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Increased Psychological Distress in Post-Partum, Cocaine-Using Mothers

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This study investigated psychological symptoms, self-reported postpartum by poor, primarily African American women who used cocaine during pregnancy. Ninety-nine cocaine-using mothers (COC+) were compared to 44 noncocaine-using mothers (COC−) on standardized measures of psychological distress and verbal comprehension. Mothers were interviewed to determine extent of drug involvement. COC+ mothers reported using alcohol, marijuana, and tobacco at two to three times the rate of comparison mothers during pregnancy and reported earlier initiation of marijuana use. COC+ women were more likely to admit to interpersonal difficulties and to report phobic anxiety and paranoid ideational symptoms. The COC+ group was also more likely to have clinically elevated scores on subscales indicating feelings of personal inadequacy, phobic anxiety, and paranoia. The use of cocaine, in combination with either alcohol or marijuana, was the best predictor of psychoticism, hostility, and total number of distress symptoms.

Maternal use of "crack" cocaine has come to the public's attention due to reports indicating that as many as 10% to 15% of newborn infants in urban hospi-

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tal nurseries are born after prenatal cocaine exposure (Chasnoff, Landress, & Barrett, 1990; Gillogley, Evans, Hansen, Samuals, & Bantra, 1990). Minority women of low socioeconomic status (SES) are most likely to use the relatively inexpensive, highly addictive, smokable form of cocaine called *crack*.

A range of psychological and social problems have been identified in substance abusers (Campbell & Stark, 1990; O'Connor & Berry, 1990; Robbins, 1989). Specific to cocaine-using populations, initial feelings of euphoria, alertness, and mental clarity induced by cocaine often are replaced with distress symptoms such as depression, sleep disturbances, a greater incidence of personality disorders, psychotic tendencies, lack of purpose, and overall poor social functioning (Griffin, Weiss, Mirin, & Lange, 1989; Kleinman et al., 1990; Newcomb, Bentler, & Fahy, 1987). Previous studies have focused primarily on male populations, have lacked adequate control groups, and have been biased toward sampling persons of higher social class, or those entering drug treatment programs. In particular, minority women of low SES have been underrepresented.

This study investigated differences in self-reported psychological symptoms between cocaine-using and noncocaine-using poor, African American, postpartum mothers. Cocaine use was hypothesized to relate to increased psychological distress based on prior studies. Because of the known prevalence of polydrug use among cocaine-using women, the effects of cocaine use were examined relative to, and in combination with, other drugs.

METHOD

Subjects

One hundred and forty-three postpartum women (99 cocaine-using; 44 noncocaine-using) were recruited from a high-risk infant follow-up clinic at a large urban teaching hospital in the Midwest. All mothers were receiving public assistance, and 98% were African Americans. Cocaine or control status was determined by results of maternal and infant urine drug screen at the time of delivery and/or clinical interview. Urine samples were obtained immediately before or after labor and delivery and were analyzed by enzyme immunoassay, using the Syva Emit method (Syva Company, Palo Alto, CA), for the presence of cocaine's primary metabolite, benzoylecgonine, and for barbiturates, marijuana, and heroin. The specificity for benzoylecgonine is 99% at a concentration of 0.3 mg/ml. Follow-up gas chromatography analyses were not performed.

Control mothers were women of the same race, social class, and high-risk group who were negative for cocaine use based on both urine screen and clinical interview findings. Women who were referred because of concerns about psychiatric status or low intellectual status were excluded, as were women with positive HIV status, or whose drug tests were positive for PCP or amphetamines. Women who used alcohol, marijuana, or tobacco were not excluded from either group.

Table 1. Means and Standard Deviations of Demographic Characterisitics

Variable	Cocaine (n = 99)	Noncocaine (n = 44)	t/χ^2	p
Race[a]	98%	98%	3.1	n.s.
Maternal age (years)	27.0 ± 5	23.3 ± 5	4.1	<.001
Gravida	3.9 ± 2.3	2.9 ± 1.6	3.1	<.01
Number of prenatal visits	4.5 ± 4	5.3 ± 4	1.2	n.s.
Alcohol use	70%	30%	17.2	<.001
Marijuana use	47%	13%	12.8	<.001
Cigarette use	84%	33%	30.7	<.001

[a] = percentage African American.

Procedures

Measures of psychological distress, cognitive functioning, and an extensive interview concerning cocaine, alcohol, marijuana, and cigarette use during pregnancy were administered to each mother as soon as possible after the birth of her child. Specific measures included the following:

- The Beck Depression Inventory (BDI; Beck, Steer, & Garben, 1988) is a standardized, normed, widely used self-report measure of adult clinical depression. Items in the BDI reflect intensity of depression and include those related to both mental and physical symptoms.
- The Brief Symptom Inventory (BSI; DeRogatis, 1992) is a widely used 53-item self-report questionnaire designed to evaluate a range of psychiatric symptoms. The scale yields three global indices of symptom severity, the Positive Symptom Total, Positive Symptom Distress Index, and Global Severity Index, as well as nine subscales (see Table 3). Cronbach's alpha for global and individual scales ranges from .71 to .83. Test–retest reliability varies from .68 to .91. Validity has been demonstrated through its relationship to content scales and cluster scores of the Minnesota Multiphasic Personality Inventory (MMPI), r varying from .30 to .72.
- The Peabody Picture Vocabulary Test (PPVT; Dunn & Dunn, 1981) is a brief screening measure used to assess maternal verbal comprehension. Internal consistency ranges from .73 to .84, and test–retest reliabilities vary from .76 to .79. The PPVT–R is highly correlated with various IQ scales.
- The Post-Partum Maternal Questionnaire (adapted from Streissguth, 1986a, 1986b) quantifies maternal alcohol and drug use during pregnancy and 1 month prior to conception. Mothers' reports of age of first use and duration of use (in years) of alcohol, marijuana, cocaine, and tobacco were considered indirect measures of severity and chronicity of drug use.

Demographic and medical characteristics, taken from hospital birth records, included race, age, gravidity, number of prenatal care visits, family composition, and school or work history.

Analyses

Because of skewed distribution, all BSI scores were normalized using square root or logarithmic transformations prior to analyses. Group comparisons were conducted using t tests or χ^2 analyses. For the BSI, all t tests were one-tailed based on the study's initial hypothesis that cocaine-using women would experience more distress. All other comparisons were two-tailed. For the BSI, two separate multivariate analyses of variance (MANOVAs) were conducted on the individual and summary subscales prior to single comparisons. Correlational and stepwise multiple regression analyses also were conducted to assess the interrelationships among variables and to assess the contribution of various drugs to maternal distress.

Results

Demographic and medical characteristics of the two groups are presented in Table 1. Cocaine-using mothers were older, with more previous pregnancies. More of the cocaine-using women also used alcohol, marijuana, and tobacco. The percentage of cocaine-using women self-reporting alcohol, marijuana, and tobacco use was two to three times the rate of the comparison group.

Drug Use History

Cocaine-using mothers reported initiating alcohol and cigarette use at similar ages (see Table 2). Cocaine-using women reported initiation of alcohol use in

Table 2. Maternal Drug Use History

Variable	Cocaine (n = 81)	Noncocaine (n = 39)	t	p
Age of first use (years)				
Cigarettes	15.3 ± 3	16.2 ± 5	.8	n.s
Alcohol	15.8 ± 4	16.8 ± 3	1.2	n.s.
Marijuana	15.8 ± 3	17.3 ± 3	1.8	<.08
Cocaine	23.1 ± 5	—		
Duration of use (years)				
Cigarettes	10.3 ± 7	3.5 ± 6	7.2	<.01[a]
Alcohol	8.7 ± 7	1.5 ± 3	18.6	<.001[a]
Marijuana	6.3 ± 6	1.2 ± 3	4.3	<.05[a]
Cocaine	3.3 ± 4	—		

[a] After statistical adjustment for maternal age.

their midteens, at a mean of about 16 years. There was a trend for cocaine-using women to report initiation of marijuana use at an earlier age, about 1.5 years earlier than noncocaine-using women. Cocaine-using women tended to be chronic users of the drug, with a mean duration of over 3 years of use. Even after controlling for maternal age, mothers who used cocaine during pregnancy also reported using alcohol, marijuana, and cigarettes for a greater number of years than nonusing mothers.

Intellectual Level and Psychological Symptoms

No group differences were found on either mean BDI or mean PPVT scores. Both groups did poorly on the PPVT, with means falling more than one standard deviation below published norms.

A MANOVA assessing differences between cocaine-using and noncocaine-using mothers on the BSI scales was not significant. However, when individual *t* tests were calculated for separate symptom domains, cocaine-using mothers had significantly poorer scores on two of the nine subscales when compared to noncocaine-using mothers (Table 3). Cocaine-using women were more likely to admit to having experienced more phobic anxiety symptoms and paranoid ideational symptoms. There were also trends for interpersonal relationships, and summary scores of Total Score and General Severity Index. BSI results by group also were examined for clinically significant elevations, that is, the percentages of mothers in each group whose scores were greater than the 84th or 98th percentile based on published BSI normative data for nonpatient females. More cocaine-using women were likely to have elevated scores (≥ 98th percentile) on the Paranoid Ideation scale (20% vs. 9%, $zc = 1.74$, $p < .05$) and the General Severity Index (5% vs. 0%, $zc = 1.71$, $p < .05$).

Table 3. Group Differences on Brief Symptom Inventory Subscales

Variable	Cocaine ($n = 99$)	Noncocaine ($n = 44$)	t one tail	p
Somatization	.34 ± .46	.26 ± .41	1.0	n.s.
Obsessive Compulsive	.51 ± .58	.42 ± .55	.8	n.s.
Interpersonal Sensitivity	.68 ± .70	.50 ± .57	1.6	<.06
Depression	.56 ± .69	.48 ± .62	.6	n.s.
Anxiety	.38 ± .59	.34 ± .53	.4	n.s.
Hostility	.57 ± .65	.49 ± .46	.8	n.s.
Phobic Anxiety	.41 ± .66[a]	.19 ± .37	2.6	<.01
Paranoid Ideation	.85 ± .81[a]	.57 ± .59	2.3	<.01
Psychoticism	.48 ± .58[a]	.36 ± .42	1.4	<.10
Total BSI	27 ± 26	21 ± 19	1.6	<.06
Positive Symptom Total	16 ± 10	14 ± 11	.9	n.s.
Positive Symptom Distress Index	1.6 ± .6	1.7 ± .8	1.3	n.s.
Global Severity Index	.52 ± .49	.41 ± .37	1.5	<.07

[a]Clinically elevated range.

Table 4. Significant Pearson Correlations of Maternal Substance Use History and BSI Subscales

BSI Subscales[a]	Alcohol	Marijuana	Cocaine
Somatic	.19*	.17	—
Obsessive Compulsive	.22*	.17	—
Interpersonal Sensitivity	—	.15	—
Depression	.22*	—	—
Anxiety	—	.15	—
Hostility	.20*	.22*	—
Phobic Anxiety	—	.16	.17*
Paranoid Ideation	.21*	—	.17*
Total BSI	.21	.20*	—
Global Severity Index	.22*	.20	—
Positive Symptom Total	.27**	.20*	—

[a]All correlations with cigarette smoking were nonsignificant.
*$p < .05$.
**$p < .01$

There were trends for cocaine-using women to have elevated scores on the Interpersonal Sensitivity scale (9% vs. 2%, $zc = 1.6$, $p < .06$). Also, when more moderate levels (≥ 84th percentile) were considered, there was a trend for cocaine-using women to have clinically elevated symptoms of phobic anxiety (20% vs. 11%, $zc = 16$, $p < .06$).

Alcohol use had the strongest and most frequent significant relationship to psychological symptoms, but both marijuana and cocaine use also were weakly related to an increase in psychological distress (see Table 4). Cigarette smoking was unrelated to any symptom.

Drug Predictors of Distress Symptoms

To assess the relative contributions of various drugs to the differences between groups, a series of stepwise multiple regression equations were calculated. Cocaine, alcohol, and marijuana use, and their interaction terms (cocaine × alco-

Table 5. Significant Stepwise Regression Statistics for the Prediction of Maternal Distress

Criterion and Predictors	R^2	F	p
Paranoid Ideation: Alcohol	.08	7.3	<.009
Marijuana	.12	5.8	<.004
Psychoticism: Cocaine × Alcohol	.03	3.0	<.09
Hostility: Cocaine × Marijuana	.04	3.8	<.05
Interpersonal Sensitivity: Alcohol	.04	3.3	<.07
Total: Cocaine × Alcohol	.05	4.3	<.05
Positive Symptom Total: Alcohol	.05	4.1	<.05

Table 6. Interaction Effect of Alcohol and Cocaine Use on Total BSI and Psychoticism Scores

	Alcohol −		Alcohol +	
BSI Total	*M*	*SD*	*M*	*SD*
Cocaine −	17.9	17.9	25.6	19.5
Cocaine +	22.4	20.4	31.5	29.4
Psychoticism				
Cocaine −	.36	.42	.42	.45
Cocaine +	.37	.56	.53	.59

hol and cocaine × marijuana) were the independent dichotomous variables used to predict scores on the BSI subscales.

As illustrated in Table 5, maternal drug use accounted for a significant portion of the variance in the specific symptoms of paranoid ideation, hostility, and the summary scores of Total Score and Positive Symptom Total. Alcohol use was the strongest predictor of symptoms of paranoia, accounting for 8% of the variance. After accounting for the effects of alcohol, marijuana use also was a significant predictor of paranoid symptoms, accounting for an additional 4% of the variance. Alcohol use was also the strongest predictor of the total number of distress symptoms endorsed. There were trends ($p < .10$) for alcohol use to predict higher levels of interpersonal sensitivity and for combined use of cocaine and alcohol to predict increased psychoticism. Maternal use of cocaine, combined with alcohol and/or marijuana use, was the best predictor of symptoms of hostility and the Total Score on the BSI. The effects of combined usage of cocaine with either marijuana or alcohol on psychological distress are illustrated in Tables 6 and 7.

DISCUSSION

This study indicates that poor, primarily African American, urban women who used cocaine during pregnancy were likely to report elevated symptoms of psychological distress postpartum compared to noncocaine-using women of sim-

Table 7. Interaction Effect of Marijuana and Cocaine Use on Hostility Score

	Marijuana −		Marijuana +	
Hostility	*M*	*SD*	*M*	*SD*
Cocaine −	.43	.36	.52	.76
Cocaine +	.46	.56	.76	.79

ilar race, social class, and risk status. Consistent with another study of rural, postpartum cocaine-using women (Woods, Eyler, Behnke, & Conlin, 1993), we did not find significant differences in level of maternal depressive symptoms. However, cocaine-using mothers were more likely to have stronger feelings of personal inadequacy and discomfort with interpersonal interactions, and more severe phobic anxiety symptoms. In particular, paranoid symptoms were more severe, and in a clinically elevated range. Similarly, psychoticism symptoms, indicative of a withdrawn, isolated lifestyle, were also in a clinically elevated range for the cocaine-using mothers.

The lack of findings related to increased depressive and somatic symptoms in this population is somewhat surprising given prior reports (Zuckerman, Amaro, Bauchner, & Cabral, 1989). However, our mothers were all seen postpartum when depressive and somatic symptoms are frequently elevated and may have masked group differences. Comparison mothers in this study were drawn from the high-risk clinic and might be expected to experience higher distress symptoms than a randomly recruited sample, thus further obscuring some differences between groups.

These findings highlight the need for individual psychological screening and assessment of cocaine-using women in conjunction with drug treatment efforts, as well as the need for tailoring intervention programs to the specific symptoms of the clients. Efforts to engage women who are feeling paranoid and suspicious and avoidant of relationships would differ markedly from those toward clients with acute internalizing symptoms, such as depression and anxiety. In this study, the data format did not lend itself to assessing whether mothers' symptoms were related to their concurrent level of drug and alcohol use, as the interview assessed use during pregnancy as a whole and did not distinguish between symptoms that occurred while using from those occurring while sober (cf. Liepman et al., 1989; Nirenberg, Liepman, Begin, Doolittle, & Broffman, 1990) or whether the mothers were sober during the interview. Whether mothers were actively using drugs or were in treatment and had discontinued use would be an important factor in understanding maternal psychological status. The risk that fetal cocaine exposure imposes on later child outcome may be exacerbated by the additional and separate contribution of the effects of being raised by a mother with significant psychological impairments related to habitual drug use.

Symptoms reported in this sample are particularly troublesome given maternal need to begin the parenting task of establishing a warm, empathic relationship with her infant. Animal studies have indicated that cocaine-fed pregnant rats were more hostile and aggressive mothers. When foster pups who were not themselves fetally exposed to cocaine were raised by these mothers their behavior was negatively affected (Heyser, Molina, & Spear, 1992). In studies of the children of mothers on methadone maintenance, those whose mothers had symptoms of personality disorders had the poorest outcomes at 2 years (Hans, Bernstein, & Henson, 1990).

There was also a trend for cocaine-using mothers to have initiated marijuana use at an earlier age, by midteens, suggesting that drug treatment and prevention efforts should be focused on adolescents.

The finding that alcohol was the best single predictor of several maternal psychological symptoms may be related to the fact that alcohol use was reported much more frequently than marijuana or cocaine use. That cocaine contributed to predicting maternal psychological distress in interaction with alcohol suggests that cocaine, as a stimulant, may have particular psychopharmacologic properties, such as euphoria and energy, that make it an attractive self-medication. Our findings also highlight the need to assess the impact of cocaine use in combination with other frequently used drugs (Singer, Arendt, Song, Warshawsky, & Kliegman, 1994).

A limitation of this study is that the levels of distress prior to drug use or prior to pregnancy were not ascertainable, precluding causative statements regarding cocaine use and psychological distress.

Increased efforts toward early identification of pregnant women and mothers whose drug use is most likely to be associated with significant symptoms is important, as such mothers may have difficulty providing an adequate psychosocial environment for their newborns.

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