, W., Markowitz, J.S., & Quitkin, F. (1986). Follow-up of patients who improved during placebo washout. *Journal of Clinical Psychopharmacology, 6*, 274–278.

Reddy, M.S. (2010). Depression: The disorder and the burden. *Indian Journal Psychological Medicine, 32(1),* 1-2.

Reinhold, J.A. (2008). Clinical Therapeutics Primer: Link to Evidence for ambulatory care pharmacist. Burlington, MA.

Romans, S. E., Tyas, J., Cohen, M. M., & Silverstone, T. (2007). Gender differences in the symptoms of major depressive disorder. *Journal of Nervous and Mental Disease, 195*(11), 905-911.

Rubio, J. M., Markowitz, J. C., Alegria, A., Perez-Fuentes, G., Liu, S-M, Lin, K-H., & Blanco, C., (2011). Epidemiology of chronic and nonchronic major depressive disorder: Results from the national epidemiologic survey on alcohol and related conditions. *Depressions and Anxiety, 28,* 622-631.

Rush, A.J. (2006). An Evaluation of the Quick Inventory of Depressive Symptomatology (QIDS) and Hamilton Rating Scale for Depression (HRSD): A Sequenced Treatment Alternative to Resistant Depression Trial Report. *Society of Biological Psychiatry, 59*,493-501.

Rush ,A.J., Fava, M., Wisniewski, S.R., Lavori, P.W., Trivedi, M.H., Sackeim, H.A., & Niederehe, G., (2004). Sequenced Treatment Alternatives to Relieve Depression (STAR*D): rationale and design. *Control Clinical Trial, 25*, 119–142.

Rush A.J., Gullion, C.M., Basco, M.R., Jarrett, R.B., & Trivedi, M.H. (1996). The Inventory of Depressive Symptomatology (IDS): psychometric properties. *Psychology Medicine, 26*, 477–486.

Rush, A.J., Trivedi, M.H., Carmody, T.J., Ibrahim, H., Markowitz, J.C., Keitner, G.I., …Keller, M.B., (2004). Self-reported depressive symptom measures: Sensitivity to detecting change in a randomized, controlled trial of chronically depressed, nonpsychotic outpatients. *Neuropsychopharmacology*, *30*(2), 405–416.

Rush, A.J., Trivedi, M.H., Ibrahim, H.M., Carmody, T.J., Arnow, B., Klein, D.N., …Keller, M.B., (2003). The 16-Item Quick Inventory of Depressive Symptomatology (QIDS), clinician rating (QIDS-CR), and self-report (QIDS-SR): A psychometric evaluation in patients with chronic major depression. *Society of Biological Psychiatry, 54*, 573–583.

Rush, A.J., Trivedi, M.H., Wisniewski, S.R., Nieenberg, A.A., Stewart, J.W., Warden, D., …Fava, M., (2006). Acute and Longer Term Outcomes in Depressed Outpatients Requiring One or Several Treatment Steps: a STAR*D report. *American Journal of Psychiatry*, *163*:1905-1907.

Sackeim, H.A. (2000). Memory and ECT: from polarization to reconciliation. *Journal of ECT*, *16*, 87-96.

Sackeim, H.A. Prudic, J., Devanand, D.P., Nobler, M.S., Lisanby, S.H., Peyser, S., Fitzsimons, L., …Clark, J., (2001). A prospective, randomized, double blind comparison of bilateral and right unilateral electroconvulsive therapy at different stimulus intensities. *Archives of General Psychology*, *57*, 425-434.

Sackeim H.A., Haskett R.F., Mulsant B.H., Thase, M.E., Mann, J.J., Pettinati, H.M., ...Prudic, J., (2001). Continuation pharmacotherapy in the prevention of relapse following electroconvulsive therapy a randomized control trial. *The Journal of the American Medical Association*, *285*, 1299-307.

Sackeim, H.A., Prudic, J., Devanand, D.P., Nobler, M.S., Lisanby, S.H., Peyser, S., …Clark, J., (2000). A prospective, randomized, double-blind comparison of bilateral and right unilateral electroconvulsive therapy at different stimulus intensities. *Archives of General Psychiatry*, *57*, 425-434.

Sackeim, H.A., Prudic, J., Nobler, M.S., Fitzsimons, L., Lisanby, S.H., Payne, N., …Devanand, D.P., (2008). Effects of pulse width and electrode placement on the efficacy and cognitive effects of electroconvulsive therapy. *Brain Stimulation*, *1*(2), 71–83.

Schulberg, H.C., Katon, W., Simon, G., & Rush, J., (1998). Treating Major Depression in Primary Care Practice: An update of the Agency for Health Care Policy and Research Practice Guidelines. *Archives of General Psychiatry, 55*(12), 1121-1127.

Shapira B., Tubi N., Drexler H., Lidsky, D., Calev, A., & Lerer, B., (1998). Cost and benefit in the choice of ECT schedule. Twice versus three times weekly ECT. *British Journal of Psychiatry*, *172*, 44-48.

Sienaert, P., Vansteelandt, K., Demyttenaere, K., & Peuskens, J., (2009). Randomized comparison of ultra-brief and unilateral electroconvulsive therapy for major depression: Clinical efficacy. *Journal of Affective Disorders*, *116*, 106-112.

Squire L. R. (1986). Memory functions as affected by electroconvulsive therapy. *Annals of the New York Academy of Sciences*, *462*, 307–314.

Task Force on Electroconvulsive Therapy (2001). The practice of electroconvulsive therapy: recommendations for treatment, training, and privileging. Washington, DC: American Psychiatric Publishing.

The National Institute of Mental Health. (2011a). *Major depressive disorder in children.* U.S. Department of Health and Human Services. Retrieved from http://www.nimh.nih.gov/statistics/1MDD_CHILD.shtml

The National Institute of Mental Health. (2011b). *Major depressive disorder among adults.* U.S. Department of Health and Human Services. Retrieved from http://www.nimh.nih.gov/statistics/1MDD_ADULT.shtml

Trevino, K., McClintock, S.M., & Husain, M.M. (2010). A Review of Continuation Electroconvulsive Therapy: Application, Safety, & Efficacy. *Journal of ECT*, *26*(3),186-195.

Trivedi, M.H., Rush, A.J., Pan, J-Y., & Carmody, T.J., (2001). Which depressed patients respond to nefazodone and when? *Journal of Clinical* Psychiatry, 62,158-163.

Trivedi, M.H., Rush, A.J., Ibrahim, H.M., Carmody, T.J., Biggs, M.M., Suppes, T., …Kashner, T.M., (2004). The Inventory of Depressive Symptomatology, Clinician Rating (IDS-C) and Self-Report (IDS-SR), and the Quick Inventory of Depressive Symptomatology, Clinician Rating (QIDS-C) and Self-Report (QIDS-SR) in public sector patients with mood disorders: A psychometric evaluation. *Psychology of Medicine*, *34*, 73-82.

United Kingdom ECT Review Group (2003). Efficacy and safety of electroconvulsive therapy in depressive disorders: a systematic review of meta-analysis. *Lancet*, *361*, 799-808.

Zimmerman, M., Martinez, J., Attiullah, N., Freidman, M., Toba, C., Boerescu, D.A., & Rahqeb, M., (2012). Determining remission from depression on two self-report symptom scales: a comparison of the Quick Inventory of Depressive Symptomatology and the Clinically Useful Depression Outcome Scale. *SciVerse ScienceDirect*, *53*, 1034-1038.

Table 1

Gender of Sample

	Frequency	Percent
Male	36	38.3%
Female	58	61.7%
Total	100	100%

Table 2

Age of Sample

	Minimum	Maximum	Mean	SD
Age	20	85	51.76	15.19

Table 3

Initial Electrode Placement

	Frequency	Percent
Right Unilateral	93	98.9%
Bitemporal	1	1.1%

Table 4

Electrode Placement Switch to Bitemporal

	Frequency	Percent
Right Unilateral	72	76.6%
Bitemporal	22	23.4%
Total	94	100%

Table 5

ECT Treatment Sessions

	Minimum	Maximum	Mean	SD
ECT Sessions Received	3	27	10.45	4.45

Table 6

The Pre-ECT total QIDS-SR$_{16}$ and domain scores

Domain	Rating Range	Mean	SD
Sleep	0-3	2.63	0.64
Mood	0-3	2.48	0.76
Suicide	0-3	2.33	0.95
Fatigue	0-3	2.09	0.96
Appetite Change	0-3	1.94	1.10
Self-Outlook	0-3	1.87	1.06
Concentration	0-3	1.84	0.72
Psychomotor	0-3	1.70	0.88
Loss of Interest	0-3	1.11	0.99
Total QIDS-SR$_{16}$ Score	8-27	18	4.34

Table 7

The Post-ECT total QIDS-SR$_{16}$ and domain scores

Domain	Rating Range	Mean	SD
Sleep	0-3	1.73	0.93
Appetite	0-3	0.96	0.99
Concentration	0-3	0.85	0.80
Psychomotor	0-3	0.84	0.90
Fatigue	0-3	0.71	0.83
Mood	0-3	0.67	0.83
Suicide	0-3	0.66	0.90
Self-Outlook	0-3	0.56	0.85
Loss of Interest	0-3	0.19	0.56
Total QIDS-SR$_{16}$ Score	0-21	7.18	4.74

Table 8

Pre- and Post- Treatment Effectiveness

Domain	Δ item *M*	*SD*	*t*-score	Effect Size (*r*)	*P*
Mood	1.81	1.00	17.58	.88	0.00
Suicide	1.67	1.11	14.58	.83	0.00
Fatigue	1.38	1.10	12.13	.78	0.00
Self-Outlook	0.55	1.15	11.07	.75	0.00
Concentration	1.02	0.96	10.03	.72	0.00
Loss of Interest	0.92	0.92	9.19	.68	0.00
Sleep	0.90	0.97	8.96	.68	0.00
Psychomotor	0.23	1.00	8.35	.65	0.00
Appetite	0.98	1.23	7.74	.62	0.00
Total QIDS-SR$_{16}$ Score	10.82	5.00	20.98	.91	0.00

BIOGRAPHICAL SKETCH

Melissa Metoyer
Dmetoyer@aol.com

EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Xavier University of Louisiana	B.S.	1996-2000	Psychology Pre-Medicine
The University of Texas Southwestern School of Health Professions	M.R.C.	2009-2013	Rehabilitation Counseling Psychology

Positions and Employment

In-Home Behavioral Therapist 2008-present Dallas, TX

- Counsels individuals and families regarding psychological, emotional, or family difficulties using evaluative techniques, and develops and implements therapeutic treatment plan in an in-home setting.
- Plans and administers therapeutic treatment, such as behavior modification to assist clients in controlling disorders and other problems.
- Consults with medical doctor or other specialists concerning treatment plan and amends as needed.

Milieu Therapist/TL 2003-2008 Children's Medical Center Dallas, TX

- Conducted yearly evaluations of employees, offering constructive feedback while maintaining a solution oriented approach when appropriate. Responsible for interviewing, making recommendations for hire, coaching, mentoring, counseling and advocating for the needs of milieu therapist. Provided daily counseling to in/out-patients.
- Developed and lead weekly parent education classes, establishing rapport with families by recognizing their concerns and feelings. Built and maintained long-term associations based on trust.
- Wrote an eating disorder resource manual that is used as a learning tool for all new employees, and took over the scheduling of parent shadowing resulting in a consistent, structured program.