

Regular article

Substance abuse treatment for mothers: Treatment outcomes and the impact of length of stay

Nicola A. Conners, (Ph.D.)^{a,*}, April Grant, (M.P.H.)^a,
Cynthia C. Crone, (M.N.Sc., A.P.N.)^b, Leanne Whiteside-Mansell, (Ed.D.)^a

^aDepartment of Pediatrics, College of Medicine, University of Arkansas for Medical Sciences, Little Rock, AR 72205, USA

^bDepartment of Psychiatry, College of Medicine, University of Arkansas for Medical Sciences, Little Rock, AR 72205, USA

Received 13 December 2005; received in revised form 31 May 2006; accepted 4 June 2006

Abstract

This article examines the treatment outcomes of 305 women enrolled in a comprehensive, residential substance abuse treatment program for pregnant and parenting women and their children. The women were assessed at intake and three times in the year after discharge. Analyses focused on change in client functioning over time, and investigating the impact of length of stay in treatment on client outcomes. Comparisons of clients' functioning before and after treatment suggest significant improvements in a number of domains, including substance use, employment, legal involvement, mental health, parenting attitudes, and risky behaviors. For most outcome domains, results suggest that longer treatment stays are associated with more positive outcomes. © 2006 Elsevier Inc. All rights reserved.

Keywords: Women; Treatment outcomes; Length of stay; Addiction

1. Introduction

Recent reports suggest that relatively large numbers of pregnant and parenting women in the United States have problems related to the use of alcohol and other drugs. For example, estimates from the 2003 National Survey on Drug Use & Health (NSDUH), suggest that 5.5% of women who were living with at least one child had abused or were dependent on alcohol or an illicit drug in the past year. Annual averages based on the NSDUH conducted in 2002 and 2003 indicate that 4.3% of pregnant women aged 15 to 44 used illicit drugs during the past month, 4.1% reported binge alcohol use, and 18.0% reported smoking cigarettes (Office of Applied Studies, 2004). Awareness of this issue has increased over the past two decades, and more substance abuse treatment providers have begun offering

specialized services to address the complex needs of mothers and their children.

Treatment efforts with this population are complicated by the reality that maternal substance abuse is associated with many other indicators of poor health (including both physical problems and mental health problems) and social problems, ranging from poverty to legal issues. Although each of these issues is important, we will give special attention here to issues related to trauma history, mental illness, tobacco use, and parenting.

1.1. Trauma history

There is a well-established link between physical, emotional, and sexual victimization and addictive and mental health disorders in populations of pregnant and postpartum women (Back et al., 2000; Grella, 1997; Kendler et al., 2000; Stevens & Arbiter, 1995). Among women seeking treatment for substance abuse problems, reports suggest that the majority experienced physical or sexual abuse by parents or others (Conners, Bradley, Whiteside-Mansell, &

* Corresponding author. Partners for Inclusive Communities, University of Arkansas for Medical Sciences, 2001 Pershing Circle, Suite 300, North Little Rock, AR 72114, USA. Tel.: +1 501 682 9906.

E-mail address: connersnicolaa@uams.edu (N.A. Conners).

Crone, 2001; Connors et al., 2003). Women in treatment often report histories of substance use beginning soon after a sexual assault (Stevens & Arbiter, 1995). Because of the high rates of victimization and exposure to traumatic events, many women in treatment exhibit symptoms of posttraumatic stress disorder (PTSD), with some studies suggesting approximately one third of women in treatment may be experiencing clinically significant symptoms (Najavits et al., 1998). Trauma treatment has become an important focus in many programs designed to treat women.

1.2. Mental illness

There is a growing awareness that mental health disorders are very common in women seeking treatment for addiction (Grella, 1997; Jessup, 1996). Although limited data exist citing the prevalence of specific mental illnesses in addicted pregnant women and mothers (Grella, 1997), results from available studies suggest that common disorders in women include depressive disorders, Axis II pathology (Haller, Knisely, Dawson, & Schnoll, 1993), and PTSD (Najavits, Weiss, & Shaw, 1997). Consistent with these findings, depression and PTSD were the most common mental health problems reported by women seeking treatment in 50 publicly funded residential treatment programs for pregnant and parenting women (Connors et al., 2003; Najavits et al., 1997). Treatment for co-occurring substance abuse and mental health disorders is complex, and the presence of mental health disorders in addicted women has been linked to shorter retention in substance abuse treatment, thus reducing the likelihood of good outcomes (Haller, Knisely, Elswick, Dawson, & Schnoll, 1997). Managing the treatment of addiction and mental illness during pregnancy and the postpartum period is especially important, as both conditions are associated with poor participation in prenatal care, obstetrical complications, and other difficulties (Mallouh, 1996).

Despite the prevalence of mental health symptoms among women with addictions and the fact that many substance abuse treatment providers now provide either parallel, linked, or truly integrated mental health treatment services, the impact of residential treatment services on mental health symptoms has rarely been reported. However, the few available studies suggest that comprehensive treatment services may lead to improvements in mental health problems. For example, Brown, Melchior, Waite-O'Brien, and Huba (2002) studied women enrolled in a residential substance abuse treatment program and reported significant reductions in self-reported depressive symptoms among 138 women whose symptoms were measured at multiple points during their treatment stay. Postdischarge outcomes were not reported. Schinka et al. (1999) examined changes in mood and personality features in 42 women from the time of admission to a therapeutic community for women to a 12-month postdischarge follow-up. They reported significant reductions in depressive symptoms and several

personality features (including measures of avoidance, dependence, self-defeating behavior, and borderline characteristics). Similarly, McComish et al. (2003) reported significant improvements in depressive symptoms and overall affect from intake to follow-up (either exit or a postdischarge assessment) among 39 women treated in a family-focused residential treatment program. Such findings need to be replicated with larger sample sizes, and specific types of mental health problems (such as symptoms of PTSD) need to be further explored.

1.3. Tobacco use

Tobacco use is an important issue for pregnant women and mothers, but has often been ignored in the treatment literature, although it is known that a high percentage of women addicted to alcohol and illicit drugs also smoke cigarettes. In our sample of pregnant and postpartum addicted women enrolled in the treatment program described in this article, 94% were regular cigarette smokers. The prenatal and postnatal consequences of tobacco use have been linked to such adverse health consequences for the mother, developing fetus, infant, and child as spontaneous abortions, low birth weight, admission to neonatal intensive care units, increased perinatal complications, increased risk for sudden infant death syndrome (Pollack, 2001), asthma, bronchitis, and recurrent otitis media (Bobo, 2002; Ibrahim, 2002). There also is evidence that continued cigarette smoking by persons receiving addiction treatment is associated with relapse to other drugs (Karan, 1991; Hoffman & Slade, 1993; Orleans & Hutchinson, 1993; Taylor et al. 2000). Despite this evidence, smoking cessation programs (especially mandatory programs) within the substance abuse treatment setting are rare and somewhat controversial (Falkowski, 2003; Ker, Leishow, Markowitz, & Merikle, 1996). There is little evidence available regarding the success of smoking cessation efforts in the context of substance abuse treatment.

1.4. Parenting

For women seeking treatment for addictions, parenthood is particularly challenging. Mothers who are distanced from social support and are preoccupied by their own addiction are often not able to provide effective, nurturing parenting to their children. Studies have shown that maternal use of drugs is associated with higher levels of parent-related stress (Kelley, 1992), and children of substance users are considered to be at increased risk for physical abuse and neglect (Murphy, Jellinek, Quinn et al., 1991; Wolock & Magura, 1996). There is some emerging evidence, although it is preliminary in nature, which suggests that parenting education in the context of addiction treatment can be beneficial to both the mother and child. Parent training in substance treatment settings has been associated with reduced parenting stress (Connors et al., 2001; Killeen &

Brady, 2000), increased parenting knowledge and improved attitudes (Camp & Finkelstein, 1997), and improvements in child behavior (Killeen & Brady, 2000).

1.5. Treatment outcomes

Although histories of trauma, mental illness, dual addictions, child maltreatment, and many other factors complicate treatment for women, there is a rapidly growing body of literature describing model substance abuse treatment programs that are designed to address these complex needs (e.g., Coletti et al., 1995; Graham, Graham, Sowell, & Ziegler, 1997; Metsch et al., 1995). Many of the programs described in the literature are long-term residential treatment programs where mothers live with their children while receiving comprehensive treatment services. Federal funding for such programs helped promote this treatment approach in many states. There have been several reports in recent years about outcomes of women and children enrolled in residential treatment, although most of the studies to date tend to involve preliminary analyses done on small samples with little in the way of long-term follow-up. The outcome data available suggest that comprehensive approaches to treatment can be effective in arresting some of the negative outcomes of substance abuse. Some of the positive outcomes reported in studies of these programs include reductions in substance use, criminal behavior, emotional problems, family problems, parenting stress, and unemployment (Brown et al., 2002; Connors et al., 2001; McComish et al., 2003; Stevens & Arbiter, 1995; Uziel-Miller, Lyons, Kissiel, & Love, 1998; Wexler, Cuadrado, & Stevens, 1998).

Although the early results of programs for pregnant and parenting women were promising, many service providers whose programs were jump-started with federal support found it difficult to sustain the comprehensive, long-term treatment approach in an era of managed care and limited resources. To achieve sustainability, many providers made major modifications to their treatment approach, such as reducing the average length of stay or cutting ancillary services. Whether these changes will impact client outcomes is unknown, and studies are needed to assess the impact of the new generation of treatment programs.

In addition to studies that assess the impact of programs that have been modified to achieve sustainability, a review of the literature reveals a need for studies that (1) include larger samples, (2) include relatively long-term follow-up (at least a year) of both treatment graduates and dropouts, and (3) assess the impact of treatment services on often ignored domains such as mental health symptoms, cigarette use, risky sexual behavior, and parenting attitudes. The present study examined a comprehensive substance abuse treatment program for pregnant and parenting women and their children in the years after the program made modifications for sustainability reasons. The most important change was shifting the recommended length of stay

from 6–12 months to 4–6 months. The present study examined the evidence of program impact on participating women in the areas of substance use (including cigarette use) and consequences of use, employment, legal involvement, mental health symptoms, risky sexual behavior, and parenting attitudes.

2. Materials and methods

2.1. Program description

The Arkansas Center for Addictions Research, Education, and Services (Arkansas CARES) is a licensed facility that provides comprehensive substance abuse prevention and treatment services to low-income pregnant and parenting women and their children. Arkansas CARES operates under the auspices of the University of Arkansas for Medical Sciences (UAMS) College of Medicine, Department of Psychiatry. The program is accredited as a behavioral healthcare provider by the Joint Commission on Accreditation of Healthcare Organizations and is licensed to provide alcohol and drug treatment, adult and child mental health services, child care, and early intervention services. During the time of the study, the program operated in two locations: (1) The Little Rock site of Arkansas CARES, where multifamily housing was provided for approximately 15 families with children aged birth to 12 years and (2) The North Little Rock location, a partnership between the city of North Little Rock and UAMS Arkansas CARES. This program was located within a public housing project and served 12 pregnant or postpartum women at one time with their respective children through age 18. Each woman at the North Little Rock site resided in her own apartment unit with her children.

Arkansas CARES utilizes an integrated services model providing intensive treatment services to address both mental health and substance abuse disorders. Women's services include daily substance abuse treatment or relapse prevention; psychiatric assessment; individual, group, and family counseling/therapy; parenting education and support; medical assessment and referral; health and nutrition education; prenatal care and family planning; medical care; case management; transportation; life skills training; employment counseling; General Education Diploma (GED) preparation; smoking cessation education; on- and off-site Twelve-Step meetings; and aftercare. Multidisciplinary staff participate in weekly treatment team meetings for women and children to develop and monitor treatment plans and determine program completion. Children in treatment with their mothers also receive a variety of educational and mental health services. An on-site licensed child-care center is available for full-day care of young children and after school and full-day summer care for school-age children. Early intervention services are provided as needed to young children, and tutoring is provided to school-age children.

Mental health services for children include individual, group, and family counseling sessions.

The planned length of stay in the voluntary treatment program is generally 4 to 6 months, although the treatment team may recommend a shorter or longer stay depending on the needs and circumstances of each client. The issue of length of stay is complicated by an array of factors, some of which are out of the control of the program. For example, some mothers are issued court orders as an alternative to incarceration. In other cases, mothers enter treatment under pressure by state agencies to maintain custody of their children. Some families are homeless and ineligible for public housing supports. Others' motivation is less clear. Regardless of these motivational factors, 58.2% leave before the recommended treatment is complete.

2.2. Research design

Whereas the ideal design for estimating program impact involves the use of randomly assigned treatment and control groups, ethical and practical concerns prevented the use of a randomized design in this study. Because of the desire of Arkansas CARES management to provide treatment services to all eligible clients, in this evaluation study, program impact was estimated by examining change over time in indicators of client functioning. In the absence of a comparison or control group, it is impossible to say whether positive outcomes are a result of participation in treatment. However, by examining the impact of length of stay in treatment on client outcomes, we can provide some additional information about treatment impact. In effect, this is an examination of treatment "dose" on client outcomes, based on the idea that if treatment has positive impacts then clients who received a greater dose should perform better.

The participants in this study included women who were admitted to Arkansas CARES from 2000 to 2004, and who agreed to participate in a treatment evaluation study. To be admitted to Arkansas CARES, the woman must have a substance abuse disorder and be pregnant and/or enter with dependent children. All participants admitted to treatment at Arkansas CARES were approached and asked to give written consent to participate in the treatment evaluation study. The study was approved by the UAMS Institutional Review Board to ensure the protection of the participants.

Once written consent was obtained, participants completed a battery of tests and questionnaires. Participants completed a baseline assessment during the first week following entry into the program. Assessments were then repeated every 3 months after intake, for as long as the client remained in the treatment program. The first postdischarge assessment was scheduled 3 months after discharge from the residential treatment facility, followed by assessments at 6 and 12 months after discharge.

All data were collected by two research assistants who served as part of an independent evaluation team, which also included two evaluator/statisticians. The research

assistants conducted in-person interviews with each client and administered paper-and-pencil questionnaires and developmental tests. Visits typically took place at Arkansas CARES while clients were in treatment and in the homes of the clients once they were discharged from the program.

2.3. Instruments

2.3.1. Addiction Severity Index-Expanded, Self-Administered version

The Addiction Severity Index-Expanded, Self-Administered version (ASI) (McLellan et al., 1990) is a semistructured interview that is designed to gather information about aspects of a client's life that may contribute to her substance abuse problem. The ASI covers seven areas: medical, employment/support, alcohol, drug, legal, family/social, and psychiatric. As part of the Treatment Outcomes Performance Pilot Study II (TOPPS II) funded by the Substance Abuse and Mental Health Services Administration, the Utah Consortium developed an expanded, computerized version of the ASI. Arkansas CARES used this version of the ASI to collect baseline information from clients. A research assistant worked closely with the participants to ensure that they understood how to use the computer, and to assist women with low reading abilities as needed. Computer-administered versions of the ASI have been found to reliably measure problem severity among addicted patients (Butler et al., 1998).

2.3.2. Beck Depression Inventory II

The Beck Depression Inventory II (BDI-II) (Beck, Brown, & Steer, 1996) is a self-report instrument for measuring the severity of symptoms of depression in adolescents and adults. It is designed to screen for *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria for depression. The BDI-II consists of 21 items rated on a 4-point scale, which patients are instructed to respond to based on their feelings over the past 2 weeks. A total score is obtained by summing the items, and scores can be interpreted as follows: 0–13 (*minimal depression*), 14–19 (*mild depression*), 20–28 (*moderate depression*), and 29–63 (*severe depression*) (Beck et al., 1996). In the present study, the BDI-II yielded a coefficient alpha of .91.

2.3.3. PTSD Checklist-Civilian Version

The PTSD Checklist (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993) is a brief self-report inventory for assessing symptoms of PTSD. It includes 17 items that are rated on a 1–5 scale. The patient is instructed to indicate the degree to which they were bothered by each symptom in the past month. A total score is obtained by summing the 17 items. In the present study, we utilized a score of 44 or greater to represent risk for PTSD. This score has been recommended when the PCL-C is used with women

(Blanchard, 1996). In the present study, the PCL yielded a coefficient alpha of .94.

2.3.4. The Adult–Adolescent Parenting Inventory-2

The Adult–Adolescent Parenting Inventory-2 (AAPI-2) is designed to assess the parenting and child-rearing attitudes of adult and adolescent parent and preparent populations. Items are based on the known parenting and child-rearing beliefs of abusive parents, and responses to the inventory provide an index of risk for practicing abusive and neglectful behavior (Bavolek & Kenne, 1999). We used Form B, which includes 40 items presented in a 5-point scale. In the present study, the full scale yielded a coefficient alpha of .87. In addition to a total score, the AAPI-2 provides five subscale scores designed to measure the following parenting attitudes: (1) inappropriate expectations of children ($\alpha = .67$), (2) parental lack of empathy towards children's needs ($\alpha = .72$), (3) belief in the use of corporal punishment as a means of discipline ($\alpha = .80$), (4) reversing parent–child role responsibilities ($\alpha = .69$), and (5) oppressing children's power and independence ($\alpha = .49$).

2.3.5. Risky behavior

This questionnaire includes questions adapted from those used by investigators at the Texas Christian University to document behaviors placing women at risk for HIV or other diseases (Kalling-Knight, Chatham, & Simpson, 2005). Clients reported how frequently they engaged in these behaviors on a 5-point scale from *never* to *almost every day*. To compute a risk score for needle use, we summed the two items related to the frequency of injecting drugs and use of “dirty” needles. To compute a risk score for sexual behavior, we summed three items related to the frequency of unprotected sex, sex with someone who injects drugs, and trading sex for money.

2.3.6. Smoking Beliefs and Behavior

This questionnaire was designed by the research team for the project to assess clients' habits related to cigarette use, including the approximate number of cigarettes smoked each day and any plans for quitting, as well as beliefs about the harmful effects of cigarette use.

2.4. Analysis plan

For each outcome of interest, we took a two-step approach to the analysis. First, we examined change over time (from intake to the final follow-up visit) by using paired *t* tests for continuous variables and the McNemar change test for dichotomous variables. The McNemar test studies the change in a group of respondents measured twice on a dichotomous variable. It is customary to tabulate the data in a 2×2 table. If as many respondents changed from A to B as changed from B to A then the number of

respondents in the bottom left and top right cell, the diagonal of changers, would be equal. If the number in the two cells is not equal, this indicates a direction in the change observed. The McNemar test indicates to what extent the observed direction in the change is caused by chance.

Second, we examined the impact of length of stay in treatment (measured in days) on the outcome variable while statistically controlling for intake differences. We used the analysis of covariance (ANCOVA) procedure to examine the impact of length of stay on continuous variables, with intake scores included as covariates. For dichotomous variables, we used logistic regression with the intake variable included in the model as a control variable. Results are reported on all clients for whom data from intake and at least one postdischarge follow-up assessment were available. Data from the last postdischarge follow-up assessment were used in the analyses; on average, the last assessment was completed 9.1 ($SD = 3.9$) months after discharge from treatment.

2.5. Sample description

A total of 340 clients were admitted during the study period (2000–2004), and 305 participated in the study. This represents an unduplicated number of clients, as clients were asked to participate in the study during their first treatment episode at Arkansas CARES, and participating clients were excluded from the study during subsequent treatment episodes. Thirty-five other clients were excluded from the study for a variety of reasons: 32 clients left treatment before intake could be completed, 2 clients were referred to other programs after admission, and 1 client was a minor. A total of 127 (42.6%) participants graduated from the program.

Of the 305 participating clients, 286 were eligible for a follow-up visit (i.e., discharged from the program for at least 3 months) at the time the study ended. At least one postdischarge follow-up assessment was completed on 219 clients (76.6%). We compared clients who received a follow-up visit to those who did not on a number of demographic variables and indicators of problem severity (including the variables listed in Table 1). The only significant difference between those that did and did not complete a follow-up assessment was on prior treatment history, with those receiving a follow-up visit having had slightly more treatment episodes on average (1.7 vs. 1.3), $t(296) = -2.2$, $p = .02$. Whereas the total sample for pre–post treatment comparison is 219, the sample size fluctuates somewhat, as certain questionnaires (including questionnaires related to cigarette use and mental health outcomes) were added to the protocol after the study had already begun.

As seen in Table 1, more than half of the women enrolled in the study (64.0%) were Caucasians, and most were single (81.4%). They had an average of 2.1 ($SD = 1.3$) children, and about a quarter (27.6%) were pregnant at the time of

Table 1
Sample description ($N = 305$)

Marital status	
Never married	46.2%
Married	18.4%
Separated/divorced	34.4%
Widowed	1.0%
Race	
White	64.0%
African American	35.6%
Multiracial	0.3%
Primary drug of choice	
Alcohol	11.5%
Cocaine	36.1%
Methamphetamine	36.1%
Marijuana	7.9%
Other	8.4%
Pregnant	27.6%
Legal pressure to enter treatment	32.8%
Formal action ever taken for child abuse/neglect	34.1%
Arrested before intake	87.2%
Risk for depression ^a	
Low risk	17.3%
Mild depression	12.7%
Moderate depression	34.2%
Severe depression	35.8%
At risk for posttraumatic stress disorder ^b	51.2%
Abuse history	
Physical	74.4%
Sexual	53.0%
Emotional	85.5%
Average number times entered AOD treatment	1.5 ($SD = 1.9$)
Mean number of minor children	2.1 ($SD = 1.3$)
Mean age at intake (years)	29.8 ($SD = 7.2$)
Mean days in treatment	110.9 ($SD = 64.5$)

AOD indicates alcohol and other drugs.

^a Based on Beck Depression Inventory 2.

^b Based on PTSD Checklist scores greater than or equal to 44.

admission to treatment. Just over a third (36.1%) of clients reported that methamphetamine was their primary drug of choice, another third cocaine (36.1%), and the remaining reported alcohol, marijuana, or other drugs. At intake, most clients exhibited difficulties across many areas of life. For example, most had a history of trauma, including physical, emotional, and sexual abuse. Scores on screening instruments at intake reveal that most (82.7%) were at risk for at least mild depression and approximately half (51.2%) were at risk for PTSD. Nearly all (87.2%) had a history of involvement with the criminal justice system.

3. Results

3.1. Substance use

As seen in Table 2, results show that almost half of clients (48.6%) reported being completely abstinent from alcohol and illicit drugs during the entire follow-up period. Results from the logistic regression reveal a significant association between length of stay and relapse, with longer stays associated with abstinence, Wald $t(1) = 7.68, p = .006$.

We should note that in most analyses of the impact of length of stay in treatment on client outcomes, we controlled for intake performance on that measure. However, in this analysis we did not include intake drug use as a covariate due to lack of variability, as a substance use problem was a requirement of admission.

In addition to reporting on alcohol and other drugs (AOD) use for the entire period since the last assessment, clients were asked to report on past 30-day use of alcohol and illicit drugs. Because past 30-day use of illicit drugs was relatively uncommon, we collapsed all illicit drugs into one category. Results show that in the 30 days before their final follow-up assessment, 22.1% of clients used alcohol and 15.7% used an illicit drug. In logistic regression analyses, length of stay was not a significant predictor of past 30-day use of alcohol or drugs.

Clients were also asked to report on their use of cigarettes before and after treatment. There was a significant reduction in the average number of cigarettes women reported smoking per day, $t(118) = 4.6, p < .001$, and results from an ANCOVA test controlling for intake cigarette use show a significant relationship between postdischarge cigarette use and length of stay in treatment, $F(1, 116) = 4.81, p = .03$, with longer stays associated with fewer cigarettes smoked per day. Results also show a small but significant increase in clients who reported no cigarette use, from 5.8% at intake to 17.5% at follow-up, $\chi^2(1, n = 120) = 8.17, p = .004$.

3.2. Arrests

As seen in Table 2, although over half of clients (59.5%) were arrested in the year prior to treatment entry, just under a quarter of clients (24.3%) were arrested at some point in the year after discharge, a statistically significant change, $\chi^2(1, n = 208) = 112.5, p < .0001$. Results from the logistic regression reveal that, controlling for arrests prior to treatment, a longer length of stay in treatment was associated with a decreased likelihood of being arrested after discharge, Wald $t(1) = 5.2, p = .002$.

3.3. Self-sufficiency

As indicated in Table 2, more clients were employed after treatment (46.3%) than at intake (13.6%), and the change was significant, $\chi^2(1, n = 214) = 54.4, p < .0001$. Results from the logistic regression (with intake employ-

Table 2
Changes in substance use, arrests, housing, and employment ($n = 219$)

	Intake (%)	Follow-up (%)
No alcohol or drug use	NA	48.6
Arrested*	59.5	24.3
Independent housing*	43.8	81.9
Employed*	13.6	46.3

NA indicates not applicable.

* $p < .001$.

Table 3
Change in mental health symptoms, parenting attitudes, and risky behavior

	Intake score, mean (SD)	Follow-up score, mean (SD)
Cigarettes smoked per day**	13.1 (7.4)	9.9 (7.6)
Beck Depression Inventory 2 (BDI II)**	24.8 (11.6)	12.0 (12.1)
Posttraumatic Stress Disorder Checklist**	45.5 (16.3)	31.9 (15.1)
Adult–Adolescent Parenting Inventory 2*	137.6 (16.7)	40.8 (17.4)
Inappropriate Expectations of Children***	18.8 (4.3)	20.0 (4.1)
Parental Lack of Empathy	38.7 (4.9)	38.4 (4.9)
Strong Belief in the Use of Corporal Punishment	37.2 (6.8)	37.1 (7.3)
Reversing Parent–Child Role Responsibilities**	23.9 (4.3)	25.7 (4.7)
Oppressing Children’s Power and Independence	19.7 (3.0)	19.7 (3.0)
Risky Sexual Behavior scale**	2.2 (2.2)	0.77 (1.6)
Needle Use scale***	1.2 (2.0)	0.15 (0.70)

* $p < .03$.

** $p < .01$.

*** $p < .001$.

ment status as a control) reveal that a longer treatment stay was associated with a greater likelihood of employment after treatment, Wald $t(1) = 6.4$, $p = .01$. There was a small although significant decrease in the number of clients who reported an income below the poverty level from intake (94.8%) to the final assessment (78.8%), $\chi^2(1, n = 212) = 22.23$, $p < .0001$. Results from an ANCOVA test show that length of stay was positively associated with past 30-day income from employment reported at the final follow-up visit, $F(1, 212) = 9.14$, $p = .003$. Although fewer than half of clients (43.8%) reported independent living situations at treatment entry, that number increased to 81.9% after discharge, a significant improvement, $\chi^2(1, n = 210) = 57.1$, $p < .001$. However, results from the logistic regression analysis (with intake independent living status as a control variable) reveal that length of stay in treatment was not significantly associated with independent living after discharge.

3.4. Mental health symptoms

As seen in Table 1, symptoms of mental health problems at intake were common, with most clients at risk for either depression or PTSD. As shown in Table 3, women reported a significant reduction in depressive symptoms (rated on BDI II) from intake to follow-up, $t(156) = 12.0$, $p < .001$. Whereas 83.4% of women were at risk for at least minimal depression (BDI II score >13) at intake, only 35.7% were at risk for depression at the final follow-up visit, again a significant reduction, $\chi^2(1, n = 157) = 69.4$, $p < .001$. Results of an ANCOVA test (controlling for intake BDI II scores) reveal a significant (negative) association between length of stay and depressive symptoms after discharge, $F(1, 154) =$

4.11, $p = .04$. Similarly, logistic regression results suggest that a longer length of stay is associated with a reduced likelihood of having an elevated risk for depression (BDI II score >13), Wald $t(1) = 5.1$, $p = .02$.

Women also reported significant improvements in symptoms associated with PTSD (from PTSD checklist) from intake to follow-up, $t(161) = 9.6$, $p < .001$. Whereas 55.6% of women had clinically elevated (PSTD Checklist score >43) symptoms at intake, that number decreased to 17.9% after discharge, a significant reduction $\chi^2(1, n = 162) = 52.4$, $p < .0001$. However, results from the ANCOVA analysis reveal that length of stay was not significantly associated with postdischarge scores, after controlling intake scores. Similarly, results from the logistic regression analysis suggest that length of stay in treatment was not associated with a reduced risk of clinically elevated symptoms after discharge.

3.5. Parenting

Significant improvements were seen on maternal attitudes associated with child abuse and neglect from intake to follow-up based on three AAPI 2 scales, indicating more positive child-rearing attitudes (higher scores indicate more positive parenting attitudes). Significant improvements were seen on the total AAPI 2 scale, $t(199) = -3.4$, $p = .001$, as well as the scales related to Inappropriate Expectations of Children, $t(199) = -4.2$, $p < .001$, and parent–child Role Reversal, $t(199) = -6.3$, $p < .001$. There were no significant changes on the other three AAPI 2 scales. Results from the ANCOVA analyses reveal that length of stay was significantly associated with AAPI 2 scores after discharge (controlling for intake scores), including the total AAPI 2 scale, $F(1, 197) = 6.16$, $p = .01$, as well as the Role Reversal scale, $F(1, 197) = 10.0$, $p = .002$. Length of stay was only marginally related to postdischarge scores on the Inappropriate Expectations scale, $F(1, 197) = 2.7$, $p = .10$.

3.6. Risky behavior

We assessed two types of risky behavior including risky sexual behavior (unprotected sex, sex with intravenous drug users, trading sex for money), and drug use involving needles. As seen in Table 3, from intake to follow-up, clients reported engaging in fewer risky sexual behaviors, $t(117) = 6.4$, $p < .001$. Results from the ANCOVA analysis (controlling for the intake score) reveal only a marginally significant association between length of stay and risky sexual behavior at follow-up, $F(1, 115) = 2.7$, $p = .10$. Although needle use was relatively uncommon, there was a significant reduction in drug use involving needles from intake to follow-up, $t(101) = 5.7$, $p < .001$. Results from the ANCOVA analysis reveal no significant relationship between length of stay and postdischarge needle use after controlling for intake use.

4. Discussion

This evaluation study focused on the outcomes of women who received residential treatment for substance abuse problems. Program impact was estimated by examining change over time in client outcomes, from intake to a follow-up assessment in the year after discharge (9 months after discharge on average). We also examined the impact of length of stay in treatment on client outcomes in an effort to provide some evidence that the changes seen may be at least partially attributable to the treatment program, based on the idea that if treatment had positive impacts, then clients who received a greater dose should perform better. Although causal statements are not appropriate, evidence of a dose effect would suggest potential treatment impacts.

Comparisons of clients' functioning at intake and after treatment suggest significant improvements in a number of domains. In terms of substance use, all clients entered treatment with substance abuse problems, but almost half (48.6%) reported being completely abstinent from alcohol and other drugs in the period between discharge and their final follow-up assessment. Many who relapsed after treatment did not return to continuous use, as less than a quarter of clients reported any alcohol (22.1%) or illicit drug use (15.7%) in the 30 days before their final assessment. Significant reductions in cigarette use were also reported, which may bring health benefits to the children as well as the mother.

Results also suggest that women made gains in terms of self-sufficiency. More women were employed and in independent living situations after treatment than before, although most still reported an income below the poverty line. This is a concern because of the stress that financial difficulties place on the family, especially for parents. There is also some evidence to suggest that women were engaging in more socially responsible behaviors after treatment. Although most women entered treatment with a criminal record, and more than half (59.5%) were arrested in the year before intake, only a quarter (24.3%) were rearrested after treatment. After treatment, women were also less likely to engage in behaviors that would lead to health risks, including risky sexual behavior and needle use.

Improvements were also seen in the area of mental health. Women reported significantly fewer symptoms of depression and PTSD after treatment than before. More importantly, only about a third of women (35.7%) reported clinically elevated symptoms after discharge. This is important both for them and for their children, as numerous studies have shown a link between depressive symptoms and parenting problems, including a tendency to either withdraw from children or to become intrusive and hostile during interactions (Lyons-Ruth, Lyubchik, Wolfe, & Bronfman, 2002; Osofsky & Thompson, 2000).

In terms of parenting, women made significant improvements on a measure of parenting attitudes associated with abuse and neglect of children. The specific areas of

improvement included attitudes related to inappropriate expectations for children and parent-child role reversal. Treatment services at Arkansas CARES include parenting classes that, among other topics, focus on helping parents understand what is developmentally appropriate for children at different ages. Anecdotal evidence from program staff suggest that problems with role reversal are common for mothers and children in treatment, particularly in situations where older children have taken on some of the responsibilities of caring for their younger siblings when their mother was preoccupied with problems related to her addiction. It is interesting that other parenting attitudes did not change, including attitudes about corporal punishment, although the importance of positive discipline is a strong focus of the parenting education curriculum.

Overall, results from the analyses assessing the impact of length of stay in treatment on client outcomes suggest that for most outcome domains, length of stay is important, with longer treatment stays being associated with more positive outcomes. Specifically, longer treatment stays were associated with abstinence from AOD, reductions in cigarette use, employment and higher income, a reduced likelihood of being arrested, a reduction in symptoms of depression, and more positive parenting attitudes. Length of stay was not found to be associated with postdischarge needle use or independent housing status; however, there was very little variability on these outcomes after discharge. Interestingly, length of stay was associated with a reduction in symptoms of depression, but not PTSD, a finding that may warrant further investigation. In all, these analyses suggest that staying in treatment longer results in better outcomes, although it is also possible that women who stayed longer were more strongly motivated to make improvements in their lives and would have done so even without treatment.

Relatedly, the primary limitation of this study was the inability to randomly assign clients to treatment and comparison groups. This limits our ability to attribute the changes seen exclusively to program impact. Although the analyses related to length of stay are supportive of the notion that treatment services may have a positive impact on clients, it is impossible to say in the absence of a comparison group. In fact, women could be motivated to make positive changes in their lives because of the desire to be a better mother, or for a number of other reasons. More motivated women might stay longer in treatment, thus accounting for the findings related to length of stay.

Overall, this study suggests that women who received comprehensive substance abuse and mental health treatment services at Arkansas CARES, especially those who stayed longer, experienced positive outcomes in a number of areas. These positive findings are generally consistent with evaluations of other comprehensive treatment programs for women, and our past studies of this program (Connors et al., 2001; Whiteside-Mansell, Crone, & Connors, 1999). However, it is encouraging to find these positive outcomes given programming changes designed to ensure the sustainability of the

program, including a reduction in the recommended length of stay. We also examined outcomes such as cigarette use and risky sexual behavior that are not often studied in this context and are encouraged by the positive results. In all, these findings offer hope for these women and the possibility of a better future for their children.

Acknowledgment

We acknowledge the dedicated research assistants who worked on this project, including Ms. Belynda Dix, Ms. Jacqueline Ward, and Ms. Angela Kyzer.

References

- Back, S., Dansky, B. S., Coffey, S. F., Saladin, M. E., Sonne, S., & Brady, K. T. (2000). Cocaine dependence with and without posttraumatic stress disorder: A comparison of substance use, trauma history and psychiatric comorbidity. *American Journal on Addictions, 9*, 51–62.
- Bavolek, S. J., & Kenne, R. G. (1999). *Adult-adolescent parenting inventory-AAP1-2: Administration and development handbook*. Park City, UT: Family Development Resources Inc.
- Beck, A., Brown, G., & Steer, R. (1996). *Beck depression inventory II manual*. San Antonio, TX: The Psychological Corporation.
- Blanchard, E. B., Jones-Alexander, J., Buckley, T. C., & Forneris, C. A. (1996). Psychometric properties of the PTSD Checklist. *Behaviour Research and Therapy, 34*, 669–673.
- Bobo, J. (2002). Tobacco use, problem drinking and alcoholism. *Clinical Journal of Obstetrics & Gynecology, 45*, 1169–1180.
- Brown, B. B., Melchior, L. A., Waite-O'Brien, N., & Huba, G. J. (2002). Effects of women-sensitive, long-term residential treatment on psychological functioning of diverse populations of women. *Journal of Substance Abuse Treatment, 23*, 133–144.
- Butler, S. F., Budman, S. H., Goldman, R. J., Newman, F. L., Beckley, K. E., Trottier, D., et al. (2001). Initial validation of a computer-administered addiction severity index: The ASI-MV. *Psychology of Addictive Behaviors, 15*, 4–12.
- Camp, J. M., & Finkelstein, N. (1997). Parenting training for women in residential substance abuse treatment: Results of a demonstration project. *Journal of Substance Abuse Treatment, 14*, 411–422.
- Coletti, S. D., Schinka, J. A., Hughes, P. H., Hamilton, N. L., Renard, C. G., Sicilian, D. M., et al. (1995). PAR Village for chemically dependent women: Philosophy and program elements. *Journal of Substance Abuse Treatment, 12*, 289–296.
- Connors, N. A., Bradley, R. H., Whiteside-Mansell, L., & Crone, C. C. (2001). A comprehensive substance abuse treatment program for women and their children: An initial evaluation. *Journal of Substance Abuse Treatment, 21*, 67–75.
- Connors, N. A., Bradley, R. H., Whiteside-Mansell, L., Liu, J., Roberts, T. J., Burgdorf, K., et al. (2003). Children of mothers with serious substance abuse problems: An accumulation of risk. *American Journal of Drug and Alcohol Abuse, 2*, 743–758.
- Falkowski, C. (2003). Addressing nicotine addiction—When is the right time? *Counselor, 4*, 12–17.
- Graham, A. V., Graham, N. R., Sowell, A., & Ziegler, H. (1997). Miracle village: A recovery community for addicted women and their children in public housing. *Journal of Substance Abuse Treatment, 14*, 275–284.
- Grella, C. (1997). Services for perinatal women with substance abuse and mental health disorders: The unmet need. *Journal of Psychoactive Drugs, 29*, 67–78.
- Haller, D., Knisely, J., Dawson, K., & Schnoll, S. (1993). Perinatal substance abusers. Psychological and social characteristics. *Journal of Nervous and Mental Disease, 181*, 509–513.
- Haller, D., Knisley, J., Elswick, R., Dawson, K., & Schnoll, S. (1997). Perinatal substance abusers: Factors influencing treatment retention. *Journal of Substance Abuse Treatment, 14*, 513–519.
- Hoffman, A. L., & Slade, J. (1993). Following the pioneers: Addressing tobacco in chemical dependency treatment. *Journal of Substance Abuse Treatment, 10*, 153–160.
- Ibrahim, J. K. (2002). Coverage of tobacco dependence treatments for pregnant women and for children and their parents. *American Journal of Public Health, 92*, 1940–1942.
- Jessup, M. (1996). Coexisting mental illness and alcohol and other drug dependencies in pregnant and parenting women. *Journal of Psychoactive Drugs, 28*, 311–317.
- Kalling-Knight, D., Chatham, L. R., & Simpson, D. D. (2005). TCU/FIRST CHOICE. Client 6-month follow-up interview package. www.ibr.tcu.edu/pubs/datacoll/Forms/wc-FOLLOWUP.PDF.
- Karan, L. D. (1991). Towards a broader view of recovery. *Journal of Substance Abuse Treatment, 10*, 101–105.
- Kelley, S. J. (1992). Parenting stress and child maltreatment in drug-exposed children. *Child Abuse and Neglect, 16*, 317–328.
- Kendler, K. S., Bulik, C. M., Silberg, J., Hettema, J. M., Myers, J., & Prescott, C. A. (2000). Childhood sexual abuse and adult psychiatric and substance use disorders in women: An epidemiological and cotwin control analysis. *Archives of General Psychiatry, 57*, 953–959.
- Ker, M., Leishow, S., Markowitz, I. B., & Merikle, E. (1996). Involuntary smoking cessation: A treatment option in chemical dependency programs for women and children. *Journal of Psychoactive Drugs, 28*, 47–60.
- Killeen, T., & Brady, K. T. (2000). Parental stress and child behavioral outcomes following substance abuse residential treatment: Follow-up at 6 and 12 months. *Journal of Substance Abuse Treatment, 19*, 23–29.
- Lyons-Ruth, K., Lyubchik, A., Wolfe, R., & Bronfman, E. (2002). Parental depression and child attachment: Hostile and helpless profiles of parent and child behavior among families at risk. In S. H. Goodman, & I. H. Gotlib (Eds.), *Children of depressed parents: Mechanisms of risk and implications for treatment* (pp. 89–120). Washington, DC: American Psychological Association.
- Mallouh, C. (1996). Effects of dual diagnosis on pregnancy and parenting. *Journal of Psychoactive Drugs, 28*, 367–380.
- McComish, J. F., Greenberg, R., Ager, J., Essenmacher, L., Orgain, L. S., & Bacik, W. J. (2003). Family-focused substance abuse treatment: A program evaluation. *Journal of Psychoactive Drugs, 35*, 321–331.
- McLellan, A., Kushner, H., Metzger, D., Peters, R., Smith, I., Grissom, G., et al. (1990). The fifth edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment, 9*, 199–213.
- Metsch, L. R., Rivers, J. E., Miller, M., Bohs, R., McCoy, C. B., Morrow, C. J., et al. (1995). Implementation of a family-centered treatment program for substance-abusing women and their children: Barriers and resolutions. *Journal of Psychoactive Drugs, 27*, 73–83.
- Murphy, J., Jellinek, M. S., Quinn, D., Smith, G., Poitras, F. G., Goshko, M., et al. (1991). Substance abuse and serious child mistreatment: Prevalence, risk, and outcome in a court sample. *Child Abuse & Neglect, 15*, 197–211.
- Najavits, L. M., Gastfriend, D. R., Barber, J. P., Reif, S., Muenz, L. R., Blaine, J., et al. (1998). Cocaine dependence with and without PTSD among subjects in the National Institute on Drug Abuse Collaborative Cocaine Treatment Study. *American Journal of Psychiatry, 155*, 214–219.
- Najavits, L. M., Weiss, R. D., & Shaw, S. R. (1997). The link between substance abuse and posttraumatic stress disorder in women. A research review. *American Journal on Addictions, 6*, 273–283.
- Office of Applied Studies. (2004). *Results from the 2003 National Survey on Drug Use and Health: National findings*. Rockville, MD: Substance Abuse and Mental Health Services Administration (DHHS Publication No. SMA 04-3964, NSDUH Series H-25).
- Orleans, C. T., & Hutchinson, D. (1993). Tailoring nicotine addiction treatments for chemical dependency patients. *Journal of Substance Abuse Treatment, 10*, 197–208.

- Osofsky, J. D., & Thompson, M. (2000). Adaptive and maladaptive parenting: Perspectives on risk and protective factors. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed., pp. 54–75) xxi, 734 pp.
- Pollack, H. A. (2001). Sudden infant death syndrome, maternal smoking during pregnancy, and the cost-effectiveness of smoking cessation intervention. *American Journal of Public Health, 91*, 432–436.
- Schinka, J. A., Hughes, P. H., Coletti, S. D., Hamilton, N. L., Renard, C. G., & Urmann, C. F. (1999). Changes in personality characteristics in women treated in a therapeutic community. *Journal of Substance Abuse Treatment, 16*, 137–142.
- Stevens, S., & Arbiter, N. (1995). A therapeutic community for substance-abusing pregnant women and women with children: Process and outcome. *Journal of Psychoactive Drugs, 27*, 49–56.
- Taylor, R. C., Harris, N. A., Singleton, E. G., Moolchan, E. T., & Heishman, S. (2000). Tobacco craving: Intensity-related effects of imagery scripts in drug abusers. *Experimental and Clinical Psychopharmacology, 8*, 75–87.
- Uziel-Miller, N. D., Lyons, J. S., Kissiel, C., Treatment needs and initial outcomes of a residential recovery program for African-American women and their children. *American Journal on Addictions, 7*, 43–50.
- Weathers, F., Litz, B., Herman, D., Huska, J., The PTSD checklist: Reliability, validity, and diagnostic utility. Paper presented at the Annual Meeting of the International Society for Traumatic Stress Studies, San Antonio, TX.
- Wexler, H. K., Cuadrado, M., Residential treatment for women: Behavioral and psychological outcomes. *Drugs and Society, 13*, 213–233.
- Whiteside-Mansell, L., Crone, C. C., The development and evaluation of an alcohol and drug prevention and treatment program for women and children. *Journal of Substance Abuse Treatment, 16*, 265–275.
- Wolock, I., Parental substance abuse as a predictor of child maltreatment reports. *Child Abuse & Neglect, 20*, 1183–1193.