

**“The Effectiveness of Integrated Treatment for Substance Use Disorder and Other Mental
Illness: A Meta-Analysis”**

An Honors Thesis

by

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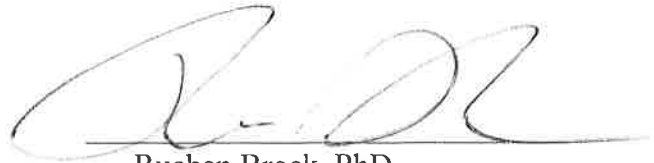
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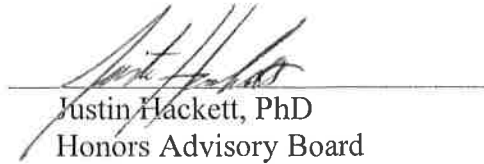
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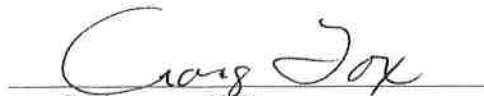
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The Effectiveness of Integrated Treatment for Co-Occurring Substance Use Disorder and Other
Mental Disorders: A Meta-Analysis

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Abstract

The comorbidity of Substance Use Disorder (SUD) and other mental disorders is common, with estimated 50-75% of patients entering SUD treatment presenting other psychiatric disorders as well (Bergman, Greene, Slaymaker, Hoepfner, & Kelly, 2014). These individuals typically require more extensive treatment, and have a poorer prognosis than individuals with only one disorder. There has been research that demonstrates that integrated treatment is more effective for this population (Drake, Mueser, Brunette, and McHugo, 2004), but the feasibility is questionable and many facilities do not implement it, thus these patients receive inadequate care. There continues to be research on the effectiveness of integrated care, and this paper reviews 18 studies that were published or reported from 2004 to 2016. It includes randomized controlled studies, quasi-experimental, as well as repeated measure and pilot studies. Significant results published in these studies were analyzed with a meta-analysis calculator to determine effect sizes using Cohen's *d*, where .2 is small, .5 is medium, and .8 is a large effect size. (Cohen, 1988). Although these studies have methodological weaknesses, this meta-analysis demonstrates cumulative evidence supporting the effectiveness of integrated care for comorbid SUD and mental illness. With this continued support of integrated care, research is moving on to combinations of therapies for combinations of disorders, as well as studying the feasibility of implementation.

Keywords: comorbidity, co-occurring, substance use disorder, mental illness, integrated care

Introduction

Effective care for individuals with comorbid Substance Use Disorder (SUD) and other mental health disorders is essential, as these individuals typically have a poorer outcome post-treatment, have poor social and emotional functioning, more hospitalizations and relapses, as well as a higher risk for suicidal actions. However, many of these individuals are either only being treated for one of their disorders at a given time, or they are receiving ineffective parallel care in separate facilities by non-cooperative teams. This is problematic since Kessler, Chiu, Demler, Merikangas, and Walters (2005) estimate that “27% of people have at least one psychiatric disorder, and 45% of people with a psychiatric condition actually have two or more disorders.” Sheidow, McCart, Zajac, and Davis (2012) report that “36% of young adults with a serious mental condition or young adults seeking treatment meet criteria for a SUD”. As research began demonstrating the effectiveness of treating both disorders simultaneously, what is known as the Integrated Treatment (IT) approach was developed in the United States in the late 1980’s. With this method, either the same therapist or a collaborating therapeutic team would treat the patient at a single site simultaneously. Many integrated treatments utilize different therapeutic techniques, such as Motivational Interviewing (MI), Cognitive Behavioral Therapy (CBT), contingency management, family interventions, as well as others that are specifically tailored to individual disorders (McKee, Harris, & Cormier, 2013).

Despite growing research demonstrating the superiority of integrated treatment in comparison to treatment as usual, many facilities are still not equipped to treat patients with co-occurring SUD and mental illness. One meta-analysis of research for the effectiveness of this treatment, *A Review of Treatments for People with Severe Mental Illnesses and Co-Occurring Substance Use Disorders* was created to cohesively demonstrate the treatment results over a ten-

year span (1994-2003 by Drake, Mueser, Brunette, and McHugo 2005). With this analysis, including 26 experimental and quasi-experimental studies, Drake and colleagues (2005) demonstrated how integrated treatment yielded better results across various factors in comparison to treatment as usual, in areas such as fewer substance relapses post-discharge, abstinence at follow-up, and improved mental health symptoms. These studies utilized interventions such as stage-wise treatment, active treatment interventions, engagement interventions, motivational interviewing, relapse prevention, and comprehensive services. Drake's meta analysis aids in the conclusion that recent research does offer evidence that integrated dual disorder treatment can be effective, but commented that future research is needed for more specific disorders and treatment combinations, as well as the issues of disseminating and implementation for this treatment to the public in a cost-effective manner.

The current meta-analysis serves as a continuation of Drake and colleagues' analysis (2005), utilizing research conducted post 2003 to further demonstrate effectiveness of integrated treatment for co-occurring Substance Use Disorder and other mental illnesses. These studies include integrated care for the combinations of SUD with depression, anxiety, Posttraumatic Stress Disorder (PTSD), Schizophrenia, and other psychotic disorders, in both adolescent and adult populations. There are several articles included in discussion for the cost-effectiveness and implementation of integrated care. Within this paper, "substance abuse" is used interchangeably with "substance use disorder", to refer to the abuse or dependence on alcohol or other drugs. This is done to remain consistent to the articles being discussed, which also utilize the terms interchangeably. "Comorbidity" and "Co-occurrence" are also used interchangeably to refer to clients having more than one diagnosable disorder simultaneously. The description of severe and/or persistent mental illness may refer to a variety of diagnoses, but typically to the diagnoses

of Schizophrenia, Schizoaffective, Schizophreniform, Bipolar Disorder, and other psychotic or personality disorders. The studies utilized in this meta-analysis were in Ebscohost, and are all peer reviewed journal articles. The publication dates range from 2004 to 2016. Keywords used to locate these articles include co-occurring, comorbidity, substance abuse, substance use disorder, and mental disorder. In regards to the synonyms co-occurring and comorbidity, most of articles utilized the word 'co-occurring.'

There are various reasons this meta-analysis was not strictly limited to controlled studies. Firstly, various articles that were originally found had to be excluded from the final evaluation of this meta-analysis. This occurred for various reasons, ranging from inadequate statistical postings (stating that results were significant but giving no actual data) to articles utilizing certain statistics that could not be translated into Cohen's *d* and properly analyzed with other results. Secondly, as Drake and colleagues (2005) stated in their study, more research needs to be completed on minority populations (including women with PTSD), and on specific treatment combinations for specific combinations of disorders. Many uncontrolled or repeated measures designs included in this review are just that, analyzing the effectiveness on different populations and using new treatments, thus they are still in their beginning stages. Since research is still needed on these topics, these preliminary studies were included. However, it is noted that the results found in uncontrolled studies are not often exactly replicated by controlled studies, so they should be interpreted with caution.

It is important to note that the studies included in this analysis include those comparing integrated treatment to standard care or treatment as usual (TAU), which clients would typically obtain in treatment that would focus on only SUD, and those comparing integrated treatment to no treatment. Since the current meta-analysis analyses the effectiveness of integrated treatment

overall, these studies are analyzed separately as to not skew results. The data reported regarding integrated care compared to TAU demonstrates how much more effective it is than TAU, while the data reported for integrated care compared to no treatment demonstrates its effectiveness in general. Since most studies do not include their own reliability data, the calculator utilized for the overall statistical analysis allows for partial reporting of reliabilities and constructs an artificial distribution from there.

Results of Initial Meta-Analysis

As previously stated, this meta-analysis serves as a continuation of the analysis completed by Drake and colleagues (2005). Thus, it is important to discuss the results found in the initial study. It was noted that there were several trends emerging in the treatment literature, such as the utilization of brief or time-limited interventions intermittent with standard care. One common therapeutic technique being utilized was motivational interviewing, either within standard care or as its own individual intervention. Various studies included in that analysis yielded positive results with the inclusion of motivational counseling, whether it was independent or not, including increased abstinence, better general functioning, fewer drinking days, greater reductions in psychopathology, and reduced substance abuse (Drake et al., 2005). It was also noted that various studies demonstrated that residential treatment with integrated treatment often yielded better results than residential treatments that focused only on substance abuse treatment. Overall, the meta-analysis reported sufficient data supporting the claim that integrated care for comorbid SUD and other mental illness tends to be effective, although it was noted that high fidelity is important and results are better if the critical components of integrated care are utilized.

Recent Studies, 2004-2016

A search of current literature identified 18 studies of integrated care interventions for SUD and comorbid mental disorders that have been published between 2004 and 2016. These studies and their significant results are summarized in Tables 1 and 3. These studies have various methodological limitations such as self-selection, small sample sizes, non-equivalence of groups, lack of control group and randomization, and so forth. The interventions, although all considered 'integrated' vary across the studies in which therapeutic methods they utilize, ranging from motivational interviewing, cognitive behavioral therapy (CBT), Behavioral Treatment for Substance Abuse in Severe and Persistent Mental Illness (BTSAS), psychoeducation, Seeking Safety (SS), and exposure therapy, in various combinations. When determining the effectiveness of integrated care, the effectiveness is measured across a variety of different factors, since there is no specific measure. These measures range from items related to substance use, psychiatric symptoms, general functioning, suicidality, arrests, hospitalizations, quality of life. In regards to measures utilized in the studies included, qualitative and quantitative methods such as assessments, surveys, and interviews were typically employed. Some of the assessment tools primarily utilized include: The Symptom Check List-90 (SDL-90-R) which evaluate a range of psychopathology, Structured clinical interviews of the DSM-IV, Brief Symptom Inventory, Addiction Severity Index (ASI), Timeline Follow Back (TLFB) which assesses alcohol and drug use, Beck Depression Inventory, the University of California at Los Angeles PTSD Reaction Index (UCLA), the Cohesion and Conflict subscales of the Family Environment Scale (FES), the drug abuse screening test (DAST-d), the short Michigan screening test (SMAST-d) for alcoholism, the Hamilton Depression and Anxiety scales (HAM-D, HAM-A), the Mood and Anxiety Questionnaire (MASQ) Global Assessment of Functioning Scale (GAF), The Clinician

Administered PTSD Scale (CAPS), The Children's Depression Inventory (CDI), The Perceived Stress Model (PSS) and others. The organization of the studies and the results reflects the decision to separately analyze integrated treatment compared to treatment as usual and integrated treatment compared to no treatment, studies are then separated further by grouping studies relating to the same or similar mental illness co-occurring with substance use disorder.

Study Results

Integrated Care vs. Treatment as Usual

There is available research that demonstrates the effectiveness of integrated care, but when it comes to demonstrating its effectiveness, it must be shown that it is more effective or superior to the standard treatment that is currently being utilized in facilities. Implementation and dissemination may be hindered if this treatment is not shown to be better than standard treatment, as it involves facilities to retrain their workers and implement new strategies regarding integrated care. Various studies included in this analysis demonstrate that integrated care can yield better results than standard care alone, and this study analyzes these results to determine how large of an effect size the results generate, as to show in a quantitative manner exactly how much better integrated care can be considered in various situations. Any measures that are not listed as being superior to the standard care were measured as being equally successful to the typical treatment (refer to table 1).

Substance Use with Psychotic Disorders

Various studies included focus on comorbid substance use disorder with psychotic disorders or psychosis, including Schizophrenia, Schizoaffective, Major effective, Bipolar, or other Axis I diagnosis. A large amount of past research has focused on integrated care with these

more severe mental illnesses and demonstrated positive results. Baker and colleagues (2006), utilized a combination of ten sessions including motivational interviewing and CBT in combination with standard care and the results were compared to clients receiving standard care alone. The therapy group yielded statistically significant results when compared to the control group in various aspects, including short term depression (6 month mark) ($d=.5$, $p<.001$), general functioning (as measured with the GAF; ($d=.58$, $p<.01$), in terms of their overall BDI-II Depression scores ($d=.78$, $p<.001$). In Barrowclough and colleagues' study (2010) motivational interviewing and CBT was also utilized alongside standard care and compared to the typical treatment, although the treatment lasted up to a year with a maximum of 26 sessions. This study demonstrated positive results in regards to substance use (abstinence on primary drug $d=.35$, $p=.02$; decrease in all substances $d=.39$, $p=.017$) and readiness to change ($d=.43$, $p=.004$). Bellack and colleagues' (2006) study utilized a specific treatment known as BTSAS as an integrated treatment for SUD and psychotic disorders. BTSAS includes contingency contracts, motivational interviewing, a harm reduction model, drug abuse education, skills training and relapse prevention. This was compared to a standard treatment known as STAR, which only includes a supportive and encouraging group environment for SUD with some psychoeducation. This study demonstrated positive results favoring the treatment group in aspects such as attendance ($d=.64$, $p<.03$), better urinalysis outcome ($d=.78$, $p<.03$), and survival of treatment ($d=.71$, $p<.03$).

Substance Use Disorder with Posttraumatic Stress Disorder

As of recent years, more studies have begun to focus on the comorbidity of SUD and PTSD. Drake and colleagues (2005) noted that "many dual disorders programs have identified high rates of trauma histories and post-traumatic symptoms among women and suggested

interventions to address trauma, but few data on outcomes are yet available.” Various studies included focus on women with PTSD or complex traumas as their population, providing some preliminary evidence for a group and disorder that was not previously available. A new therapeutic model known as Seeking Safety (SS) is utilized in some of these studies. SS is a highly flexible evidence-based model that addresses both trauma and addiction. Positive results were found when SS replaced twice weekly recovery groups in standard treatment in a study completed by Boden and colleagues (2012), in comparison to standard treatment alone. The experimental group had greater attendance ($d=.69$, $p<.01$), had greater client satisfaction ($d=.53$, $p<.01$), and had greater active coping skills than the control group post-treatment ($d=.59$, $p<.01$). In Gatz and colleagues’ study (2007), Seeking Safety was also utilized and yielded positive results in favor of the experimental group, which did not receive any trauma specific treatment. The population for this group was women with co-occurring disorders who have experienced trauma. Those who received SS had better improvement on their PTSD ($d=.23$, $p<.05$), and on their coping skills ($d=.23$, $p<.05$). However, those who did improve on their coping, regardless of the group, had significantly better PSS scores ($d=.28$, $p<.05$), GSI scores, ($d=.41$, $p<.001$) and drug scores ($d=.29$, $p<.05$). Although not utilizing SS, Danielson and colleagues (2012) studied the effect of a therapy known as RRFT, which incorporates psychoeducation, coping, family counseling, communication, substance use counseling, PTSD counseling, healthy dating and sexual decision making, and revictimization risk reduction on a group of sexually assaulted adolescents with SUD and their caregivers. This was a pilot study but it did utilize randomization and a comparison group. Results in favor of the RRFT group were found with significant improvements on the UCLA-A ($d=.74$, $p=.42$), UCLA-P ($d=1.47$, $p=.02$), CDI ($d=.65$, $p=.03$), TLFB ($d=.6$, $p=.04$), Cohesion-A ($d=1.95$, $p=.02$), Cohesion-P ($d=.87$, $p=.003$),

Conflict-A ($d=1.41$, $p=.02$), and Conflict-P ($d=.61$, $p=.10$). In the study completed by McGovern and colleagues (2015), results of a group receiving I-CBT alongside standard care was compared to standard care alone, and the I-CBT group was found to have greater reduction in substance use ($d=.31$, $p<.05$).

Substance Use Disorders with Other Mental Illness

There are various studies included in this analysis that observe integrated treatment utilized for comorbid SUD and less severe mental illness such as depression and anxiety, as well as other aspects such as suicidality and integrated on-site or off-site comparison. Wustoff, Waal, and Grawe (2014) analyzed the outcomes of integrated care for comorbid SUD and depression/anxiety, and although they found that the experimental group had significantly higher motivation ($d=.36$, $p=.003$), this was the only factor that was significantly better than the control group. Although various diagnoses were identified in the study completed by Esposito-Smythers and colleagues (2011), the focus was on the comorbidity and the presence of suicidality. The experimental group received I-CBT, compared to the control group receiving treatment as usual. In comparison, the experimental group had less suicide attempts ($d=.82$, $p=.023$), inpatient hospitalizations ($d=.81$, $p=.02$), partial hospitalization ($d=.57$, $p=.11$), emergency department visits ($d=.93$, $p=.007$), arrests ($d=.94$, $p=.01$) and client run aways ($d=.69$, $p=.05$). In terms of analyzing whether on-site integration is superior too off-site, Brooner and colleagues (2013) compared results for psychiatric and SUD comorbidity within versus outside of a methadone treatment center. Clients in the onsite group had lower SCL-90-R scores ($d=.31$, $p=.006$), larger reductions in GSI ($d=.34$, $p=.003$), were more likely to remain in treatment ($d=.7$, $p<.001$), and were more likely to initiate psychiatric care ($d=.76$, $p<.001$) when compared to clients receiving off-site psychiatric treatment with a methadone clinic.

Overall Analysis for Integrated Care vs. Standard Care

When significant statistics from the studies regarding integrated care in comparison to standard care were entered in the meta-analysis calculator (Lyons & Morris, 1997), which weights the studies per their sample size, a result of $d=.46$ was found in regards to integrated care being superior to standard care. This analysis included 39 effect sizes on multiple factors from 11 of the 18 studies included. There was a standard deviation of .23, and a variance of .06, using Brannick-Hall (2001) Variance corrections for small K sizes. The mean N for these included studies was 170. Full summary results are listed on table 2.

Table 1— Compared to Standard Treatment

Study	Design	Participants	Interventions	Outcomes	Effect Size
Baker et al., 2006	Randomized Controlled Trial	N = 130 dual diagnosis clients	10 sessions of integrated MI and CBT vs. Standard Care	Greater improvements in depression, general functioning, and BDI-II scores.	Cohen's $d=.5$, $.58$, and $.78$ respectively
Barrowclough et al., 2010	Randomized Controlled Trial	N= 327 dual diagnosis clients	Combination of MI and CBT with Standard Care vs. TAU	Greater decrease in main substance use, greater decrease in all substance use, and greater increase in readiness to change.	Cohen's $d=.35$, $.39$, $.43$ respectively
Bellack, Bennett, Gearon, Brown, & Yang, 2006	Randomized Clinical Trial	N = 110 dual diagnosis clients	BTSAS vs. STAR	Significantly more clean urine tests, as well as better attendance and survival rates.	Cohen's $d=.64$, $.78$, $.71$ respectively
Boden et al., 2012	Randomized Controlled	N= 98 male veterans with	Seeking Safety plus	Significantly greater	Cohen's $d=.69$, $.53$,

	Trial	comorbid SUD and PTSD	TAU vs. TAU alone.	attendance, satisfaction, and active coping skills.	.59 respectively
Brooner et al., 2013	Randomized Controlled Trial	N=360 dual diagnosis clients	Integrated treatment outside a Methadone clinic vs. TAU within.	Significantly lower follow-up SCL-90-R scores, larger reductions in GSI scores, more likely to remain in treatment, and more likely to initiate psychiatric care.	Cohen's d= .31, .34, .7, .76 respectively
Esposito-Smythers, Spirito, Kahler, Hunt, & Monti, 2011	Randomized Controlled Study	N = 40 adolescents with SUD and suicidality.	I-CBT vs. TAU	Significantly fewer suicide attempts, inpatient hospitalizations, partial hospitalizations, emergency department visits, arrests, and run aways	Cohen's d= .82, .81, .57, .93, .94, .69 respectively
McGovern et al., 2015	Randomized Controlled Trial	N= 221 clients with SUD and PTSD	I-CBT plus standard care, IAC plus standard care, SC only.	Significantly less substance use in I-CBT group than both.	Cohen's d = .31
Wusthoff, Waal & Grawe, 2014	Randomized Controlled Trial	N= 76 clients with SUD and depression/ anxiety	Combination MI/CBT vs. TAU	Significant increase in motivation.	Cohen's d= .36
Bergman et al., 2014	Repeated Measures Design	N = 300 dual diagnoses and SUD clients.	CBT/MI	Comorbid patients showed greater symptom decrease than SUD only counterparts.	Cohen's d=.3

Cook, Walsler, Kane, Ruzek, and Woof, 2006	Uncontrolled Pilot Study	N = 25 veterans with PTSD and SUD	Seeking Safety	Significant reduction in PTSD symptoms, significant increase in quality of life.	Cohen's d = 1.32, .5 respectively
Danielson, 2012	Pilot Randomized Study	N = 30 adolescents with PTSD and SUD with their caregivers	RRFT vs. TAU	Significantly better UCLA PTSD-A and P scores, CDI scores, TLFB scores, Cohesion A and P scores, and Conflict A and P scores.	Cohen's d = .74, 1.47, .7, .6, 1.95, .87, 1.41, .61 respectively
Gatz et al., 2007	Quasi-experimental	N = 402 women with PTSD and SUD	Seeking Safety vs. TAU	Significantly better improvement on PTSD symptoms and coping skills, and those who increased in these had significantly better PSS, GSI, and drug scores.	Cohen's d = .23, .23, .28, .41, .29 respectively

Table 2: Summary Results Integrated Treatment vs. Standard Treatment

	Sample Weight Mean FX Size & Std Dev		Brannick-Hall (2001) Variance Corrections for Small K Sizes (http://luna.cas.usf.edu/~mbrannic/files/conf/siok.htm)		Unweighted Mean Fx Size & Std Dev	
	Mean	Std Dev	Variance	Std Dev	Mean	Std Dev
r	.22	.1	0.01	0.10	.30	0.13
d	.46	.24	0.06	0.24	0.65	0.35
z	.23	.11	0.01	0.11	0.32	0.16
Mean N					170.05	145.89
K					(# of effects)	39
Sampling Error Variance					0.006	
Corrected Variance					0.004	

Integrated Care vs. No Treatment

When determining the effectiveness for integrated care, various studies included in this analysis did not utilize a control group that was receiving the standard care giving for SUD. Instead, some of these studies either did repeated measures to analyze the overall improvement post-treatment, or compared results to a control group that was waitlisted and served as a 'no-treatment' group. These studies have been analyzed separately in this meta-analysis, because the effect sizes calculated represent the overall effectiveness in comparison to no treatment, rather than treatment as usual, thus it is expected for these effect sizes to be larger. The separation was completed for this to avoid skewing.

Substance Use and Posttraumatic Stress Disorder

In addition to other studies that focused on minority groups such as women who have experienced trauma, Cohen and Hien (2006) observed the results of CBT on women with

comorbid PTSD and SUD who have experienced complex traumas in comparison to a group receiving no treatment. The experimental group yielded positive results in regards to ASI alcohol scores ($d=.33$, $p=.005$) and CAPS score ($d=.59$, $p=.006$) that were significantly better than the no treatment group. Lynch, Heath, Mathews, and Cepeda (2012) analyzed the difference in results of Seeking Safety vs. waitlisted trauma-exposed incarcerated women, after the need for treatment of the comorbidity of SUD and PTSD was identified in this population. The women in the treatment group obtained significant decreases in their PTSD ($d=.56$, $p=.034$), depression scores ($d=.67$, $p<.0001$), and maladaptive coping ($d=.66$, $p=.002$), while experiencing increases in interpersonal functioning ($d=.42$, $p=.009$) and better adaptive coping ($d=.34$, $p=.024$). In regards to populations typically observed for PTSD treatment, Cook and colleagues (2006) analyzed the effect of CBT for comorbid SUD and PTSD in the Veteran's population with a repeated measures design. With this study, it was found that the veterans had significantly decreased PTSD symptoms ($d=1.32$, $p<.001$) and an increased quality of life ($d=.49$, $p<.05$) when compared to pre-treatment. Although this study has a very small sample size ($n = 5$), the results were recorded statistically allowing for comparison in the study completed by Najavits, Schmitz, Gotthardt, and Weiss (2005). This study utilized Seeking Safety with the addition of Exposure therapy, which is not something that many other studies have attempted to incorporate due to the fear of exposure causing a relapse in drug use (Najavits, Schmitz, Gotthardt, & Weiss, 2005). With this combination of treatments, the dually diagnosed men with comorbid PTSD and SUD yielded various significant results: reductions in drug use ($d=1.29$, $p=.05$), improvements in family social functioning ($d=1.24$, $p=.05$), improvements in psychiatric problems ($d=.96$, $p=.1$), reductions in trauma symptom checklist score ($d=1.45$, $p=.03$), reductions in anxiety ($d=1.3$, $p=.04$), reductions in dissociation ($d=1.46$, $p=.03$),

reductions in sexual abuse trauma index ($d=1.28$, $p=.04$), reductions in depression scores ($d=1.14$, $p=.06$), improvements in sleep problems ($d=1.09$, $p=.07$), and improvements on GAF scores ($d=1.8$, $p<.02$). Since this was a preliminary study with a very small sample size, these very large effect sizes need to be interpreted with caution since a controlled study would likely not yield such superior results. However, since the results were overly positive (so much that even if a controlled study yielded only half as significant results, it would still have moderate effects) and this study includes a new aspect of treatment, it was included.

Substance Use Disorder and Other Mental Illness

The remainder of the studies included focused on either a variety of mental illnesses or less severe illness such as depression. Within the study completed by Cooper and colleagues (2010), the population was focused on the homeless with comorbid SUD and the following disorders: somatization, obsessive compulsive, depression, anxiety, phobias, and psychotic disorders. This study utilized repeated measures design to analyze the effect of I-ACT on this population. By the end of the study, significant results were found for reduction of substance use ($d=1.12$, $p<.001$) and psychiatric symptoms ($d=.76$, $p<.001$) compared to pre-treatment statistics. Another study observed the effect of integrated CBT therapy for co-occurring depression and SUD in young adults (Hides et al., 2010). This study demonstrated various significant results including better HAM-D scores ($d=1.35$, $p<.001$), HAM-A scores ($d=.91$, $p<.001$), MASQ anxious scores ($d=.67$, $p<.001$), MASQ depressive scores ($d=.8$, $p<.001$), MASQ anxious arousal scores ($d=.61$, $p<.001$), MASQ anhedonic depression scores ($d=.76$, $p<.001$), and CGI-S scores ($d=1.05$, $p<.001$). Finally, Grawe, Hagen, Espeland, and Mueser (2007) utilized a specific treatment in their study known as the Better Life Program. With this, individuals receive weekly sessions in closed-ended groups for 4-6 months, with

psychoeducation, MI, social skills training, peer support, establishing healthy relationships and leisure activities incorporated. This pilot study demonstrated significant results in comparison to pre-treatment on DAST-d scores ($d=.34$, $p<.01$), SMAST-d scores ($d=.36$, $p<.01$), and GAF scores ($d=.78$, $p<.001$).

Overall Analysis of Integrated Care vs. No Treatment

When significant statistics from the studies regarding integrated care in comparison to no treatment were entered in the meta-analysis calculator (Lyons & Morris, 1997), which weights the studies per their sample size, a result of $d=.70$ was found in regards to integrated care being superior to no treatment. This analysis included 31 effect sizes on multiple factors from 7 of the 18 studies included. There was a standard deviation of .29, and a variance of .09, using Brannick-Hall (2001) variance corrections for small K sizes. The mean N for these included studies was 57.83. Full summary results are listed on table 4.

Table 3 – Compared to no Treatment

Study	Design	Participants	Interventions	Outcomes	Effect Size
Cohen & Hien, 2006	Quasi-Experimental	N = 107 women with SUD and PTSD with complex trauma	CBT compared to no treatment group	Significantly better ASI alcohol scores and CAPS score.	Cohen's $d=.33$, $.59$ respectively
Cooper et al., 2010	Repeated Measures Design	N = 152 homeless dual diagnosis clients	I-ACT	Significant reduction in substance use and psychiatric symptoms	Cohen's $d=1.12$, $.76$ respectively
Grawe, Hagen, Espeland & Mueser, 2007	Pilot Study	N = 63 dual diagnosis patients.	Better Life Program	Significantly better DAST, SMAST, and GAF scores.	Cohen's $d=.34$, $.36$, and $.78$ respectively
Hides et al., 2010	Repeated Measures	N = 60 young adults with SUD	10 sessions of CBT with case	Significantly better Ham-D	Cohen's $d = 1.35$, $.91$,

	Design	and depression.	management	and A scores, MASQ anxious, depressive, anxious arousal, and anhedonic depression scores, and CGI-S scores.	.67, .8, .61, .76, 1.05 respectively
Lynch, Heath, Mathews & Cepeda, 2012	Quasi-experimental	N= 114 incarcerated women with PTSD and SUD	Seeking Safety vs. waitlist	Greater decrease in PTSD, depression scores, and maladaptive coping. Greater increases in interpersonal functioning and adaptive coping.	Cohen's d=.56, .67, .42, .34, .66 respectively
Najavits, Schmitz, Gotthardt and Weiss, 2005	Repeated Measures Pilot Trial	N = 5 men with PTSD and SUD	Seeking Safety and Exposure therapy	Significant reductions in drug use, trauma symptoms, anxiety, dissociation, sexual abuse trauma index, and depression scores with improvements on family social functioning, psychiatric symptoms, sleep problems and GAF scores.	Cohen's d = 1.29, 1.24, .96, 1.45, 1.3, 1.46, 1.28, 1.14, 1.09, 1.8 respectively

Table 4: Summary Results Integrated Treatment vs. No Treatment

	Sample Weight Mean FX Size & Std Dev		Brannick-Hall (2001) Variance Corrections for Small K Sizes (http://luna.cas.usf.edu/~mbrannic/files/conf/siok.htm)		Unweighted Mean Fx Size & Std Dev	
	Mean	Std Dev	Variance	Std Dev	Mean	Std Dev
r	.32	.12	.01	.12	.4	.15
d	.7	.3	.09	.3	.9	.4
z	.34	.14	.02	.13	.43	.18
Mean N					57.84	47.95
K					(# of effects)	31
Sampling Error Variance					.02	
Corrected Variance					.003	

Principals of Integrated Treatment

There are various principals and themes within Integrated Care that are deemed as necessary for the treatment to be effective in a population of dually diagnosed individuals. Since this study includes randomized controlled studies, and quasi-experimental studies, as well as uncontrolled, repeated measures, and pilot studies, the inclusion of evidence rating is vital to demonstrate that the principals of this treatment are well supported. The level of evidence is rated in accordance with the Texas Psychosocial Rehabilitation Conference Criteria (Carmichael et al., 1998). The levels of evidence range from 1 to 5, with level 1 requiring at least 5 controlled studies with meaningful outcomes, level 2 indicates fewer than 5 studies and/or studies with less meaningful outcomes, level 3 refers to uncontrolled empirical studies, level 4 is based on multiple studies, and level 5 denotes expert panel recommendations (Carmichael et al., 1998). The principals of care for integrated treatment in which evidence is demonstrated are: taking a low stress or harm reduction approach, motivation based treatment (including a stage-wise

approach), Cognitive-Behavioral Therapy, supporting functional recovery, and engaging the individual's social network (Mueser and Gengerich, 2013).

Low Stress and Harm Reduction

For individuals with comorbid disorders, interpersonal stress caused by intense treatment may cause an increase in symptoms, and be responsible for high drop-out rates. These individuals may be more vulnerable to overly direct approaches or confrontations, including raised voices or calling out of negative behaviors in the presence of others (such as in group therapy). It is ideal for those administering treatment to this population to be empathetic and understanding of the client, aiding in their progression and realizing what stage of change they are in. In terms of harm reduction, the primary initial goal is to remove the most harmful aspects of the individual's life, such as those that cause immediate threat to safety of self or others, threats to housing, etc. This is done without necessarily eliminating or reducing the use of substance or engagement in other risky behaviors. It is typically accomplished in various ways, such as providing clean needles to drug users or counseling individuals who trade sex for money about protection and their options (Mueser and Gengerich, 2013). A total of 10 of the studies included in this analysis are supportive of the low stress and harm reduction approach with three of them being randomized controlled trials (Bellack et al., 2006; Boden et al., 2012; McGovern et al., 2015), three being quasi-experimental (Cohen and Hien, 2006; Gatz et al., 2007; Lynch et al., 2012), and four of them being repeated measures or pilot studies (Cook et al., 2006; Cooper et al., 2010; Hides et al., 2010; Najavits et al., 2005). Due to the combination of RCT and quasi-experimental, the level of evidence rating for this principal is 1.

Motivation Based Treatment

Motivation to change is often an issue for individuals suffering from SUD, with the problem increasing if they also demonstrate comorbid mental illness. Motivation to change is an important aspect of treatment and necessary for true progress to be made. In regards to stage-wise approaches, it is important to recognize that there are stages of motivation, and each stage requires different aspects of treatment. These can be divided into precontemplation, where the person is not thinking about change, and contemplation, where the person is thinking about change. The next is preparation, in which they make plans on how to change their behaviors. Completion of this stage leads to the action stage, where the person is actively attempting to make these changes (Mueser and Gengerich, 2013). Finally, the maintenance stage is achieved and the individual is maintaining the desired changes in behavior that they have obtained. Depending on the stage the client is currently in, aspects of therapy will vary such as motivation to encourage change, interventions, awareness, psychoeducation, or a firmer focus on the reduction of symptoms. Of the studies included, a total of 16 of 18 demonstrated motivation based treatment, including a stage-wise approach. Of these studies, seven were RCT (Baker et al., 2006; Barrowclough et al., 2010; Bellack et al., 2006; Boden et al., 2012; Brooner et al., 2013; Esposito-Smythers et al., 2011; Wustoff, Waal, & Grawe, 2014), three were quasi-experimental experimental (Cohen and Hien, 2006; Gatz et al., 2007; Lynch et al., 2012), and six were repeated measures or pilot studies (Bergman et al., 2014; Cook et al., 2006; Cooper et al., 2010; Danielson et al., 2012; Hides et al., 2010; Najavits et al., 2014). The level of evidence for this principal is 1.

Cognitive-Behavioral Therapy

Cognitive-behavioral therapy has been utilized in treatment for various mental disorders, including SUD (Mueser and Gengerich, 2013). Although there is a range of different techniques and methods for CBT, it is primarily used to teach effective skills to individuals, cope with symptomatology, and reframing negative thought processes. Some examples of CBT that are known to be useful for treating co-occurring disorders include social skills training, coping skills training, cognitive restructuring, and the development of new outside activities to replace the previous dangerous acts (Mueser & Gengerich, 2013). Of the 18 studies included in this analysis, a total of 16 supported the principal of inclusion of cognitive-behavioral therapy. Seven of these studies had RCT designs (Baker et al., 2006; Barrowclough et al., 2010; Boden et al., 2012; Brooner et al., 2013; Esposito-Smythers et al., 2011; McGovern et al., 2015) three of them were quasi-experimental experimental (Cohen and Hien, 2006; Gatz et al., 2007; Lynch et al., 2012), and six were either repeated measures or pilot studies (Bergman et al., 2014; Cook et al., 2006; Cooper et al., 2010; Danielson et al., 2012; Hides et al., 2010; Najavits et al., 2014). The level of evidence for this principal is 1.

Supporting Functional Recovery

Supporting functional recovery refers to progress that is made in life outside of the psychiatric and SUD symptomatology. This may include a focus on employment, since many individuals with severe mental illness do not currently work. This may be done using supportive employment programs that do not enforce eligibility criteria on participants beyond the desire and motivation to work. Functional recovery may also focus on peer relationships and psychosocial functioning. These individuals typically have very strained relationships with their families and friends, inhibiting their support system. Of the 18 studies included, only eight of

them incorporated a specific focus on supporting functional recovery. Two of these studies had an RCT design (Boden et al., 2012; Esposito-Smythers et al., 2011), two of them were quasi-experimental (Gatz et al., 2007; Lynch et al., 2012), and four were either repeated measures or pilot studies (Cooper et al., 2010; Danielson et al., 2012; Grawe et al., 2007, Wustoff et al., 2014). Due to the insufficient controlled results for this principal, the level of support is 3.

Engaging Social Networks

Having a family member or loved one with a mental illness can cause tension and stress. When overwhelmed, family members may withdraw their support from the individual in care, which can create more problems such as instable housing and financial situations. When engaging the social network, the family is included in the treatment. This is important because family support is associated with a faster rate of remission (Mueser & Gengerich, 2013). While helping the family cope with their loved one's illness, they also become involved in the treatment. Psychoeducation is often used to properly inform them of the illness's that they are dealing with, creating a more understanding and empathetic atmosphere for the client. Of the 18 studies included, a total of 12 of them supported the principal of engaging the individual's social network. Of those included, four were of RCT design (Baker et al., 2006; Boden et al., 2012; Esposito-Smythers et al., 2011; Wustoff et al., 2014), three were quasi-experimental (Cohen and Hien, 2006; Gatz et al., 2007; Lynch et al., 2012), and five were either repeated measures or pilot studies (Cook et al., 2006; Cooper et al., 2010; Danielson et al., 2012; Grawe et al., 2007; Najavits et al., 2005). The level of evidence for this final principal of integrated care is 1.

Discussion

Since the completion of the initial meta-analysis by Drake and colleagues (2005), recent studies have continued to analyze the effectiveness of integrated care when treating comorbid SUD and other mental illnesses. Although much of the initial research was aimed at the more severe mental illnesses, current research is beginning to include the analysis of less severe diagnosis comorbid with SUD such as depression and anxiety. Another trend is the focus on PTSD in various populations, such as women, veterans, and incarcerated individuals, and the utilization of more specific interventions for these populations. These specific integrated interventions, such as Seeking Safety, BTSAS, RRFT, and the combination of SS and Exposure Therapy, demonstrate a forward motion in comparison to the studies included in Drake et al., (2005), as this was listed as a future focus. However, many of these specific approaches are still in their preliminary stages and controlled studies are still needed. Current studies are demonstrating combinations of the principals of integrated care, with many implementing at least four of the listed principals and achieving significant results. (Boden et al., 2012; Cohen & Hien, 2006; Cook et al., 2006; Cooper et al., 2010; Danielson et al., 2012; Esposito-Smythers et al., 2011; Gatz et al., 2007; Lynch et al., 2012; Najavits et al., 2005; Wusthoff, Waal, & Grawe, 2014).

Although a continuation of more mature studies is necessary for specific treatments, the issues of feasibility and dissemination are still pressing. The feasibility of implementing integrated care for co-occurring Substance Use Disorders and other mental health disorders presents a challenge. Although the implementation of these services would be difficult, there are some studies that show that it can happen (Killeen, Back, & Brady, 2015; Padwa et al., 2016; Mckee, Harris & Cormier, 2013). However, health-care reform in the United States of America,

for example, would require changes in the workforce and delivery of substance abuse treatments. They would need to include clinicians that can address disorders other than just Substance Use Disorder in scientifically sound manners (Killeen, Back, & Brady, 2015). Care systems would need to hire clinicians who have knowledge of their care but also are cross trained in addiction and mental health. However, the cost that is associated with training and supervision may be worth the positive outcomes associated with integrated care. Once implemented, facilities may experience a decrease in staff turnover and readmission rates, as well as improved patient outcome. Some studies have attempted the implementation of integrated services, such as Mckee, Harris, and Cormier (2013) and Padwa and colleagues (2016). Although Padwa and colleagues (2016) acknowledged the difficulty and unfeasibility for some centers to provide fully integrated behavioral health services, the authors did state that it was possible in many facilities. They also offered the solution of “enhancing primary care clinic capacities related to SU medications” to help close the gap between services. Mckee, Harris & Cormier (2013), however, conducted a successful study of implementing integrated care. With this, a 28-day addiction service was transformed into a 3-month integrated treatment program. With 155 individuals participating in the study, it demonstrated significant improvement in mental health symptoms, acquisition of knowledge and skill, and improvement in self-esteem. This entire study was completed with positive results while maintaining the lowest per inpatient cost of all hospital inpatient units, despite having to have a completely new manualized service, training for clinicians, and formal measurements. One of the studies previously mentioned in this review involving the Better Life Program (Grawe et al., 2007) also measured their feasibility during the experiment and found that they could effectively give treatment and maintain positive results. With the current research supporting the superiority and effectiveness of integrated care, and

future research verifying specific techniques for specific combinations of disorders, it is likely that research will put more of a focus on implementation in the future.

The results of this meta-analysis lend support for the implementation of integrated care for this high-risk population. Future research focusing on specific combinations of disorders would help with the establishment of evidence-based practices, which is necessary in the field and when dealing with managed care. The data from this analysis demonstrates that this is a more appropriate treatment for this population than what is currently being utilized. These integrated treatments may be more effective in various situations and significantly improve quality of life for patients. Although implementation may be a costly endeavor, there is evidence that it can be done in a cost-effective manner. Research on implementation and comorbid specific treatments would be the necessary next step in expanding knowledge and understanding of this field.

Conclusions

Comorbidity of Substance Use Disorder with other mental illnesses typically leads to a poorer prognosis and increased risk of negative outcomes. Recent research has demonstrated the effectiveness of integrated treatments for this population, and also offers some evidence of its possible superiority over standard care for SUD, primarily when the treatment incorporates multiple principals of integrated care. Although this meta-analysis offers continued evidence of its effectiveness, statistical results should be interpreted with caution due to some methodological weaknesses. Despite these positive results, further research is still necessary to identify specific intervention combinations for specific comorbid diagnoses and analyze the effectiveness in a randomized, controlled environment. Research has begun to analyze the

process of feasibility of dissemination, but continued research is still necessary to identify cost-effective mechanisms.

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