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Psychosocial Problems in Children of Women Entering Substance Use Disorder Treatment:

A Longitudinal Study

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Abstract

Background: While parental substance use disorder (SUD) has been recognized as a risk factor for child outcomes, past research seldom focused specifically on children whose mothers suffer from alcohol and drug use disorders. Are these children at risk for elevated psychosocial problems, and would such risk be reduced if maternal substance use was reduced?

Aims: Children of substance-abusing mothers (COSAM, $N = 130$) were compared to a demographically matched comparison sample, and examined at baseline soon after their mothers entered SUD treatment and in the 18 months after treatment entry. We expected to observe elevated symptomatology among COSAM before maternal treatment entry, followed by a decreasing trend after maternal treatment in general, and remission in particular.

Results: Children's psychosocial problems were assessed through maternal reports on the Pediatric Symptom Checklist. Soon after their mothers entered SUD treatment, COSAM exhibited significantly greater overall and clinical-level psychosocial problems than the children from the matched comparison sample. However, at the end of the 18-months study period, these two groups no longer differed in terms of problems. Results from the longitudinal growth models revealed reductions in COSAM's overall and clinical-level problems following their mothers' SUD treatment. However, these reductions were similar for all COSAM, regardless of whether their mothers relapsed or remitted.

Conclusion: Psychosocial problems were significantly reduced in COSAM following maternal SUD treatment, such that COSAM did not significantly differ from children from the matched comparison sample by the end of the 18-month study period.

Keywords: Maternal SUD, psychosocial symptoms

1. Introduction

Substance use disorder (SUD) is associated with a range of negative outcomes not only among those affected by it, but also among their children – whose numbers seem far from negligible (Grant, 2000; Manning, Best, Faulkner, & Titherington, 2009; Substance Abuse and Mental Health Services Administration, 2009). For example, children of alcoholics appear to be at greater risk for various psychopathology (Chassin, Rogosch, & Barrera, 1991; Hill et al., 2008; Johnson & Leff, 1999; Marmorstein, Iacono, & McGue, 2009; Sher, Walitzer, Wood, & Brent, 1991; Walden, Iacono, & McGue, 2007; West & Prinz, 1987). However, studies focusing specifically on children from families with substance-abusing mothers remain relatively scarce (Chatterji & Markowitz, 2001; Hill & Muka, 1996), even though mental health and behavioral problems seem to be greater in the offspring of alcoholic mothers than in those of alcoholic fathers (Christoffersen & Soothill, 2003; Morgan, Desai, & Potenza, 2010; Rogmo, Torvik, Ask, Roysamb, & Tambs, 2012).

Further, only a handful of studies looked at what happens to children when their parents lessen substance use, with somewhat inconsistent results. While several studies reported problem alleviation in children following the decline in parental substance use (Bountress & Chassin, 2015; Burdzovic Andreas & O'Farrell, 2007; Moos & Billings, 1982), others noted that such children remained on a relatively high-risk trajectory (DeLucia, Belz, & Chassin, 2001; Hussong, Huang, Curran, Chassin, & Zucker, 2010). Again, whether these studies examined community or treatment samples, they tended to focus on alcoholic fathers. Thus, little is known about children whose mothers **suffering** from alcohol and drug use disorders are seeking treatment to reduce their substance use. Are these children at risk for elevated psychosocial symptomatology and would this risk be reduced if their mothers ceased substance use?

1.1. Aims

This longitudinal study examined children whose substance-abusing mothers entered SUD treatment, with assessments at baseline, 6-, 12-, and 18-month follow-up. First, to establish whether maternal SUD represents a risk factor for elevated psychosocial problems among their children, we

compared children of substance abusing mothers (COSAM) to a matched comparison sample. Second, we examined COSAM over the course of the 18-month study period. We predicted symptomatology in COSAM would be greater than that of the comparison sample before their mothers' treatment, but that it would be reduced during the 18-month study period to the levels of the matched comparison sample. Following the positive results from studies on children of substance-abusing fathers in treatment (Burdzovic Andreas, O'Farrell, & Fals-Stewart, 2006; Moos & Billings, 1982), we further hypothesized that improvements would be more pronounced among children of remitted mothers, because the risk factor of parental SUD and the associated family dysfunction such as parental conflict for example (Rounsaville, O'Farrell, Burdzovic Andreas, Murphy, & Murphy, 2014) may be substantially reduced for such children.

2. Methods

The study was approved by the Institutional Review Boards at Harvard Medical School and VA Boston.

2.1. Participants

2.1.1. Maternal SUD treatment sample (COSAM sample)

The sample came from a larger study of female patients entering SUD treatment (Schumm, O'Farrell, Murphy, Murphy & Muchowski, 2011). For this report, 130 women from the larger study who had at least one child between 4 and 16 years of age provided data about their children. These children of substance abusing mothers (COSAM; $N = 130$) were the focus of this investigation.

2.1.2. Matched comparison sample

A demographically matched comparison sample provides a realistic baseline against which to compare COSAM. We used the nationally-representative and publically available sample of 18,045 families from the Ambulatory Sentinel Practice Network (ASPN) and Pediatric Research in Office Settings (PROS) studies on primary care for children (Gardner, Murphy, & Childs, 1999), which utilized the same measure of child psychosocial problems as our COSAM sample. A comparison sample of 130 was extracted from the ASPN-PROS data-set through a case-by-case matching

procedure, based on socio-demographic characteristics of the child and the family (Table 1). Each COSAM was therefore individually matched to his/her demographic 'equivalent' from the ASPN-PROS sample.

2.2. Procedures

2.2.1. Data collection

Mothers entering SUD treatment were assessed semi-annually 4 times, at baseline and at M6, M12, and M18 follow-ups, providing questionnaire and interview data at each assessment.

2.2.2. Treatment received by mothers

In this naturalistic study of treatment as usual, mothers attended SUD treatment sessions (detoxification, residential treatment, intensive outpatient treatment, and/or outpatient counseling) an average of 15.4 days ($SD = 8.8$) in the 60 days before the baseline interview; 24.9 days ($SD = 32.1$) in the 180 days before M6; 16.5 days ($SD = 30.8$) in the 180 days before M12; and 13.7 days ($SD = 29.8$) in the 180 days before 18M follow-up.

3. Measures

Demographics were obtained from maternal interviews (COSAM) and from the ASPN-PROS data set (matched comparison sample). The extent of *psychosocial problems* in children from both samples was assessed through maternal reports on the 35-item Pediatric Symptom Checklist (PSC), (Gardner et al., 1999; Jellinek et al., 1999), which measures the frequency of both the internalizing and externalizing symptoms on a 3-point scale (0 = 'never', 1 = 'sometimes', and 2 = 'often'). The PSC was used to assess both the overall symptomatology (i.e., all items summed up to compute the PSC Total Scores, where greater scores reflect greater level of psychosocial problems) and the prevalence of clinical-levels symptoms (i.e., the proportion of children meeting or exceeding the PSC age-adjusted clinical cut-off). The COSAM sample was assessed 4 times, whereas only a single PSC assessment was available for the matched comparison sample. The PSC internal consistency (α) was $> .91$ for both samples.

Following Moos and Billings (1982), *maternal post-treatment status* was determined as remitted if in the 18 months after baseline the patient was: (a) completely abstinent or drinking no more than 3 drinks per day for $\leq 10\%$ of the interval; (b) free of illicit drug use (except for marijuana use for $\leq 10\%$ of the interval); and (c) had no hospitalizations, no legal problems, no job problems, and no withdrawal symptoms or blackouts from substance use. These data were extracted from the maternal self-reports on The Timeline Follow-Back Interview (TLFB; Sobell & Sobell, 1996). Those not meeting remission criteria were considered relapsed, regardless of the timing, extent, or duration of relapse.

4. Analytical Plan

Paired tests were used to compare overall (paired sample t-tests) and clinical-level (McNemar's tests) psychosocial problems in COSAM and children from the comparison sample. Those COSAM with available data at baseline, M6, M12, and M18 were compared to their counterparts from the matched sample who are assumed to represent a realistic level of psychosocial problems for a given socio-demographic group. Changes in COSAM problems over time were estimated using the mixed longitudinal regression models with the *-xtmixed* (for continuous outcome) and *-xtmelogit* (for binary outcome) STATA commands. We first examined changes in COSAM symptoms from before to after maternal SUD treatment, and then we examined those changes as a function of maternal post-treatment status (i.e., remitted vs. relapsed). Time was estimated as a categorical indicator with baseline as a reference category, in order to obtain estimates for each follow-up time period.

5. Results

5.1. Sample characteristics

Table 1 shows demographics for the COSAM and matched comparison samples. These two samples did not differ on child or family characteristics, except that COSAM families were more likely to be co-habiting. Most mothers were currently diagnosed with alcohol abuse or dependence, and many had additional drug-related problems (Table 1, bottom). A total of 130 mothers provided data

at study entry, 118 at M6, 110 at M12, and 111 at M18; a complete (i.e., not a single missing assessment) mother and child data were available for 98 cases. COSAM for whom data were available at all 4 assessments were not different from the remaining sample in terms of age, gender, race, or PSC Total scores (all p 's ns).

5.2. Psychosocial problems in COSAM vs. matched comparison sample

To investigate whether current substance abuse in mothers is associated with elevated symptomatology in children, we examined problems in COSAM and in comparison sample, before and after maternal SUD treatment. As expected, soon after their mothers' entered treatment, COSAM had significantly greater PSC problem scores than did children from the matched sample, $M_{\text{COSAM-baseline}} = 21.20$ (14.36) vs. $M_{\text{Matched-sample}} = 14.93$ (10.17), paired $t(129) = -4.28$, $p < .001$ (Table 2). However, at the end of the 18-month study period, these differences were no longer significant, $M_{\text{COSAM-M18}} = 15.77$ (12.73) vs. $M_{\text{Matched-sample}} = 14.86$ (10.02), paired $t(110) = -.63$, ns (Table 2). Similarly, soon after their mothers entered treatment, prevalence of clinical-level problems was greater in COSAM than in the comparison sample (33.07% vs. 15.38%; McNemar $X^2(1) = 11.26$, $p = .0008$) but by the end of the study period, these differences were no longer significant (20.70% vs. 15.31%; McNemar $X^2(1) = 1.00$, $p = .31$, Table 2).

We hypothesized that children whose mothers remitted would be improved to the comparison group levels, but the PSC scores in children of both relapsed and remitted mothers were no different from their counterparts from the matched sample at M18; $M_{\text{COSAM-relapsed-M18}} = 15.95$ (12.56) vs. $M_{\text{matched-relapsed-sample}} = 15.29$ (10.40), paired $t(87) = -.38$, ns , and $M_{\text{COSAM-remitted-M18}} = 15.08$ (13.62) vs. $M_{\text{matched-remitted-sample}} = 13.21$ (8.38), paired $t(22) = -.84$, ns (Table 2). That is, COSAM improved to the levels of comparison sample whether their mothers relapsed or remitted following treatment, even though both COSAM groups at baseline had significantly greater problems than their comparison sample matches; $M_{\text{COSAM-relapsed-baseline}} = 21.51$ (14.44) vs. $M_{\text{matched-relapsed-sample}} = 15.07$ (10.27), paired $t(104) = -6.43$, $p < .001$, and $M_{\text{COSAM-remitted-baseline}} = 19.45$ (14.12) vs. $M_{\text{matched-remitted-sample}} = 13.08$ (8.22), paired $t(23) = -6.37$, $p < .05$ (Table 2). Mostly parallel set of results was obtained for

clinical-level problems as a function of maternal relapsed or remitted status: even though both those COSAM groups had greater prevalence of clinical-level problems than their demographic matches at baseline (34.90% vs. 17.92% for “Relapsed”; McNemar $\chi^2(1) = 7.71, p = .005$, and 25.00% vs. 4.10% for “Remitted”; McNemar $\chi^2(1) = 5.00, p = .02$), by M18 COSAM whose mothers relapsed improved and did not differ in terms of clinical symptomatology from their demographic counterparts (20.45% vs. 18.18%; McNemar $\chi^2(1) = .13, p = .72$). However, unexpectedly, COSAM whose mothers remitted remained at greater clinical risk even at M18 (21.70% vs. 4.34%; McNemar $\chi^2(1) = 4.00, p = .045$), likely due to the small cell sizes (i.e., fewer than 25 cases) and low prevalence of clinical problems in the matched sample subgroup (i.e., less than 5%).

5.3. Symptomatology in COSAM over time

The results of longitudinal growth models suggest decreased problems in COSAM at every follow-up vs. baseline, both in terms of overall symptomatology (estimate_{M6} = -4.76 (.89), estimate_{M12} = -3.43 (1.00), and estimate_{M18} = -5.19 (1.12), all p 's < .001) and the clinical-level problems (OR_{M6-baseline} = .18 (95% CI .06 - .54), $p = .002$; OR_{M12-baseline} = .30 (95% CI .07 - 1.26), $p = .10$; OR_{M6-baseline} = .13 (95% CI .02 - 1.11), $p = .06$), Table 2, *Growth Curve Model 1*. However, these changes did not appear to be driven by the maternal post-treatment status, as there were no differences in symptomatology over time between children of relapsed vs. remitted mothers (Table 2, *Growth Curve Model 2*).

6. Discussion

This report adds to the scarce literature concerning the effects of maternal SUD on children, including the putative secondary benefits of maternal SUD treatment on children. Our results showed that: a) maternal SUD was associated with elevated symptomatology among COSAM, and b) maternal SUD treatment was associated with reductions in COSAM symptoms. Specifically, soon after their mothers entered treatment, COSAM had significantly greater psychosocial problems than did children from the matched sample, yet following maternal SUD treatment, they improved to the levels of the matched comparison sample. Even though we hypothesized that children whose mothers stably remitted would exhibit greater improvements given the removal of the maternal

substance abuse risk factor, both groups of COSAM (i.e., children of remitted and relapsed mothers) appear to have improved at similar rates. It is possible that maternal substance use patterns should be examined in more detail (i.e., focusing on the timing or duration of remission, cf. Burdzovic Andreas & O'Farrell, 2007).

Even though reductions in COSAM symptoms were significant and paralleled maternal SUD treatment, causal inferences are nevertheless limited given the lack of randomization and the omission of a control group of substance-abusing mothers not receiving treatment. Also, these basic associations do not reveal possible psychological or social mechanisms -- ranging from improved parenting to lessened family conflict -- underlying the observed improvements in COSAM. It is also possible that such improvements could simply be a regression to the mean, or a reflection of the maternal reporting bias and expectations following treatment participation. Further, the comparison sample did not provide information on parents' substance abuse, so our comparison sample may have included families with substance-abusing parents. Nevertheless, we believe that the present results are strengthened by the inclusion of the demographic matched sample and the prospective longitudinal design in which detailed maternal and child data were collected simultaneously.

More importantly, these results extend the limited literature on children of mothers affected by alcoholism and drug abuse. They also cautiously suggest secondary associations between maternal treatment and child outcomes. Specifically, as symptomatology in all COSAM was reduced during maternal SUD treatment participation, even treatment as usual that did not involve children or focus on mothers' parenting appears to be beneficial for these at-risk children and should thus warrant further investigation.

Table 1.

Demographic characteristics of the maternal SUD treatment and matched comparison samples.

Variables	Maternal SUD Treatment Sample (N = 130)	Matched Comparison Sample (N = 130)
<i>Child Characteristics</i>		
	<i>M (SD) or N (%)</i>	<i>M (SD) or N (%)</i>
Age	10.1 (3.4)	10.1 (3.3)
Gender (boy)	69 (53.1%)	68 (52.3%)
Race (Caucasian)	117 (90.0%)	113 (86.9%)
Biological child of the SUD-seeking mother	117 (90.0%)	--
<i>Family Characteristics</i>		
	<i>M (SD) or N (%)</i>	<i>M (SD) or N (%)</i>
Marital status*		
Married, living together	76 (58.5%)	99 (76.2%)
Not married, cohabiting	54 (41.5%)	31 (23.8%)
Maternal education	4.2 (1.4)	4.2 (1.4)
Paternal education	3.6 (1.4)	3.8 (1.4)
Maternal current alcohol-related SCID dx	109 (83.8%)	--
Maternal current opioid-related SCID dx	32 (24.6%)	--
Maternal current cocaine-related SCID dx	50 (38.5%)	--
Maternal current marijuana-related SCID dx	20 (15.4%)	--
Maternal current stimulants-related SCID	6 (4.6%)	--
Maternal current sedatives-related SCID dx	18 (13.8%)	--
Maternal current alcohol-only SCID dx	56 (43.0%)	--
Maternal current drug-only SCID dx	21 (16.2%)	--
Maternal current alcohol and drug SCID dx	53 (40.8%)	--

* Different across the maternal SUD treatment and matched comparison samples at $p < .05$ Parental education was coded as follows: 1 = less than 8th grade; 2 = no HS degree; 3 = HS/GED; 4 = some college; 5 = AA degree; 6 = BA/BS degree; 7 = BA+

Substance-related SCID diagnoses (dx) refers to the number (and percent) of women who met criteria within the past 6 months for abuse or dependence on the respective substance according to the Structured Clinical Interview for the DSM-IV (SCID; First, Spitzer, Gibbons & Williams, 1996) in mothers seeking SUD treatment.

Table 2.

Overall and clinical-level symptomatology among children of substance-abusing mothers (COSAM, $N = 130$) before and after their mothers' SUD treatment; entire COSAM sample and by maternal post-treatment status and matched comparison sample.

Psychosocial Symptoms in Children		Assessment			
<i>a) PSC Total Problem Scores</i>		Baseline	Month 6	Month 12	Month 18
1. Entire sample		$N = 130$	$n = 118$	$n = 110$	$n = 111$
COSAM sample ^b	M (SD)	21.20 (14.36) ^{a ***}	16.69 (13.15)	17.75 (14.09) ^{a *}	15.77 (12.73)
Matched comparison sample	M (SD)	14.93 (10.17)	14.83 (9.84)	14.14 (9.07)	14.86 (10.02)
<i>Growth curve model 1</i>					
<i>Time</i>	<i>estimate (s.e.)</i>	--	-4.76 (.89) ^{b ***}	-3.43 (1.00) ^{b ***}	-5.19 (1.12) ^{b ***}
2. By maternal post-treatment status					
<i>Relapsed</i>		$n = 106$	$n = 96$	$n = 89$	$n = 88$
COSAM sample	M (SD)	21.51 (14.44) ^{a ***}	16.69 (13.11)	18.00 (14.17) ^{a *}	15.95 (12.56)
Matched comparison sample	M (SD)	15.07 (10.27)	15.19 (10.14)	14.60 (9.35)	15.29 (10.40)
<i>Remitted</i>		$n = 24$	$n = 22$	$n = 21$	$n = 23$
COSAM sample	M (SD)	19.45 (8.22) ^{a *}	16.68 (13.67)	16.71 (14.05)	15.08 (13.62)
Matched comparison sample	M (SD)	13.08 (8.22)	13.22 (8.47)	12.19 (7.62)	13.21 (8.38)
<i>Growth curve model 2</i>					
<i>Relapsed (vs. Remitted)</i>	<i>estimate (s.e.)</i>	1.99 (3.04)			
<i>Time</i>	<i>estimate (s.e.)</i>	--	-2.94 (2.08)	-2.41 (2.30)	-4.34 (2.54)
<i>Time x Relapsed Status</i>	<i>estimate (s.e.)</i>	--	-1.71 (2.31)	-1.22 (2.56)	-.99 (2.83)

b) PSC Clinical-level Problems		Baseline	Month 6	Month 12	Month 18
1. Entire sample		<i>N</i> = 130	<i>n</i> = 118	<i>n</i> = 110	<i>n</i> = 111
COSAM sample ^b	%	33.07% ^{a ***}	19.49%	23.63% ^{a §}	20.70%
Matched comparison sample	%	15.38%	14.40%	14.14 (9.07)	15.31%
<i>Growth curve model 1</i>					
<i>Time</i>	<i>OR (95% CI)</i>	--	.18 (.06 - .55) ^{b ***}	.30 (.07 - 1.26) ^{b §}	.13 (.02 - 1.11) ^{b §}
2. By maternal post-treatment status					
<i>Relapsed</i>		<i>n</i> = 106	<i>n</i> = 96	<i>n</i> = 89	<i>n</i> = 88
COSAM sample	%	34.90% ^{a ***}	19.80%	24.27% ^{a *}	20.45%
Matched comparison sample	%	17.92%	16.66%	16.85%	18.18%
<i>Remitted</i>		<i>n</i> = 24	<i>n</i> = 22	<i>n</i> = 21	<i>n</i> = 23
COSAM sample	%	25.00% ^{a *}	18.18%	19.05% ^{a *}	21.70% ^{a *}
Matched comparison sample	%	4.10%	4.54%	0.00%	4.34%
<i>Growth curve model 2</i>					
<i>Relapsed (vs. Remitted)</i>	<i>OR (95% CI)</i>	2.91 (.25 - 34.15)			
<i>Time</i>	<i>OR (95% CI)</i>	--	.36 (.04 - 3.67)	.44 (.03 - 7.54)	.37 (.01 - 10.75)
<i>Time x Relapsed Status</i>	<i>OR (95% CI)</i>	--	.44 (.04 - 5.58)	.61 (.04 - 10.44)	.27 (.01 - 6.29)

Note: [§] $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Shown are: a) means and standard deviations for the PSC Total Problem scores, and corresponding significance-levels from the paired t-tests comparing COSAM and children from the matched comparison sample, and b) proportions of children exceeding the PSC Clinical-level cut-offs, and corresponding significance-levels from the McNemar's tests comparing COSAM and children from the matched comparison sample. In *italics* below are shown the results from the longitudinal growth curve models, examining changes in symptomatology (both in PSC overall problem levels, and in prevalence of clinical-level problems) over time among COSAM. Model 1 examined changes in COSAM symptoms over time, while Model 2 examined those changes as

a function of maternal post-treatment status (i.e., relapsed vs. remitted). All longitudinal growth models accounted for children's age and gender; intercept was set at baseline assessment.

^a COSAM > children from the matched comparison sample at noted assessment times.

^b COSAM at baseline > COSAM at noted assessment times.

A total of 24 mothers in SUD treatment were classified as remitted at the end of the study: of these, 24 provided child data at baseline, 22 at M6, 21 at M12, and 23 at M18. Of the 106 mothers classified as relapsed, 106 provided child data at baseline, 96 at M6, 89 at M12, and 88 at M18.

For the paired t-tests and McNemar's tests comparing COSAM with the children from the matched comparison sample at each assessment, we did not utilize any missing values procedures. In these paired sample analyses, we have analysed only those COSAM cases for whom data were available at a given assessment and their demographic counterparts. For example, at M6, the 118 participant COSAM children were compared to their 118 demographic counterparts in terms of overall (paired t-test) and clinical-level symptoms (McNemar's test).

On the other hand, the general hierarchical linear approach permits the use of all available data under the Missing-at-Random (MAR) assumption and the restricted maximum likelihood (REML) estimation method (Fitzmaurice, Laird, & Ware, 2004); that is, even those participants who had not participated in all assessments were included in the hereby shown growth curve analyses.

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