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Reinforcing Integrated Psychiatric Service Attendance in an Opioid-Agonist Program: A Randomized and Controlled Trial

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Abstract

Background—The benefits of integrating substance abuse and psychiatric care may be limited by poor service utilization. This randomized clinical trial evaluated the efficacy of using contingency management to improve utilization of psychiatric services co-located and integrated within a community-based methadone maintenance treatment program.

Methods—Opioid-dependent outpatients (n = 125) with any current psychiatric disorder were randomly assigned to: 1) reinforced on-site integrated care (ROIC), with vouchers (worth $25.00) contingent on full adherence to each week of scheduled psychiatric services; or 2) standard on-site integrated care (SOIC). All participants received access to the same schedule of psychiatrist and mental health counseling sessions for 12-weeks.

Results—ROIC participants attended more overall psychiatric sessions at month 1 (M = 7.53 vs. 3.97, $p < .001$, month 2 (M = 6.31 vs. 2.81, $p < .001$, and month 3 (M = 5.71 vs. 2.44, $p < .001$). Both conditions evidenced reductions in psychiatric distress ($p < .001$) and similar rates of drug-positive urine samples. No differences in study retention were observed.

Conclusions—These findings suggest that contingency management can improve utilization of psychiatric services scheduled within an on-site and integrated treatment model. Delivering evidenced-based mental health counseling, or modifying the contingency plan to include illicit drug use, may be required to facilitate greater changes in psychiatric and substance abuse outcomes.

Keywords

methadone maintenance; psychiatric comorbidity; treatment adherence; contingency management

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AUTHOR DISCLOSURES

Contributors. Drs. Kidorf, Brooner, King, and Peirce designed the study. Dr. Ghazarian undertook the statistical analysis. Dr. Kidorf wrote the first draft of the manuscript. Drs. Brooner, Gandotra, Antoine, King, and Peirce contributed to the implementation and conduct of the study, and edited earlier versions of this manuscript.

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1. INTRODUCTION

The high prevalence of psychiatric disorders in people with substance use disorder (Brooner et al., 1997; McGovern et al., 2006), and the correspondingly low rates of psychiatric service utilization in this population (McGovern et al., 2006; Pringle et al., 2006), has facilitated study of on-site integrated treatment models (Donald et al., 2005; Sacks et al., 2008a). While integrated care models can improve access to enhanced and specialized psychiatric services by delivering them in a single treatment setting, available research has produced mostly equivocal results, with only some studies demonstrating even modest effects on psychiatric or drug use outcomes (see Donald et al., 2005, for a review). A potential explanation for these disappointing findings is the limited scope and utilization of on-site psychiatric services reported in the literature, which may limit the potential effectiveness of integrated care approaches (Donald et al., 2005; Sacks et al., 2008b).

Poor service utilization, which has been implicated as a primary reason for partial and poor response to a wide range of medical and psychiatric interventions (Sabate, 2003), is also apparent in the small number of published studies offering integrated services within substance abuse treatment settings (e.g., Bowen et al., 2000; Randall et al., 2001). Lydecker et al. (2010), for example, recently evaluated an ambitious 6-month protocol combining cognitive-behavioral group therapy and medication management for alcohol dependent individuals with comorbid depression. These authors found that group sessions were attended considerably less often than medication management appointments, and that both integrated and non-integrated protocols demonstrated reductions in depression symptoms. Utilization of scheduled services was positively associated with reduced depressive symptoms and drug use, suggesting that improving attendance rates in integrated care models might have good collateral effects on both psychiatric and substance use outcomes.

Engaging opioid dependent individuals in psychiatric care may be particularly challenging because they are often poorly adherent to even routine substance abuse services (see Kidorf et al., 2006, for a review). Brooner et al. (2004), for example, showed that opioid-dependent individuals randomly assigned to a control group that was offered both routine and intensified substance abuse care attended less than half of all scheduled services, with adherence considerably worse for any sessions offered supplemental to routine individual counseling. Low rates of utilization is also commonly found in studies evaluating the efficacy of specialized individual or group therapies (e.g., cognitive-behavioral or 12-step facilitation therapies) added to routine methadone maintenance practices (Carroll et al., 2012; Rawson et al., 2002).

Service delivery strategies that result in opioid abusers receiving a higher dose of prescribed services are likely to produce substantially better outcomes. One potential mechanism for improving adherence to scheduled services is contingency management, a motivational intervention that uses behavioral reinforcement principles to encourage behavior change (Higgins et al., 2004). Contingency management has been used most frequently within substance-dependent populations to reduce drug use (Lussier et al., 2006), and a growing literature supports its use for increasing treatment participation (e.g., attendance behavior). Voucher-based incentives as a delivery platform for behavioral reinforcement have shown efficacy in improving rates of substance abuse treatment enrollment (Kidorf et al., 2009), attendance to individual and group therapy (Helmus et al., 2003; Jones et al., 2001), and adherence to medication regimens (Sorensen et al., 2007).

The present study provides data from the first known randomized clinical trial evaluating the efficacy of voucher-based reinforcement to improve attendance to specialized psychiatric services integrated within an outpatient program for opioid-dependent patients. Opioid-

dependent participants receiving methadone maintenance in a community-based program were provided co-located and integrated psychiatric care that included psychiatrist appointments, individual and group mental health counseling sessions, and good access to prescribed psychiatric medications for 12-weeks. Psychiatric care was integrated primarily by having substance abuse clinical staff deliver the psychiatric treatment protocol. One half of the participants received voucher reinforcement (i.e., $25.00) for each week they attended all scheduled psychiatric treatment services. The reinforced attendance condition was expected to attend more of their scheduled counseling and psychiatrist appointments, achieve greater reductions in psychiatric distress, and submit lower proportions of drug-positive urine samples.

2. METHOD

2.1 Participants

Study participants were 125 opioid-dependent outpatients enrolled in a community-based opioid-agonist clinic (see Consort Diagram, Figure 1). Participants were recruited from 12/15/09 to 4/30/12. Forty percent (n = 50) of participants were new admissions; the remainder (n = 73) had been in the program for at least 60-days. Patients were study eligible if they met DSM-IV-R criteria for a current psychiatric diagnosis and expressed interest in receiving psychiatric treatment offered within the program. Patients were not eligible for the study if they were pregnant, had an acute medical problem that required immediate and intense medical management, or had cognitive impairment that interfered with comprehension of study procedures. The study was approved by the Johns Hopkins University Institutional Review Board.

Table 1 shows that the most participants were Caucasian and female, and the mean age at study enrollment was 39.1 years. Major depression was the most prevalent DSM-IV Axis I psychiatric disorder, followed by Post Traumatic Stress Disorder, and Panic Disorder. Over 40% of the sample was diagnosed with Antisocial Personality Disorder, and 44% of the urine samples collected during the one-month baseline tested positive for at least one illicit drug. Comparisons of randomized (n = 125) and non-randomized (n = 33) enrollees on demographic variables found only one significant difference -- fewer randomized participants were classified as new admissions (40% vs. 61%; $\chi^2 = 4.49$, $p = 0.03$).

2.2 Assessments

Participants completed the Structured Clinical Interview for the DSM-IV (SCID-I and SCID-II; First et al., 1995) during the second week of baseline. The SCID-I is a structured interview that uses a decision-tree approach for determining diagnoses of many DSM-IV Axis I psychiatric disorders; the SCID-II was used for making diagnoses of Axis II personality disorders. The SCID can be used to distinguish independent and substance-induced psychiatric disorders, though in the present study only one participant was diagnosed with a substance-induced disorder (i.e., major depression). Participants receiving a psychiatric diagnosis were clinically reappraised by one of the study investigators, who also screened participants for suicidal ideation, thought disorder, delusions, and hallucinations. The Addiction Severity Index (ASI; McLellan et al., 1992, 2006) was administered at baseline and monthly to assess problem severity in seven areas commonly affected by substance use. The Hopkins Symptom Checklist - Revised (SCL-90-R; Derogatis, 1983; Derogatis and Cleary, 1977) was also administered at baseline and monthly to measure self-reported psychiatric distress (using a 0-4 Likert Scale) across 90-items and 9-subscales (e.g., depression, anxiety). The present study used the Global Severity Index (GSI) score, which is the average rating given to all 90 items and correlates highly to the individual scales. Finally, the Self-Report Measure of Medication Adherence (SMMA;

Morisky et al., 1986) was administered monthly to assess adherence to prescribed psychiatric medications. The SMMA uses a 4-point Likert Scale, with lower scores indicating better adherence. Study interviewers completed an intensive training protocol to establish and sustain good inter-rater reliability (Kidorf et al., 2004).

Participants submitted urine samples for testing once per week using a modified random schedule (Monday, Wednesday, or Friday). Urine samples were obtained under direct observation (through a one-way mirror) and tested at a certified laboratory that employed TLC and EMIT testing for the presence of opioids, cocaine, and benzodiazepines. Most participants (78%; n = 97) completed all three monthly assessment follow-ups. No condition differences were observed in mean number of follow-ups completed (ROIC: M = 2.62 (SD = .79) vs. SOIC: M = 2.53 (SD = .91); $t = .58$, $p = .56$). Participants were paid $40.00 for completion of the baseline assessment battery, and $15.00 for completing each follow-up assessment.

2.3 Procedure

Participants were randomly assigned (using a computerized randomization program) to one of two study conditions for 12-weeks: reinforced on-site integrated care (ROIC) versus standard on-site integrated care (SOIC). ROIC participants received voucher-based incentives ($25.00 per week) for each week they attended all of their scheduled psychiatric sessions. The maximum amount of voucher incentives that a participant could earn was $300.00. These monetary-based vouchers could be exchanged any time during the study for goods and services in the community and were purchased by a research assistant. SOIC participants were not provided the opportunity to earn voucher incentives.

Participants in each condition were offered an identical set and schedule of psychiatric services in the program, integrated within the substance abuse treatment by having the same staff treating their substance use disorder providing psychiatric care. The psychiatric service schedule included individual psychiatrist appointments (usually scheduled once every 2 weeks), individual mental health counseling sessions (once per week), and group mental health education and support sessions (once per week). The research assistant helped participants in each condition schedule their first psychiatrist appointment and individual and group mental health counseling sessions.

Board-certified psychiatrists in the ATS program used the first session to confirm the SCID diagnosis and formulate the initial care plan. Individual mental health counseling was conducted by the participant's primary substance abuse counselor, who was state certified as a Professional Counselor. These sessions lasted about 50 minutes and were scheduled weekly in addition to the participant's routine substance abuse counseling schedule. Counselors used a case management approach that employed empathic and psycho-educational strategies to help participants reach goals established in the treatment plan, monitor psychiatric symptoms, discuss possible interactions between their psychiatric and substance use diagnoses, and encourage adherence to prescribed psychiatric medications (Center for Substance Abuse Treatment, 2005). The weekly mental health education and support group was led by doctoral staff and lasted 60 minutes. The group sessions provided education about the psychiatric diagnoses and their symptom expression and interactions with substance use symptoms and disorder, monitored and discussed patient expectations for psychiatric medications, response to the medications and overall adherence with their prescribed use, and provided both cognitive behavioral and supportive interventions to help participants manage symptoms and maximize functioning.

2.4 Access to prescribed psychiatric medications

All participants had good access to prescribed psychiatric medications. The study paid for psychiatric medications for those participants without insurance coverage for their medications. Most participants (94%) were started on at least one psychiatric medicine (see Table 1).

2.5 Staff training and fidelity to psychiatric treatment protocol

Substance abuse staff attended seminars on the treatment of substance users with co-occurring disorders, led by study investigators (MK, RKB, VK) and other faculty members. Senior staff provided routine clinical supervision using standards published by the Center of Substance Abuse Treatment (CSAT, 2005). Psychiatrists and counselors completed forms each week to document all treatment contacts. These forms were given to research support staff that monitored adherence to the treatment protocol on a weekly basis. Urinalysis results for participants were distributed weekly to all treatment staff.

T-tests were used to compare ratios of scheduled psychiatric sessions per month to assess fidelity to delivery of the psychiatric treatment protocol. ROIC and SOIC participants were scheduled to attend a similar number of individual (ROIC: M = 3.66; SD = 0.99 vs. SOIC: M = 3.60; SD = 1.09; $t = .54$, $p = .58$), group (ROIC: M = 3.70; SD = .97 vs. SOIC: M = 3.66; SD = 1.04; $t = .41$, $p = .67$), and psychiatrist (ROIC: M = 2.41; SE = 1.12 vs. SOIC: M = 2.34; SD = 1.30, $t = .56$, $p = .57$) sessions during the study.

2.6 Routine substance abuse treatment

All participants received the same scope and schedule of routine substance abuse treatment in the program, which included daily methadone administration and an adaptive stepped care counseling approach that varied the number of weekly substance abuse counseling sessions based on substance abuse treatment response (Brooner et al., 2004). No condition differences were observed in scheduled (M = 9.03; SD = 9.10) or attended (M = 5.87; SD = 6.36) substance abuse counseling sessions during the study.

2.7 Data analyses

Chi-square and t-tests were used to compare ROIC and SOIC conditions on demographics, SCID-based current psychiatric and substance use disorder diagnoses, and baseline urinalysis results. A t-test was used to compare conditions on number of days participants remained in treatment post-randomization, and a chi-square test was used to compare conditions on study completion. T-tests were used to compare conditions on scheduled and attended mental health and substance use sessions, and SRMS scores. Mixed models were used to compare conditions on SCL-90 GSI scores and urinalysis results; significant main effects were followed by post-hoc Tukey-Kramer tests. Sensitivity analyses (not reported in the manuscript) using the baseline variables of pre-study treatment days, methadone dose, SCL-90 GSI scores, and ASI Psychiatric scores as covariates yielded no differences in the study results. Finally, a post-hoc multiple regression model was used to evaluate the relationship between attendance to mental health sessions and GSI scores at each time point, followed by a mixed-model analysis controlling for baseline methadone dose and baseline GSI scores.

3. RESULTS

3.1 Baseline characteristics

No condition differences were observed for demographics, new admission status, prevalence of substance use disorders, or urinalysis results. ROIC participants were more likely diagnosed with Bipolar Disorder, and had a higher mean methadone dose.

3.2 Study retention

ROIC and SOIC participants remained in psychiatric treatment for a similar number of days (ROIC: M = 77.1; SD = 16.3 vs. SOIC: M = 77.3; SD = 16.6; $t = .07$, $p = .94$); 82.2% of ROIC participants and 82.5% of SOIC participants completed the 12-week randomized study ($\chi^2 = .001$, $p = .96$).

3.3 Mental health service utilization

As shown in Table 2, ROIC participants attended more individual and group mental health sessions each study month. ROIC participants attended more psychiatrist sessions during Months 1 and 2, but not Month 3. ROIC participants earned a mean of $166.53 (SD = 90.76) during the study for adherence to the psychiatric protocol; 94% (n = 58) earned at least one voucher.

3.4 Medication administration and adherence

Most participants were prescribed psychiatric medications; no condition differences were observed in the class of medications administered (see Table 1). Participants in both conditions reported good adherence to psychiatric medications. However, ROIC participants reported lower SRMS scores (i.e., more adherence with psychiatric medications) at Month 1 (ROIC: M = .55, SD = .61 vs. SOIC: M = .89, SD = .92; $t = 2.22$, $p = .02$) and Month 3 (ROIC: M = .50, SD = .72 vs. SOIC: M = .94, SD = .88; $t = 2.52$, $p = .01$), but not at Month 2 (ROIC: M = .54, SD = .66 vs. SOIC: M = .82, SD = .95; $t = 1.66$, $p = .09$).

3.5 Psychiatric distress

As shown in Figure 2, participants in both studies showed reductions in SCL-90-R GSI scores over time ($F(3, 317) = 15.54$, $p < .001$). Tukey-Kramer post-hoc tests showed that GSI scores at all three time points were significantly lower than baseline, and Month 3 GSI scores were significantly lower than Month 1 GSI scores. No condition differences ($F(1, 317) = .56$, $p = .45$) or condition × time interactions ($F(3, 317) = 1.10$, $p = .39$) were observed. Post-hoc multiple regression analyses showed non-significant relationships between mental health session attendance and GSI scores at month 1 ($F = .00$, $p = .97$), month 2 ($F = .04$, $p = .84$, and month 3 ($F = 1.31$, $p = .25$). A mixed model analysis, controlling for the effect of baseline methadone dose and GSI scores, was also not significant ($F = .00$, $p = .97$).

3.6 Substance use outcomes

No condition ($F(1, 345) = 0.00$, $p = .96$), time ($F(3, 345) = 0.79$, $p = .50$), or condition × time ($F(3, 345) = 0.23$, $p = .88$) effects were observed for opioid-positive urine samples. No condition ($F(1, 345) = 2.05$, $p = 0.15$), time ($F(3, 345) = 2.53$, $p = .06$), or condition × time ($F(3, 345) = 0.77$, $p = 0.51$) effects were observed for cocaine-positive urine samples. While no condition ($F(1, 345) = 0.05$, $p = 0.82$) or condition × time ($F(3, 345) = 0.25$, $p = .86$) effects were observed for sedative-positive urine samples, a time effect ($F(3, 345) = 2.96$, $p = 0.03$) showed that the proportion of sedative positive samples increased somewhat from Month 1 (M = .16) to Month 3 (M = .18). No main effects or interactions were observed for any of the ASI composite scores.

4. DISCUSSION

This is the first known randomized trial evaluating the efficacy of contingency management for improving the delivery of onsite and integrated psychiatric services in a sample of opioid-dependent outpatients with comorbid psychiatric disorder. A $25/week voucher incentive was associated with almost a 2-fold increase in overall rates of attendance to scheduled psychiatric treatment sessions. The efficacy of contingency management was revealed most powerfully in utilization of individual and group counseling, interventions that are routinely poorly attended by substance users with or without psychiatric comorbidity (Kidorf et al., 2006), but which can support pharmacological interventions by enhancing medication adherence and facilitating longer-term treatment gains (Pampallona et al., 2004).

Nevertheless, enhanced utilization of counseling services in the ROIC condition did not translate to greater reductions in psychiatric distress. Both conditions evidenced strong reductions in psychiatric distress, and had good overall rates of psychiatrist session attendance and medication adherence. This finding supports studies showing that opioid abusers can respond positively to psychiatric treatment (Nunes et al., 1998), though it is qualified due to the absence of a no-treatment comparison condition.

That the ROIC condition failed to facilitate better psychiatric outcomes than the SOIC condition has many potential explanations. Condition differences in service utilization, which totaled about three counseling sessions and one psychiatrist appointment over the 3-month study, may have been insufficient to facilitate differences in psychiatric distress. While it is possible that a higher dose of counseling in the ROIC condition may have improved outcomes, post-hoc analyses conducted across conditions showed no relationship between service utilization and psychiatric distress. Lydecker et al. (2010) demonstrated that service utilization was positively associated with better psychiatric outcomes in both integrated and parallel care models, though that study was conducted with a different population of substance users who were offered evidenced-based psychosocial treatments (i.e., cognitive-behavioral or 12-step facilitation therapy) over a longer (i.e., 6-months) trial.

In the present study, counselors were trained and supervised to deliver a case management mental health counseling strategy advocated by the Center for Substance Abuse Treatment (CSAT, 2005) and easily adaptable to community-based treatment programs. It is possible that higher intensities of a more specialized approach like CBT, which has demonstrated good effects with substance using and depressed samples (e.g., Carroll et al., 1994; Wampold et al., 2002), may have had a stronger impact on psychiatric distress outcomes in the ROIC condition. Similarly, alternative group therapy models, including those using CBT principles (Rawson et al., 2002) or significant other supports (Kidorf et al., 2005), may have been more efficacious at higher doses than a general support and education group.

Reductions in psychiatric distress had no apparent effect on drug use, and modest increases in sedative use were observed across conditions. Psychiatric and substance use disorders are two separate conditions, and the treatment of one often has little bearing on the other (Drake et al., 2008). In addition, psychiatric distress is only one of many factors affecting drug use in opioid abusers. Perhaps directing the contingency management intervention toward reducing drug use may have added to the efficacy of the ROIC condition. Studies that have reinforced both attendance and drug use have facilitated improvements in both of these outcomes in methadone maintenance settings (Brooner et al., 2007; Petry et al., 2005).

The maximum cost of attendance incentives used in this study (i.e., $\underline{M}$ = $165.00) might raise questions about feasibility in community treatment settings. It is worth noting that the significantly higher frequency of missed counseling sessions in the control condition would

cost providers considerably more in billing losses than the per case cost associated with using the attendance reinforcement, in addition to the negative impact that missed sessions have on the benefits of the sessions that were received but perhaps not measured in this study. Nevertheless, a formal cost analysis is required to further advance this research. Alternative low-cost strategies to reinforce attendance to routine and intensified substance abuse counseling sessions have been used successfully in methadone maintenance programs (e.g., take-home medication and access to methadone), and these approaches might work with specialized psychiatric services (Brooner et al., 2004; Kidorf et al., 2005).

The 3-month duration of this trial is a notable study limitation. A longer trial could have evaluated the efficacy of reinforced attendance over a longer course (and higher dose) of psychiatric care and evaluated the effects of removing incentives on subsequent attendance and outcomes. The benefits of some verbal therapies in substance users are often not revealed until after the intervention is completed (Carroll et al., 1994; Rawson et al., 2002). It is also possible that psychiatric care modified behaviors or cognitions (e.g., motivation; treatment readiness) that were not measured explicitly in the present study. That about one-quarter of the enrolled sample left the study prior to randomization limits the external validity of these findings.

The study controlled for scope and frequency of psychiatric services, but neither therapy content nor prescription practices, which may have introduced unknown error variance across participants and conditions. Similarly, the use of evidenced-based psychosocial therapies may have improved the integrated care model. Finally, the present study added psychiatric care to intensive substance abuse treatment protocol to avoid dilution of services in patients with severe substance use problems. Other strategies for integrating care (e.g., Mueser et al., 2013; Watkins et al., 2011; Weiss et al., 2007) may have provided stronger reductions of psychiatric distress if offered at higher doses.

In sum, improving health care outcomes while reducing its overall cost is a challenging goal for any service provider. The health care field is responding in myriad ways to address this mounting pressure, and improving patient adherence is one potential pathway. The present findings show that a monetary-based attendance incentive resulted in patients receiving about 70% of the dose of treatment prescribed for them, though this intervention was not sufficiently powerful to improve psychiatric or substance abuse outcomes compared to a non-reinforced integrated care model. Future studies might evaluate alternative strategies of integrating contingency management and psychiatric interventions to facilitate better outcomes for this population of patients with co-occurring opioid-dependence and psychiatric disorders.

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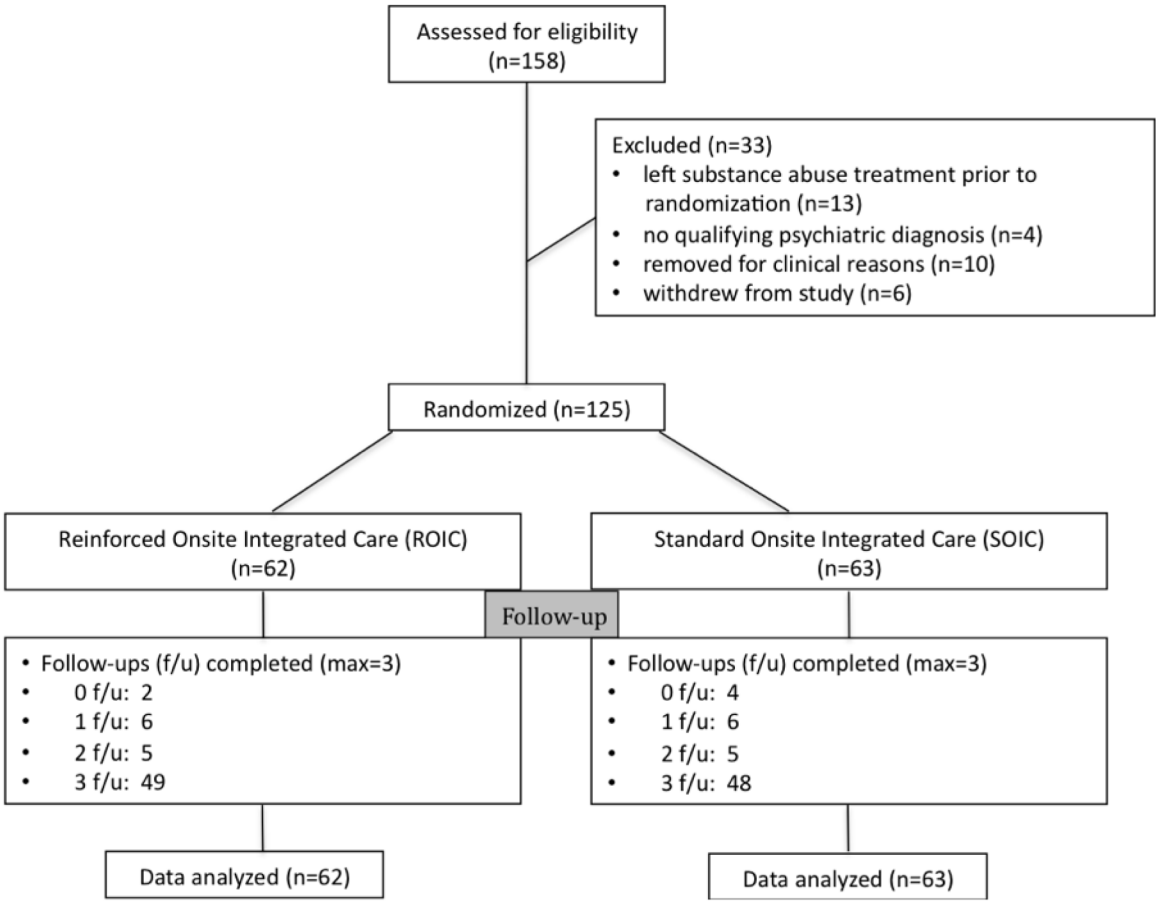

Figure 1.
Consort Diagram

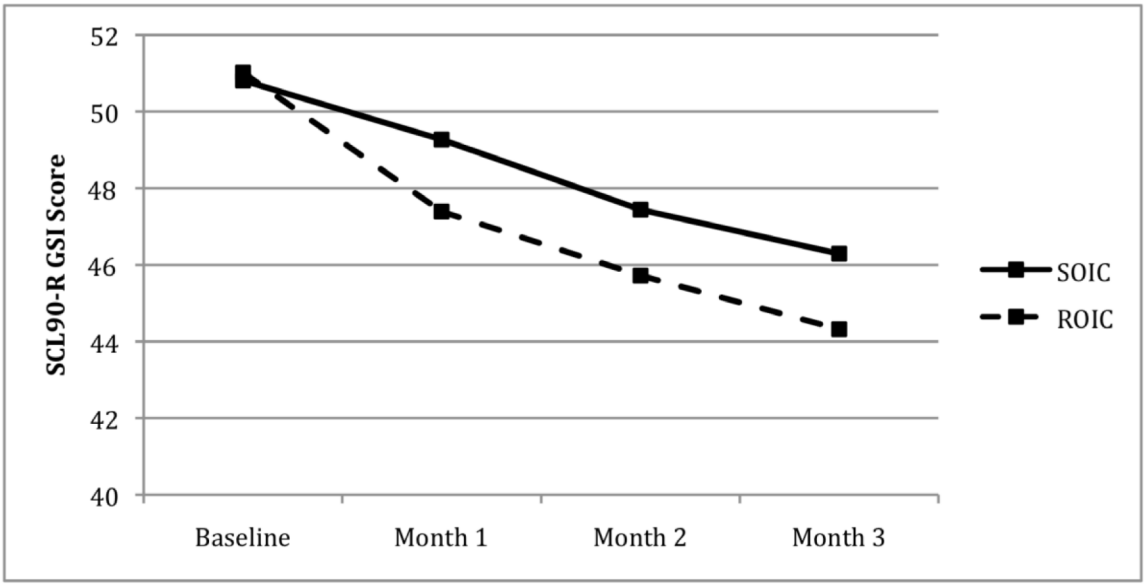

Figure 2.
Changes in SCL-90-R Global Severity Index (GSI) scores over time in the Standard Onsite Integrated Condition (SOIC) and Reinforced Onsite Integrated Condition (ROIC).

Table 1

Baseline demographics, psychiatric and substance use disorders[1], urinalysis results, and prescribed medications[2]

Characteristic	Overall (n=125)	ROIC[3] (n=62)	SOIC[3] (n=63)	χ^2 or t-test (df)	p-value
	M (SD) or %	M (SD) or %	M (SD) or %		
Demographics					
Gender (%)					
Male	46.4%	50.0%	42.9%	χ^2=0.64	0.42
Female	53.6%	50.0%	57.1%		
Race (%)					
White	64.8%	64.5%	65.1%	χ^2=1.61	0.65
Minority[4]	35.2%	35.5%	34.9%		
Age (years)	39.1 (10.2)	39.4 (10.4)	38.9 (10.1)	t=0.32	0.74
Education (highest grade completed)	11.5 (2.2)	11.5 (2.4)	11.5 (1.9)	t= 0.14	0.88
Married (%)	24.8%	22.6%	27.0%	χ^2=0.32	0.56
Employed (%)	20.0%	14.5%	25.4%	χ^2=2.31	0.12
New admission (< 60 days in treatment)	40.0%	35.5%	44.4%	χ^2=1.05	0.31
Psychiatric Disorders [1]					
Current Axis I disorder	100.0%	100.0%	100.0%	--	--
Current psychotic disorder	2.4%	4.8%	0%	*	*
Schizophrenia	--	--	0%	*	*
Schizoaffective disorder	2.4%	4.8%	0%	*	*
Current mood disorder	72.8%	71.0%	74.6%	χ^2=0.20	0.64
Major Depression	36.0%	33.3%	40.3%	χ^2=1.09	0.29
Bipolar I	17.6%	24.2%	11.1%	χ^2=3.68	0.05
Dysthymia	14.4%	14.5%	14.3%	χ^2=0.00	0.97
Current anxiety disorder	59.2%	61.3%	57.1%	χ^2=0.22	0.64
Posttraumatic stress disorder	29.6%	25.8%	33.3%	χ^2=0.64	0.42
Panic disorder	17.6%	17.7%	17.5%	χ^2=0.00	0.96
Generalized anxiety disorder	10.4%	12.9%	7.9%	χ^2=0.82	0.36
Axis II disorder	63.2%	62.9%	63.5%	χ^2=0.01	0.95
Antisocial personality disorder (APD)	41.6%	41.9%	41.3%	χ^2=0.00	0.93

Characteristic	Overall (n=125)	ROIC[3] (n=62)	SOIC[3] (n=63)	χ^2 or t-test (df)	p-value
	M (SD) or %	M (SD) or %	M (SD) or %		
Other Axis II (not including APD)	44.8%	38.7%	50.8%	χ^2=1.84	0.17
Substance Use Disorders [1]					
Alcohol	6.4%	4.8%	7.8%	*	*
Sedative	15.2%	12.9%	17.5%	χ^2=0.45	0.50
Cocaine	16.8%	21.0%	12.7%	χ^2=1.52	0.21
Urinalysis Results					
Opioid-positive (%)	16% (0.27)	15% (0.26)	16% (0.30)	t= 0.27	0.78
Cocaine-positive (%)	18% (0.32)	20% (0.32)	16% (0.31)	t=0.73	0.46
Sedative-positive (%)	16% (0.29)	15% (0.28)	16% (0.31)	t=0.26	0.79
Any-positive (%)	43% (0.41)	45% (0.41	42% (0.42)	t=0.40	0.69
Prescribed Medications					
Substance abuse					
Methadone	100.0%	100.0%	100.0%	--	--
Methadone dose	84.6 (23.3)	89.2 (23.7)	80.0 (22.2)	t=2.23	0.03
Psychiatric					
Any psychiatric medication	93.6%	98.4%	88.9%	*	*
Heterocyclic antidepressants	38.4%	38.7%	38.1%	χ^2=0.00	0.94
SSI antidepressants	52.0%	54.8%	49.2%	χ^2=0.39	0.52
Unspecified antidepressants	31.2%	30.6%	31.7%	χ^2=0.01	0.89
Mood stabilizers	18.4%	22.6%	14.3%	χ^2=1.43	0.23
Anti-anxiety medications	16.0%	17.7%	14.3%	χ^2=0.27	0.59
Typical antipsychotics	8.8%	11.3%	6.3%	χ^2=0.95	0.33
Atypical antipsychotics	14.4%	17.7%	11.1%	χ^2=1.11	0.29

[1]Diagnoses determined using the Structured Clinical Interview for the DSM-IV. With the exception of psychotic and alcohol use disorders, only psychiatric disorders prevalent in at least 10% of the sample are included.

[2]Substance abuse and psychiatric medications. Participants were often prescribed more than one psychiatric medication.

[3]ROIC: Reinforced Onsite Integrated Care; SOIC: Standard Integrated Onsite Care

[4]Most minority participants (n = 44) were African American (n = 32; 73%) or Hispanic (n = 5; 11%).

*Due to low cell counts, chi square results would be invalid

Table 2

Mean number of individual, group, and psychiatrist sessions attended at Months 1, 2, and 3

Sessions	ROIC[1] (n = 62)	SOIC[1] (n = 63)	*t*	*p*
	M (SD)	M(SD)		
Individual				
Month 1	2.4 (1.2)	1.4 (1.4)	4.52	<.001
Month 2	2.3 (1.3)	1.2 (1.5)	4.38	<.001
Month 3	2.2 (1.5)	1.0 (1.3)	4.94	<.001
Group				
Month 1	2.5 (1.3)	0.4 (0.7)	11.00	<.001
Month 2	2.2 (1.4)	0.3 (0.8)	9.28	<.001
Month 3	2.2 (1.7)	0.2 (0.6)	8.91	<.001
Psychiatrist				
Month 1	2.6 (0.9)	2.2 (1.1)	2.48	0.01
Month 2	1.9 (1.1)	1.4 (1.1)	2.57	0.01
Month 3	1.4 (1.0)	1.3 (1.2)	0.34	0.73
Overall				
Month 1	7.5 (2.7)	4.0 (2.4)	7.80	<.001
Month 2	6.3 (3.1)	2.8 (2.5)	6.96	<.001
Month 3	5.7 (3.7)	2.4 (2.5)	5.83	<.001

[1]ROIC: Reinforced Onsite Integrated Care; SOIC: Standard Onsite Integrated Care