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Psychopathology and treatment outcome of drug dependent women in a perinatal program

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Abstract

One hundred and five drug-dependent women in outpatient perinatal addiction treatment were classified by cluster analysis of the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) profiles into high and low psychopathology (HP and LP) groups that differed on three validation measures. The HP group ($n = 29$, 27.6%) had elevations on MMPI-2 Scales F, 2, 4, 6, 7, and 8, while the LP group ($n = 76$, 72.4%) generated a normal range profile with elevations on Scales F and 4. Psychological outcomes differed by group. HP participants showed reduced alcohol, family, and psychiatric severity, and reduced depressive symptoms, while LP subjects showed reduced drug, self-debasing, and acting-out problems. Data suggest the need for lower intensity services for the majority of the perinatal drug dependent population with LP.

1. Introduction

How does psychopathology impact treatment outcome in women and perinatal drug-dependent women? Drug-dependent women are significantly different from men in greater severity of psychopathology (DeLeon & Jainchill, 1991; Galen, Brower, Gillespie, & Zucker, 2000; Griffin, Weiss, Mirin, & Lange, 1989; Moras, 1998), legal and social problems including parenting demands, access to treatment, barriers to treatment, absence of abstinence-supporting social structures (Moras, 1998; Morris & Schinke, 1990), and more negative stereotyping (Erickson & Murray, 1989). Psychological distress may play a large role in a woman's decision to seek treatment (Smith, Dent, Coles, & Falek, 1992). A recent study found that perinatal drug-dependent women with alcohol dependence scored higher in psychopathology and exhibited worse treatment outcomes (Miles, Svikis, Kulstad, & Haug, 2001), suggesting a link between dependence, psychopathology, and outcome.

Although they differ from men, drug-dependent women are a heterogeneous group, and subgroups may respond differentially to treatment. Haller and Dawson (1997) found that treatment response varied by Millon Clinical Multiaxial Inventory-II (MCMI-II) cluster groups among perinatal drug-dependent women. The first cluster had early onset and family history,

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similar with the Type II profile described by Cloninger (1987). The second cluster had a normal profile, except for drug dependence. The third cluster was a psychiatrically disturbed group with extreme pathology. Cluster 1 showed no response to treatment, while Cluster 2 manifested no psychopathology or addiction severity problems at follow-up. Cluster 3 improved on addiction problems but not in psychopathology. Similarly, other researchers found that perinatal drug-dependent women evidenced 3 MCMI-II clusters: low, moderate, and high risk, whose outcome varied (Howard, Espinosa, & Beckwith, 1997). Parenting gains depended on psychopathology status. Taken together, these results indicate that cluster analysis with the MCMI-II can identify distinct groups of drug-dependent women, and that outcome varies by psychopathology cluster.

The purpose of this study was to identify clinically relevant subgroups within a sample of perinatal drug-dependent women and to examine the subgroups' psychopathology outcomes in an intensive perinatal program using the Minnesota Multiphasic Personality Inventory-2 (MMPI-2).

2. Method

The participants were 105 drug-dependent women, who were pregnant or less than 6 months postpartum upon first-time admission to the treatment program, with valid profiles on the MMPI-2. Of the participants, 46 completed discharge assessments and were included in the treatment outcome component of the study. The setting was the Center for Perinatal Addiction (CPA), which provided comprehensive, multimodality day treatment for pregnant and recently postpartum women under a "one-stop shopping" treatment model. Women received 24 hours of intervention per week, including obstetric and pediatric care, psychological assessment, interpersonally focused group, family, and individual psychotherapy, life-skill groups, and child care during services. A more complete description of the program is available (Haller, Knisely, Dawson, & Schnoll, 1993).

2.1. Measures and variables

Demographic information was collected using the Division of Substance Abuse Medicine Intake Form (DSAM Intake Form, DSAM, 1990). The *Structured Clinical Interview for DSM-III-R (SCID)*; Spitzer, Williams, Gibbon, & First, 1988) was used to determine the presence of major Axis I disorders including mood disorders, anxiety disorders, and drug or alcohol dependence. The Structured Interview for DSM-III-R Personality Disorders (*SIDP-R*; Pfohl, Blum, Zimmerman, & Stangl, 1989) was used to determine *DSM-III-R* Axis II diagnosis. The Symptom Checklist 90-R (SCL-90-R, Derogatis & Cleary, 1977) measured psychiatric distress during the past seven days. The MMPI-2 (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) and MCMI-II (Millon, 1987) were used to assess personality pathology and disorders. The Addiction Severity Index (ASI; McLellan et al., 1992) composite scores were used to assess severity in seven areas: psychiatric, family/social, medical, employment, drug use, alcohol use, and legal.

The women completed an informed consent, process approved by the IRB, and provided written informed consent. Intake assessments were administered in 4-hour time blocks prior to the initiation of treatment. At the time of discharge, or 20 weeks, the participants completed discharge measures.

2.2. Data analyses

2.2.1. Cluster validity—Hierarchical cluster analysis tested for homogeneous subgroups within the full sample using SAS Version 8 Proc Cluster (Ward, 1963). A validation method (Wieczorek & Miller, 1992) was used to determine whether the MMPI-2 clusters represented

meaningful groups, rather than mere artifacts of this particular measure. Specifically, *t* tests compared the means of the cluster groups' scores on the global severity index (GSI) of the SCL-90-R and the psychiatric severity composite of the ASI. Two-tailed Fisher's Exact Tests were used to identify which diagnoses on the SCID and SIDP-R differed by MMPI-2 cluster group membership. Lastly, two logistic regression analyses were used to determine if aggregated MCMI-II Axis I and II diagnoses varied by group.

2.2.2. Differential outcomes by cluster—A mixed-models repeated-measures ANOVA (Laird & Ware, 1982) tested for between-time (intake vs. discharge) and between-groups simultaneously for all scales within a given instrument. If the multivariate procedure revealed interactions, follow-up univariate *t*-tests were used to examine the differences from intake to discharge on individual scales by group. Length of stay was compared for each group using SAS Proc Lifetest to determine whether the Kaplan-Meier survival curves differed. Retention measures, including type of discharge, and loss to follow-up were examined for each group, and rates were compared using Fisher's Exact Test.

3. Results

3.1. Demographic characteristics

Table 1 shows the demographic characteristics of the total sample and the characteristics of the subgroup with outcome data versus those with intake data only. The 46 participants with outcome data did not differ from the 59 participants with intake data only.

3.2. MMPI-2 clustering

Cluster analyses revealed two homogeneous subgroups on the MMPI-2. This solution was translated into an algorithm that classifies a participant as high psychopathology (HP) if the MMPI-2 Scales F, 2 (D, depression), 4 (PD, psychopathic deviate), 6 (PA, paranoia), 7 (PT, psychasthenia), and 8 (SC, schizophrenia) summed to 412 or above, and as low psychopathology (LP) otherwise. Plots of the mean MMPI-2 profiles for the two clusters are shown in Fig. 1. HP participants had elevations on MMPI-2 Scales F, 2, 4, 6, 7, and 8, while LP participants generated a normal range profile, with mild elevations, on Scales F and 4 only. The demographic characteristics of those classified into the HP and LP groups are provided in Table 1. The 76 LP participants (72.4% of the total sample) did not differ from the 29 HP participants (27.6% of the total sample) on any baseline variable.

3.3. Validation of clusters

The HP and LP clusters had significantly different means on two measures of psychiatric severity and Axis I and II psychopathologies from three instruments, depicted in Table 2. Psychiatric severity was significantly higher in the HP group than the LP group on both the GSI of the SCL-90-R and the ASI mean psychiatric severity composite score. Psychopathology on the SCID and SIDP-R also differed between groups. Major depression was diagnosed significantly more often in the HP (41.4%) than in the LP (18.4%) group on the SCID. The LP group had a higher rate of drug dependence diagnoses (98.7%) than the HP group did (86.2%) on the SCID. HP evidenced a higher rate of diagnosis in paranoid personality (HP 37.9% vs. LP 13.2%), dependent personality (HP 27.6% vs. LP 10.5%), borderline personality (HP 27.6% vs. LP 9.2%), and self-defeating personality (HP 44.8% vs. LP 15.8%) disorders.

For further validation, we compared the two cluster groups on their scores on Axis I and II disorders ($N = 104$, 29 HP and 75 LP). A logistic regression analysis modeling the likelihood of HP predicted by the nine MCMI-II Axis I disorders was significant (multivariate likelihood ratio χ^2 with 9 *df* = 45.18, $P < .0001$). Similarly, a logistic regression analysis modeling the likelihood of HP predicted by the 13 MCMI-II Axis II disorders was significant (likelihood

ratio χ^2 with 13 $df = 37.04$, $P < .0004$). Consistent with validation analyses with the SIDP-R and SCID at intake, these analyses indicate that HP and LP participants also differed on MCMI-II disorders, aggregated into Axis I and II disorders.

3.4. Outcome in the clusters

Forty-six of the 105 participants had complete data for intake and discharge assessments: 13 (28.3%) were HP and 33 (71.7%) were LP. There was no difference by group in the length of stay in the program, detected in the Kaplan-Meier survival rates by group (log-rank $\chi^2 = 0.29$, ns). There was also no difference by cluster group in the type of discharge, with 31% of the HP and 33% of the LP completing the program, 34% of the HP and 42% of the LP leaving AMA, 31% of the HP and 24% of the LP administratively discharged, and 3% of the HP and 1% of the LP referred out.

Table 3 presents the outcome results for each cluster group on the ASI and MCMI-II. In contrast to no difference between groups on the SCL-90-R, the groups showed differential improvement on the other three tests examined, and univariate analyses were conducted. On the ASI, significant interactions were found between assessment times (intake and discharge) and cluster group (HP and LP) in the mean composite scores using a mixed-models repeated measures analysis of variance. This interaction indicates that differences varied by group (likelihood ratio $\chi^2 = 144.37$, $P < .0001$). Univariate analyses revealed that the LP had a significant improvement in the drug composite, and the HP improved in the alcohol, family, and psychiatric severity composite scores.

Similarly, on the MCMI-II, differences between intake and discharge varied by group in the mixed models repeated measures analysis of variance (likelihood ratio $\chi^2 = 152.03$, $P < .0001$). Post hoc univariate tests revealed that both the HP and LP improved on the debasement and dysthymia scales. The HP showed additional decreases on the major depression scale, and the LP exhibited significantly decreased scores on the borderline scale.

4. Discussion

Among perinatal drug-dependent women, we identified two levels of psychopathology, high and low, using cluster analysis. These clusters, derived from the MMPI-2, were validated with alternative measures of psychiatric severity and psychiatric diagnosis. Subjects classified in the HP group by the MMPI-2 cluster analysis had greater psychopathology, as measured by both standardized personality inventories and structured clinical interviews than participants classified in the LP group by the MMPI-2 cluster analysis. We conclude that the HP and LP clusters represent real, clinically relevant differences in the two groups. These results indicate that the MMPI-2 can identify distinct groups in perinatal drug-dependence treatment and provide an alternative to the MCMI-II. The cluster groups seem comparable with two of the three clusters previously identified by Haller and Dawson (1997) and Howard et al. (1997) in that the HP group was smaller and had a range of psychiatric problems in both Axis I and II disorders, while the LP group was the larger group, had less serious psychopathology, and more symptoms related to drug dependence. The evidence is accumulating that there are at least two types of perinatal drug-dependent women, with distinct differences in type and severity of psychopathology. It is important to note that the groups were not identifiable by examining demographic characteristics, indicating a clear role for personality assessment in treatment planning for this group.

Attrition limits our ability to determine whether the differential outcomes observed in the HP and LP clusters would have been observed in the whole perinatal drug-dependent sample. This concern is moderated because those with and without outcome measures did not differ on demographic characteristics at baseline, and the HP and LP groups showed minimal differences

(only in employment) on demographic characteristics at baseline. The HP group would be expected to show improvement on a greater number of scales due either to regression to the mean or the restricted range in the LP group. However, the breadth of change was not necessarily greater in the HP group than in the LP group. Dropout from intensive perinatal programs is not uncommon (Svikis et al., 1996). However, due to this limitation, our conclusion that psychopathology level yields differential psychological outcomes should be replicated by others.

The identification of the types of psychopathology within a perinatal drug-dependent sample may be a step towards developing cost-effective treatment programs for this group, as has already been done for men (McLellan & Alterman, 1991). Although some participants manifested severe psychopathology, the majority of drug dependent women in perinatal treatment were classified as having low psychopathology and may not have required high-dose, extensive treatment. It is important to note that the rates of retention or type of discharge did not vary by psychopathology group. It is possible that pregnant and parenting women with low or moderate psychopathology might have benefited from briefer, less intensive treatment, or that an interaction among the psychopathology types and levels of service might be found similar with that identified in drug-dependent men (McLellan, 1986; McLellan et al., 1983a). The fact that 72% of the sample was LP, coupled with our high observed dropout rate from the required 24 h/week of treatment services, suggests the need for a range of less intensive treatment services for this population, matched to patient psychiatric severity and other needs (McLellan & Alterman, 1991; McLellan et al., 1983b). Comprehensive services may be best suited to those with extensive psychopathology in addition to drug problems and acting-out behavior patterns. Future research should examine whether briefer or less intensive psychosocial drug treatment, perhaps paired with obstetrical care, yields successful outcome in pregnant, drug-dependent women with lower psychopathology.

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Fig. 1.
Mean intake MMPI-2 profiles of HP and LP clusters.

Table 1

Subject demographic characteristics at intake

Characteristic	Total sample		Outcome subject		Intake-only subject		χ^2 Value	Low psychopathology cluster		High psychopathology cluster	χ^2 Value
	n	%	n	%	n	%		n	%	n	%
Race	105	100	42		61		ns	76		29	5.71 ns
African-American	86	81.9	35	83.3	49	80.3		66	86.8	20	69.0
Caucasian	18	17.1	7	16.7	11	18.0		9		9	31.0
Native American	1	1	0	0	1	1.6		1	1.3	0	0
Educational level	100	95.2	42		56		1.69 ns	72		28	0.15 ns
Less than high school	44	44	18	42.9	25	44.6		31	43.1	13	46.4
High school diploma ^d	35	35	13	31.0	22	39.3		26	36.1	9	32.1
More than high school	21	21	11	26.2	29	16.1		15	20.1	6	21.4
Employment status	99	94.3	42		55		3.19 ns	71		28	FE=.07
Full time	2	2	0	0	1	1.8		1	1.41	1	3.57
Part time	1	1	0	0	1	1.8		0	0	1	3.57
Unemployed	93	93.9	42	100	51	92.7		69	97.2	24	85.7
Other ^b	3	3	0	0	2	3.6		1	1.41	2	7.1
Marital status	100	95.2	42		56		3.99 ns	72		28	1.53 ns
Single, never married	74	74	28	66.7	44	78.6		53	73.6	21	75.0
Married	5	5	4	9.5	1	1.8		3	4.2	2	7.1
Separated	18	18	8	19.1	10	17.9		13	18.1	5	17.9
Divorced	3	3	2	4.8	1	1.8		3	4.2	0	0
Legal status	100	95.2	42		56		3.44 ns				0.56 ns
Clear	48	48	17	40.5	31	55.4		33	45.8	15	53.6
Paroled	5	5	2	4.8	3	5.4		4	5.6	1	3.6

Characteristic	Total sample		Outcome subject		Intake-only subject		χ^2 Value		Low psychopathology cluster		High psychopathology cluster		χ^2 Value	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Probation	27	27	15	35.7	11	19.6	20	27.8	7	25				
Pending charges	20	20	8	19.1	11	19.6	15	20.8	5	17.9				
Cigarette smoker	101	96.2	42		59				74		27			0.00 ns
Yes	75	74.3	31	73.8	44	77.2			55	74.3	20	74.1		
No	26	25.7	11	26.2	13	22.8			19	25.7	7	25.0		
Primary drug of abuse	105	100	42		61				76		29			8.56 ns
Cocaine/crack	83	79.0	34	81.0	49	80.3			61	80.3	22	75.9		
Alcohol	9	8.6	3	7.1	6	9.8			4	5.3	5	17.2		
Heroin/other opiates	9	8.6	5	11.9	2	3.3			8	10.5	1	3.5		
Primary drug of abuse														
Cannabis	3	2.9	0	0	3	4.9			3	3.6	0	0		
Hallucinogens	1	1	0	0	1	1.6			0	0	1	3.5		

There were no differences in the mean number of children between high and low psychopathology cluster groups ($t = 0.63$, ns) or between the subgroups with outcome data or intake data only [$t(103) = 1.01$, ns]. Fisher's Exact Test (indicated by FE) was used when χ^2 expected values were 5 or less in 25% or more of cells.

^aIncludes GED and Trade School Diplomas equivalent to completion of 12th grade.

^bIncludes two students and one homemaker.

Table 2

Validation of MMPI-2 clusters: Comparing clusters on alternative measures of psychiatric severity

Measure	High psychopathology cluster group					Low psychopathology cluster group					Test Value	
	n	Mean	S.D.	Min	Max	n	Mean	S.D.	Min	Max	t	Test value
SCL-90-R global severity index	29	67.14	7.51	37	81	76	60.01	8.08	37	79	3.47	***
ASI psychiatric composite score	12	0.34	0.13	0	0.64	29	0.16	0.14	0	0.55	2.94	**
<i>SIDP-R Axis II disorders</i>												
Paranoid	10		13.2		11		37.9	$\chi^2 = 8.05^{**}$				
Schizoid	3		3.9		2		6.9	FE = 0.30, ns				
Schizotypal	3		3.9		3		10.3	FE = 0.16, ns				
Obsessive-compulsive	7		9.2		6		20.7	FE = 0.07, ns				
Histrionic	20		26.3		11		37.9	$\chi^2 = 1.36$, ns				
Dependent	8		10.5		8		27.6	FE = 0.03*				
Antisocial	22		28.9		11		37.9	$\chi^2 = 0.79$, ns				
Narcissistic	6		7.9		6		20.7	FE = 0.05, ns				
Avoidant	3		4.0		2		6.9	FE = 0.30, ns				
Borderline	7		9.2		8		27.6	FE = 0.02*				
Passive-aggressive	19		25.0		12		41.4	$\chi^2 = 2.71$, ns				
Sadistic	4		5.3		3		10.3	FE = 0.21, ns				
Self-defeating	12		15.8		13		44.8	$\chi^2 = 9.76^{**}$				
PDNOS ^a	4		5.3		1		3.5	FE = 0.36, ns				
<i>SCID Axis I disorders</i>												
Bipolar	2		2.6		0		0	FE = 0.52, ns				
Major depression	14		18.4		12		41.4	$\chi^2 = 5.94^*$				
Dysthymia	3		3.9		3		10.3	FE = 0.16, ns				
Alcohol dependence	34		44.7		15		55.2	$\chi^2 = 0.92$, ns				
Drug dependence	75		98.7		25		86.2	FE = 0.02*				
Panic disorder	1		1.3		1		3.4	FE = 0.41, ns				

	Number diagnosed (<i>n</i>)	Percent diagnosed	Number diagnosed (<i>n</i>)	Percent diagnosed	Chi-square (χ^2) or Fisher's Exact (FE) Test
Social phobia	5	5.3	5	17.2	FE = 0.05, ns
Simple phobia	11	14.5	3	10.3	FE = 0.23, ns
Obsessive compulsive	4	5.3	4	13.8	FE=0.11, ns
Generalized anxiety disorder	4	5.3	1	3.4	FE = 0.39, ns
Bulimia nervosa	0	0	1	3.4	FE = 1.28, ns

A woman was diagnosed if the disorder was present in the last month at subthreshold or above. Although all criteria were assessed on the SCID, no women were diagnosed with agoraphobia, anorexia nervosa, depressed syndrome, hypochondriasis, somatization disorder, somatoform pain disorder, or undifferentiated somatoform disorder. Fisher's Exact Test was used in cases where the expected value of 25% or more of the table's cells was less than 5. FE represents the Fisher's Exact Test probability.

^aPDNOS = personality disorder not otherwise specified.

* $P < .05$.

** $P < .01$.

*** $P < .001$.

Table 3

Psychological outcomes for low psychopathology (LP) and high psychopathology (HP) subjects

Measure	Score/scale	LP		HP		t-Test value
		Intake mean	Discharge mean	Intake mean	Discharge mean	
ASI		n = 33, df = 64		n = 13, df = 24		
	Medical composite score	0.35	0.24	0.50	0.20	-1.69
	Employment composite score	0.87	0.88	0.78	0.79	0.11
	Alcohol composite score	0.13	0.07	0.18	0.03	-2.53*
	Drug composite score	0.15	0.06	0.16	0.12	-1.01
	Legal composite score	0.21	0.14	0.28	0.14	-1.31
	Family composite score	0.19	0.11	0.44	0.17	-3.30**
	Psychiatric composite score	0.15	0.15	0.34	0.16	-2.35*
		n = 30, df = 58		n = 11, df = 20		
MCMI-II	Disclosure	71.33	63.67	78.09	68.55	-1.09
	Desirability	62.53	67.33	55.82	57.00	0.15
	Debasement	52.87	43.93	70.27	52.00	-2.91**
	Schizoid PD	60.53	53.13	68.09	62.91	-1.24
	Avoidant PD	70.93	62.00	87.27	74.73	-1.87
	Dependent PD	60.10	54.77	69.36	61.00	-0.95
	Histrionic PD	82.33	82.73	76.36	77.91	0.25
	Narcissistic PD	79.70	80.20	65.36	77.00	1.60
	Antisocial PD	85.27	81.30	80.00	82.91	0.51
	Aggressive PD	67.33	67.33	65.27	72.46	1.50
	Compulsive PD	49.00	60.73	46.46	45.91	-0.06
	Passive PD	78.53	66.90	82.00	79.18	-0.23
	Self-defeating PD	68.93	61.10	83.36	67.18	-1.73
	Schizotypal PD	62.07	56.40	71.18	61.91	-1.69
	Borderline PD	79.70	66.33	81.82	73.46	-1.02
	Paranoid PD	70.33	71.03	65.46	68.82	0.52
	Anxiety disorder	42.97	30.93	62.36	42.46	-2.02

Measure	Score/scale	LP		HP		t-Test value
		Intake mean	Discharge mean	Intake mean	Discharge mean	
	Somatoform disorder	57.00	53.33	57.91	54.55	-0.53
	Bipolar disorder	61.10	63.63	59.18	60.46	0.33
	Dysthymia	47.73	34.53	72.36	47.27	-2.53 *
	Alcohol dependence	71.83	67.07	69.55	68.36	-0.19
	Drug dependence	81.57	78.10	78.00	79.46	0.29
	Thought disorder	52.10	50.80	62.73	58.00	-1.15
	Major depression	51.03	41.40	63.82	50.27	-2.42 *
	Delusional disorder	55.87	58.37	61.00	56.82	-0.60

* $P < .05$.** $P < .01$.*** $P < .0001$.