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The Cost Effectiveness of Psychotherapy for Treating
Adults with Post-Traumatic Stress Disorder

Micah LaVar Ingalls

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of
Master of Science

D. Russell Crane, Chair
Angela Bradford
Richard Miller

School of Family Life
Brigham Young University
June 2015

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ABSTRACT

The Cost Effectiveness of Psychotherapy for Treating Adults with Post-Traumatic Stress Disorder

Micah LaVar Ingalls
School of Family Life, BYU
Master of Science

This paper presents results from cost-analysis research for treating Post-Traumatic Stress Disorder in adults. Data for this research was provided by Cigna, a nation-wide healthcare manager in the United States of America. The sample size was 12,845 adults who were diagnosed with PTSD and received outpatient individual and family psychotherapy from one of the following mental health care providers: Marriage and Family Therapists (MFTs), Master's Nurses (RNs), Medical Doctors (MDs), Professional Counselors (LPCs), Psychologists (PSYs), and Social Workers (MSWs). Results were compared across treatment modality, across practitioner license type and between practitioner educational levels. The results demonstrated that family therapy was most cost effective and used the fewest sessions, while mixed therapy was least cost effective. Among practitioner licensure types MDs were found to be the most cost effective, while the group of RNs, MSWs and MFTs were least cost effective compared to one another. Also, no significant differences in cost effective treatment outcomes were found between Masters Level and Doctoral Level practitioners.

Keywords: cost effectiveness, cost, post-traumatic stress disorder, ptsd, psychotherapy, family therapy

ACKNOWLEDGEMENTS

The completion of this thesis represents in part the culmination of my experiences in the Brigham Young University Marriage and Family Therapy Master's program. As such I would like to thank all of those who supported me and believed in me throughout my time in the MFT program. In particular I would like to thank my loving and supporting parents for believing in me and sacrificing to support me in all my academic struggles and endeavors. Thank you for teaching me to work hard and to finish the game. I would like to thank my amazing wife, who was there to support me through the discouraging and disappointing experiences and who also celebrated the triumphs with me.

I would like to thank Dr. D. Russell Crane for providing me with the opportunity to attend BYU's Marriage and Family Therapy program. Dr. Crane provided me with personal growth promoting experiences and career building opportunities. Thank you for opening the door for the many blessings that I received in this program. I would also like to thank each member of my cohort for loving, accepting and supporting me as I worked to be who I am and become who I needed to become. Thank you for providing the opportunities for healing experiences.

Finally I would like to express gratitude to the collaborators who assisted in making this project possible: Jodi Aronson Prohofsky, PhD, LMFT, Former Senior Vice President of Operations, Cigna, and now Senior Director of Channel Management, Health, and Wellness, Wal-Mart Stores, Inc. and David Bergman, JD, Former Director of Legal and Government Affairs at AAMFT, now VP of Legal & External Affairs & Chief Legal Officer, National Board for Certified Counselors.

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Introduction

Post-Traumatic Stress Disorder (PTSD) is associated with significant psychological, physical, and relational burdens (Greenman & Johnson, 2012; APA, 2013; Gallagher and Ressick; 2013). The changes that individuals and families experience with PTSD can result in a variety of individual and relational distresses (Gorman, Fitzgerald & Blow, 2009; Boss, 2010). Research continues to bring to light better understanding about mental health disorders, their symptoms, and best practice techniques. This study adds to the mental health field by conducting a comparative cost analysis which considers the cost effectiveness of treating Post-Traumatic Stress Disorder (PTSD) among adults.

Lifetime prevalence rates of PTSD for the general public are between 6% and 9% (Pacella, Hruska, & Delahanty, 2013), with the DSM-V claiming lifetime prevalence rates for a 75 year lifespan at 8.7% (APA, 2013). Individuals diagnosed with PTSD often experience a broad range of biopsychosocial problems (Reynolds, 2007; Monson et al., 2012; Bryant & Friedman, 2001; Coulter, 2013) such as relational distress, a heightened startle response, nightmares, flashbacks, increases in fear, and demands for control in life, along with many other changes. Furthermore, adults diagnosed with PTSD also have a high comorbidity with depression and a strong correlation with suicide (APA, 2013; Davis, Witte & Weathers, 2014; Ramsaw et al. 2014). The general symptoms of PTSD combined with the trauma, in addition with a correlation with other biopsychosocial responses, provides a compelling argument for the study of a variety of treatment modalities to find the most cost effective treatment for PTSD and its associated symptoms.

Moreover, the far reaching effects of PTSD are felt by the individual who is suffering from trauma related symptoms, by their family, by their associates as well as by their society

(Kilmer et al., 2011; Coulter, 2013). These effects are felt emotionally, relationally and financially. Therefore, conducting a comparative cost effectiveness analysis of various factors that influence treatment outcome is beneficial to individuals, families, and society (Basham, 2008; Crane & Payne, 2011). The research reported in the current study compares the cost effectiveness of treating PTSD across treatment modalities (individual, family, and mixed psychotherapy); across practitioner licensure type (Marriage and Family Therapists (MFTs), Master's Nurses (RNs), Medical Doctors (MDs), Professional Counselors (LPCs), Psychologists (PSYs), and Social Workers (MSWs)); between types of treatment approaches (biomedically oriented vs. talk therapy oriented); and between education and the associated differences in payment rates for masters vs. doctoral level practitioners. Comparing across practitioner type will allow for the analysis of the cost of therapeutic services provided to clients. The costs of therapy are examined and compared in terms of cost effectiveness, client drop out, and client recidivism. The results of this data provides policy makers with information to assist them in their efforts to provide cost effective treatments for individuals, families, and societies suffering from the effects of PTSD (Mills, 2012; Forneris et al., 2013; Crane & Payne, 2011; Law & Crane, 2000).

Literature Review

Post-Traumatic Stress Disorder

Post-Traumatic Stress Disorder involves exposure to or experiencing an event that resulted in the individual experiencing intense fear, helplessness, or horror. This could occur from experiencing or witnessing combat trauma, violent assaults, sexual assaults, car accidents, natural disasters or any other form of trauma. As a result, individuals may have symptoms such

as re-experiencing the event, distressing dreams, feeling as if the event were recurring intense psychological distress, or strong physiological responses to external stimuli (APA, 2013).

Research shows that lifetime prevalence rates of PTSD range from 6-9% for the general population and about 17% for military combat populations —U.S. Army soldiers and Marines assessed during the time of deployment in Iraq (Sundin, Fear, Iversen, Rona, & Wessely, 2010). Since PTSD is two to three times higher in military combat populations, they can be a good sample for medical cost offset research. An example of the potential cost offset effect for trauma treatment is demonstrated by Foreneris et al. (2013). They estimated that if all U.S. military personnel received evidence based care (that is care that is proven to reduce symptoms) the total treatment expenditure for treating trauma and depression among military combat veterans could be reduced by as much as \$1.7 billion over a two year treatment period (Forneris et al., 2013). Even though ideal treatment will not always occur, Forneris et al.'s (2013) results suggest the potential monetary value of psychotherapy treatment of PTSD. PTSD is a growing problem among combat veterans and is often comorbid with other mental health issues (Chan, Cheadle, Reiber, Unützer, & Chaney, 2009). Based on Chan et al.'s (2009) study, individuals diagnosed with PTSD had higher utilization of health care. They also reported that over a one year period individuals with both PTSD and depression had much higher outpatient costs (\$1,399 more than those with just depression) and medical care costs (\$425 more than those with just depression) than those individuals with depression and no PTSD. Such research continues to reveal the complexity of PTSD and its associated cost of treatment.

Psychological and physical symptoms associated with PTSD. The influence of PTSD also has a significant impact on individual's well-being (Bryant & Friedman, 2001; Pacella, et al., 2013). For example, the APA (2013) reports that PTSD sufferers often experience

psychological distress, such as re-experiencing, avoidance, numbing, and hyper arousal. Also, Gallagher and Ressick (2013) report positive associations between PTSD and cognitions of hopelessness. Moreover, hopelessness cognitions are highly correlated with suicide and suicidal ideation (Jakupack et al., 2011). In comparison to the general population, it is estimated that 1.1%-4.6% of people attempt suicide at some point in their lifetime, while approximately 9.6% of those diagnosed with PTSD have attempted suicide since the trauma (Tarrier & Gregg, 2004). Furthermore, individuals with PTSD experience comorbid mental and physical health challenges including substance abuse, depression, anxiety, later life dementia, musculoskeletal pain, cardio-respiratory, gastrointestinal issues and general health complaints (APA, 2013; Ramsaw et al., 2014; Barret et al., 2002; Pacella et al., 2013).

Impact of PTSD on family relationships. Research with individuals suffering from PTSD also demonstrates the socially and relationally debilitating nature of PTSD (Gallagher & Ressick, 2012; Monson et al., 2012). Within partner relationships, PTSD correlates with relationship distress, relationship aggression, caregiver burden, psychological distress (Monson et al., 2012), and relationship sexual satisfaction (McFarlene & Bookless, 2001). Further, McFarlene and Bookless (2001) also reported that experiencing trauma was associated with increased irritability, increased withdrawal, and increased avoidance of discussions, which had detrimental effects on self-awareness, intimacy, sexuality, and communication. These areas are all vital aspects of functional relationships (McFarlene & Bookless, 2001) that may be damaged or altered by PTSD. In a meta-analysis by Taft, Watkins, Stafford, Strees, Monson (2011) reported correlations between PTSD and intimate relationship discord, intimate relationship physical aggression, and intimate relationship psychological aggression. Consequently, not only is the identified patient impacted by PTSD but often their intimate partner experiences secondary

trauma or compassion fatigue (Goff et al., 2005). The general idea is that those who are close with a trauma survivor often pick up many PTSD like symptoms (Goff et al., 2005). Thus, it would be prudent to address these relational changes along with the treatment of trauma symptoms when treating PTSD in adults.

In terms of parent child relationships, parents with PTSD also suffer disruptions in their relationships with their children (Gorman, Fitzgerald & Blow, 2009). Gorman et al. (2009) demonstrated that parental PTSD had both direct and indirect effects on family functioning and the development of young children. These detrimental effects included personalization of parent's anger or rejection, declines in affective expressions by the parent, confusion about "ambiguous loss", and loss of parental support and connection (Gorman et al., 2009; Boss, 2010). One type of ambiguous loss is when a family member is still physically present, but they have changed. Thus leaving the family experiencing a loss for who the person used to be, but also confused about how to mourn that loss and adjust to the change since the individual is still present. This results in an ambiguous loss, which as defined by Boss, (2010) is an unclear, traumatic loss which affects ones relationships. When ambiguous loss is experienced it can distress and even traumatize families (Boss, 2010). Furthermore, McFarlene and Bookless' (2001) report that those who have experienced trauma have correlated increases in irritability, increases in withdrawing and increases in avoidance of discussions. Such responses to trauma could leave the child feeling distant from their parent. Also, children may have a harder time adjusting to the fact that their parent is different than they were prior to the trauma. Therefore, treating PTSD within families appears to have promise for alleviating the problems of family life associated with PTSD.

Cost Effectiveness

Cost effectiveness research provides a method that allows for the comparison of treatment outcomes in economic terms (Law & Crane, 2000; Crane & Payne, 2011; Crane & Christenson, 2012). One type of cost effectiveness research that has been used to support the use of psychotherapy services is the concept of “medical cost offset,” which is defined by Anderson and Estee (2002) as the net change in medical care costs in association with the net change in mental health care costs (Anderson & Estee, 2002). Medical cost offset research laid the foundation for other types of cost effectiveness research. Other types of cost effectiveness research include the cost effectiveness of various treatment modalities, the cost effectiveness of differing practitioner license types, the impact of diagnosis on the costs of therapy, and the varying costs of psychotherapy by gender (Crane & Payne, 2011; Crane et al., 2012; Christenson, Crane, Bell, Beer & Hillin, 2014; Fawcett & Crane, 2013). These types of cost effectiveness research have already provided many valuable contributions to the field of psychotherapy (Husereau et al., 2013). These contributions, which are discussed in later sections, help establish the value of various types of treatment and the cost effectiveness of select treatment providers.

Dropout and recidivism as measures of cost effectiveness. Recent studies demonstrate that cost effectiveness research allows for the comparison of treatment outcomes across various treatment variables (Law & Crane, 2000; Crane & Payne, 2011; Crane & Christenson, 2012). Two key aspects of treatment that factor into treatment cost effectiveness are client dropout rates and client recidivism rates (Law & Crane, 2000; Crane & Payne, 2011; Crane & Christenson, 2012). Ehlers et al. (2013) cited nearly a dozen studies that claimed that dropout rates for individual psychotherapy treatment of PTSD ranged anywhere from 26%-43%. That means that

anywhere from a quarter to almost one half of PTSD clients do not complete treatment, with many of them not returning after the first session. Client dropout is influenced by client demographic factors, pre-treatment symptom severity, and feelings of shame, anger, or guilt (Mills, 2012). Furthermore, it has been observed that symptoms have a tendency to peak most commonly between the assessment intake and the beginning of therapy (Ehlers et al., 2013). This rapid spike in symptoms may potentially be correlated to the high dropout rate which occurs during this time period of therapy.

Much of the research that has been conducted in regards to PTSD evaluates and compares different models of treatment (Levi, 2013). Although this analysis is valuable, most research for PTSD demonstrates that there is no significant difference in treatment outcomes across different theoretical models (Gallagher & Ressick, 2012). With the theoretical stalemate for symptom management, it becomes valuable to consider other aspects that may increase or decrease the cost effectiveness of PTSD treatment such as treatment modality, practitioner license, and client gender. Thus, with the growing literature on various treatments for PTSD it now becomes vital to consider not only the effectiveness but also the cost effectiveness of these treatments in order to determine which treatments to consider administering to individuals suffering from PTSD (Freed et al., 2009; Mills, 2013).

The impact of treatment modality on cost effectiveness. Comparative, cost effectiveness research provides a measure that can be used for comparison between psychotherapy treatment modalities (individual, family, and mixed) (Crane & Christenson, 2012; Crane & Payne, 2011). Results from previous studies demonstrate differences in treatment outcomes based upon the type of treatment modality the patient received (Crane & Payne, 2011; Crane et al., 2013). In general, it has been found that family therapy is more cost effective than

individual therapy, or a mixed modality of therapy (Crane & Payne, 2011). However there are sometimes differences in treatment modality cost effectiveness depending on the specific diagnosis. For example, when considering sexual dysfunction, it was found that a mixed therapy modality was more cost effective (Fawcett & Crane, 2012). Whereas recidivism rates for relational problems were not significantly different based upon treatment modality (Moore & Crane, 2014). Furthermore, it was reported that family therapy had more cost effective outcomes than individual therapy modality or mixed therapy modality when treating depression and substance use (Crane et al., 2013; Morgan, Crane, Moore & Eggett, 2013).

Individuals diagnosed with PTSD often face additional mental health struggles and physical health struggles in conjunction with their PTSD. For example depression, anxiety and substance abuse are often comorbid with PTSD (APA, 2013; Ramsaw et al. 2014). As previously discussed, the treatment modality used to treat depression and substance abuse impacts the cost effectiveness of the treatment. Declines in physical health are also correlated with diagnoses of PTSD (Barrett et al., 2002; Pacella et al., 2013). In particular, physical health distress may include increased musculoskeletal pain, increased cardio-respiratory symptoms, increased gastrointestinal issues, and general health complaints (Pacella et al., 2013). Therefore, the correlation between PTSD and mental and physical health declines may also impact cost effectiveness.

The Impact of Practitioner License on Cost Effectiveness.

Practitioner license type has also yielded unique results in terms of cost effective treatment outcomes (Crane & Payne 2011; Crane et al., 2012; Crane & Christenson, 2012). For example, when comparing provider licensure type (Marriage and Family Therapists (MFTs), Master's Nurses (RNs), Medical Doctors (MDs), Professional Counselors (LPCs), PSYs, and

Social Workers (MSWs)), Moore, Hamilton, Crane & Fawcett (2011) found that practitioners with the MFT license were more cost effective than RNs, MDs, and PSYs but were less cost effective than MSWs and LPCs.

Furthermore, practitioner license impact on cost effectiveness has been compared across a variety of different diagnoses (Crane & Payne, 2011; Crane & Christenson, 2012). For example, when considering Somatoform Disorder no significant differences were found in treatment outcomes across professional licensure (Crane et al., 2012). Whereas, MFT's were found to be the most cost effective when treating depression (Crane et al., 2012). Furthermore, when considering substance abuse disorders MFT's were found to have the lowest recidivism rate. Therefore, this study considers the impact of practitioner license type on the cost effectiveness of treating PTSD.

Cost effectiveness of mental health treatments is measured through analysis of treatment efficacy compared on the scale of clinical outcome per unit of cost (Crane et al., 2013). This provides a unique and valuable measurement guideline that allows for cross-disciplinary comparison, and treatment modality comparisons. Furthermore, health care cost effectiveness analysis research influences decisions made by insurance companies, government officials, practitioners, health care utilizers, and others. Therefore, the cost effectiveness research implications provide strong support for conducting accurate and extensive research in this area of study.

Treatment Modalities for Post-Traumatic Stress Disorder

There are a number of differing treatments for PTSD (Bryant & Friedman, 2001; Allen & Bloom, 1994); including biomedical treatments, peer to peer support groups, individual, family, group and a mixed therapy modality. Ehlers et al. (2013) recommend that trauma focused

psychological treatment be used as a first-line of treatment for PTSD. The scope of this research is the comparison of treatment outcomes across treatment modalities and across practitioner training as evidenced by mental health license types.

Biomedical treatments. Medications for PTSD can be used to aid individuals with their biological symptoms of PTSD along with their psychological symptoms. A meta-analysis of medical treatment efficacy was published in the International Journal of Neuropsychopharmacologicum in 2012 by Ipser and Stein. According the authors, selective serotonin reuptake inhibitors are the medication of choice within the field (Ipser & Stein, 2012). Furthermore Ipser and Stein's (2012) Meta-analysis reported some promising findings for selective noradrenergic reuptake inhibitors and found lacking evidence of effectiveness for benzodiazepines. In a recent study by Greer, Grob and Halberstadt (2014) medical Cannabis has been investigated as an alternative treatment for the symptoms of PTSD. It is recommended that along with medications, individuals also seek out psychotherapy. Oehen, Traber, Widmer and Schnyder (2013) ran a clinical trial that tested the effectiveness of combining MDMA (Methylenedioxymethamphetamine) with psychotherapy treatment for PTSD. They found that there were clinically and statistically significant self-reported positive changes in client Posttraumatic Diagnostic Scale scores (Oehen et al., 2013).

Individual psychotherapy. When PTSD is treated with individual psychotherapy, it has been found to be more effective than no treatment (a waitlist control group) in the reduction of PTSD symptoms (Bryant & Friedman, 2001). In the Bryant and Friedman (2001) research, all clients who had been waitlisted still had PTSD symptoms at the end of the 5 week waitlist period, whereas 65%-68% of clients who were in individual treatment showed improvement.

Another form of individual psychotherapy is seen in peer to peer support groups. In these groups, peers who are others who have experienced similar trauma, work in a mentor-mentee type role. In one report of National Guard soldiers, peer to peer based groups were reported as being effective in reinforcing the general bond of combat groups, minimizing the stigma of a mental illness, and increased treatment with these groups (Pfeiffer et al., 2012).

Family psychotherapy. Family psychotherapy has the potential to be effective in treating PTSD (Coulter, 2013). When one individual in the family is suffering from PTSD the family frequently is impacted and often can be a moderating influence of the impact of PTSD on the identified patient (Matsakis, 2013). Since PTSD has been cited as having detrimental impacts on family relations (McFarlene & Bookless, 2001; Taft et al., 2011; Monson et al., 2012) it may be valuable to treat PTSD with family psychotherapy. For example, Elhers et al. (2013) report that individuals with PTSD who were not currently living with or had never lived with a partner had worse therapy outcomes. Therefore, having close social support is implied by Elhers et al. (2013) to have a moderating influence on PTSD therapy outcomes. Elhers et al. (2013) research helps lay the groundwork for studying the value of including the individual's social support network in the treatment of PTSD through family psychotherapy (Coulter, 2013; Matsakis, 2013).

There is little literature discussing clinical effectiveness in treating adults with PTSD through a systemic or family-based model (Coulter, 2013; Jordan, 2011; Goff & Smith, 2005). Instead, the majority of the research in this area discusses the impact of PTSD on the family system. For example Basham (2008) discusses the attachment injuries that may occur from trauma. There are ample amounts of theoretical conjecture that suggest that treating PTSD through a family model would be effective because of the increased family support and social

structure (Zulueta, 2006). Furthermore, Brewin, Andrews & Valentine (2000) reviewed eleven studies that correlated the lack of social support with PTSD symptoms and found the effect size was .40, the largest of any risk factor they evaluated. Greenman and Johnson (2012) reported the emotionally focused therapy for couples has been found to be effective in reducing PTSD symptoms. In particular, women who had experienced childhood abuse from family member(s) reported notable reductions in trauma symptoms after 20 sessions of couples EFT (Greenman & Johnson, 2012). Although, these are preliminary studies, they support the theory that increased social support can help reduce PTSD symptoms.

Mixed psychotherapy. A mixed modality of treating PTSD combines both individual and family psychotherapy as a treatment approach (Crane & Payne, 2011). There is a gap in the research of looking at the treatment outcomes of treating PTSD with a mixed therapy modality. Using a mixed modality of treatment has been found to be cost-effective when conducting sex therapy to treat sexual dysfunctions (Fawcett & Crane, 2013). Although this has yet to be tested for PTSD, applying a mixed method of treatment for PTSD may allow the client to receive the best of both treatment modalities. For example, the client may be able to explore the deep trauma in individual sessions to avoid compassion fatigue for family members, while also receiving the social support and strength that conjoint therapy offers. Conversely, mixed psychotherapy may result in a disjointed feel to therapy. There may be a disconnect between family sessions and individual sessions which may add to client frustration and suffering. Therefore, further research would provide valuable information regarding the effectiveness of mixed psychotherapy.

Gender as a Unique Factor of PTSD

Although men and women are exposed to roughly the same number of traumatic events, women are twice as likely to develop PTSD (Tolin & Foa, 2002). This disparity in PTSD diagnoses between genders suggests that trauma impacts men and women differently. It has been suggested that one possibility for the higher prevalence among women is due to interpersonal assaultive violence rates which are higher among women. However, when researchers Hetzel-Riggin and Roby (2013) controlled for assaults, women were still found to have a higher prevalence of PTSD. Since PTSD diagnoses are more common among women, it would be valuable to consider if gender impacts PTSD treatment outcomes.

Current Study

The value of the present study is that it differentiates between psychotherapy modalities in the cost effectiveness of the treatment provided for PTSD. Furthermore, this study identifies differences in cost effectiveness by license type. The results of this study provide valuable empirically supported research to the general public, to mental health professionals, to policy makers, insurance companies, to healthcare providers, and to those who suffer from PTSD. The empirically supported data of this study obtained from a large sample size helps to better inform each of the preceding entities on the ways in which cost effective treatments can be provided to individuals who are suffering from PTSD. Finally, the results of this study add to the research base that can inform the mental health care community of a few cost effective methods for providing care to those suffering with PTSD.

Research Questions

1. What is the average total cost and average cost effectiveness of treating Post-Traumatic Stress Disorder (PTSD) with psychotherapy?

2. What are the differences in treatment outcomes (total cost, number of sessions, cost effectiveness, dropout, and recidivism), when comparing treatment modality (individual therapy, family therapy, and mixed therapy) for treating individuals diagnosed with PTSD?
3. What are the differences in treatment outcomes (cost effectiveness, dropout, recidivism, number of sessions, and total cost) when comparing treatments provided by practitioners of differing license types (MFTs, RNs, MDs, LPCs, PSYs, MSWs) for treating clients diagnosed with PTSD?
4. What are the differences in treatment outcomes (cost effectiveness, dropout, recidivism, number of sessions, and total cost) when comparing treatments provided by biomedical practitioners (Master's Nurses and Medical Doctors) with treatments provided by talk therapists (MFTs, LPCs, PSYs, and MSWs)?
5. What are the differences in treatment outcomes (cost effectiveness, dropout, recidivism, number of sessions, and total cost) when comparing treatments provided by Masters level practitioners compared with doctorate level practitioners?
6. What are the differences in outcomes in PTSD treatment by gender?

Method

Design

This research uses a comparative, retrospective analysis of insurance claims from Cigna, a nationwide health insurance management company in the United States. The dataset for this research was extracted from over 5 million insurance claims between the years of 2001 and 2006. Based upon the 1996 Health Insurance Portability and Accountability Act (HIPAA), non-identifiable administrative data may be used for comparative statistical analysis. No personal

client or provider information is present in the data. The data set contains the following 11 variables: 1. A client identification number unique for each client; 2. The age and gender of the client; 3. The treatment date; 4. The state where the visit took place; 5. The current procedural terminology (CPT) code; 6. The primary DSM-IV diagnosis; 7. The therapist's license type; 8. The highest degree earned by the therapist; 9. The dollar amount of the claim; 10. The number of sessions or visits per claim; and 11. A calculated cost-effectiveness measure (Crane & Payne, 2011). For a more detailed explanation of the original dataset and the extraction process see the Crane and Payne (2011) article.

Criteria for PTSD Diagnosis.

The criteria for a PTSD diagnosis used here are based upon the DSM IV-TR criteria which were used during the period of data collection.

According to the APA (2000) "The essential feature of Posttraumatic Stress Disorder is the development of the characteristic symptoms following exposure to an extreme traumatic stressor involving direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one's physical integrity; or witnessing an event that involves death, injury or a threat to the physical integrity of another person; or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate. The characteristic symptoms resulting from the exposure to the extreme trauma include persistent re-experiencing of the traumatic event, persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness, and persistent symptoms of increased arousal." (P. 424)

These diagnostic criteria are the standards that clinicians use for PTSD diagnosis

Sample

The sample size ($n=12,845$) is made up of adults (ages 18-82) diagnosed with PTSD (DSM IV Code 309.81) who received individual, family, or mixed therapy (a derived modality that combines both mixed and individual therapy). These 12,845 cases were pulled from a data set made up of 6 million insurance claims (and over 500,000 unique individuals) provided by Cigna, a health insurance benefits administration system. Only individuals who were 18 years of age at the start of treatment and who had PTSD (ICD9 Code 309.81) as their primary diagnosis were included in the sample of 12,845 cases. Of these participants 76.5% (9,823) are female, 23.4% (3,000) are male, and 0.1% (22) did not have gender recorded within the data set. Considering that more than 75% of the sample are female it would be valuable to consider if there are differences in treatment outcomes by gender. Regionally, all 50 states within the U.S. were represented within the data. No other descriptive statistics were available.

Providers

This study examines the cost effectiveness of mental health services provided by six professional license types. These license types are MFTs, RNs, MDs, LPCs, PSYs, MSWs. These service providers were included in the study due to their national recognition as independently licensed health care practitioners (Crane & Payne, 2011). In instances when a provider had multiple licenses, the provider was categorized based upon the license identified as the primary license.

Definition of Terms and Measures

Episode of care. Episode of care (EoC) is defined by Cigna as a sequence of continuous treatment for the same patient. An EoC begins with the first psychotherapy session and ends 90 days after the last psychotherapy session.

Recidivism. For the purposes of this study, recidivism is defined as a patient returning to therapy (after at least a 90 day break) for an additional episode of care with the same provider type (Crane & Payne, 2011; Fawcett & Crane, 2013).

Total cost. Total cost is defined as the total dollar amount paid by Cigna for all therapy services during the episode of care.

Cost effectiveness. The cost effectiveness formula was developed based upon the data available in the insurance claims provided by Cigna. The formula for cost effectiveness is:
Estimated cost effectiveness = 1st EoC average cost + (1st EoC average cost * recidivism rate)
(Crane & Christenson, 2008; Crane & Payne, 2011; Moore, Hamilton, Crane & Fawcett, 2011).
This formula was developed to compare different types of therapy treatments and professions based on treatment cost and recidivism rate. Participants who dropped out of treatment were eliminated from cost effectiveness analysis to prevent artificially low costs and recidivism rates. The development and use of this formula has been effective in providing primary results of cost effectiveness analysis and comparison research (Crane, 2008; Crane & Payne, 2011; Moore et al., 2011).

Drop out. Drop out is defined as a participant attending only one session of therapy for individual treatment or family treatment and for mixed modality one session of family therapy and one session of individual therapy and then not returning for future services.

Provider type. Provider type is considered the license type in which the therapist is legally licensed and was listed first on the insurance claim form MFTs, RNs, MDs, LPCs, PSYs, and MSWs.

Modality. Modality is defined as the therapeutic context within which mental health services were provided. This could be family therapy, individual therapy or a combination of the two modalities creating a third type known as mixed therapy.

Family therapy. Family therapy is identified in this study by Current Procedural Terminology (CPT) code 90847, “Family psychotherapy (conjoint psychotherapy) (with patient present)” (American Medical Association, 2006, p. 278).

Individual therapy. Individual therapy in this study is identified by CPT code 90806, “an insight oriented, behavior modifying, and/or supportive treatment in an office or outpatient facility, approximately 45 to 50 minutes face-to-face with the patient” (American Medical Association, 2006, p. 277).

Mixed therapy. Mixed therapy in this study is defined as an EoC including sessions of at least one session of both family and individual therapy.

Research Questions Analysis

1. What is the average total cost and average cost effectiveness of treating PTSD with psychotherapy?
 - a. Descriptive statistics were used to demonstrate average total cost and cost effectiveness of treating PTSD with psychotherapy
2. What are the differences in treatment outcomes (total cost, number of sessions, cost effectiveness, dropout, and recidivism), when comparing treatment modality for treating individuals diagnosed with PTSD?
 - a. ANOVA was used to compare treatment modalities for the dependent variables of cost effectiveness, number of sessions, and total cost. A post hoc Tukey test was used for pairwise comparison. Also logistical regression was used to compare

treatment modalities for the dependent categorical variables of dropout and recidivism

3. What are the differences in treatment outcomes, when comparing treatments provided by practitioners of differing license types for treating clients diagnosed with PTSD?
 - a. An ANCOVA (with fee per session as the covariate) was used to compare practitioner license types for the dependent variables of cost effectiveness, number of sessions, and total cost. Pairwise comparisons were used to analyze how each license compared with each other. Also logistical regression was used to compare practitioner license types for the dependent categorical variables of dropout and recidivism.
4. What are the differences in treatment outcomes when comparing treatments provided by biomedical practitioners (RNs and MDs) with treatments provided by talk therapists (MFTs, LPCs, PSYs, and MSWs)?
 - a. An ANCOVA (with fee per session as the covariate) was used to compare practitioner license types for the dependent variables of cost effectiveness, number of sessions, and total cost. Also logistical regression was used to compare practitioner license types for the dependent categorical variables of dropout and recidivism.
5. What are the differences in treatment outcomes when comparing treatments provided by Masters level practitioners compared with doctorate level practitioners?
 - a. An ANCOVA (with fee per session as the covariate) was used to compare practitioner license types for the dependent variables of cost effectiveness, number of sessions, and total cost. Also logistical regression was used to compare

practitioner license types for the dependent categorical variables of dropout and recidivism.

6. What are the differences in outcomes in PTSD treatment by gender?
 - a. An ANOVA was used to compare practitioner license types for the dependent variables of cost effectiveness, number of sessions, and total cost. Also logistical regression was used to compare practitioner license types for the dependent categorical variables of dropout and recidivism

Results

Research question one asked, “What are the average total cost and average cost effectiveness of treating PTSD with psychotherapy?” The average total cost of treatment for PTSD across all health care providers and across all modality types is \$570.88 (SD=883.99). While the cost-effectiveness average is \$838.05 (SD=1506.63). See Table 1.

The second question examined “What are the differences in treatment outcomes when comparing treatment modality (individual therapy, family therapy, and mixed therapy) for treating individuals diagnosed with PTSD?” Using one-way ANOVA, significant differences were found between modalities for average number of sessions [$F(2, 12842) = 151.60, p < 0.001$], average cost [$F(2, 12842) = 205.09, p < 0.001$], and average level of cost effectiveness [$F(2, 12842) = 154.63, p < 0.001$]. Post hoc Tukey test revealed that in each of the types of outcomes, family therapy was the lowest, followed by individual therapy, and then mixed therapy was the highest (see Table 2). Furthermore, individual therapy recidivism and dropout rates are also reported in Table 2. Interestingly enough, the dropout rates for individual (24%), family (36%), and mixed (4%) therapies are within or below Elhers et al. (2013) reported average range (26%-43%) of individuals with PTSD who dropout.

Furthermore, logistic regression was used to compare therapy modalities on recidivism (see Table 3). Family therapy served as the reference group, so results were obtained for individual therapy versus family therapy and mixed modality versus family therapy. Participants were more likely to recidivate if they had individual therapy than if they had family therapy ($B = 1.109$, $SE = .138$, $p < .001$). These results indicate that those receiving individual therapy were roughly 203 times more likely to recidivate than those receiving family therapy alone ($\exp[1.109] = 3.032$). Similarly, participants in mixed modality therapy were more likely to recidivate than those in family therapy ($B = 2.139$, $S.E. = .146$, $p < .001$). Those in mixed modality therapy were 749 times more likely to recidivate than those who received family therapy alone ($\exp[2.139] = 8.49$).

Logistic regression was also used to compare therapy modalities in dropout (See Table 3). Family therapy served as the reference group. Participants were more likely to drop out if they had family therapy exclusively than if they had individual therapy exclusively ($B = -.566$, $SE = .089$, $p < .001$). These results indicate that those receiving family therapy were 74 times more likely to drop out as those receiving Individual therapy ($\exp[-.566] = .568$). Similarly, participants who received family therapy were also more likely to drop out than those in a mixed therapy modality ($B = -2.684$, $S.E. = .163$, $p < .001$). Those in family therapy were 1,328 times less likely to dropout than those in mixed therapy ($\exp[-2.684] = .068$).

The third question asked “What are the differences in treatment outcomes when comparing treatments provided by practitioners of differing license types for treating PTSD?” ANCOVA was used to compare first episode of care total cost, cost effectiveness and total session across practitioner licensure type while controlling for fee per session. As shown in table 4 an ANCOVA [between-subjects factor: practitioner license type; Covariate: fee per session]

revealed significant main effects of practitioner license for average total cost [$F(5, 11,909) = 4.974, p < 0.001$], for average total number of sessions [$F(5, 11,909) = 3.678, p = 0.03$], and for average level of cost effectiveness [$F(5, 11,909) = 4.902, p < 0.001$]. See Tables 5, 6, and 7 for significant between factor differences. When controlling for fee per session, MDs were found to use fewer sessions, cost less, and were more cost effective than all other practitioners treating PTSD.

As seen in table 8, logistic regression was used to compare recidivism and dropout by practitioner license. MFTs served as the reference group so results were obtained for RNs, MDs, LPCs, PSYs, and MSWs as compared to MFTs. For recidivism, individuals were more likely to recidivate if they received care from RNs than if they received care from MFTs ($B = .598, SE = .182, p = .001$). These results indicate that those receiving care from RNs are about 82 times more likely to recidivate as those who received care from MFTs ($\exp[.598] = 1.819$). Also, persons were more likely to recidivate if they received care from MSWs than if they received care from MFTs ($B = .254, SE = .082, p = .002$). These results indicate that those receiving care from MSWs are about 29 times more likely to recidivate than those who received care from MFTs ($\exp[.254] = 1.289$). Similarly, individuals were more likely to recidivate if they received care from PSYs than if they received care from MFTs ($B = .251, SE = .085, p = .003$). These results indicate that those receiving care from Psychologist are also about 29 times as likely to recidivate as those who received care from MFTs ($\exp[.251] = 1.285$). Whereas, there was no difference in likelihood to recidivate between MDs and MFTs ($B = .194, SE = .187, p = .299$) and between LPCs and MFTs ($B = .124, SE = .087, p = .154$).

Logistic regression was also used for drop out (see Table 8), individuals were more likely to drop out if they received care from MDs than if they received care from MFTs ($B = .946, SE =$

.172, $p < .001$). These results indicate that those receiving care from MDs are about 156 times more likely to drop out than those receiving care from MFTs ($\exp[.946] = 2.575$). However, Table 8 also demonstrates that individuals were equally as likely to drop out if they received care from LPCs ($B = .119$, $SE = .089$, $p = .180$), RNs ($B = -.004$, $SE = .206$, $p = .983$), MSWs ($B = -.023$, $SE = .085$, $p = .783$), or PSYs ($B = -.033$, $SE = .088$, $p = .707$) as those who received care from MFTs.

Research question four asked “What are the differences in treatment outcomes comparing treatments provided by biomedical practitioners vs. treatments provided by “talk therapists?” As shown in Table 9 an ANCOVA was used to compare the treatment outcomes of total dollars [$F(1, 11,913) = 6.03$, $p = 0.014$], total number of sessions [$F(1, 11,913) = 2.50$, $p = 0.114$], and cost effectiveness [$F(1, 11,913) = 5.79$, $p = 0.016$], while controlling for fee per session. On average psychotherapy provided by talk therapists cost \$109.20 ($SE = 44.49$, $p = 0.014$) less than psychotherapy provided by biomedical practitioners. Talk therapists were also found to be more cost effective than biomedical practitioners ($MD = 110.54$, $SE = 45.98$, $p = 0.016$). Whereas no significant difference was found between the number of sessions provided by talk therapist versus biomedical practitioners [$F(1, 11,913) = 2.50$, $p = 0.114$].

Question four also asked what differences exist between biomedical and talk therapist in terms of the outcomes of dropout and recidivism. As shown in table 11, logistic regression was used to compare dropout and recidivism between biomedical providers and talk therapists. Biomedical practitioners were used as the reference group. Individuals who received services from talk therapists were less likely to dropout compared to those who received services from biomedical practitioners ($B = -.520$, $SE = .119$, $p < .001$). These results indicate that individuals who received services from Biomedical practitioners were 68 times more likely to drop out

compared to those who received services from talk therapists practitioners ($\exp[-.520] = .594$).

No difference was found in recidivism rates between talk therapists and biomedical practitioners ($B=-.193$, $SE = .120$, $p = .108$).

Question five asked “What are the differences in treatment outcomes (cost effectiveness, total cost, number of sessions, recidivism, and dropout) when comparing treatments provided by Masters level practitioners compared with doctorate level practitioners?” The statistical test ANCOVA was used to compare the treatment outcomes of total cost, total number of sessions and cost effectiveness. As shown in Table 9 no significant differences were found for any of the treatment cost outcome variables: Total Cost [$F(1, 12,430) = 0.072$, $p=.789$], Total Sessions [$F(1, 12,430) = 0.117$, $p=0.733$], Cost Effectiveness [$F(1, 12,430) = 0.073$, $p=.0787$].

Logistic regression was also used to compare dropout and recidivism between Masters and Doctorate level practitioners. As demonstrated in Table 11, no difference was found in dropout rates between talk therapists and biomedical practitioners ($B=.031$, $SE = .045$, $p = .488$). No difference was found in recidivism rates between talk therapists and biomedical practitioners ($B=-.054$, $SE = .042$, $p = .198$).

Question six asked “What are the differences in outcomes in PTSD treatment by gender?” A one way ANOVA was conducted which found significant differences between genders. As seen in Table 10 significant differences were found for total dollars [$F(1, 12824) = 8.256$, $P=0.004$], total sessions [$F(1, 12824) = 17.239$, $P<0.001$], and for level of cost effectiveness [$F(1, 12824) = 8.501$, $P=0.004$]. The treatment of men with PTSD used less sessions, cost less and was more cost effective than the treatment of women. Logistic regression was also used to compare men and women in terms of dropout likelihood and recidivism likelihood (See Table 11). Logistic regression was also used to compare dropout and recidivism

between genders. Women were less likely to dropout than men ($B=-.192$, $SE = .049$, $p < .001$).

These results indicate that men are 21 times more likely than women to drop out of therapy ($\exp[-.192] = .825$) No difference was found in recidivism rates between men and women ($B=-0.089$, $SE = .047$, $p = .059$).

Discussion

The results of this study yielded significant and impactful findings. Particularly in terms of the impacts of treatment modality, practitioner license, practitioner degree type, practitioner degree level, and client gender on cost effective treatment outcomes. Furthermore, these results lay a valuable foundation for future research and provides meaningful implications for the field of psychotherapy.

Therapy modality was found to have significant impacts on the treatment outcomes of total cost, total sessions, cost effectiveness, dropout likelihood and recidivism likelihood. As reported by Crane and Payne (2011), in general, family therapy is more cost effective than individual therapy or a mixed modality of therapy. The findings of this study are consistent with the previous findings in that family therapy was found to have fewer sessions on average, fewer total cost in the first episode of treatment and a more cost effective level of treatment expense. When treatment outcomes were compared by modality using a Tukey Post hoc test, as shown in table 2 it was found that family therapy had the lowest average total cost \$295.32 ($SD=441.70$), while individual therapy had the second lowest average \$538.99 ($SD=841.88$), followed by a mixed modality of therapy which had an average cost of \$918.59 ($SD=1,181.00$). The total number of sessions during the first episode of care followed a similar pattern. A Tukey Post hoc test also revealed that the mean number of sessions for family therapy was 5.89 ($SD=7.05$), while individual therapy had an average number of sessions of 10.74 ($SD=14.94$) and mixed therapy

had an average number of sessions of 18.41 (SD=18.53). When the first episode of care cost-effectiveness was analyzed using a Tukey Post hoc test family therapy had an average of 302.38 (SD= 866.31), while individual therapy had an average of 554.94 (SD=866.32) and mixed modality cost effectiveness average was 949.34 (SD=1212.65).

One theory for the cost effective results for treating PTSD with a family therapy modality is the impact that increased social support has on trauma symptoms. Increased social support is shown to have a moderating influence on PTSD symptoms (Elhers et al., 2013). Brewin et al., (2000) reported similar findings, claiming that lack of social support was the largest risk factor they found for those with continued symptoms of PTSD. Greenman and Johnson's 2012 study supports this as they reported significant reductions in PTSD symptoms in trauma victims after providing emotionally focused couples therapy to victims and their partners.

Furthermore, recidivism and dropout were also compared across treatment modalities. As displayed in Table 3 It was found that, individuals who received individual therapy were 203 times as likely to return for a second episode of care and those who received mixed therapy were 749 times as likely to return for a second episode of care. This could be for a variety of reasons. Family therapy may not have worked for the client so they decided to not try family therapy again if they needed further services. Also it may be that family therapy is harder to schedule due to the need to coordinate schedules across multiple members of the family. It may also be that individual and mixed therapy was more comfortable and so they decided to return for a second episode of care within the same modality. It may simply be that family therapy was better at long term reduction of symptoms and so symptoms returned for those in the individual or mixed modalities. Finally it may be that family members learned how to help the client

manage their symptoms and thus the client no longer needed a therapist to help them heal from their trauma.

Practitioner licensure was also found to have a few significant impacts on PTSD treatment outcomes. Treatment outcomes were compared between the six practitioner licenses types within this study (MFTs, RNs, MDs, LPCs, and MSWs) and then also compared between biomedical practitioners and talk therapists. It was believed that differences would be found between the various practitioner licenses, however the main significant differences in treatment outcomes were found between Medical Doctors and all other licenses. See tables 5, 6, and 7 for licensure pairwise comparison results. In the end MDs used less sessions, and fewer dollars (when controlling for fee per session) and were more cost effective (when controlling for fee per session) than all other practitioner licenses treating PTSD. However, MDs were 156 times more likely than MFTs to experience client dropout and equally as likely as MFTs and LPCs to experience client recidivism. It is unclear as to the reasons for Doctors being more cost effective than all other practitioners but it may be that they see clients for just 1 session and refer or prescribe medication to manage trauma symptoms. It may also be that Doctor's preferred modality includes 1 session of treatment with long gaps between each treatment. This would help explain doctor's higher statistical propensity for client drop out. But, if this were the case, then this higher statistical drop out would only be a reflection of the operational definition of drop out within in this study. The other important finding that should not be over looked is the fact that in general talk therapists were found to be statistically equal, when controlling for fee per session, in terms of the treatment outcomes of total sessions, total cost, drop out, and cost effectiveness (See Tables 4, 5, 6, 7 and 8). These are important findings because they show that

talk therapists regardless of licensure yield essentially the same results (when controlling for fee per session).

Furthermore, when the practitioners were divided into talk therapists and biomedical practitioners more significant results were found. As demonstrated in Table 9, on average psychotherapy provided by talk therapists cost \$109.20 (SE=44.49, $p=.014$) less than psychotherapy provided by biomedical practitioners. Talk therapist were also found to be more cost effective than biomedical practitioners (MD=110.54, SE=45.98, $p=.016$).

Although, similar numbers of men and women are exposed to trauma events, it has been reported that women are two times as likely to develop PTSD (Tolin & Foa, 2002). Results from this data set had an even high gender disparity with more than three times as many women (9,823) as men (3,000) diagnosed with PTSD. The results demonstrated in Table 10 revealed that on average women received more sessions of care and that care cost more over all. Furthermore, men were found to be more cost effective to treat than women. These results show that not only are more women traumatized than men, but also that they spend more time in treatment and that they spend more dollars on treatment. These key findings help present the ways in which PTSD treatments may be impacted by gender and vice versa.

Limitations

The current study employed retrospective comparative outcome analysis of administrative data. Due to the limitation of the variables that were available within the data, the cost effectiveness analysis conducted was not the “gold standard” of cost effectiveness research (Pirraglia, Rosen, Hermann, Olchanski, & Neumann, 2004). The lack of using an experimental design may produce potential biases within the results. For example, clients may have been influenced by outside factors to select a specific treatment provider. Treatment modality was

also not randomly assigned and clients may have self-selected into or out of specific modalities. It may be that cases in which more symptoms were manifested lead to a use of a mixed modality because of attempts to involve outside influences. Therefore, the lack of random modality assignment may be a limitation to the research. On the other hand, there are many benefits to gain from this study being done in real life, as opposed to within the constrictions of an experiment. Furthermore, not all practitioners receive the same level of training even within the specific practices, as such that may impact the results of this study (Moore, et al., 2011). Also it is a limitation to think that cost effective treatments are the most effective treatments. This would be an unwise assumption to make because it may place greater importance on the costs than one would place on patient needs. However, when balanced together cost effectiveness and treatment effectiveness can be united to provide all around benefits.

Another potential limitation would be measuring treatment outcomes based upon dropout and recidivism. These are not the best measures of success, but they were the measures that were available. Specifically the dropout definition is a limitation to the study because dropout for individual and family therapy are defined as not returning after the first session, whereas dropout for the mixed modality inherently means they had to attend at least two total sessions (one family and one individual) before they could actually drop out of therapy. Therefore, this mixed modality dropout definition may significantly impact the cross comparison dropout statistics. Since there are different definitions of dropout based upon modality, the results may not be generalizable.

Furthermore, this data had a large range within the variables of total cost, total sessions, and cost effectiveness which resulted in the standard deviations being greater than the means for many of the statistical outputs. Such results could be negated by using a log transformation for

calculating the inferential statistics. In spite of much debate, it was decided to leave the statistical outputs in their original units of dollars, sessions, etc., which makes them more readable and more easily interpreted by all audiences. As such, it is then important to note that there is a large range within this data which leads to the size of the standard deviation being greater than the average for many of the statistical outputs.

Directions for Future Research

Future research should be able to build significantly on this foundational study. It would be able to use randomized control experimental designs to assess further for the impact that any self-selection biases may have presented here. Moreover, they could analyze the ways in which the reduction of the many biopsychosocial symptoms may impact the client's wellbeing in other areas of life.

It would also be valuable for future research to explore further the differences in treatment methods between practitioners and with practitioner groups. This could provide valuable information that would help increase understanding as to what are cost effective treatments that help provide symptom relief and healing for those diagnosed with PTSD.

Implications

This study demonstrates the value of analyzing treatment modality and treatment practitioners to recognize their impact on treatment outcomes. In particular the results that family therapy modality is most cost effective for treating PTSD demonstrates the importance of ensuring that all practitioners are trained in family therapy practices in order to be able to provide the most cost effective treatments. Furthermore policymakers, insurance companies, and psychotherapists would find value in the results of this cost effectiveness research as it would better inform them as to how to allocate their resources of time, energy and money in terms of

treating PTSD. Finally, this study supports previous studies (Elhers et al., 2013; Matsakis, 2013) that suggested that family and social support help provide PTSD symptom reduction. As reported in the Meta analysis conducted by Brewin, Andrews & Valentine (2000) the largest of any of the risk factors for PTSD was a correlation with the lack of social support. Furthermore, recent research has shown that couples treatment that takes uses emotionally focused therapy, which strengthens the individual's social support, has resulted in a reduction of PTSD symptoms. Therefore, the results of this study which demonstrate that family therapy is more cost effective, utilizes fewer sessions, and costs less over all supports the results of these preliminary studies. With family therapy utilizing the fewest number of sessions and providing the most cost effective results it would be valuable for individuals suffering from PTSD to be informed of the influence their family or other social support systems can have on their treatment. This could help inform trauma victims and their families that they can find joint healing in the process of overcoming PTSD.

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Table 1 *Descriptive Statistics for PTSD in Adults*

Category	N	Mean	SD	%
Total Sessions	12845	11.38	15.38	-
Total Dollars	12845	\$570.92	883.89	-
Cost Effectiveness	12845	588.15	909.13	-
Recidivism	3557	-	-	28
Dropout	2887	-	-	23

Table 2 *Treatment Modality Results*

Modality	N	M Sessions (SD)	M Cost \$ (SD)	M Cost Effectiveness (SD)	Recidivism %	Dropout %
Individual	10804	10.74 (14.95) ^{1*}	538.99 (841.88) ^{2*}	554.94 (866.32) ^{3*}	26	24
Family	585	5.89 (7.05) ^{1*}	295.33 (441.70) ^{2*}	302.38 (450.90) ^{3*}	10	36
Mixed	1456	18.41 (18.534) ^{1*}	918.60 (1181.93) ^{2*}	588.15 (909.13) ^{3*}	49	4

Notes. * $p < 0.05$; ₁[$F(2, 12842) = 205.09, p < 0.001$]; ₂[$F(2, 12842) = 151.60, p < 0.001$]; ₃[$F(2, 12842) = 154.63, p < 0.001$]

Table 3 *Recidivism and Dropout Logistic Regression by Modality as Compared to Family Therapy*

Modality	Recidivism			Dropout		
	B	SE B	β	B	SE B	β
Individual	1.11	0.14	3.03*	-0.56	0.08	0.57*
Mixed	2.14	0.15	8.49*	-2.68	0.16	0.07*

Notes. * $p < 0.05$

Table 4 *Treatment Modality Outcomes*

Profession	<i>n</i>	M Sessions(SD)	M Cost \$ (SE)	M Cost	Recidivism	Dropout
				Effectiveness (SE)	%	%
LPCs	2748	10.62 (0.29) ¹ *	527.37 (15.24) ² *	559.02 (16.90) ³ *	26	24
MDs	173	7.69 (1.16) ¹ *	289.76 (60.79) ² *	283.38 (67.51) ³ *	27	42
RNs	159	12.33 (1.19) ¹ *	610.89 (62.54) ² *	628.65 (68.63) ³ *	36	22
MSWs	4620	11.60 (0.22) ¹ *	568.98 (11.68) ² *	601.22 (13.04) ³ *	28	21
MFTs	987	10.93 (0.48) ¹ *	544.29 (25.05) ² *	573.16 (27.92) ³ *	24	24
PSYs	3229	11.37 (0.27) ¹ *	557.29 (14.26) ² *	576.00 (15.74) ³ *	28	28

Notes. * $p < 0.05$; ¹ $[F(5, 11909) = 3.68, p = 0.003]$; ² $[F(5, 11909) = 4.97, p < 0.001]$; ³ $[F(5, 11909) = 7.74, p < 0.001]$;

Covariates appearing in the model are evaluated at the following value: Average fee per session = 48.04

Table 5 *Total Cost Comparison between Professions in the First EoC for Adult PTSD*

	Profession	<i>n</i>	I \$	II \$	III \$	IV \$	V \$	VI \$
I	LPCs	2,748	-	237.61***	-83.52	-41.61*	-16.92	-29.91
II	MDs	173	-	-	-321.13***	-279.22**	-254.53***	-267.53***
III	RNs	159	-	-	-	41.91	66.60	53.61
IV	MSWs	4,620	-	-	-	-	-24.69	11.70
V	MFTs	987	-	-	-	-	-	-13.00
VI	PSYs	3229	-	-	-	-	-	-

Notes. * $p < .05$, ** $p < .01$, *** $p < .001$; Use Roman numeral assigned to each profession for comparing between each of the professions.

Table 6 *Total Number of Sessions comparison between Professions in the First EoC for Adult PTSD*

	Profession	<i>n</i>	I	II	III	IV	V	VI
I	LPCs	2,748	-	2.94*	-1.70	-.97**	-.31	-.74
II	MDs	173	-	-	-4.64**	-3.91**	-3.25 *	-3.98**
III	RNs	159	-	-	-	.73	1.40	.96
IV	MSWs	4,620	-	-	-	-	-.67	.23
V	MFTs	987	-	-	-	-	-	-.43
VI	PSYs	3229	-	-	-	-	-	-

Notes. * $p < .05$, ** $p < .01$, *** $p < .001$; Use Roman numeral assigned to each profession for comparing between each of the professions.

Table 7 *Cost Effectiveness Difference Comparison between Professions in the First EoC for Adult PTSD*

	<u>Profession</u>	<u>n</u>	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>
I	Counselors	2,748	-	241.34***	-87.30	-43.46*	-17.16	- 31.42
II	MDs	173	-	-328.64***	-284.80***	-258.50 ***	-272.76***	
III	RNs	159		-	43.85	70.14	55.89	
IV	MSWs	4,620			-	26.30	12.04	
V	MFTs	987				-	-14.26	
VI	PSYs	3229						-

Notes. *p < .05, **p < .01, ***p < .001; Use Roman numeral assigned to each profession for comparing between each of the professions.

Table 8 *Dropout and Recidivism Logistic Regression by Practitioner License as Compared to Marriage and Family Therapists*

Practitioner License	Recidivism			Dropout		
	B	SE B	β	B	SE B	β
LPC	0.12	0.09	1.13	-0.03	0.09	1.13
MD	0.19	0.19	1.21	-0.23	0.09	2.56 *
Nurse	0.60	0.18	1.82*	-0.01	0.21	1.00
MSW	0.25	0.08	1.29*	-0.02	0.09	0.98
PSYs	0.25	0.09	1.29*	-0.33	0.09	0.97

Notes. * $p < 0.05$

Table 9 *Talk Therapy Vs. Biomedical*

Education	<i>n</i>	M Sessions(SD)	M Cost \$ (SD)	M Cost Effectiveness (SD)	Recidivism %	Dropout %
Talk Therapy	11584	11.22 (15.00) ¹	547.65 (809.70) ²	564.61 (835.24) ³	27 ⁴	22 ^{5*}
Biomedical	332	10.81 (15.13) ¹	656.38 (891.37) ²	673.69 (917.30) ³	31 ⁴	32 ^{5*}

Notes. * $p < 0.05$; ¹ $[F(1, 11913) = 2.50, p = 0.114]$; ² $[F(1, 11913) = 6.03, p = 0.014]$; ³ $[F(1, 11913) = 5.79, p = 0.016]$;

⁴ $[F(1, 11914) = 2.586, p = 0.108]$; ⁵ $[F(1, 11914) = 19.469, p < 0.001]$; Covariates appearing in the model are evaluated at the following value:

Average fee per session = 48.04

Table 10 *Education Level*

Education	<i>n</i>	M Sessions(SD)	M Cost \$ (SD)	M Cost Effectiveness (SD)	Recidivism %	Dropout %
Masters	8045	10.99 (14.63) ¹	504.06 (743.30) ²	520.60 (767.89) ³	27 ⁴	22 ⁵
Doctorate	4388	11.74 (16.30) ¹	661.52 (1045.69) ²	679.33 (1072.06) ³	28 ⁴	22 ⁵

Notes. Non-Significant; ¹[$F(1, 12430) = 0.12, p = 0.733$]; ²[$F(1, 12430) = 0.07, p = 0.789$]; ³[$F(1, 12430) = 0.07, p = 0.787$];

⁴[$F(1, 12431) = 1.66, p = 0.198$]; ⁵[$F(1, 12431) = 0.48, p = 0.488$]; Covariates appearing in the model are evaluated at the following value: Average fee per session = 48.04

Table 11 *Gender Comparison*

Education	<i>n</i>	M Sessions(SD)	M Cost \$ (SD)	M Cost	Recidivism	Dropout
				Effectiveness (SD)	%	%
Female	9826	11.70 (15.79) ^{1*}	583.56 (904.93) ^{2*}	601.34 (930.98) ^{3*}	28 ⁴	22 ^{5*}
Male	3000	10.37 (13.92) ^{1*}	530.58 (811.84) ^{2*}	546.04 (834.18) ^{3*}	26 ⁴	25 ^{5*}

Notes. * $p < 0.05$; ¹ $[F(1, 12824) = 17.24, p < 0.001]$; ² $[F(1, 12824) = 8.26, p = 0.004]$; ³ $[F(1, 12824) = 8.50, p = 0.004]$;

⁴ $[F(1, 12431) = 1.66, p = 0.198]$; ⁵ $[F(1, 12431) = 0.48, p = 0.488]$

Table 12 *Pairwise Logistic Regression for Dropout and Recidivism*

	Recidivism			Dropout		
	B	SE B	β	B	SE B	β
Talk therapists vs.						
Biomedical Practitioners	-0.193	0.120	0.825	-0.520	.119	0.594*
Masters vs. Doctoral	0.054	0.042	1.056	-0.031	0.045	0.969
Gender (F=0 M=1)	-0.089	0.047	0.915	0.192	0.049	1.212*

Notes. * $p < 0.05$