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Treatment Outcomes for Mood Disorders with Concurrent Partner Relational Distress:
A Comparison by Treatment Modality and Profession

Holly Pack

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

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ABSTRACT

Treatment Outcomes for Mood Disorders with Concurrent Partner Relational Distress: A Comparison by Treatment Modality and Profession

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Mood disorders are often linked with concurrent partner relational distress. The present study compared the cost effectiveness of treating mood disorder alone versus when the condition is comorbid with partner relational distress. Cigna, a leading health insurance management company in the US, provided outpatient data. Participants included patients with solely a mood disorder diagnosis ($n = 72,712$) and those with both a mood disorder and a comorbid partner relational distress diagnosis ($n = 113$, including 69 females and 44 males). These participants were treated in outpatient settings throughout the US. These numbers are surprisingly low considering the extensive literature showing a strong relationship between mood disorder and partner relational distress. A multivariate general linear model and binary logistic regressions were used to analyze the data. Results indicate that having a mood disorder present with a partner relational distress disorder significantly increased the average cost of care by about \$471 per person compared to having solely a mood disorder. For mood disorders alone, there were also differences in cost effectiveness and readmission for mood disorders by professional license type, age, and gender with counselors being the most cost effective and medical doctors being the least (60% more costly). The treatment modality used impacted readmission rates, with family therapy having the lowest (8.54%) and mixed therapy having the highest (33.54%). Due to the small sample size, we were unable to determine the significance of subsequent analyses for comorbid disorders. Clinical implications and future directions for research are discussed.

Key words: mood disorders, depression, anxiety, partner relational distress, mental health care, therapy modality, family therapy, dropout, readmission, diagnosis, mixed therapy, Cigna, cost, cost effectiveness, number of sessions, treatment length.

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Treatment Outcomes for Mood Disorders with Concurrent Partner Relational Distress: A Comparison by Treatment Modality and Profession

Major depressive disorder and generalized anxiety disorder are among the most prevalent and costly mental health diagnoses (Crane & Payne, 2011; Crane et al., 2013; Langlieb & Khan, 2005). For the purposes of this study, the term “mood disorder” is used to refer to either of these primary diagnoses. Research shows a strong link between mood disorders and concurrent partner relational distress (e.g., Baucom, Belus, Ademan, Fischer, & Paprocki, 2014; McLeod, 1994; Whisman, & Schonbrun, 2010). This comorbidity is noteworthy, as there is a potentially significant impact on treatment effectiveness and costs when these conditions exist in conjunction with one another (Moore & Crane, 2014). This is described by Caldwell, Woolley, and Caldwell (2007), who conducted a study examining the hypothetical costs that the government and individual health providers experience as a result of relational distress. Their analysis suggests that the financial benefits of providing couple therapy outweigh the costs of treatment.

By considering the interaction between mood disorders and partner relational distress, it is possible to gain greater understanding regarding effective treatment. Such an increase in understanding is imperative, considering the impact that mood disorders, particularly when combined with a partner relational distress diagnosis, has on individuals, couples, families, and society (Crane et al., 2013; Zinbarg, Lee, & Yoon, 2007). These effects include increased health care costs, extended length of treatment, and higher readmission (Crane et al., 2013; Marciniak, Lage, Landbloom, Dunayevich, & Bowman, 2004; Yoon & Zinbarg, 2007). Thus, improvements in treatment have the potential to decrease cost, length of treatment, and readmission rates.

The costs associated with increased mental health service utilization have direct consequences for businesses, health insurers, the government, and individuals (Langlieb & Khan, 2005; Konnopka, Leichsenring, Leibing, & König, 2009). These costs emphasize the need to improve comprehension of treatment effectiveness when a mood disorder exists in conjunction with partner relational distress (Crane & Christenson, 2008). Little research, however, has focused on mood disorders with a comorbid relational distress condition in relation to cost effectiveness using real-life, non-lab-based data (Moore & Crane, 2014). Additionally, the majority of the extant research focuses on married couples, while a limited number of studies have included other types of relationships. The purpose of the current study was to examine the relationship between treating mood disorders with a comorbid partner relational distress diagnosis, including the cost effectiveness of individual, family, and mixed therapy. Understanding these implications will provide needed information to better provide effective treatment for those with mood disorders and a comorbid partner relational distress diagnosis.

Literature Review

Depression

Depression is one of the most common mental health diagnoses in the United States, as evidenced by the fact that approximately 6.7% of the American adult population experiences a major depressive disorder (“National Institute of Health,” 2013), resulting in an estimated 18.8 million Americans being directly affected by depression each year (Crane & Payne, 2011; Crane et al., 2013; Kessler, Berglund, Demler, Jin, & Walters, 2005). Crane and Payne (2011) found that of 5,315,827 claims data from Cigna health, that mood disorders (depression-34% and anxiety/PTSD -12.2%) made up 46.2% of claims. These statistics suggest that mood disorders make up the second most common mental health care claims.

Given the prevalence of depression, it is not surprising that this disorder has immense, negative effects on health care costs, businesses, health insurers, the government, and individuals (Langlieb & Khan, 2005). Indeed, depression has devastating consequences including direct and indirect costs to patients, the government, and health insurers of up to \$83.1 billion per year (Greenberg et al., 2003). For instance, Langlieb and Kahn (2005) examined the costs from decreased work performance and productivity that occur when employees have depression and found that US employers lose an estimated \$51.5 billion per year as a result of the losses in work and productivity (Greenberg et al., 2003). In addition, other costs associated with depression result from absenteeism, disability, “presenteeism” – which occurs when an employee is at work but not able to work at full capacity – physical disability, and increased medical care costs to employers. They also found that in addition to lost workdays and diminished productivity, having a mental illness is associated with higher health care use.

Research has found a bi-directional causality between partner relational distress and depression; partner relational distress frequently precedes the development of depression, and depression often leads to partner relational distress (Cano & O’Leary, 2000; Snyder & Whisman, 2004; Whisman, 2001; Whisman & Schonbrun, 2010). Relationships have been found to either exacerbate or improve depressive symptoms, depending on the condition of the relationship (Whisman, 2007). Crane et al. (2013) stated that, “Positive interpersonal relationships can protect against depression, while relationship problems can exacerbate symptoms for individuals predisposed to depression, or worsen depressive symptoms already present” (p. 458).

The importance of treating partner relational distress in conjunction with depression is supported by a number of studies (Beach & Whisman, 2012). For example, a meta-analysis (Whisman, 2001) discovered an association between depressive symptoms and relationship

dissatisfaction for both women and men. Another study that used a couple-based approach discovered an association between changes in depression and changes in marital satisfaction (Lebow et al., 2012). This study also found that the mental health index and numbers of psychological symptoms of depression decreased as relationship satisfaction increased. Hooley and Teasdale (1989) found that those patients who had higher relationship satisfaction were less likely to experience a relapse of depressive symptoms. Another study found that patients with higher partner relational distress were up to three times less likely to attain a remission of their depression than patients who did not have partner relational distress (Denton et al., 2010).

Because depression is frequently associated with poor relationship satisfaction (Cano & O'Leary, 2000), and treating depression is costly (Crane & Payne, 2011), it is imperative to understand how the inclusion or exclusion of partner relational distress as a diagnosis impacts the overall cost of treatment.

Anxiety

Approximately 40 million American adults experience an anxiety disorder every year ("National Institute of Health," 2013a), and an estimated 29% of Americans will experience one over his or her lifetime (Kessler et al., 2005). Among those who seek mental health treatment, 12% are for anxiety disorders, ranking anxiety-related disorders as the third most prevalent mental health care diagnosis (Crane & Payne, 2011). Given its pervasiveness, it is not surprising that it is also costly, as evidenced by the fact that the US spent an estimated \$63.1 billion in 1998 on costs linked to anxiety disorders (Greenberg et al., 1999).

Part of the costs associated with anxiety is due to the fact that it also has a high readmission rate, increasing the total costs for treatment. Considering that research shows that spouses with anxiety disorder reported greater relationship dissatisfaction than spouses without

the disorder (Whisman, Sheldon, & Goering, 2000), perhaps part of the increased readmission rate for clients experiencing anxiety is due to the presence of a relational disorder. The consideration of a comorbid diagnosis with anxiety is particularly pertinent, given that the majority of people diagnosed with anxiety have at least one other disorder (Grant, Hasin, Stinson, Dawson, Ruan, Goldstein, et al., 2005; Sandelin, Kowalski, Ahnemark, & Allgulander, 2013). Anxiety is also associated with diminished every-day functioning that has a negative impact on the identified patient's occupation, interpersonal life, and family (Yoon & Zinbarg, 2007). These findings highlight the financial consequences of anxiety for society at large, given that much of the costs are often unseen and uncalculated. These costs include direct health care costs, increased readmission and hospitalization, lost work, and decreased productivity (Langlieb & Khan, 2005).

In addition to anxiety being associated with increased costs, it has also been shown to be connected to partner relational distress (Baucom et al., 2014). Zinbarg, Lee, and Yoon (2007) compared pre-treatment levels of partner hostility and non-hostile criticism to see whether they predicted the outcome for anxiety when using individual cognitive-behavioral therapy (CBT). They found that partner hostility predicted poorer end-state functioning. They also found that non-criticism predicted better functioning at the end-state. These findings portray the benefit of improving marriage or marriage-like relationships as a means for helping to decrease the frequency and intensity of anxiety symptoms. Additionally, Durham, Allan, and Hackett (1997) found that couples where one partner was diagnosed with anxiety had a reduced probability of improving when increased levels of friction and relationship tensions were present. They also found that with the increase of marital distress, the likelihood of experiencing a reduction in anxiety symptoms decreased. Additional research shows an association between partner

relational distress and poorer outcomes in treating anxiety (Whisman & Baucom, 2011), where higher levels of anxiety resulted in increased quantities of self-reported relationship tension and friction (Durham et al., 1997).

Research also indicates that relationship distress influences anxiety prevalence and intensity (Overbeek, Vollebergh, de Graaf, Scholte, de Kemp, & Engels, 2006). For example, McLeod (1994) found that individuals with anxiety have increased partner relational distress and are at heightened risk for divorce. This finding is reinforced by the finding that lower levels of relationship satisfaction for anxiety individuals were more predictive of continued prevalence of anxiety than other predictors (Mancuso, Townsend, & Mercante, 1993). Additionally, Overbeek et al. (2006) were able to use the prior occurrence of relational distress to predict the presence of anxiety disorders 1 year later. These findings, along with other research results (Borkovec, Newman, Pincus, & Lytle, 2002), emphasize the powerful role that couples therapy could play in increasing effectiveness of treating anxiety. Additionally, few studies have investigated the relationship between anxiety and partner relational distress and their influence on recovery and readmission rates, further emphasizing the need for the current study.

Partner Relational Distress

Partner relational distress is very prevalent in the US. A study that included 800 employee assistance program clients found that 65% of participants ranked family problems as “considerable” and “extreme” (Shumway, Wampler, Dersch, & Arredondo, 2004). Partner relational distress results in negative effects for the individuals experiencing them, including diminished physical health (Kiecolt-Glaser & Newton, 2001). Research shows a positive correlation between health and marital satisfaction (Kiecolt-Glaser & Newton, 2001). Indeed, marital conflict is associated with a variety of health problems, including increased heart rate,

heightened blood pressure, the release of stress hormones, inflammatory factors in the immune system, and the suppression of immune components; if these conditions are experienced repeatedly, they can eventually result in the development of life-threatening diseases (Smith et al., 2011). Such findings portray the potential negative effects of partner relational distress.

Research also suggests that partner relational distress is linked to impaired mental health. For example, partner relational distress is frequently reported by persons who experience mood disorders and has been shown to result in an increased likelihood of mood disorders (Lebow et al., 2012; Whisman, 2007). It is important to note that within these findings, partner relational distress is more likely to cause depression than vice versa (Beach & O'Leary, 1992). Partner relational distress is also associated with increased suicide ideation, negative health outcomes, impaired parent-child relationships, and overall distress (Sandberg, Harper, Hill, Miller, Yorgason, & Day, 2013; Whisman & Uebelacker, 2006). Moreover, there is increased vulnerability for individuals experiencing partner relational distress to develop and maintain mental health problems (Snyder & Whisman, 2004). It has also been found that when mental health problems exist, a higher rate of partner relational distress is present, even when controlling for general distress in other relationships (Snyder & Whisman, 2004; Whisman et al., 2000). In addition, Lebow et al. (2012) proposed a circular causality between Axis I & II diagnoses and partner relational distress, such as mood disorders and substance use disorders, suggesting that these diagnoses and partner relational distress influence the development and maintenance of one another. This concept is supported by a study using a time series analysis that found that mental health service utilization increased following partner relational distress (Schonbrun & Whisman, 2010). These studies portray an association between partner relational distress and mental health diagnoses, emphasizing the need to study the role that partner relational distress plays in treating

psychological disorders.

Given that partner relational distress influences workplace effectiveness (Sandberg et al., 2013), health care costs (Stanton & Rutherford, 2005), and overall decrease in life satisfaction (Pihet, Bodenmann, Cina, Widmer, & Shantinath, 2007), it is important to examine effective mental health treatment, particularly when dealing with comorbid disorders (Crane & Christenson, 2008; Kiecolt-Glaser & Newton, 2001; Langlieb & Khan, 2005; Schonbrun & Whisman, 2010; Whisman, 2007). Additionally, gaining an improved understanding for alleviating partner relational distress is essential, as the devastating effects linked to it are experienced by approximately 20% of married couples in the United States (Bradbury, Fincham, & Beach, 2000). Given the personal and societal costs created by partner relational distress, counseling focused on improving couple relationships may be a viable means not only for improving one's quality of life, but also decreasing the financial burden associated with the effects of partner relational distress (Caldwell et al., 2007; Kiecolt-Glaser & Newton, 2001).

Family, Individual, and Mixed Therapy

Research indicates that psychotherapy improves treatment outcomes for patients with depression (Crane et al., 2013). Psychotherapy has been shown to be an effective means for reducing the occurrence of mild to severe depression, and in cases where depression already exists, psychotherapy is a successful method to keep it from worsening (Smit et al., 2006). It has also been found to be an effective means for treating anxiety (Rosenblatt, 2010). Family and individual therapies are the main psychotherapy modalities used for mental health diagnoses and have been found to be similarly effective in treating mood disorders (Barbato & D'Avanzo, 2008; Crane & Payne, 2011). Despite similarities between treatment modalities, some may prove more beneficial than others. For instance, research suggests that couple therapy is as effective as

individual therapy, and has added benefits for more than just the identified patient (Beach & Whisman, 2012; Lebow et al., 2012).

Additionally, there may be cases where providing conjoint therapy can offer an advantage over individual therapy, particularly when there is a comorbid diagnosis of a mood disorder and partner relational distress. Research supports this, showing that while individual therapy helps to treat psychiatric disorders, it does not significantly decrease partner relational distress in depressed spouses (Beach & O'Leary, 1992; Whisman, 2001;). As mood disorders and partner relational distress are often comorbid, using family therapy may be more cost-effective and offer better outcomes (Beach & Whisman, 2012; Lebow et al., 2012).

In addition, couple relationships have been found to significantly influence treatment outcomes for individuals experiencing mental health problems (Denton et al., 2010; Whisman & Baucom, 2012). A meta-analysis conducted by Snyder and Whisman (2004) suggests that including couple interventions in the treatment of individual mental health problems positively influences outcomes. Another study found that depressed women who receive family interventions in their treatment show a decreased likelihood of having prolonged episodes of depression (Keitner, Miller, & Ryan, 2005). While family therapy has been shown to help both mental health problems and relational distress, it appears that individual-based treatments have little to no effect on partner relational distress beyond symptom-related improvement (Baucom et al., 2014; Whisman, 2001). These findings emphasize the profound influence of therapy modality on treatment effectiveness, as measured by symptom reduction, vulnerability for mental illness, and odds for recidivism.

Cost Effectiveness

As described previously, mood disorders and relational distress have substantial monetary consequences. Unfortunately, the local, state, and federal government, work force, and health insurers shoulder much of the monetary costs associated with these disorders (Caldwell et al., 2007; Langlieb & Khan, 2005; Sandberg, Yorgason, Miller, & Hill, 2012). Consequently, cost effectiveness, which is determined by analyzing which clinical treatment provides the greatest clinical outcomes (i.e. decreased symptoms) per unit cost (Crane et al., 2013), is of great interest. A recent study focused on the cost effectiveness of treating depression showing that marriage and family therapists had the lowest recidivism rate and that family therapy, as a modality, was the least expensive (Crane et al., 2013).

Additionally, when examining cost effectiveness, there is a need to consider the offset effect, which exists when a patient's overall health care is reduced after receiving a treatment or intervention (Crane & Christensen, 2008). Substantial evidence exists showing that for all diagnoses, family therapy is more cost effective than individual or "mixed" therapy (Crane & Payne, 2011). For instance, Law and Crane (2000) found a 21.5% reduction in health care use after one year for those who participated in family therapy, in contrast to a 10% reduction in health care use for patients who received individual therapy instead. What is even more noteworthy is that the non-identified patient who attended family therapy had a 30% reduction in health care use. Considering such findings, it is estimated that health insurers may decrease their overall costs by as much as \$44,619,462 per year simply by providing couple and family therapy due to the various savings associated with these modalities (Caldwell, et al., 2007). Such reductions in health care use, experienced by both the identified patient and other family

members, result in an improved standard of living for patients and their families, as well as reduced healthcare costs.

Dropout and Readmission

Part of the current costs for treating depression and partner relational distress are comprised of patient dropout and readmission. Dropout often results in the increased utilization of other types of health services, continued mental health distress, and prolonged physical ailments (Hamilton, Moore, Crane, & Payne, 2011). Psychotherapy dropout rates for all DSM-IV diagnoses have been found to range from 17 to 29% with dropout defined as not coming back after the first session. This poses a key problem for mental health care providers (Hamilton et al., 2011). One explanation for dropout could be that people do not get an adequate “dose” of therapy to sufficiently mitigate the need for continued mental health care usage (Baldwin, Berkeljon, Atkins, Olsen, & Nielsen, 2009). This may be due to the fact that people do not always receive a sufficient amount of treatment before they choose to dropout (Baldwin et al., 2009). In addition, if patients choose to terminate treatment prematurely, their overall medical care utilization is higher in comparison to those patients without a mental illness (Crane & Christenson, 2008; Langlieb & Khan, 2005). This finding is also true for those who later return for treatment.

Readmission, or the return to treatment, often results when patients initially dropout. The premature termination of treatment, and then later return to it, can result in extended problems for the patient, as well as increased costs for treatment (Langlieb & Khan, 2005). Patients typically return for additional mental health services when they experience a relapse with their mental illness. Readmission rates for depression have been found to fall within a 50-70% range

(Zajacka, 2000). Readmission rates for anxiety were found to be 43% for men and 36% for women (Yonkers, Bruce, & Keller, 2003).

In the context of treating partner relational distress in conjunction with mood disorders, dropout and readmission are especially relevant, as partner relational problems have been shown to negatively impact mental health functioning, including the prevalence and duration of treatment for mood disorders. Indeed, partner relational problems have been found to create an increased risk for readmission (Sandberg et al., 2013; Whisman & Uebelacker, 2006). Additional research found that dysfunction related to increased levels of negativity, hostility, tension, and control attempts, increases the chance of depression relapse and decreases the rates of recovery (Crane et al., 2013; Keitner et al., 2005; Whisman & Uebelacker, 2006). There is also evidence that improvement in interpersonal problems aids in the recovery from anxiety (Crits-Christoph, Gibbons, Narducci, Schamberger, & Gallop, 2005). Considering the findings from these studies, it is not surprising that additional studies found that comorbid diagnoses can take longer to treat (Sloan, Yokley, Gottesman, & Schubert, 1999; Snyder & Whisman, 2004).

Current Study

Despite the groundwork laid by previous research, a review of the extant literature offered no known studies regarding the cost effectiveness of provider license types, treatment modalities, and outcomes when treating patients with comorbid mood and partner relational distress disorders. As described previously, examination of the impact of a comorbid diagnosis on treatment length is a crucial factor when estimating the length and costs of treatment. Thus, the central focus of this paper is to provide greater insight regarding the provision of the most efficient and cost effective treatment. Specifically, this paper will explore how the presence of a mood disorder diagnosis, with a comorbid partner relational distress diagnosis, affects treatment

cost effectiveness and outcomes. Additionally, this study will examine the cost effectiveness of using various modalities to treat such diagnoses.

Research Questions

1. Mood Disorders Comorbid with Partner Relational Diagnosis. What are the differences in cost effectiveness, number of sessions, total cost, readmission, and dropout between treating persons who have been diagnosed with mood disorders and those with a comorbid diagnosis of a mood disorder and partner relational distress?

2. Practitioner Type. When considering cost effectiveness and readmission, what are the differences between the types of professionals, and how does a diagnosis of a mood disorder versus a comorbid diagnosis of mood disorders and partner relational distress affect those differences?

3. Therapy Modality. What are the differences between the therapy modalities (individual, family, and mixed) when considering cost effectiveness and readmission for treating persons who have been diagnosed with mood disorders and those with a comorbid diagnosis of a mood disorder and partner relational distress?

4. Age and Gender. Are cost effectiveness and readmission influenced by the age and gender of the patient?

Method

This study is a retrospective analysis using administrative data from Cigna from 2001 through 2006. The Health Insurance Portability and Accountability Act of 1996 (HIPAA) allows the use of non-identifiable administrative data for analysis. The data available for each patient included: unique, non-identifiable client identification number, age, gender, primary and secondary DSM-IV diagnoses, the state where the visit took place, current procedural

terminology (CPT) code (family or individual therapy), treatment provider's license type, highest degree earned by the treatment provider, number of therapy sessions per participant, and dollar amount of each claim.

Sample

A subset of a larger data set was created to examine solely those patients with either a Major Depressive Affective Disorder, Single Episode, Unspecified (296.20) primary diagnosis or Generalized Anxiety Disorder (300.02) as a primary diagnosis and those who had a secondary Partner Relational Distress Disorder (V61.1) diagnosis. This created two groups; one for participants with solely a mood disorder diagnosis ($n = 72,712$) and one for those with a comorbid diagnosis of a mood disorder and partner relational distress ($n = 113$). Marital status was not considered. A more detailed explanation of the data cleaning procedure and the original data set is available in Crane and Payne (2011).

Data were available only for outpatient care. Participants' ages ranged from 18 to 96 ($M = 39.33$, $SD = 11.74$) for mood disorders, and from 22 to 65 ($M = 39$, $SD = 8.35$) for mood disorders plus partner relational distress. Sixty six percent of participants with mood disorders were female ($n = 47,866$), 34% were male ($n = 24,715$). Of the participants diagnosed with a mood disorder and partner relational distress, 61% were female ($n = 69$), and 39% were male ($n = 44$). Participants were from all regions of the US. To avoid artificially lowered number of sessions, dropouts (less than 2 sessions) were controlled for in all analyses. Results were first run for total log cost effectiveness, log total sessions, and log total dollars in order to account for the positive skew in the data. They were then back-transformed into real dollars and number of sessions for real life comparison in real units.

Providers

This study included the number of patients seen by the following six types of mental health professionals: mood disorders alone included Marriage and Family Therapists (MFTs; $n = 7,429$), Master's Nurses (RNs; $n = 561$), Medical Doctors (MDs; $n = 1,333$), Professional Counselors (LPCs; $n = 12,717$), Psychologists ($n = 20,188$), and Social Workers (MSWs; $n = 25,106$) and for mood disorders plus partner relational distress included MFTs ($n = 14$), LPCs ($n = 33$), Psychologists ($n = 29$), and MSWs ($n = 29$). For those with a mood disorder comorbid with partner relational disorder MDs and RNs were not considered because there were no cases seen by these professional groups. These providers were studied because they are nationally recognized as "core" mental health providers (Crane & Payne, 2011).

Definition of Terms

Episode of care. Cigna defines an episode of care (EoC) as a continuous series of services for one participant. An EoC begins when the first psychotherapy claim is received and ends after a participant has had no psychotherapy claims for 90 days. The number of sessions in the first EoC ranged from 1 to 339 being ($M = 9.37$, $SD = 11.36$) for mood disorders and ranged from 5 to 47 being ($M = 14.01$, $SD = 11.32$) for a mood disorder plus a comorbid partner relational distress. Eighty two percent of patients being treated for mood disorders ($n = 59,476$) completed therapy in the first EoC and 68% of patients being treated for mood disorders plus comorbid partner relational distress completed therapy in the first EoC ($n = 77$).

Readmission. Readmission is classified as a patient returning for additional care, after a period of at least 90 days, with the same provider type (Crane & Payne, 2011).

Total cost. Total cost is calculated by multiplying the number of sessions per patient with the amount of money paid by Cigna to the provider.

Dropout. Dropout is used to define all participants who attended only one therapy session. The total number of dropouts for participants with solely a mood disorder was 12,617 and 0 for those with a comorbid partner relational distress diagnosis. These participants who dropped out were controlled for when considering cost effectiveness in order to mitigate artificially lowering the overall costs for groups with higher dropout rates (Hamilton et al., 2011).

Comorbidity. Comorbidity is used to define a dummy coded independent variable when considering a mood disorder alone compared to a mood disorder present with a partner relational distress diagnosis.

Cost effectiveness. Cost effectiveness is determined by examining the cost per session for treatment, readmission rate, and the number of sessions. Estimated cost effectiveness = 1st EoC average cost + (1st EoC average cost * readmission rate; Crane & Payne, 2011).

Modality. Therapy modalities include individual ($n = 62,102$), family ($n = 5,008$), and both therapy types, referred to as mixed ($n = 5,602$). Therapy modalities for mood disorders plus partner relational distress include individual ($n = 46$), family ($n = 7$), and both therapy types, referred to as mixed ($n = 60$).

Provider type. Provider type refers to the practitioner license type (MFTs, RNs, MDs, LPCs, Psychologists, and MSWs).

Family therapy. Family therapy is listed as Current Procedural Terminology (CPT) code 90847, "Family psychotherapy (conjoint psychotherapy) (with patient present)" (American Medical Association, 2006, p. 278).

Individual therapy. Individual therapy is listed as CPT code 90806, “an insight oriented, behavior modifying, and/or supportive treatment in an office or outpatient facility, approximately 25 to 50 minutes face-to-face with the patient” (American Medical Association, 2006, p. 277).

Mixed therapy. Mixed therapy is any combination of both family therapy (90847) and individual therapy (90806) sessions in one EoC. It can consist of only one therapy session of individual therapy combined with multiple family therapy sessions or vice versa.

Analysis

The research questions were addressed using three statistical methods: multivariate general linear models (GLM), univariate GLMs, and binary logistic regressions. Three multivariate GLMs were used to answer the research questions concerning continuous dependent variables (cost effectiveness, total number of sessions, and total cost). A univariate analysis was run as a follow up to the significant findings in the multivariate GLMs (Rencher & Christensen, 2012). The other three models included binary logistic regressions to answer the research questions concerning dichotomous dependent variables (readmission and dropout). Additionally, each of the provider license types is compared to MFTs as well as individual and mixed therapy being compared to family therapy. Since previous research had identified the substantial influence of gender (Crane et al., 2013; Parslow, Jorm, Christensen, Jacomb, & Rodgers, 2004; Weisman, 1996) and age (Kessing, 1998) these variables were controlled in all analyses performed. Dropout is also controlled in all models, with the exception of the analysis that examines dropout as a dependent variable.

Results

Research Question 1

The first question examined differences in cost effectiveness, number of sessions, cost of treatment, readmission, and dropout between clients with mood disorders and those with mood disorders and partner relational distress. A multivariate GLM was fit to determine differences in the dependent variables of cost effectiveness, number of sessions, and total cost. This model examined comorbidity as the independent variable.

The multivariate analysis found that there was statistical difference for all three dependent variables. Total cost effectiveness by comorbidity showed that a mood disorder alone ($M = \$971.60$, $SD = \$1638.00$) was less expensive than a comorbid mood disorder with partner relational distress ($M = \$1,443.00$, $SD = \$1,584.20$) [$F(1, 72692) = 30.45$, $p < .001$]. The total number of sessions for mood disorder alone ($M = 9.4$, $SD = 11.4$) was lower than a comorbid mood disorder with partner relational distress ($M = 14.0$, $SD = 11.3$) [$F(1, 72692) = 46.64$, $p < .001$]. The total cost of a mood disorder alone ($M = \$491.10$, $SD = \$741.00$) less expensive than a comorbid mood disorder with partner relational distress ($M = \$744.80$, $SD = 679.00$) [$F(1, 72692) = 43.09$, $p < .001$] (See Table 1).

Insert Table 1 About Here

Binary logistic regressions were used to analyze the influence of comorbidity on readmission and dropout rates. For comorbid disorders, readmission was $n = 32$ (31.9%) for relational comorbid disorders, compared to $n = 11,992$ (18.2%) for clients with only mood disorders. Readmission for patients being treated for mood disorders was statistically different compared to patients being treated for a relational comorbid diagnosis. A one unit increase of readmission was associated with .76 times the likelihood of having a comorbid diagnosis versus only having a mood disorder (75.8% more likely to be a comorbid diagnosis than a mood disorder diagnosis; $B = -.28$, $p = .006$).

The dropout rate for clients with solely a mood disorder diagnosis was $n = 12.617$ (17.4%), while those with a relational comorbid diagnosis had zero dropout. Dropout is not predictive of client diagnosis of a mood disorder versus a mood disorder comorbid with a partner relational distress diagnosis ($B = 9.82, p = .966$).

Research Question 2

The second question assessed the differences in cost effectiveness and readmission by license type. These differences were examined both for persons who were diagnosed with a mood disorder and those with a comorbid diagnosis. A multivariate GLM was fit with cost effectiveness as the dependent variables and comorbidity and provider license type (compared to MFTs) as the independent variables.

Overall analysis of variance found statistical differences in cost effectiveness by provider license type [$F(1, 67314) = 23.302, p < .001$], as well as by comorbidity for mood disorders as a single diagnosis ($M = \$494.38, SD = \12.74) and a comorbid partner relational distress diagnosis ($M = \$1,004.74, SD = \132.04) [$F(1, 67314) = 35.859, p < .001$]. Further analyses indicated that when mood disorders were the only diagnosis, the most cost effective provider type was LPCs ($M = \$729.74, SD = \$1,236.30$), followed by MFTs ($M = \$813.98, SD = \$1,263.53$), MSWs ($M = \$886.22, SD = \$1,495.59$), RNs ($M = \$854.54, SD = \$1,243.49$), psychologists ($M = \$1,107.92, SD = \$1,652.29$), and MDs ($M = \$1,214.06, SD = \$1,943.64$).

When there was a partner relational distress comorbid diagnosis the most cost effective provider type was MSWs ($M = \$1,199.99, SD = \$1,404.65$), followed by LPCs ($M = \$1,190.85, SD = \$1,198.06$), MFTs ($M = \$1,160.14, SD = \$1,045.00$), and psychologists ($M = \$1,945.45, SD = \$1,835.27$). However, because of the small sample size, the results for a comorbid diagnosis cannot be considered to be accurate or valid (See Table 2).

Insert Table 2 About Here

Binary logistic regressions were used to analyze the influence of diagnostic comorbidity and provider license type on readmission. Each of the provider license types within the total data set was compared to MFTs. For every unit increase in being a LPC, the odds ratio of expecting readmission increases by .09 ($B = .09, p < .001$). For every one unit increase in seeing a MD, the odds ratio of readmission decreases by .17 ($B = -.17, p < .001$). Readmission is not predictive of being seen by a RN versus a MFT ($B = .05, p = .357$), a MSW versus a MFT ($B = .05, p = .101$), or a psychologist versus a MFT ($B = -.01, p = .485$; See Table 3). For patients treated for only mood disorders, the profession with the lowest readmission rate was LPCs, followed by MFTs, RNs, MSWs, psychologists, and then MDs. For those treated for a mood disorder and a comorbid partner relational distress disorder, the profession with the lowest readmission rate was LPCs, followed by MSWs, MFTs, with psychologists being the highest. Due to the small sample size, however, these results cannot be considered accurate or valid (See Table 4).

Insert Tables 3 and 4 About Here

Research Question 3

The third question assessed the differences in cost effectiveness and readmission between various therapy modalities. Therapy modalities included individual, family, and mixed modalities. A multivariate GLM was created to examine the relationship between comorbidity, providers' license type (compared to MFT), and therapy modality (compared to family therapy) on cost effectiveness of treatment.

Overall analysis of variance found statistical differences in cost effectiveness by comorbidity where a mood disorder alone ($M = \$560.24, SD = \11.18) was found to be less expensive than a comorbid partner relational distress diagnosis ($M = \$861.78, SD = \139.59) [F

(1, 72692) = 12.376, $p < .001$]. Statistical differences in cost effectiveness by modality was not found when examining individual therapy ($M = \$676.44$, $SD = \$70.21$), family therapy ($M = \381.44, $SD = \$72.85$), and mixed therapy ($M = \$1,075.17$, $SD = \$71.59$) [$F(2, 72691) = 1.396$, $p = .248$]. These results for cost effectiveness by treatment modality for mood disorders indicate that family therapy is the most cost effective, followed by individual therapy, with mixed therapy being the least cost effective. The results for a comorbid mood disorder and partner relational distress diagnosis by modality cannot be considered to be accurate or valid due to the small sample size (See Table 2).

Binary logistic regressions were used to examine the influence of comorbidity, provider license type, and modality on readmission rates. When looking at the total data set, every unit increase in individual therapy is associated with an increase of 68.9% likelihood of readmission when compared to family therapy ($B = -.37$, $p < .001$) and every unit increase in mixed therapy is associated with a 49.5% likelihood of readmission compared to family therapy ($B = -.70$, $p < .001$; See Table 2). For patients treated for a mood disorder, the modality with the lowest readmission rate was family therapy, followed by individual therapy, with mixed therapy having the highest readmission rates. These results were the same for clients who received a comorbid diagnosis, however, due to the small sample size the results cannot be considered to be accurate or valid (See Table 4).

Research Question 4

The fourth question assessed for whether cost effectiveness and readmission were influenced by the age and gender of the patient. A multivariate GLM was used to test the influence of age, gender, and diagnosis on cost effectiveness of treatment. Age was separated into two groups (group 1 = 18-27 and group 2 = 28-96) in order to make it into a categorical

variable to run the analysis. Non-parametric tests of distribution indicated a demographic breakdown different than what would be expected by chance for cost effectiveness on the measured outcomes for age with a mood disorder alone for group 1 ($M = \$633.48$, $SD = \$1,158.68$) and for group 2 ($M = \854.33, $SD = \$1,587.99$) [$F(1, 72692) = 428.241$, $p < .001$] compared to a comorbid partner relational distress diagnosis for group 1 ($M = \$1,124.59$, $SD = \$1,171.68$) and for group 2 ($M = \$1,463.91$, $SD = \$1,609.78$). Statistical difference was also found with cost effectiveness and gender with treatment for females ($M = \$785.38$, $SD = \$70.36$) being more expensive than for males ($M = \$731.92$, $SD = \$70.61$) [$F(1, 72692) = 39.652$, $p < .001$] (See Table 2).

Binary logistic regressions were used to analyze the influence of comorbidity, provider license type, and modality on readmission. Results indicate that being female increases the likelihood for readmission such that for every unit increase in being female, the odds ratio of expecting readmission increases by .09, such that a one unit increase in being female multiplies the odds of expecting readmission by 1.10 ($B = .09$, $p < .001$). Additionally, those in their early to mid-twenties have a lower chance of readmission such that for every one unit increase in age, the odds ratio of readmission increases by .02 ($B = .02$, $p < .001$; See Table 3).

Discussion

The purpose of this study was to expand understanding concerning cost effectiveness of treatment for individuals who receive a diagnosis for either depression or anxiety, and for those who are diagnosed with a mood disorder and partner relational distress. Mood disorders are among the most prevalent and costly mental health diagnoses (Crane & Payne, 2011; Crane et al., 2013; Langlieb & Khan, 2005) and are frequently concurrent with partner relational distress (McLeod, 1994; Whisman & Schonbrun, 2010). By analyzing multiple facets of treatment, this

study aimed to inform and improve intervention efforts for those experiencing a mood disorder or comorbid diagnosis of a mood disorder and partner relational distress. Research questions for this study focused on examining the various factors that impact treatment cost effectiveness.

Diagnosis Type

The first research question examined differences in treatment factors and outcomes for individuals diagnosed with a single mood disorder versus a comorbid diagnosis. Findings suggest that treatment for mood disorders alone was more cost effective than treatment for comorbid disorders. Mood disorders were lower in number of sessions, total cost, and readmission than when an individual received a comorbid diagnosis. Mood disorders were found to be \$254 less expensive as well as being half as likely to result in readmission, which is not only statistically significant but also practically important when calculated across thousands of persons. This is similar to previous research findings, showing that comorbid diagnoses typically take longer and are more difficult to treat (Sloan et al., 1999; Snyder & Whisman, 2004). This may in part be explained by the fact that a comorbid diagnosis typically is more complicated (Sloan et al., 1999; Snyder & Whisman, 2004), which would result in a higher number of sessions, higher total cost, lower cost effectiveness, and a higher potential for readmission fitting the findings from this study.

Those with a comorbid diagnosis had zero dropout. The small number of patients with a comorbid diagnosis may have impacted the dropout rate, as well as dropout simply being defined as only attending one session of therapy it may mean that those with a comorbid diagnosis are in higher distress leading to a higher motivation to attend therapy potentially explaining why they did not have any patients' dropout.

Provider License Type

The second question focused on analyzing treatment outcomes of cost effectiveness and readmission, based on the treatment provider's license type. For patients with only a mood disorder, LPCs were found to be the most cost effective, followed closely by MFTs, MSWs, and RNs, with psychologists coming in fifth with the least cost effective being MDs. While psychologists had the second-highest readmission rates for clients diagnosed with a mood disorder, MDs had the highest readmission rates of all the license types. This may be due to the fact that MDs typically follow a medical model, where counseling and medication are combined, and requiring clients to return for a new prescription or because the counseling was not as in depth (Beecher, 2009).

Out of the different provider license types two broad categories exist. These consist of those professionals who are authorized to prescribe medication and those who provide talk therapy (Crane et al., 2013). The different approaches each group takes to treating patients with a mood disorder and/or a partner relational distress would vary depending on their way of viewing the complaint.

These findings highlight the cost effective use of mental health professionals, especially LPCs, MFTs, and MSWs, in treating mood disorders comorbid with a partner relational distress diagnosis. The fact that so many mental health providers are comparative in cost effectiveness is positive for those seeking assistance for mood disorders and/or partner relational distress because they have multiple providers to choose from that will yield similar results, specifically in regards to treatment for partner relational distress.

Treatment Modality

The third research question examined outcomes based on treatment modality to determine whether family, individual, or mixed therapy was most cost effective and what differences there were in readmission. The results showed that there were no significant differences between the modalities for cost effectiveness, although there were for readmission. This finding is different than what Moore and Crane (2014) found regarding looking at partner relational distress as a single diagnosis. They found modality and cost effectiveness to be statistically different and that individual therapy was the least costly, followed by family therapy, with mixed therapy being the most costly. In contrast, this study did not find statistical difference by modality looking at the entire data set but it did find that family therapy was the least expensive for mood disorders alone followed by individual therapy and mixed therapy being the most costly. While this finding was not statistically different it could be seen as practically important as the real numbers for treatment add up across claims and may impact policy decisions.

For both mood disorders and comorbid diagnosis, family therapy had the lowest readmission rates with mixed therapy having the highest, although the findings for the comorbid diagnosis need to be taken with caution as the sample size was too small for significance to be found. This may be due to the fact that family therapy has a wider range of impact on the family system, resulting in a more complete treatment or that families dislike family therapy and refuse to return. In regards to mixed therapy, it has been postulated that it is often used for more complicated cases, accessing multiple forms of modality for treatment (Crane & Payne, 2011; Crane et al., 2013). With more complicated and severe cases, treatment outcomes are expected to be poorer and readmission is expected to be higher. For example, if patients are more severely

depressed they would potentially need individual sessions as well as working as a couple to address the partner relational distress. It is also possible that the smaller comorbid sample size decreases the chances of finding statistical significance that may have influenced the non-significant findings for modality and cost effectiveness (Gray & Kinnear, 2012).

Additionally, provider training may play a bigger role in treating relational problems than treatment modality (Crane et al., 2010). This hypothesis is supported by additional findings that when professionals achieve specific training requirements for conducting family therapy as a treatment modality, these providers have better outcomes when treating those issues than providers who have not specialized in treating families (Moore, Hamilton, Crane, & Fawcett, 2011; Moore & Crane, 2014).

Age and Gender

Results for the fourth question suggest that both age and gender significantly impact cost effectiveness and readmission rates. Results show that as age goes up treatment is more expensive and less cost effective. Increased age also predicts a higher likelihood of readmission. This is consistent with previous research, which found that middle-aged and older women are at higher risk for readmission compared to younger women (Kessing, 1998). For gender, being female was associated with higher readmission rates. This finding may be explained by the fact that women are more likely to use mental health services than men in the first place, so they may be more open to returning for additional help (Crane et al., 2013; Crane & Payne, 2011).

Professional and Clinical Implications

Even though there are great benefits to including a partner relational diagnosis, health care providers typically are not paid by insurance companies for treating relational disorders resulting in relatively low rates at which partner relational disorders are diagnosed (Moore &

Crane, 2014). Additionally, mental health providers have been entrenched in following an individual focus for treating adults because they are viewed as more autonomous resulting in significant others not being included in treatment. They also have a tendency to follow more of a “medical model” of treatment where psychological problems are treated like a physical illness (Baucom et al., 2014). This is an issue that is important for health care providers, insurance companies, and the government to consider, as it is less costly in the long run to treat both a mood disorder and relational distress. Indeed, the literature clearly shows medical benefits to the patient and the non-identified patient when treating seemingly individual problems in a relational setting (Caldwell et al., 2007; Crane & Christenson, 2008; Law & Crane, 2000).

The findings from this study show that treating comorbid diagnoses with conjoint therapy has implications for potential savings. It may also prove of value to insurance providers and clinicians who are trying to decide on the most cost effective way to treat mood disorders and/or partner relational distress. Relational diagnoses, on average, were the least costly to treat out of the 11 diagnosis categories from the Cigna data set (Crane & Payne, 2011). Thus, including partner relational distress as a reimbursable diagnosis would likely prove cost effective and beneficial for insurance providers (Baucom et al., 2014).

Limitations and Implications for Future Research

Some of the limitations of this study result from the nature of the design. Retrospective analysis does not allow one to collect additional information. Because of this, it is not possible to explore factors that may influence the reason clients sought treatment, as well as treatment outcomes resulting in it not being a “gold standard” cost effectiveness study (Husereau et al., 2013). Such reasons might include abuse history, physical illness or disability, client satisfaction with services received, use of medication, or the reason for ending care.

Limited knowledge regarding the diagnoses is another shortcoming of this study. For instance, the severity of diagnoses was unknown, making it impossible to decipher more distressing cases from those experiencing less severe symptoms. Such knowledge is important, as it may have implications for length of treatment, total cost, and readmission. Some cases are more difficult and more severe, requiring longer treatment. Future research could include the level of severity as part of their analysis. Such information could be gathered via client completion of self-report assessments, the severity of problems as designated by v-codes, and/or using their Global Assessment of Functioning score. Acquiring information regarding symptom severity would be important because while more severe symptoms may result in longer treatment, an initial extension in treatment length could prove more cost effective in the long run if it prevents readmission. Also, an analysis of cost, readmission, and cost effectiveness by severity would add new depth and understanding to these variables, as researchers would see how they are impacted by the severity of a diagnosis. Such studies could offer insight as to whether more resources at the beginning of treatment would reduce the need for services later.

Another limitation of this study is that therapeutic outcomes were defined as “successful” if clients did not return for a second EoC and did not dropout after one session. It is possible that those patients who did not return after one session did so due to other reasons besides successfully completing treatment such as transportation issues, lack of resources, dissatisfaction with the services provided, etc. Because the data available did not specify a reason for termination, it is impossible to determine whether treatment was fully complete or if there were additional, outside factors that may have influenced termination and dropout rates.

A final limitation of this study is the low number of participants who actually received a comorbid partner relational diagnosis in comparison to those that received solely a mood

disorder diagnosis ($n = 72,712$ versus $n = 113$). Crane and Payne found that out of 490,000 claims less than 1% were a relational diagnosis. This is surprising considering that previous research shows a strong bidirectional relationship between mood disorders and partner relational distress (Cano & O'Leary, 2000; Snyder & Whisman, 2004; Whisman & Schonbrun, 2010). The present result although accurate are not to be considered to be accurate or valid because the number in the groups for provider license type or modality is less than 30.

Perhaps part of the reason there is an unexpectedly small number of persons diagnosed with comorbid relational diagnoses is due to provider training and education or the fact that one diagnosis is all that is required to process a claim even if it seems that multiple diagnoses are concurrently occurring. Considering that mood disorders and relationships mutually impact each other in significant ways (Cano & O'Leary, 2000; McLeod, 1994; Whisman & Schonbrun, 2010), it would be beneficial to gain greater understanding as to why relational disorders are diagnosed infrequently. Thus, future research would benefit by examining whether a provider's training influences what they choose for diagnoses. For instance, whether a MFT is more likely to diagnosis a patient with partner relational distress compared to another provider type, due to the emphasis on systems in MFT training.

Implications for therapists who work with patients with these diagnoses include working with couples and families (Baucom et al., 2014) as part of treatment planning. Such findings encourage the inclusion of couples and families for treatment rather the current protocol of using only individual-based approaches when patients do not initially present with a relational distress diagnosis. In conjunction, additional research on when couple-based approaches are preferable would add greatly to the field. This will provide therapists with a wider range of empirically

supported tools to work with as well as to access the many advantages of taking a systemic view of mental health care.

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Table 1. *Treatment outcomes for mood disorder and comorbid relational disorder*

| | Sessions | | Total Cost | | Cost Effectiveness | | LN Sessions | | LN Total Cost | | LN Cost Effectiveness | |
|---|----------|-----------|---------------|----------------|--------------------|----------------|-------------|-----------|---------------|-----------|-----------------------|-----------|
| | <i>M</i> | <i>SD</i> | <i>M</i> (\$) | <i>SD</i> (\$) | <i>M</i> (\$) | <i>SD</i> (\$) | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> |
| Mood Disorder Alone | 9.4* | 11.4 | 491.1* | 741.0 | 971.6* | 1638.0 | 1.8* | 0.9 | 5.7* | 0.9 | 6.2* | 1.1 |
| Mood Disorder Comorbid with Partner Relational Disorder | 14.0* | 11.3 | 744.8* | 679.0 | 1,443.0* | 1584.2 | 2.3* | 0.8 | 6.2* | 0.9 | 6.7* | 1.1 |

Notes: * $p < .001$. LN is the natural log transformation of the data. LN Cost Effectiveness: $F(1, 72692) = 428.241, p < .001$. LN Total Sessions: $F(1, 72692) = 46.635, p < .001$. LN Total Dollars: $F(1, 72692) = 43.088, p < .001$.

Table 2. *Cost effectiveness broken out by comorbidity, provider license type, treatment modality, age, and gender*

| Provider License Type | Cost Effectiveness (\$) | | LN Cost Effectiveness | |
|---|-------------------------|-----------|-----------------------|-----------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> |
| Mood Disorder Alone | | | | |
| MFT | 813.98 | 1263.53 | 6.12 | 1.01 |
| RN | 854.54 | 1243.49 | 6.27 | 0.91 |
| MD | 1214.06 | 1943.64 | 6.47 | 1.04 |
| LPC | 729.74 | 1312.30 | 6.02* | 1.00 |
| Psychologist | 1107.92 | 1652.29 | 6.40* | 1.05 |
| MSW | 886.22 | 1495.59 | 6.15 | 1.06 |
| Mood Disorder Comorbid with Partner Relational Disorder | | | | |
| MFT | 1160.14 | 1045.00 | 6.61 | 1.05 |
| LPC | 1190.85 | 1198.06 | 6.60 | 1.05 |
| Psychologist | 1945.45 | 1652.93 | 7.15 | 1.05 |
| MSW | 1199.99 | 1404.65 | 6.53 | 1.00 |
| Treatment Modality | | | | |
| Mood Disorder Alone | | | | |
| Individual | 960.19 | 1644.39 | 6.22 | 1.07 |
| Family | 421.15 | 854.91 | 5.87 | 0.88 |
| Mixed | 1259.46 | 1878.66 | 6.65 | 1.04 |
| Mood Disorder Comorbid with Partner Relational Disorder | | | | |
| Individual | 1219.16 | 1516.95 | 6.51 | 1.09 |
| Family | 576.43 | 315.84 | 6.20 | 0.64 |
| Mixed | 1715.52 | 1671.92 | 6.99 | 1.05 |

Table 2. *Cost effectiveness broken out by comorbidity, provider license type, treatment modality, age, and gender - continued*

| Age | | | | |
|---|---------|---------|-------|------|
| Mood Disorder Alone | | | | |
| Age – 18-27 (n = 12,339) | 633.48 | 1158.68 | 5.72* | 1.17 |
| Age – 28-96 (n = 60,373) | 854.33 | 1587.99 | 5.94* | 1.24 |
| Mood Disorder Comorbid with Partner Relational Disorder | | | | |
| Age – 18-27 (n = 7) | 1124.59 | 1171.68 | 6.43* | 1.35 |
| Age – 28-96 (n = 106) | 1463.91 | 1609.78 | 6.77* | 1.05 |
| Gender | | | | |
| Mood Disorder Alone | | | | |
| Female (n = 47,866) | 989.92 | 1673.77 | 6.25 | 1.07 |
| Male (n = 24,715) | 935.74 | 1564.74 | 6.20 | 1.06 |
| Mood Disorder Comorbid with Partner Relational Disorder | | | | |
| Female (n = 69) | 1493.19 | 1616.41 | 6.77 | 1.08 |
| Male (n = 44) | 1364.03 | 1547.49 | 6.71 | 1.07 |

Notes: * $p < .001$. LN is the natural log transformation of the data. Cost effectiveness: By profession, modality, and gender - the average cost of the first EoC plus the average cost of the first EoC times the recidivism rate. Measures average cost effectiveness by profession, modality, and gender for a single EoC. Due to the small sample size for comorbid diagnoses, the results for provider license type and modality cannot be considered to be accurate.

Table 3. Readmission for total data set by provider license type, treatment modality, age, and gender

| Readmission Rate by Provider License Type | <i>B</i> | <i>SE B</i> | β |
|--|----------|-------------|---------|
| MFT | -.15 | .03 | .86 |
| RN | .05 | .06 | 1.06 |
| MD | -.17* | .04 | .84 |
| LPC | .09* | .02 | 1.09 |
| Psychologist | -.01 | .02 | .99 |
| MSW | .02 | .01 | 1.02 |
| <hr/> | | | |
| Readmission Rate by Modality | | | |
| Individual | -.37* | .026 | .69 |
| Family | -.93* | .05 | .40 |
| Mixed | -.70* | .029 | .50 |
| <hr/> | | | |
| Readmission Rate by Age and Gender | | | |
| Gender | .09* | .01 | 1.10 |
| Age | .02* | .00 | 1.02 |

Notes: * $p < .001$. LN is the natural log transformation of the data. Gender and age were used a control variables. The results of each modality are compared with the outcomes where family therapy was the treatment modality. The results of each provider license type are compared with the outcomes where MFTs provided treatment.

Table 4. *Readmission rates broken out by comorbidity, provider license type and treatment modality*

| Provider License Type | <i>Readmissions</i> | <i>No Readmissions</i> | <i>Readmission Rate (%)</i> |
|---|---------------------|------------------------|-----------------------------|
| Mood Disorder Alone | | | |
| MFT | 1186 | 6243 | 15.96 |
| RN | 95 | 466 | 16.93 |
| MD | 282 | 1051 | 21.16* |
| LPC | 2016 | 10701 | 15.85* |
| Psychologist | 3853 | 16335 | 19.09 |
| MSW | 4560 | 20546 | 18.16 |
| Mood Disorder Comorbid with Partner Relational Disorder | | | |
| MFT | 4 | 10 | 28.57 |
| LPC | 9 | 24 | 27.27 |
| Psychologist | 11 | 18 | 37.93 |
| MSW | 8 | 21 | 27.59 |
| Treatment Modality | | | |
| Mood Disorder Alone | | | |
| Individual | 10934 | 51168 | 17.61* |
| Family | 423 | 4585 | 8.45* |
| Mixed | 1879 | 3723 | 33.54* |
| Mood Disorder Comorbid with Partner Relational Disorder | | | |
| Individual | 12 | 34 | 26.09 |
| Family | 1 | 6 | 14.29 |
| Mixed | 23 | 37 | 38.33 |

Notes: * $p < .001$. Readmission is whether a patient returned for a second EoC after completing a first EoC. Due to the small sample size for comorbid diagnoses, the results for provider license type and modality cannot be considered to be accurate or valid.