Improving pregnancy outcomes among high-risk mothers who abuse alcohol and drugs: Factors associated with subsequent exposed births

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Abstract

Parental alcohol and drug abuse is a factor in approximately 15% of the cases investigated by the child welfare system and in approximately one quarter of cases with substantiated maltreatment. While substance abuse treatment is generally an essential component of child welfare family plans, a relatively low proportion of substance abusing mothers involved in the child welfare system complete treatment, which typically results in placement of their children in substitute care and the beginning of a new generation of adaptive problems. This longitudinal study explores whether loss of an index child due to substance abuse is associated with risk of a subsequent alcohol/drug-exposed birth in a sample of 795 substance-abusing mothers enrolled in the Washington State Parent–Child Assistance Program (PCAP). Results indicate that at program exit, over one-fifth of these women had a subsequent birth (SB) after the birth of their index child. Among these women, over half (i.e., 56.3% or 12.3% of the entire sample) used alcohol and/or drugs during the subsequent pregnancy. Consistent with our main hypothesis, the adjusted odds of having a SB were increased nearly two-fold for women who had the index child removed from their care. Furthermore, among mothers with subsequent births, the adjusted odds of having an exposed SB were increased three-fold if the index child had been removed from the mother’s care. We discuss implications of our findings for child welfare policy and practices.

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1. Introduction

Maternal alcohol and drug abuse during pregnancy continues to be a serious social and public health concern (NIDA, 2011). The 2012 National Survey on Drug Use and Health reported that among pregnant women, 5.9% used illicit drugs, 8.5% consumed alcohol, and 2.7% drank alcohol in a binge pattern (Department of Health and Human Services, DHHS, Substance Abuse and Mental Health Services Administration, SAMHSA and Center for Behavioral Health Statistics and Quality, 2013). Prenatal alcohol and drug exposure adversely affects growth and development of the fetus and may put an exposed child at risk for a range of physical and neurodevelopmental problems that persist across the lifespan (Matson & Riley, 1998; Nolan et al., 2005; Singer et al., 2002; Streissguth et al., 2004; Thompson, Levitt, & Stanwood, 2009). Postnatally, a birth mother with an untreated substance abuse disorder is likely to provide a home environment compromised by myriad problems associated with addiction (Conners et al., 2004; Grant et al., 2011; Lustbader, Mayes, McGee, Jatlow, & Roberts, 1998; Marsh, Ryan, Choi, & Testa, 2006).

Evidence from studies meeting standards of scientific rigor indicates that parental alcohol or drug abuse may be a factor in 50 to 79% of child welfare cases in which young children are removed from custody, and in approximately 25% of cases with substantiated maltreatment. Among investigated cases, the prevalence of parental substance abuse is lower (approximately 15%) (Testa and Smith, 2013; Young, Boles & Otero, 2007). In these cases substance abuse treatment generally is an essential component of child welfare family plans, with the aim of reducing risk to children by treating maternal addiction, improving maternal functioning, and if possible achieving family reunification (Smith, 2003). Unfortunately, treatment completion rates are low among women in the U.S., ranging from 32% for outpatient treatment (SAMHSA, 2009a) to 52% for short-term inpatient (SAMHSA, 2009b). Treatment completion rates vary according to how they are measured. Among substance abusing mothers who are involved in the child welfare system, rates that take into account completion of all treatment requirements (e.g., detoxification, inpatient, and intensive outpatient) range from 22% (Choi & Ryan, 2006) to 26.5% (Gregoire & Schultz, 2001). Choi, Huang, and Ryan (2012) report a higher rate of 56.5% in their investigation of rates for completion of only one treatment episode, however the ratio of treatment referrals to treatment completions is 0.34, indicating that only about one-third of treatment referrals were completed. One reason for seemingly lower rates of treatment...
completion among substance abusing mothers involved in the child welfare system may be that women with substance use disorders commonly have co-occurring psychological disorders (Choi & Ryan, 2007; Miles, Svikis, Kulstad, & Haug, 2001; Minnes, Singer, Humphrey-Wall, & Satayathum, 2008; Zilberman, Tavares, Blume, & el-Guebaly, 2003), which not only put them at risk for poor or disrupted parenting (Grant et al., 2011) but also increases the likelihood of substance abuse treatment dropout (Bernstein, 2000). When a mother who has delivered a substance-exposed infant fails to comply with her alcohol and drug treatment regimen, the likelihood of relapse or ongoing substance abuse increases along with the risk that if she does become pregnant she will have a subsequent substance-exposed infant.

We located only four published studies that examined recurrent childbearing among substance-abusing mothers. In a longitudinal study of 931 women in the child welfare system who were enrolled in an Illinois Title IV-E Waiver Demonstration project (Ryan, Choi, Hong, Hernandez, & Larrison, 2008), investigators found that 94% of the 151 subsequent substance-exposed infants born during the study period were the offspring of women who had had a prior substance-exposed infant. Another study found that among the 240 opioid- or cocaine-dependent pregnant women enrolled in a comprehensive substance abuse treatment program, 98.3% of the mothers previously had given birth to a child prenatally exposed to alcohol or drugs (Sikkis, Svikis, Morgan, & Haug, 2001). In a related vein, Smith and Testa (2002) found that families involved with the child welfare system due to prenatal substance abuse (N = 142) were more likely to have subsequent allegations compared to families involved in the system due to other child maltreatment allegations (N = 135). This finding was largely attributable to mothers who had subsequent births with accompanying substance-exposed infant allegations. In fact, these researchers suggested that in their maternal sample a substance-exposed infant allegation may have predicted subsequent prenatal drug use. In a fourth study, Wright, Schuetter, Fombonne, Stephenson, and Haning (2012) examined postpartum outcomes, including family planning and childbearing. This was an observational study of 103 mothers who used methamphetamine prenatally and were enrolled in a perinatal addiction clinic in Hawaii. Controlling for other predictors, these investigators found that compared to mothers who retained custody of the index child, those who lost custody at or within six months of birth were nearly three times more likely to have a poor family planning outcome, defined as not using a family planning method postpartum or having a subsequent pregnancy within six months after the birth of the index child.

The purpose of the present study is to examine factors that predict subsequent births and subsequent alcohol or drug-exposed births among mothers enrolled in the Parent–Child Assistance Program (PCAP), a three-year case management intervention in Washington State. PCAP is well-positioned to examine this question because the program serves substance-abusing pregnant and parenting mothers throughout the state who have multiple other risk factors that contribute to disrupted parenting or loss of child custody (Grant et al., 2011). In particular, we expand on the limited body of research in this area by testing the hypothesis that women who have their youngest child removed by the state will be more likely to have a subsequent birth and more likely to have a subsequent exposed birth than women whose youngest child remains with them (i.e., is not removed). Further, because research on family reunification intervention services in mothers with substance abuse problems has demonstrated the benefits of comprehensive, multidisciplinary services (Choi & Ryan, 2007; Grant et al., 2011; Marsh, D’Aunno, & Smith, 2000; Newmann & Sallman, 2004; Suchman, Papulo, DeCoste, & Hayes, 2006), we use multivariable statistical modeling to take into account substance abuse treatment and other community services received during the intervention. We surmise that mothers who fail to comply with their substance abuse treatment regimens both are more likely to have the index child removed and also are more likely to give birth to another substance-exposed baby. We discuss the implications of our findings for child welfare policy and practices.

2. Methods

2.1. Overview

The Parent–Child Assistance Program (PCAP) is based on a framework of relational theory, motivational interviewing concepts, and harm reduction principles designed to help mothers replace risky behaviors with healthy adaptive ones (Grant, Ernst, & Streissguth, 1999; Grant & Huggins, 2013). Participants are paired with case managers (CMs) who develop a positive, empathic relationship with their clients, help them identify personal goals, and work with them to take incremental steps toward achieving those goals. CMs have a caseload of 16 families, conduct home visits approximately twice per month, connect women and their families with comprehensive community services, coordinate services among providers in this multidisciplinary network, and assure that children of parents participating in the program are in safe and stable home environments. CMs are highly trained and closely supervised by clinicians who are credentialed in the mental health, social work, or the chemical dependency fields.

2.2. Participants

Women are eligible to participate in PCAP if they: 1) are pregnant or up to 6 months postpartum; 2) self-report heavy alcohol and/or illicit drug use during the index pregnancy; and 3) are ineffectively (or not at all) engaged with community social services. Participants are referred to PCAP by community providers familiar with the intervention through brochures, presentations, and word of mouth (e.g., social workers, public health nurses). PCAP clinical supervisors review each referral for eligibility and contact women who meet the inclusion requirements.

A total of 1355 mothers were enrolled in PCAP from January 1, 1998, through June 30, 2008, at program sites in nine Washington State counties (King, Pierce, Yakima, Spokane, Grant, Cowlitz, Skagit, Clallam, and Kitsap). Of these, 261 (19.3%) did not complete the program because they disengaged or disappeared (n = 117), moved out of the area (n = 60), withdrew from the program (n = 54), died (n = 14), went into long-term incarceration (n = 9), or transferred to another intervention program (n = 7). An additional 156 (11.5%) participated in PCAP for three years but did not complete the exit interview (reasons included no-shows, could not be located, were too busy, and did not want to end PCAP). An additional 143 clients (10.6%) participated in PCAP and completed exit interviews, but their data are excluded from this analysis because they did not consent to use of their data for research purposes (n = 40); exited early (<30 months in PCAP, n = 18); were interviewed outside the 6-month post-PCAP follow-up window (n = 3); were enrolled under age 18, which precluded use of their data for research (n = 19); had a subsequent birth that occurred before the index child was removed (n = 19); miscarried or had an index child who died (n = 13); transferred to PCAP from another program without an intake interview (n = 9); or had a fetal alcohol spectrum disorder (FASD) and were enrolled in a separate study (n = 22). FASD, a medical condition caused by prenatal alcohol exposure, involves brain damage that impairs executive functioning and other cognitive skills. The mental health sequelae of FASD are diagnosed in DSM-5 as Neurodevelopmental Disorder associated with prenatal alcohol exposure, or ND-PAE.) Data from the remaining 795 participants provided the basis of this analysis. Institutional Review Board approval was obtained from the Washington State IRB. Informed consent was obtained from participants. A certificate

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1 This exclusion was necessary because the main purpose of the study was to examine whether or not child removal predicted first subsequent birth, so any subsequent birth necessarily had to come after removal (if there was one).
of confidentiality was obtained from the U.S. Department of Health and Human Services.

2.3. Measures

2.3.1. Addiction Severity Index

We used the Addiction Severity Index (ASI), 5th edition (McLellan et al., 1992), to interview participants at program intake and at the 3-year exit point. The ASI is a widely-used standardized, semi-structured interview instrument for which good reliability and validity have been demonstrated (Mäkelä, 2004). With its use, seven potential problem areas are assessed: medical status, employment and support, drug use, alcohol use, legal status, family/social status and, psychiatric status. In 1997, PCAP researchers developed supplemental questions for pregnant and postpartum women regarding childhood history, alcohol and drug use during pregnancy, reproductive history, and service utilization. Intake interviewers were PCAP clinical supervisors with licensed chemical dependency credentials or Master’s-level degrees in mental health or social work, all of whom had extensive experience working with ethnically diverse, substance-abusing women. Exit interviewers were trained research assistants who did not have contact with participants during the intervention. All interviewers used detailed instruction manuals and were trained to reliability standards to ensure consistent interview procedures.

2.3.2. Biannual assessment

Every six months throughout the 3-year intervention, PCAP case managers completed assessments regarding client status based on observations of client substance use and participation in treatment, family planning and number of pregnancies, index child status (i.e., health, living situation/caregiver, child welfare involvement), stability indicators (e.g., housing, employment), and connection to community services for the mother and her family members. Regarding substance abuse treatment, we took into account timing of treatment (i.e., whether treatment occurred prior to the six-month period in which a subsequent birth occurred) as well as treatment progress (i.e., given that inpatient treatment was time-limited, it was analyzed as to whether it was completed or not completed, and as outpatient treatment was generally ongoing for an indeterminate amount of time, it was analyzed as to whether it was completed or in progress).

2.4. Key variables of interest

Key dependent variables of interest were subsequent birth (no/yes) and subsequent alcohol or drug exposed birth (no/yes), which were derived from the biannual assessments and exit ASI. The primary independent variable of interest was whether the index child had been removed from the mother’s care prior to the delivery of a subsequent child and was unlikely to be returned (“child removed”). This was determined by reference to six sequential biannual assessments. Over the 3-year intervention, child legal custody status was sometimes undetermined, and child living arrangements changed as women either stabilized or did not. Therefore, in determining mother’s caregiving status during each biennial period, we considered variables other than legal custody status of the child, including who the child was living with during the preceding 6-month period, who the child was living with at the end of the 6-month period, composition of the family, and whether the mother was incarcerated or hospitalized for any length of time during that 6-month period. In cases where data on custody were unclear or caregiving arrangements varied across time, authors TG and KMP examined case files to determine most appropriate coding. They also read case manager comments to ascertain unusual circumstances. For example, a biannual assessment might state that a child was in the care of relatives, although on all subsequent biannual assessments the child may have been with the mother. Usually in these cases, a child was living with relatives because the mother was temporarily unstable or unable to provide care (e.g., she was in treatment, incarcerated, or hospitalized). In such cases, the authors coded a child as not being removed from mother’s long-term care.

2.5. Data analyses

We conducted an attrition analysis, comparing intake data from women included in the study (N = 795) versus those excluded for whom we had intake information and who had given consent for their data to be used for research purposes (N = 413). We analyzed selected intake characteristics by group using two-tailed Fisher’s Exact Tests and used Bonferroni correction to address the issue of multiple comparisons (of which there were 17).

There were two dichotomous outcomes of interest: 1) no subsequent birth (NSB) versus any subsequent birth (SB); 2) among participants with SB, those with a first subsequent birth in which an infant was not exposed prenatally to alcohol and/or illicit drugs (SBE) vs. those with a first subsequent birth in which an infant was prenatally exposed (SBE). Both outcomes were defined as necessarily occurring after the birth of an index child and during the three years a subject participated in PCAP. We produced descriptive statistics on maternal demographic and psychosocial characteristics and community services received during PCAP and conducted a bivariate analysis of these variables with group membership for each outcome pair, using Fisher’s Exact Test for 2 × 2 tables and Pearson Chi-Square for variables having more than two categories. For continuous variables, we tested differences in means with independent t-tests. All tests were two-tailed, with p < .05. In these analyses we made no corrections for test-wise error (i.e. multiple hypothesis testing), because the intent was primarily descriptive.

For the multivariable analyses, employing IBM® SPSS® Statistics software (V. 19) within the context of logistic regression, we used hierarchical backward-elimination variable selection procedures with Likelihood Ratio tests involving an “in” criterion of p < .05 and an “out” criterion of p > .10. Odds ratios (OR) and 95% confidence intervals (95%CI) were calculated. The full set of candidate independent variables is provided in Tables 1 and 2. For both outcomes, a core demographic/psychosocial model (including “child removed”) was selected and entered as a first step; community service variables, including treatment modality as defined above (i.e., inpatient, outpatient, and an interaction term [i.e. both modalities]), were entered as a second step.

3. Results

3.1. Attrition analysis

Following Bonferroni correction, only one variable was significantly associated with study loss to follow up: Excluded women had a higher rate of child welfare involvement during their own childhoods (35.8%) compared to women included in the analysis sample (26.7%) (p < .05).

3.2. Intake maternal demographic and psychosocial characteristics (Table 1)

3.2.1. No subsequent birth (NSB) versus subsequent birth (SB)

A total of 174 women (21.9%) in the sample had a SB after the birth of the index child and while the mother was still in PCAP. At intake, compared to the 621 women who had NSB, those in the SB group were younger (24.4 vs. 28.0 years, p < .0001), had less education (10.6 vs. 11.1 years education, p < .005); no high school diploma (58% vs. 47.7%, p < .05), and fewer children (2.7 vs. 3.0, p < .05). We found a significant difference by race, with relatively higher proportions of Native American (45/147, 30.6%) and lower proportions of White (87/465, 18.7%) women having SBs (p < .01). There were no statistically significant differences in maternal reports of childhood physical abuse (about 50% in each group), childhood sexual abuse (about 60%), or
## Table 1
Maternal demographic and psychosocial characteristics at program intake (N = 795).

<table>
<thead>
<tr>
<th></th>
<th>No subsequent Birth (n = 621)</th>
<th>Subsequent Birth (n = 174)</th>
<th>p-Value</th>
<th>Unexposed Subsequent birth (n = 76)</th>
<th>Exposed Subsequent birth (n = 98)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age, mean (SD)</strong></td>
<td>28.0 (6.24)</td>
<td>24.4 (4.49)</td>
<td>&lt;.0001</td>
<td>25.1 (5.18)</td>
<td>23.8 (3.81)</td>
<td>.07 ns</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native American</td>
<td>102/621 (16.4%)</td>
<td>45/174 (25.9%)</td>
<td></td>
<td>19/76 (25.0%)</td>
<td>26/98 (26.5%)</td>
<td></td>
</tr>
<tr>
<td>Asian/ Philippine/Hawaiian</td>
<td>15/621 (2.4%)</td>
<td>1/174 (0.6%)</td>
<td></td>
<td>1/76 (1.3%)</td>
<td>0/98 (0.0%)</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>80/621 (12.9%)</td>
<td>21/174 (12.1%)</td>
<td></td>
<td>11/76 (14.5%)</td>
<td>10/98 (10.2%)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>46/621 (7.4%)</td>
<td>20/174 (11.5%)</td>
<td></td>
<td>8/76 (10.5%)</td>
<td>12/98 (12.2%)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>378/621 (60.9%)</td>
<td>87/174 (50.0%)</td>
<td></td>
<td>37/76 (48.7%)</td>
<td>50/98 (51.0%)</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>60/621 (9.7%)</td>
<td>21/174 (12.1%)</td>
<td></td>
<td>10/76 (13.2%)</td>
<td>11/98 (11.2%)</td>
<td></td>
</tr>
<tr>
<td>Education, mean (SD)</td>
<td>11.1 (2.00)</td>
<td>10.6 (1.88)</td>
<td>&lt;.005</td>
<td>10.5 (1.67)</td>
<td>10.6 (2.04)</td>
<td>ns</td>
</tr>
<tr>
<td>Employment, full or part time</td>
<td>187/620 (30.2%)</td>
<td>32/174 (18.4%)</td>
<td>&lt;.0001</td>
<td>17/76 (22.4%)</td>
<td>15/98 (15.3%)</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Substance abuse treatment</td>
<td>432/621 (56.8%)</td>
<td>101/174 (58.0%)</td>
<td>&lt;.0005</td>
<td>53/76 (69.7%)</td>
<td>57/98 (60.5%)</td>
<td>&lt;.0005</td>
</tr>
</tbody>
</table>

### Table 2
Community services/involvement during PCAP or at PCAP exit (N = 795).

<table>
<thead>
<tr>
<th></th>
<th>No subsequent Birth (n = 621)</th>
<th>Subsequent Birth (n = 174)</th>
<th>p-Value</th>
<th>Unexposed Subsequent birth (n = 76)</th>
<th>Exposed Subsequent birth (n = 98)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Index child removed from mother's care</strong></td>
<td>242/621 (39.0%)</td>
<td>97/174 (55.7%)</td>
<td>&lt;.0001</td>
<td>30/76 (39.5%)</td>
<td>67/98 (68.4%)</td>
<td>&lt;.0005</td>
</tr>
<tr>
<td>Child welfare services</td>
<td>407/617 (66.0%)</td>
<td>132/174 (75.9%)</td>
<td>&lt;.05</td>
<td>54/76 (71.1%)</td>
<td>78/98 (79.6%)</td>
<td></td>
</tr>
<tr>
<td>Substance abuse treatment</td>
<td>a. Inpatient, completed or in progress</td>
<td>372/621 (59.2%)</td>
<td></td>
<td>106/174 (60.9%)</td>
<td>38/76 (50.0%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td></td>
<td>b. Completed prior to subsequent birth</td>
<td>349/621 (56.2%)</td>
<td></td>
<td>76/174 (43.7%)</td>
<td>33/76 (43.4%)</td>
<td>43/98 (43.9%)</td>
</tr>
<tr>
<td></td>
<td>c. Outpatient, completed or in progress</td>
<td>542/621 (87.3%)</td>
<td></td>
<td>156/174 (89.7%)</td>
<td>72/76 (94.7%)</td>
<td>84/98 (85.7%)</td>
</tr>
<tr>
<td>Both inpatient and outpatient</td>
<td>a and c</td>
<td>353/621 (56.8%)</td>
<td></td>
<td>101/174 (58.0%)</td>
<td>38/76 (50.0%)</td>
<td>.08</td>
</tr>
<tr>
<td>Both inpatient and outpatient prior to subsequent birth</td>
<td>b and d</td>
<td>331/621 (53.3%)</td>
<td></td>
<td>66/174 (37.9%)</td>
<td>31/76 (40.8%)</td>
<td>&lt;.005</td>
</tr>
<tr>
<td>Mental healthcare services</td>
<td>463/620 (74.7%)</td>
<td>130/174 (75.1%)</td>
<td>&lt;.0005</td>
<td>53/76 (69.7%)</td>
<td>77/98 (79.4%)</td>
<td></td>
</tr>
<tr>
<td>Family planning services</td>
<td>528/621 (85.0%)</td>
<td>148/174 (85.1%)</td>
<td></td>
<td>67/76 (88.2%)</td>
<td>81/98 (82.7%)</td>
<td></td>
</tr>
<tr>
<td><strong>At PCAP exit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uses family planning method regularly</td>
<td>421/620 (67.9%)</td>
<td>105/174 (60.3%)</td>
<td>&lt;.01</td>
<td>53/76 (69.7%)</td>
<td>52/98 (53.1%)</td>
<td>&lt;.05</td>
</tr>
</tbody>
</table>

### Notes

* Clients in column 1 had no subsequent birth; therefore, a, b, c, and d refer to treatment received during PCAP without reference to timing of subsequent birth.
* Includes any of the following: During PCAP received services in a psychiatric hospital or as an outpatient or private patient; had a psychiatric evaluation; received any mental health services in past year; receives a psychiatric pension.
* Includes any of the following: At PCAP exit use of a family planning method; use of family planning services in past year; has tubal ligation.
* Full- or part-time work was usual employment pattern during PCAP.
child welfare involvement in the family during the mothers' own childhoods (about 25% to 30%). We found no differences in adult history of physical abuse by a partner (about 80% in each group) or reports of psychiatric problems in the preceding month (nearly 70%). In both groups, the illicit drug most commonly used during the index pregnancy was marijuana (about 60%), followed by methamphetamine and cocaine (each about 50%).

3.2.2. Subsequent birth child not exposed prenatally to alcohol and/or illicit drugs (SBE) versus subsequent birth child exposed prenatally to alcohol and/or illicit drugs (SBNE)

A total of 98 women had a SBE, representing 12.3% of the entire sample and 56.3% of the 174 women who had any subsequent birth. Compared to the 76 women who had a SBNE, those with an exposed birth were somewhat younger (23.8 vs. 25.1 years, \( p = .07 \), marginal significance), and a higher proportion had child welfare involvement during childhood (36.7% vs. 23.7%, \( p = .07 \), also marginal).

3.3. Community services received during PCAP (Table 2)

3.3.1. No subsequent birth (NSB) versus subsequent birth (SB)

Compared to the women who had NSB, higher proportions of those in the SB group had been involved with child welfare services during PCAP (75.9% vs. 66.0%, \( p < .05 \)) and had an index child removed from their care by child welfare (55.7% vs. 39.0%, \( p < .0001 \)). At PCAP exit and prior to the SB, lower proportions of women in the SB group had completed inpatient treatment (56.2% vs. 43.7%, \( p < .005 \)), had completed or were involved in outpatient treatment (87.3% vs. 77.6%, \( p < .005 \)), or had completed inpatient treatment and either had completed or were involved in outpatient treatment (53.3% vs. 37.9%, \( p < .0005 \)). Similar proportions of women in each group had received mental health services during PCAP (about 75%). Compared to women who had a SB, higher proportions of women in the NSB group had been employed full or part time for most of their involvement in PCAP (30.2% vs. 18.4%, \( p < .005 \)) and were using a family planning method on a regular basis (67.9% vs. 60.3%, \( p < .01 \)).

3.3.2. Subsequent birth child not exposed prenatally to alcohol and/or illicit drugs (SBNE) versus subsequent birth child exposed prenatally to alcohol and/or illicit drugs (SBE)

Compared to women who had a SBNE, a higher proportion of those with a SBE had the index child removed from their care by child welfare services (68.4% vs. 39.5%, \( p < .0005 \)). Although more women with a SBE had received inpatient substance abuse treatment (69.4% SBE vs. 50.0% SBNE, \( p < .05 \)), similar proportions in the SB and SBNE groups had completed such treatment prior to the SB (43.9% vs. 43.4%). Fewer women with a SBE had completed or were participating in outpatient treatment prior to the SB (70.4% SBE vs. 86.8% SBNE, \( p < .01 \)). Although a higher proportion of women in the SBE group had completed inpatient treatment and either had completed or were participating in outpatient treatment, the proportions were not significantly different (40.8% vs. 35.7%). Compared to women who had a SBE, higher proportions of women in the SBNE group were using a family planning method on a regular basis (69.7% vs. 53.1%, \( p < .05 \)).

3.4. Logistic regression analysis results of association between subsequent birth and maternal psychosocial characteristics and services received (Table 3)

3.4.1. Model 1: no subsequent birth (NSB) (coded 0) versus subsequent birth (SB) (coded 1)

The odds of having a SB were increased nearly two-fold for women who had an index child removed from their care (OR = 1.836, CI = 1.275–2.643, \( p < .005 \)). Cocaine use during an index pregnancy was significantly associated with having a SB (OR = 1.510, CI = 1.046–2.180, \( p < .05 \)). For every increasing year of maternal age, risk of having a SB decreased by 12% (OR = 0.888, CI = 0.857–0.920, \( p < .001 \)). A pattern of employment during intervention also reduced the odds of having a SB (OR = 0.591, CI = 0.378–0.923, \( p < .05 \)). Furthermore, having completed inpatient treatment and either completing or participating in outpatient treatment reduced the odds of having a subsequent birth (OR = 0.583, CI = 0.404–0.840, \( p < .005 \)).

3.4.2. Model 2: subsequent birth not exposed prenatally to alcohol and/or illicit drugs (SBNE) (coded 0) versus subsequent birth exposed prenatally to alcohol and/or illicit drugs (SBE) (coded 1)

The odds of having a SBE were increased more than three-fold if an index child was removed from maternal care (OR = 3.582, CI = 2.037–6.299, \( p < .001 \)). The odds of having a SBE were reduced among women who had completed outpatient treatment prior to the SB or were participating in treatment at exit from PCAP (OR = 0.536, CI = 0.338–0.850, \( p < .01 \)).

4. Discussion

Recurring alcohol or drug-exposed births among women who abuse substances prenatally is a social and public health concern with serious implications for their exposed children, families, and communities. This study advances an understanding of this phenomenon by examining the unintended consequences (from the perspective of the child welfare system) of removing an exposed child from its mother's custody. Investigation of a large group of post-partum women who abused alcohol or drugs during an index pregnancy and were enrolled in a long-term intensive case management intervention found that at program exit, 78.1% of the mothers had not delivered a SB during the three-year intervention, 9.6% had a SB not exposed to alcohol or drugs, and 12.3% had a SB exposed to substances. Consistent with our main hypothesis, we found that among women whose index child had been removed from their care, the adjusted odds of having a SB increased nearly two-fold and the adjusted odds of having an exposed SB increased three-fold. Additionally, we found that among the women in this study, being relatively young, having no pattern of employment, and using cocaine during an index pregnancy increased risk of having a subsequent birth, while receiving both inpatient and outpatient treatments reduced those odds. Receiving outpatient treatment reduced the risk of a subsequent exposed birth.

In addition, maternal cocaine use during the index pregnancy also increased risk of having a SB. In seeking to understand the cocaine effect, we found that women in our study who used cocaine had marginally

Table 3

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Coefficient</th>
<th>SE</th>
<th>Odds ratio</th>
<th>95.0% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1: No subsequent birth (NSB) vs. Subsequent birth (SB) (n = 621)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother's age</td>
<td>−0.119</td>
<td>0.018</td>
<td>0.888</td>
<td>0.857–0.920</td>
</tr>
<tr>
<td>Cocaine use**</td>
<td>0.412</td>
<td>0.187</td>
<td>1.510</td>
<td>1.046–2.180</td>
</tr>
<tr>
<td>Index child removed:*</td>
<td>0.607</td>
<td>0.184</td>
<td>1.836</td>
<td>1.275–2.643</td>
</tr>
<tr>
<td>Employment**</td>
<td>−0.526</td>
<td>0.228</td>
<td>0.591</td>
<td>0.378–0.923</td>
</tr>
<tr>
<td>Birth inpt. &amp; outpt. tx.*</td>
<td>−0.540</td>
<td>0.187</td>
<td>0.583</td>
<td>0.404–0.840</td>
</tr>
<tr>
<td>Intercept</td>
<td>1.703</td>
<td>0.471</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2: Subsequent birth exposed prenatally to alcohol and/or illicit drugs (SBE) vs. Subsequent birth exposed prenatally to alcohol and/or illicit drugs (SBNE) (n = 76)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index child removed:*</td>
<td>1.276</td>
<td>0.288</td>
<td>3.582</td>
<td>2.037–6.299</td>
</tr>
<tr>
<td>Outpatient Treatment*</td>
<td>−0.624</td>
<td>0.236</td>
<td>0.536</td>
<td>0.338–0.850</td>
</tr>
</tbody>
</table>

* For women with a subsequent birth, child was removed from home prior to the subsequent birth.

** \( p < .05 \), *** \( p < .01 \), **** \( p < .005 \), ***** \( p < .001 \).
significant higher rates of child removal compared to those who did not use cocaine (45.6% vs. 39.9%, p = .059 using a one-tailed test). In contrast, and somewhat surprisingly, other prenatal alcohol and drug indicators (i.e., alcohol, heroin, methamphetamine) either had no significant association with child removal or in some cases (i.e., binge alcohol, opiates, and marijuana) they were associated with lower removal rates than would be expected. (Data are not shown in the table.) In other words, cocaine was the only drug used during pregnancy that approached significance in the expected direction (i.e., conveying risk of removal). We suggest that our cocaine findings may be related to the powerful stigma and residual effects in the child welfare system of the purported “crack baby epidemic” that began in the late 1980s, which has resulted in inequitable treatment and disproportionately high rates of child removal from mothers who used cocaine prenatally (Lyons & Rittner, 1998; Vargas, 2010).

Two demographic factors reduced risk for SB in our model: older maternal age and having a pattern of regular employment. A woman’s age influences the number of future births she might have as the older a mother is, the less likely she is to have a subsequent birth (Mathews & Hamilton, 2009). In our study we observed that mothers who did not have a SB were significantly older (28 years) than those who did (24.4 years). Similarly, in their evaluation of the recovery coach model, Ryan et al. (2008) found that each additional year of a mother’s age reduced the odds of SB by 4%. Among mothers who are employed, subsequent births are less likely, and intervals between births are longer (Hoem & Hoem, 1989; Rahim & Ram, 1993). Further, our employment outcome may be explained by an association between employment factors and reunification, as other researchers have found. For example, Grella, Needell, Shi, and Hser (2009) reported that among substance-abusing mothers receiving treatment, poor employment status reduced the likelihood of reunification, and Choi and Ryan (2007) found that having problems with job training services reduced the likelihood of family reunification. Smith and Testa (2002) suggested that among women with a substance-exposed infant, attending work or school may decrease likelihood of incurring a subsequent substance-exposed infants (SEI) allegation.

Substance abuse treatment modality and maternal treatment compliance (completed or in progress) had a strong influence on outcomes in this study. The multi-challenged women in the study had treatment completion rates higher than those reported in the literature for substance abusing women involved in the child welfare system (see the Introduction). We surmise that this is because the PCAP intervention provides intensive case management with a focus on helping participants complete treatment, stay in recovery, and adopt healthy behaviors. The odds of having a SB were significantly reduced among women who had both completed inpatient treatment and either completed or were participating in post-residential outpatient treatment. Risk of a SBE was significantly reduced among women having outpatient treatment in particular. Completing inpatient treatment alone was not a protective factor for either SB or SBE. The benefit of treatment on SB and SBE outcomes may be explained in a wider context of achieving stability and maintaining child custody. Clients who attend inpatient residential treatment must ultimately transition to the community. During that transition, continuity of care (i.e., residential treatment followed by outpatient aftercare) is important to developing a recovery-oriented support network, preventing relapse, and maintaining overall progress — all factors critical to building a safe and stable home environment for children. In their study of 160 mothers who had delivered a substance-exposed infant, Huang and Ryan (2011) reported that mothers who received residential treatment combined with other community-based transitional programs (including outpatient, intensive outpatient, recovery homes, and methadone maintenance) were significantly more likely to achieve reunification compared to mothers who received only inpatient residential treatment. In general, correlational studies suggest that clients who receive a continuum of care have better substance use outcomes and are less likely to be readmitted to treatment (Donovan, 1998; McKay, 2001). Randomized studies of the efficacy of continuing care have yielded mixed results (McKay, 2001).

Other investigators have found that for parents with open child welfare cases and drug use histories, treatment compliance strongly increases the likelihood of reunification (Smith, 2003), and treatment dropout strongly reduces the likelihood of reunification (Rockhill, Green, & Furrer, 2007). In an earlier study, PCAP researchers examined this association in a more nuanced way and found that mothers who reunified with their children and those who did not were equally likely to have completed inpatient treatment in structured residential settings. In such settings daily planning and organization were the responsibility of staff, which reduced need for clients’ independent decision-making and self-regulation. However, mothers who did not regain custody were far less successful in completing outpatient treatment, settings that were less structured and required intact independent functioning skills (e.g., prioritizing, planning daily activities around treatment sessions, coping with unforeseen events, arranging for transportation) (Grant et al., 2011). Regardless of treatment modality, results of the present study suggest that the association between treatment completion and subsequent birth, and subsequent exposed birth, may be explained at least in part by child custody status. A related underlying factor may be maternal mental health. We know that mothers who have co-occurring psychological and substance abuse disorders are less likely to succeed in treatment (Bernstein, 2000). Non-compliance with a required treatment regimen is likely to result in loss of child custody, and loss of custody may exacerbate a mother’s mental health problems (Grant et al., 2011). Under these circumstances it is unlikely that a woman will become clean and sober on her own, and if she becomes pregnant the chances are increased that she will have a subsequent substance-exposed baby.

Researchers (Ryan et al., 2008) who examined the issue of repeated births of substance-exposed infants found that 94% of subsequent SEI were delivered by mothers who had at least one known prior SEI. Commenting on child welfare policy, they noted that repeat SEIs among women in the child welfare system lead to placement of infants in substitute care and difficulty achieving reunification with older siblings in substitute care, which contributes generally to poor outcomes for these families. Results of the present study, which looks at this problem from a different perspective, leads us to conclude that placement of infants in substitute care may in fact contribute to a likelihood that their mothers not only will have a subsequent birth but that the subsequent birth will involve prenatal alcohol or drug exposure.

If our conclusion is accurate, we suggest that there may be a way for child welfare systems to interrupt this pattern with policies and practices that enhance factors known to help mothers maintain custody, or for women whose child(ren) already have been removed, to bolster supports that will help these mothers reunify safely. A significant body of research on family reunification among mothers who have substance abuse problems confirms the benefits of comprehensive, multidisciplinary, and accessible services being available and tailored to needs (Choi & Ryan, 2007; Marsh et al., 2000; Newmann & Sallman, 2004; Suchman et al., 2006). Investigators examining reunification outcomes have further reported on the value of longer treatment duration (Grella et al., 2009); the importance of families making progress in the areas of mental health, housing, and domestic violence (Marsh et al., 2006); the benefits of family-related and employment/education services (Grella et al., 2009); and of mothers having their children with them while in treatment (Stevens & Patton, 1998). For example, in a previous study, PCAP researchers found that at program exit 60% of the substance-abusing women who participated in the intervention program were caring for their index child (Grant et al., 2011). Factors that contributed to this outcome included having more substance abuse treatment and mental health service needs met, more time abstinent from alcohol and drugs, secure housing, higher income, and support for staying clean and sober. As the mothers who were unable to regain custody of the index child
had more serious psychiatric problems and fewer of their service needs met than those who were able to regain custody, we suspect that untreated mental health problems may have limited the ability of the former group to access mental health treatment and utilize critical community services. Similarly, Grella et al. (2009) also found that among substance-abusing mothers receiving treatment, poor psychiatric status reduced the likelihood of reunification.

For mothers who lose their children and hope to regain custody, Smith and Testa (2002) recommend that instead of making reunification contingent upon treatment completion and remaining clean and sober, an alternative child welfare policy would consider reunification (with monitoring) after a parent achieves sobriety and demonstrates that she is engaged successfully in outpatient treatment. They further suggest that delaying reunification not only jeopardizes parent–child bonds, which is harmful to children, but also inadvertently may increase substance use and other problems related to future births. We further propose that subsequent births might be reduced and subsequent exposed births prevented by finding options for substitute care that keep a mother involved in her role and responsibilities as a mother. This might include kinship/relative care with appropriate contingencies, foster care with increasing but supervised mother/child visitation, supervised transitional group home settings, or residential treatment facilities for mothers and their children.

While subsequent pregnancies are theoretically preventable, the fact is that among all pregnancies in the U.S., approximately half are unintended, including those attributable to failed contraception (Finer & Zolna, 2014), and 21% of all pregnancies (excluding miscarriages) end in therapeutic abortion (Jones & Jerman, 2014). Women who abuse alcohol and drugs are at even greater risk of unintended pregnancy due to potential for unexpected and unprotected sexual encounters. For example, Kissin et al. (2001) reported that 54% of the 240 substance-abusing pregnant women in their study had received previous abortions.

Intensive case management has been demonstrated as an effective strategy for preventing subsequent exposed births. For instance, Ryan et al. (2008) tested the efficacy of a recovery coach/intensive case management model in reducing subsequent exposed births among substance-abusing mothers in the child welfare system (N = 931). Similar to the PCAP model, the recovery coach model is comprehensive and includes home visits, clinical assessments, advocacy, service planning and coordination, and case management for substance abusing families. Findings of their randomized controlled trial demonstrated that compared to traditional substance abuse services, recovery coach services significantly reduced likelihood of subsequent substance-exposed infants over a three-year period (15% vs. 21%, p < .01). By way of comparison, in the PCAP study reported here, 12.3% of the substance-abusing mothers had a subsequent exposed birth over the three-year intervention, and at PCAP exit two-thirds of the women were regularly using a family planning method. PCAP case managers use motivational interviewing strategies to explicitly address the issue of contraception with their clients. The aim for most mothers in PCAP is either to end future childbearing and focus on caring for the children they already have or to delay a next pregnancy until a time when they are better prepared to care for another child. Obviously, these choices are framed within a context of hope that their children will be able to remain in their care.

5. Limitations

Our study is subject to a number of limitations. Study intake and exit data were obtained from maternal interviews and therefore are subject to self-report biases (Rothman, 1986). Nevertheless, in an earlier report we verified clients’ report of alcohol and drug use at program exit by comparing self-reports of previous 30-day substance use (on the exit ASI) to CM reports for the same time period and found 94.2% agreement (Grant et al., 2011), suggesting that the present study’s self-report data are likely to be valid. Attrition analysis revealed that women not included in the study sample were more likely to have a personal childhood history of child welfare involvement compared to women who were included in the analysis, perhaps limiting study generalizability. Yet within the study sample, we still found that those in the SBE study group had a higher proportion of involvement in the child welfare system compared to women in the SBNE group (36.7% vs. 23.7%, p = .07). While this variable was not selected in the final regression model, we suggest that had non-completers been included in the study, our main finding of an association between the “child removed” and having a SBE might be strengthened, given the above observation. Study methods enable observations of associations only; they do not enable conclusions about causation. It is possible that other measured or unmeasured factors influenced both child removal decisions and subsequent births in this study.

In summary, results of this study add to a growing body of evidence that mothers who use substances struggle with complex social and personal issues that substantially increase the challenges they face when trying to succeed in treatment. The traditional response in our child welfare system has been to protect their children by removing them from their mother’s care, which inadvertently increases the likelihood of serious attachment issues in these children. Those who complete treatment services alone, without interventions that change their parenting styles from the problematic caregiving they received in their own childhoods, perpetuate the “revolving door” dynamic this situation creates in our society. Results of this study demonstrate that sufficient substance abuse treatment, along with other services and supports that promote a woman’s keeping her child or successfully reunifying, further the possibility of her being able to focus on caring for the children she has rather than bringing one or more children into the world under very troubled circumstances.

Acknowledgments

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References


