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Transition to Parenthood Among Drug Abusing Mothers: Stressors, Supports, Coping and Mental Health

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Abstract: We examined the impact of drug abuse on prenatal resources (social support and coping strategies) and mental health problems (depressiveness, pregnancy distress and hostility), and analyzed whether they would differently predict postpartum mental health between drug abusing and non-abusing women. Drug abusing (n=44) and comparison (n=50) women participated in the second or third trimester (T1), and reported depressive and anxiety symptoms at four (T2) and 12 (T3) months postpartum. Results showed that drug abusing women had higher levels of prenatal depression, distress and hostility, and lower levels of social support, and coped more by using denial and avoidance and less with cognitive reconstruction than the comparison group. Prediction of prenatal resources and problems was somewhat group-specific: the prenatal depression predicted depressive symptoms, and cognitive constructive coping predicted low anxiety, especially in the drug abusing group. The findings emphasize the need for effective support for adequate coping strategies and early treatment of depression in drug abusing mothers in their transition to motherhood.

Key Words: Drug abuse, transition to parenthood, coping strategies, social support, depression, anxiety, hostility

Pregnancy is an important transition in a woman's life, leading generally toward more maturity, but also signifying a severe crisis for

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many. Participants in our study are women whose pregnancies were shadowed by drug dependency and related risks. Distressed mothers easily project their emotional problems into the interaction with their infant (Stern & Bruschweiler-Stern, 1998), and it is therefore important to recognize risk factors already in pregnancy in order to prevent their transmission into motherhood. Our prospective study focused on prenatal mental health problems among drug abusing women and analyzed their impacts on depressive and anxiety symptoms postpartum. It is crucial to realize that pregnancy can also provide an opportunity for positive change, and accordingly we analyzed the role of social support and coping strategies in preventing symptoms among drug abusing mothers.

The psychological process of becoming a mother is often stressful and conflicting in conditions of substance abuse. Substance dependent women worry about the possible risks of the drug exposure on their infants (Mayes & Truman, 2002) and face an accumulation of social and psychological problems (Brady, & Sinha, 2005; Nair, Schuler, Black, Kettinger, & Harrington, 2003). A qualitative study by Brudenell (1997) revealed that women struggled and attempted to seek a balance between the identities of being a mother versus that of being an addict. During pregnancy they found new ways to recover from drugs and care for the fetuses' health. However, their focus reverted from maternal identity into addict identity in the postpartum when the child was 4 – 11 months. The high risk of relapse among substance abusing mothers may have a connection with their fragile and conflicting, either negative or idealized, experiences and expectations of motherhood (Suchman, Slade, & Luthar, 2005), Substance dependent mothers give a high value to their new role and some of them expect the motherhood to repair their entire lives. At the same time they express deep fears of failing in motherhood and subsequently, of losing their baby (Belt & Punamäki, 2007).

There is evidence that substance abusing mothers are highly vulnerable to postpartum depression (Hans, 1999) and suffer from depressive symptoms already in pregnancy (Howell, Heiser, & Harrington, 1999; Pajulo, Savonlahti, Sourander, Helenius, & Piha, 2001). In a Finnish study 40% of pregnant substance abusing women in residential care screened positively for depression (Pajulo et al., 2001). Epidemiologic data confirms the high prevalence of mental health problems among substance dependent mothers (Ashley, Marsden & Brady, 2003; Johnson, Brems, & Burke, 2002). Conners et al. (2004) found a prevalence of 58% with mental health problems of depression and anxiety in a sample of 3000 mothers with long-term

substance abuse. Personality disorders (Haller & Miles, 2004) and bipolar affective disorders (Ashley et al., 2003) are also documented among drug abusing women. Psychiatric comorbidity is found to be more common among poly-substance users than among heavy alcohol drinkers (Kandel, Huang, & Davies, 2001). Furthermore, high levels (42%-84%) of sexual or/and physical abuse in childhood have been reported among substance abusing women (Freeman, Collier, & Parillo, 2002; Medrano et al., 2002), which often associates with increased risk for PTSD and other trauma-related psychiatric symptoms (Conners, Grant, Crone & Whiteside-Mansell, 2006; Hien, Cohen, Miele, Litt, & Capstick, 2004).

The accumulation of social, legal and economic stressors is common among substance abusing women (Knight, Logan Nair, & Simpson, 2001; Nair et al., 2003). Their pregnancies are often unplanned and they receive little social support from their partners or relatives (Pajulo et al., 2001b; Suchman et al., 2005). Their partners can be substance abusers themselves, behave violently and engage in criminal activities, which exacerbate spousal problems. In the study by Conners et al., (2004), 79% of family members of seriously substance dependent mothers were involved in substance abuse related activities. The social support received from partners and closest relatives can thus be counterproductive by actually increasing women's drug abuse (Falkin & Strauss, 2003). Stressful and abusive relations are especially detrimental in pregnancy, when the mothers aim at rapidly recovering from drug addiction and try to learn a normal lifestyle in order to protect their children.

To deal with the accumulated mental health and social problems, drug abusing women would need highly effective coping capacities. However, the opposite seems to be true according to the research on coping strategies among drug abusers. Problem-focused coping, involving active initiative taking, constructive thinking and attempts to change or remove the sources of stress, is considered effective in attenuating mental health problems. On the contrary, emotion-focused coping strategies, consisting of distraction, daydreaming and escapism, are generally considered ineffective (Carver, Shayer, & Weintraub, 1989; Lazarus, 2000). These ineffective coping strategies in turn are common among drug abusers (Burns, Feaster, Mitrani, Ow, & Szapocznik, 2008). In a prospective community study students who used distraction, daydreaming and other avoidant coping strategies, were more likely to be cannabis users (Wills, Pierce, & Evans 1996). Substance abuse itself is sometimes understood as a consequence of unsuccessful and dysfunctional coping efforts that were aimed at

protecting oneself from painful memories and insecurity. Coping through avoidance and denial may have initially helped substance abusing women to regulate and endure painful emotions (Khanzian, 1985; Medrano et al., 2002). Conflicting feelings of helplessness and emotional venting were typically combined with avoidant coping among substance abusers (Najavits et al., 1996).

Aims of the Study

The first aim of the study was to examine how social support, coping strategies and mental health problems differ between drug abusing women and their comparison group in pregnancy. We hypothesized that drug abusing women would show higher levels of depressive, distressing and hostile symptoms and lower levels of social support and adequate coping strategies. The second aim was to examine whether resources (social support and coping strategies) and symptoms differently predict depressive and anxiety symptoms during the postpartum among drug abusing and comparison mothers. We hypothesized that drug abusing mothers are more vulnerable in the transition to motherhood than the comparison mothers (i.e., scarce prenatal resources and severe mental health symptoms predict postpartum mental health problems especially among drug abusers). The substances referred to in this study included illicit drugs, alcohol, tranquilizers and sleeping pills, anabolic steroids, sniffing medicaments and over-the-counter medicines.

METHOD

Participants and Procedures of the Study

Participants in the drug abusing group were recruited from two pregnant women interventions involving psychodynamic group therapy or psychosocial support at two outpatient Family Support Centers. All the pregnant women had a history of illegal drug use or poly-substance use. The comparison group consisted of women with medical risks recruited from a maternity clinic. The sample consists of 94 women, 44 belonging to drug abusing and 50 to comparison group, who participated in the second and the last trimester of pregnancy (T1) and when the child was 4 months (T2) and 12 months (T3). The original data were 106 women. Seven mothers were excluded from the drug abusing group, because they had given birth before T1 assessment. Three mothers were omitted due to insufficient criteria of substance use and 2 because of insufficient data. The dropout rates

were 8% (n=4) in the drug abusing and 12% (n=7) in the comparison group from T1 to T2, and respectively n=5 and n=6 from T2 to T3.

The drug abusing women were referred by the staff of two addiction psychiatry outpatient clinics and by social workers in outpatient clinics. Participation to both therapy and support interventions was on a voluntary basis. The comparison group mothers were recruited at a maternity outpatient clinic in southern Finland. They visited the clinic for medical risks such as gestational diabetes, abnormalities in ultrasound, or premature labor symptoms. Exclusion criteria were ever usage of illegal drugs (self-report and urine tests), and non-moderate consumption of alcohol during pregnancy. Smoking was not a criterion for exclusion criteria for either group.

At the T1 assessment, the staff in the outpatient Family Support Centers informed drug abusing women about the study before they participated either psychotherapeutic group therapy (PGT) or psychosocial support (PSS). Detailed descriptions of the interventions and their effectiveness will be reported elsewhere (Belt et al., personal communication). The staff in the maternity clinic recruited consecutive clients in their second and third trimesters to participate as a comparison group. In both groups the information included description of the purpose of the study (aiming at understanding psychosocial conditions in pregnancy and the transition to parenthood), the voluntary nature and procedure of the study. The future mothers who were willing to participate in the study signed an informed consent form and completed the T1 questionnaire at the following appointment. The T2 and T3 assessments were conducted by trained research assistants (students of psychology) at the women's homes or in the outpatient Family Support Centers.

The study was approved by the Ethical Committees of Päijät-Häme Central Hospital and the City of Tampere, Finland, and the whole study was carried out according to the provisions of the Declaration of Helsinki.

Measures

Both drug abusing and comparison group women completed the same questionnaires at T1, T2 and T3. Questions concerning illegal drug abuse were not relevant for the comparison women, but served as a double check of the exclusion criterion.

Demographic factors at T1. The women provided the following information by marking the right alternative: Education (basic education including primary and secondary school, vocational

training, college and university education), employment (permanent work, unemployed, housewife, student or other) and marital status. Length of marriage/cohabiting and number of children were also elicited by an open-ended question. Economic situation was indicated by two questions focusing on difficulties paying bills (1= extremely difficult, 5= not at all difficult), and sufficiency of salary/money to cover monthly family maintenance (1= More than sufficient, 4= Not sufficient).

Obstetric issues at T1. First, women were presented with a list of 6 pregnancy-related medical problems and asked to indicate whether they had them (1= no, 2= yes: high blood pressure, high sugar level, bleeding, early labor pains, threatened miscarriage, and abnormalities in ultrasound). A sum variable was formed to indicate their occurrence, and ranging between 0-6. Second, women reported whether they earlier had experienced 5 other obstetric problems (miscarriage, extra-uterine pregnancy, abortion, infertility, or serious infection). Similarly, a sum variable was constructed from previous obstetric problems ranging between 0-5.

Drug abuse at T1 and T2. Drug abuse was assessed by presenting a list of 7 drugs and asking women in drug abuse group to indicate which they had used or experimented with (1=no 2=yes: marijuana, LSD; amphetamine, ecstasy, heroin, sniffing, medicaments, and other, e.g., buprenorphin). Further, they indicated how often they had used each drug by an open question. At T1 women reported their drug abuse before pregnancy, and whether it had changed during the pregnancy (1=no change, 2=decreased, 3= stopped and 4= increased). At T2 women reported the drug use after the child was born, and whether there had been changes in drug use after the child was born (1-4). They were further queried as to whether they had used intravenous drugs (1=no, 2=yes), substituted medication (1=no, 2=yes), or had been harmed by illegal drug abuse (1=no, 2=yes) at both T1 and T2.

Social support at T1. Social support was measured by the Perceived Social Support Scale-Revised, PSSS-R by Parkes (1986). Twelve items indicate availability of emotional and practical help from family members and friends. The participants evaluated on a 5-point scale how well the descriptions matched their current social situation. An average sum variable was constructed with reliability Cronbach's $\alpha = 89$.

Depressive symptoms at T1, T2, and T3. Depressive symptoms were measured by a 23-item questionnaire that consisted of the ten-item Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden & Sagovsky, 1987; translated into Finnish by Tamminen, 1990) and 13 items from the Center for Epidemiological Studies Depression Scale

(CES-D; Radloff, 1977). Both EPDS and CES-D involve descriptions of depression related feelings, thoughts and behaviors, and respondents answer on a 4-point scale (0-3) how well the description fits the severity and persistence of their symptoms. The time reference is the previous week. We extended the use of the EPDS in order to increase variation of depressive tendencies. The literature reports sufficient internal consistencies for EPDS (Cronbach's α = .87 according to Cox et al., 1987) and for CES-D (α =.85-.91 according to Himmelfarb & Murrell, 1983). Discrimination validity and split-half-reliabilities have also been found to be good for EPSD (Cox et al., 1987) and for CES-D (Radloff & Teri, 1986). In this study, average sum variables were constructed for depressiveness in pregnancy and at four months postpartum. Their reliabilities of Cronbach's were α = .91 and α =.84 respectively.

Hostility. Hostility at T1 was measured by 20 items covering feelings of anger, frustration, and impulsivity and urges to hurt somebody, as well as hostility and cynicism derived from the SCL-90-R (10-item hostility scale by Derogatis & Cleary, 1977) and aggressive attitudes by Cowen (1995). Hostile feeling states were indicated by 'I lose my temper without any apparent reason', and by cognitive thoughts, such as 'I feel that life treats me unfairly'. On the behavioral level, hostility was indicated by descriptions such as 'I fear that I may do something bad to other people'. Participants responded on a 4-point scale how well the descriptions fit them in general (1 = Not at all; 4 = Fits completely). A sum variable was constructed, and its reliability was Cronbach's α = .88.

Coping strategies at T1. These were measured by a Lazarus Coping Model comprising avoidance, activeness, cognitive reconstruction and social domains of coping (Lazarus, 1993). The participants were asked to think of different ways of dealing with painful experiences: What do you do, feel and think when you have bad experiences? They were given four groups of descriptions: Denial and avoiding involved responses e.g. 'I do not think of the whole issue' and 'I deny that the bad has happened', and cognitive meaning-giving responses e.g. 'I attempt to understand what it is about' and 'I think about the reasons that led to what happened'. Active and constructive responses are e.g. 'I take care that nothing bad can happen again' and 'I collect all my energy and attempt to change things', and, finally, Seeking social support involve responses e.g., 'I like to share my bad experience with others' and 'I feel that I will recover when I get consolation and understanding from others'. Participants responded to the four clusters as to how well the descriptions fit their typical thinking and

behaviour (1=not at all, 2= hardly, 3= fairly well, and 4= completely).

Anxiety symptoms at T2 and T3. These were assessed by a 17-item scale, including the seven items of the GHQ-Anxiety scale and seven items from the Beck Anxiety Inventory (BAI) (Beck, Ebstain Brown, & Steel, 1988). The GHQ-Anxiety scale describes feelings of being under constant pressure, worry and panicking, while BAI includes somatic indicator of anxiety such as fierce heart beating, hands sweating and headaches. Both scales have been found reliable and valid among Finnish adults (Punamäki, et al., 2006; Tuisku et al., 2006). The participants rated how often they had experienced each symptom over the past month on a 5-point scale ranging from 1 (Not at all) to 5 (All the time). The reliability of anxiety symptoms was α =.84.

Results

Descriptive Statistics

Table 1 shows that the drug abusing women had lower educational levels, poorer economic situations and more often unstable work than the women in comparison group. For instance, more than a half of drug abusing women had a basic education, while the corresponding share was 12% among comparison women. Only one drug abusing mother and about a fifth of the comparison group had a university degree. The groups also differed in their marital status: a fifth of the drug abusing and a half of the comparison women were married. The share of 'other' such as being widowed was exceptionally high among drug abusing mothers. Educational level, civic status and economic situation (indicated by difficulty of paying bills) are included as covariants in the subsequent analyses. Women were 22-42 years old (M=34.98, SD=4.11). There were no age differences between the groups (t(94)= -0.91, p=ns) and in the number of children.

Obstetric characteristics in drug abusing and comparison groups. The pregnancy weeks ranged between 22-41, the mean being 35.01+4.08. No differences were found between substance abusing and comparison groups in pregnancy weeks (t(94)= 0.88, p=ns.) earlier obstetric complications (t(94)= 0.50, p=ns.) and child birth weight (t(94)= 0.39, p=ns). Pregnancy-related obstetric problems were more common in the comparison group (M=1.46+ 1.01) than drug abusing (M=0.77+ .96) women (t(94)= -3.35, p=.0001).

Results revealed that *drug abuse behavior* substantially changed in transition to motherhood. All the drug abusing participants reported at T1 having used cannabis before pregnancy recognition,

nearly all (95.2%) had used amphetamine, 85% reported medical misuse (including tranquilizers), and about a half (47.5%) had taken heroin. Of the women 80.9% had taken drugs intravenously.

All drug abusing women reported changes in drug abuse during the pregnancy: 12% (n=5) had decreased usage and 88% (n=39) had stopped. At T2 postpartum, six (15%) of 40 drug abusing women reported illegal drug abuse and three reported using drugs intravenously. Almost one fourth of women reported receiving substitute medication.

Table 1
Percentages and frequencies of demographic and economic characteristics of drug abusing and comparison women

	Substance abuse		Comparison		
	%	*n*	%	*n*	χ^2 value
Education					29.08****
Basic education	58.1	25	12.0	6	
Vocational school	34.9	15	28.0	14	
College studies	4.9	2	38.0	19	
University degree	2.3	1	22.0	11	
Work situation					35.02****
Permanent work	11.6	5	60.0	30	
Without work	44.2	19	6.0	3	
House wife	32.6	14	12.0	6	
Student	2.3	2	2.0	1	
Other	9.3	4	20.0	10	
Civic status					19.71***
Married	22.7	10	50.0	25	
Co-habiting	34.1	15	44.0	22	
Single	18.2	8	4.0	2	
Divorced	10.4	5	2.0	1	
Other	13.6	6	0	0	
Number of children					0.32
None	47.6	20	47.9	23	
1	31.0	13	33.3	16	
2-4	21.4	9	18.8	9	
Difficulty of paying bills					14.26**
Not at all	31.4	11	72.0	38	
Somewhat difficult	62.9	22	24.0	12	
Very difficult	5.7	2	4.0	2	
Sufficiency of money					25.30****
Sufficient	13.6	6	64.0	32	
Moderately	56.8	25	28.0	14	
Insufficient	29.5	13	8.0	4	

Note: *** p <.001; **** p < . 0001; N=94.
The differences in numbers are due to the missing values.

Table 2
Means, standard deviations and ANCOVA statistics of support, coping responses, distress and psychiatric symptoms among drug abusing and comparison groups in pregnancy at T1

	Drug abusing group		Comparison group			
	M	SD	M	SD	F-values	Effect size
Resources						
Social support	4.24	.08	4.67	.09	12.04***	.13
Coping strategies						
Denial and avoidance	2.22	.15	1.74	.14	4.48*	.05
Cognitive meaning giving	3.11	.11	3.42	.10	3.98*	.05
Active and constructive	2.88	.12	3.10	.11	1.50	.02
Seeking social support	2.90	.14	3.13	.13	1.25	.02
Symptoms						
Pregnancy-related distress	2.15	.09	1.76	.08	8.49**	.09
Depressive	0.90	.07	0.66	.06	5.51*	.06
Hostility	2.27	.07	1.79	.07	18.07****	.18

Note: $df = 1, 92$, Education, civic status, economic difficulties and pregnancy weeks at T1 are included as covariants
* $p < .05$, ** $p < .01$, *** $p < .001$,**** $p < .0001$

Support, coping and mental health in pregnancy

The group differences in prenatal resources and symptoms at T1 were analyzed by one-way ANCOVAs, using education, marital status, economic status and gestation weeks as covariants. As hypothesized, Table 2 shows that drug abusing women reported a lower level of social support and higher levels of depressive and hostile symptoms and pregnancy-related distress than comparison women. Also, drug abusing women coped more often by denial and avoidance and less often by employing cognitive meaning-giving strategies when facing traumatic stress.

Of the covariants, marital status was significantly associated with social support ($F(1,90) = 4.63$, $p < .03$, $\eta = .05$), education with active coping ($F(1,90) = 4.15$, $p < .05$, $\eta 2 = .05$) and seeking social support as coping ($F(1,90) = 4.00$, $p < .05$, $\eta 2 = .05$), and economic difficulties with hostility symptoms ($F(1, 90) = 4.64$, $p < .03$, $\eta 2 = .05$). We subsequently examined interactions between the group and significant covariant variables in order to see whether the hypothesized group effects were neutralized or sustained. Only the Group X Education -interaction effect on seeking social support as coping proved significant ($F(1,83) = 2.78$, $p < .05$, $\eta 2 = .09$), indicating that in the substance abusing group low educational level was associated with low support-seeking coping, whereas in the comparison group education was not associated with social coping.

Prenatal predictors of postpartum mental health

Multiple hierarchical regression analyses were conducted to analyze how prenatal resources and symptoms at T1 predict depressive and anxiety symptoms postpartum at T2 and T3. In the first Step, prenatal depressive/distress symptoms were entered in order to control for the dependent variables. The group (dummy variable 0=Drug abusing 1=Comparison group) was entered in the second Step, the resources (social support and coping strategies) in the third and the symptoms (prenatal depressive/distress symptoms and hostility) were entered in the fourth Step. Because we hypothesized that the prenatal resources and symptoms would differently predict postpartum mental health among drug abusing and comparison women, we added the interaction terms between the group dummy variable and resources (Step 5) and symptoms (Step 6). All the predictors and interaction terms were first cantered, as suggested by Aiken and West (1991) in order to avoid multicolinearity.

Table 3
Multiple stepwise regression main effect and interactional models of prenatal resources and symptoms (T1) predicting depressive symptoms 4 (T2) and 12 (T3) months postpartum

	Depressive symptoms													
	Postpartum 4 months (T2)							Postpartum 12 months (T3)						
Predicting variables	△ R^2	Step 1 β	Step 2 β	Step 3 β	Step 4 β	Step 5 β	Step 6 β	△ R^2	Step 1 β	Step 2 β	Step 3 β	Step 4 β	Step 5 β	Step 6 β
Step 1 Depressive symptoms T1	.27****	.52****	.43****	.45****	.44**	.44**	.38*	.20****	.44***	.36***	.42***	.24	.21	.12
Step 2 Group (Drug=0; Comparison=1)	.06**		-.26**	-.27*	-.26*	-.28*	-.28	.04*		-.23*	-.35**	-.25+	-.27+	-.25+
Step 3 Resources T1	.06							.07						
Social support				-.16	-.16	-.20	-.23				-.05	-.06	-.12	.06
Denial & avoidance coping				.01	.01	.02	.01				-.26*	-.28*	-.26+	-.25+
Cognitive reconstruction				-.17+	-.20*	-.19+	-.19+				-.13	-.17	-.19	-.16
Active and constructive				-.15	-.15	-.16	-.14				-.02	-.02	-.01	.03
Seeking support				.03	.03	.04	.00				.12	.12	.14	.07
Step 4 Symptoms T1	.00							.05+						
Pregnancy-related distress				.	.05	.09	.04					.01	.03	.14
Hostility					.08	.08	.08					.32*	.33*	.34*
Step 5 Group X Resources - Interactions	.03							.03						
Step 6 Group X Symptoms - Interactions	.05+							.07+						
Regression models	F (17,64) = 3.49, p < .0001; 48% explained							F (17,59) = 2.86, p < .001; 45% explained						

Note: The β -values of Steps 5 and 6 interaction effects between the group and resources and symptoms are not presented due to save place.
Step 3 include the impact of all variables statistics represent figures at the final step, when all variables were entered into the equation
+ $p < .10$ * $p < .05$, ** $p < .01$, *** $p < .001$, **** $p < .0001$

Results in Table 3 reveal that the regression models were significant for depressive symptoms at T2 (48% variation explained) and T3 (45% variation explained). The significant main effect models (β -values of Step 4) indicate that depressive symptoms were most likely at T2 among women, who were depressive already in pregnancy, belonged to the drug abusing group and used low level of cognitive restructuring coping strategies. The predictors of T3 maternal depressive symptoms were somewhat different (β -values of Step 4): depressive symptoms were most likely among drug abusing women who used low levels of denial and avoidant coping strategies and had shown a high level of hostility.

The Group X Symptoms-interaction effect models were marginally significant for depressive symptoms at T2 ($F(3,64) = 2.19$, $p=.09$, R2 Change = 5%) and T3 ($F(3,59) = 2.50$, $p = .06$, R2 Change = 7%). Significant Group X Prenatal depressive symptoms –interactions were found both at T2 ($\beta = -.33$, $t = -2.21$, $p < .03$) and T3 ($\beta = -.42$, $t = -2.60$, $p < .01$). In accordance with the vulnerability hypothesis, Figure 1 illustrates that a high level of prenatal depressive symptoms predicted high postpartum depressive symptoms especially in the drug abusing group.

Figure 1. *Group X Prenatal depressive symptoms –interaction effects on Depressive symptoms at 12 months postpartum*

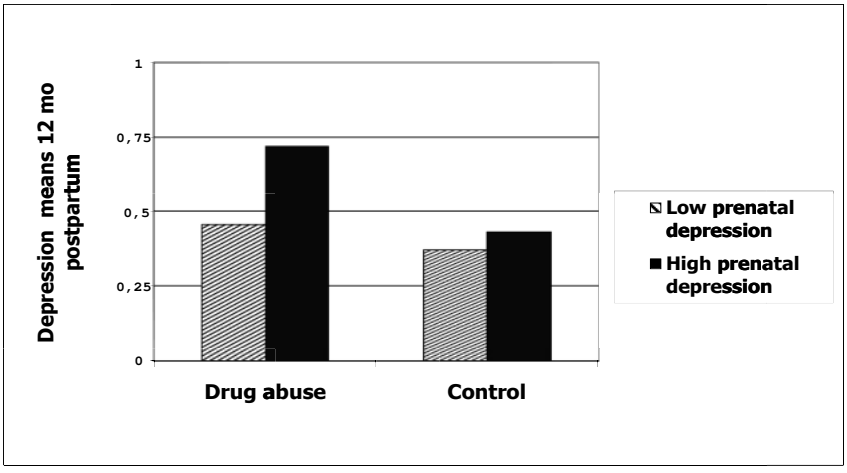


Table 4
Multiple stepwise regression main and interaction effect models of prenatal resources and symptoms (T1) predicting anxiety symptoms 4 (T2) and 12 (T3) months postpartum

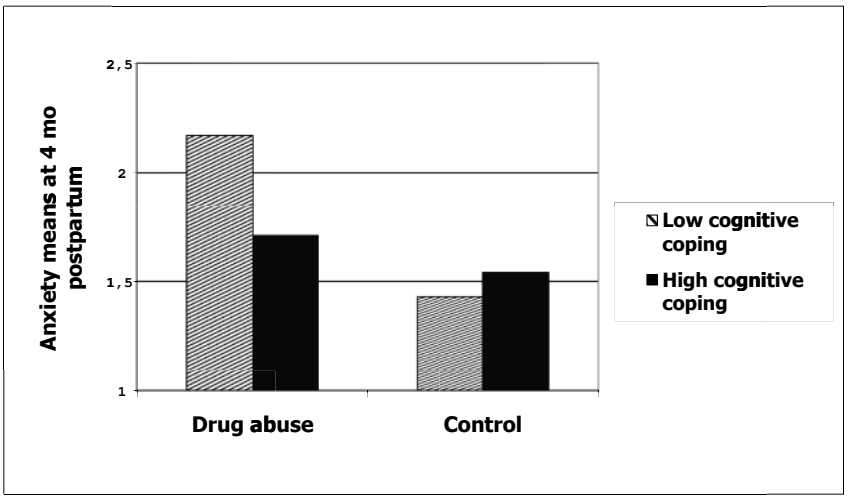
	Anxiety symptoms													
	Postpartum 4 months (T2)							Postpartum 12 months (T3)						
Predicting variables	$\triangle R^2$	Step 1 β	Step 2 β	Step 3 β	Step 4 β	Step 5 β	Step 6 β	$\triangle R^2$	Step 1 β	Step 2 β	Step 3 β	Step 4 β	Step 5 β	Step 6 β
Step 1 Pregnancy-distress T1	.30****	.50****	.40****	.40****	.17	.17	.20	.25****	.45***	.31**	.34****	.11	.14	.24
Step 2 Group (Drug=0; Comparison=1)	.11****		-.37***	-.38***	-.30***	-.32**	-.31**	.18****		-.47**	-.49***	-.41***	-.41***	-.38**
Step 3 Resources T1	.03							.03						
Social support				-.02	-.03	-.05	-.05				-.09	-.05	-.01	.01
Denial & avoidance coping				-.17	-.18+	-.14	-.15				-.15	-.21+	-.11	-.13
Cognitive reconstruction				-.16	-.20*	-.22*	-.21*				-.04	-.10	-.09	-.07
Active and constructive				-.02	-.01	-.01	-.02				-.10	-.14	-.08	.09
Seeking support				.05	.01	.02	.00				.02	.03	-.02	-.04
Step 4 Symptoms T1	.06*							.05*						
Depressive symptoms					.05	.01	.01					.11	.06	.01
Hostility					.36**	.36**	.37**					.30*	.27*	.29*
Step 5 Group X Resources – Interactions	.05							.05						
Step 6 Group X Symptoms – Interactions	.00							.02						
Regression models	$\underline{F}$ (17,64) = 4.83, $\underline{p}$ < .0001; 57% explained							$\underline{F}$ (17,59) = 4.80, $\underline{p}$ < .0001; 58% explained						

Note : The β -values of Steps 5 and 6 interaction effects between the group and resources and symptoms are not presented due to save place.
Step 3 include the impact of all variables statistics represent figures at the final step, when all variables were entered into the equation
+ $p < .10$ * $p < .05$, ** $p < .01$, *** $p < .001$, **** $p < .0001$

Results in Table 4 show that the regression models were significant for anxiety symptoms at T2 (57% variation explained) and T3 (58% variation explained). The significant main effect models (β -values of Step 4) indicate that drug abusing women using low levels of cognitive coping strategies and showing high hostility were most likely to suffer anxiety symptoms when the child was four months (T2). The predictors of T3 (child 12 months) maternal anxiety symptoms were similar to depressive symptoms: drug abuse, low levels of denial and avoidant strategies (marginally) and high level of hostility.

Although the Group X Resources -interaction effect regression models were non-significant for anxiety symptoms at both T2 and T3, the significant Beta-value of the Group X Cognitive coping –interactions at T2 ($\beta = -.24$, $t = -2.54$, $p < .01$) indicated that a low level of cognitive reconstruction coping strategies predicted postpartum anxiety especially in the drug abusing women. Figure 2 illustrates that drug abusing mothers who used high level of cognitive reconstruction coping strategies showed similar level of T2 anxiety symptoms as comparison group.

Figure 2. *Group X Cognitive coping -interaction effects on Anxiety symptoms at 4 months postpartum*



Discussion

We considered it important to study both negative and positive aspects in the lives of the drug abusing women during the crucial transition period to motherhood. The dual design captures the phenomenon that although pregnancy increases stress and risks among drug abusing women, it can also mean an opportunity for positive life-change and self-realization. We were especially interested in whether resources and symptoms differently predict postpartum mental health between the drug abusing and other mothers.

Similar to earlier studies (e.g., Nair et al., 2003), our results confirmed that substance abusing women have an accumulation of burdensome life circumstances. They reported more economic difficulties, lone mothering and low education than comparison group. Research has demonstrated that social support especially from a spouse and own mother is important in pregnancy and can prevent postpartum depression (Field, et al., 2003). The drug abusing women in our study lacked this support and caring, which meant a kind of vicious circle exists in their lives. Women who were the most urgently in need of help had the least opportunity to receive adequate support.

Our results substantiated a high level of depressive symptoms across the transition to motherhood among drug abusing mothers, thus concurring with the earlier findings of elevated depression prenatally (Howell, Heiser, & Harrington, 1999; Pajulo et al., 2001a) and postpartum (Pajulo et al., 2001b). Drug abusing mothers in our study reported more distress than comparison group involving worries about pregnancy, birth, the child and motherhood. They also had a considerably higher level of anxiety symptoms postpartum, which indicated accumulated vulnerability in early motherhood. Moreover, they expressed more hostility, including angry feelings, bitterness and urge to behave aggressively than the comparison women. We could not find earlier research on hostile feelings among pregnant substance abusing women, but clinical observations confirm the phenomenon. Stress and distress in pregnancy can mean a double risk for the future child, as maternal drug abuse can increase toxic impact on fetus development (Mayes & Pajulo, 2006) and maternal stress, depression and hostility contribute to unfavorable fetus development such as over activity, elevated heart rate and possible growth delays (Field et al., 2003).

Reducing maternal stress and hostility in pregnancy is further important, because parental hostility forms a risk for child abuse (Farc, Crouch, Skowronski, & Milner, 2008). Parental hostile-intrusive

behavior toward the infant is found to predict insecure and disorganized attachment styles (Lyons-Ruth & Jacobvitz, 1999) and developmental problems later in childhood (Nix et al., 1999). Our results specified that maternal hostility in pregnancy predicted anxiety symptoms postpartum when the child was four months and depressive symptoms when the child was 12 months. It would be therefore important to tailor treatments for substance abusing mothers that allows them to work through hostility and frustration already in pregnancy. Pregnancy-related distress did not predict mental health problems in transition to motherhood, indicating that focused and specific worries, anxieties and fears were not necessarily transferred into future, while more generalized feelings of anger and frustration do form a risk.

As another example of a vicious circle in risk mothers' lives, our results revealed that drug abusing women lack effective coping resources. Their coping strategies involved less cognitive restructuring and more denial and avoidance than the coping non-abusers. This concurs with the arguments that substance abusers tend to deny and ignore traumatic experiences and avoid painful feelings (Khanzian, 1985; Medrano et al., 2002).

Drug abusing mothers showed higher depressiveness and anxiety than comparison women when their children were four and twelve months. The predictors of these symptoms were somewhat group-specific, which suggests the salience of unique underlying mechanisms among drug dependent mothers in their transition to parenthood. Consistent with our vulnerability hypothesis, prenatal depressive symptoms predicted postpartum depression among drug abusing women more persistently than among non-abusers. Against our vulnerability hypothesis, adequate coping resources, here cognitive strategies, were effective in preventing anxiety especially among drug abusing women. Their ability to mobilize prenatal resources can thus be crucial in preventing the transfer of mental health problems into the mother-child relationship. Our results are thus encouraging in showing that although substance abusing women had less access to resources in the face of the new demands of pregnancy, adequate coping strategies worked effectively among them.

The limitations of the study include a fairly small sample size, non-random assignment to the two intervention groups and self-reported mental health and substance usage. Mothers reported low substance consumption during and after pregnancy. Drug dependent mothers may underestimate their drug use (e.g., because the use is criminal and they have strong fears of losing custody of their children). They

may therefore give more positive responses (Comfort et al., 2003; Suchman et al., 2005). Corroborating self-reports with the objective assessments such as urine drug screening would be recommended. The relatively low drop-out rate suggest that the mothers were motivated to participate in treatment, and were thus not representative of all substance abusing women. On the other hand, drug abusing mothers' low dropouts are in the line with Luthar, Suchman, and Altomare (2007) who reported high retention rates in mothers' short-term psychotherapy groups.

Our comparison mothers belonged to an obstetric risk group, and subsequently there were no significant group dissimilarities in the child's birth weight or length. Generally the infants of substance abusing mothers have been found to be at risk of neonatal problems and low birth weight (Mayet, Groshkova, MacCormack, & Strang, 2008). Another explanation for normative neonatal status is the intervention including the reduction in substance abuse or abstinence from intoxicant substances. We have to keep in mind that the mothers in the comparison group apparently got less systematic psychological support than the drug abusing mothers participating in therapeutic and supportive interventions. Another interesting discovery is the high and fairly similar response rates postpartum between the intervention and comparison groups.

Conclusions

Early motherhood and a substance abuse problem make an exceptionally demanding combination, and there is a great need to develop intensive and accurately-focused clinical interventions that start during pregnancy. The aim of these interventions would be that as many mothers as possible could reach adequate interaction and parenting capacities with her child, and also remain the main caregiver for her child. However, it is very important to be realistic and fully aware of the particularly weak starting points that these mothers have, both in practical and in psychological spheres of life. At the same time, one should cherish the aspect of "hope" and be open to the possibility of change for the better. Individual differences among drug abusing mothers should be considered and the help should be tailored accordingly. The present study was an attempt to increase our knowledge of the psychological circumstances in which the drug abusing mothers and their babies start their shared lives, and how those circumstances differ from "ordinary" mother-baby dyads. Although preliminary, our findings encourage us to believe that it is

possible to reduce the transfer of negative burdens on mother-child interactions by helping the mother cope effectively and enjoy social and psychological support during the transition from pregnancy to postpartum.

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