Perinatal Complications in Births to Low Socioeconomic Status Schizophrenic and Depressed Women

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Pregnancy and birth complications in births to 57 schizophrenic, 28 depressed, and 31 well women were studied. The sample was of low socioeconomic status and predominantly African-American. The study extended earlier work on the perinatal status of infants born to schizophrenic women by including measures of severity of maternal disturbance, mother's age, IQ, and premorbid social competence, and family composition. The results show that maternal competence and the mother's diagnosis of schizophrenia were significant variables in determining the likelihood of less adequate prenatal care and more complicated births. The results indicate the importance of an assessment not only of a disturbed woman's diagnosis but also of her personal background and social competence in determining the likelihood of obstetrical complications.

Psychopathology, such as schizophrenia, in an expectant mother is thought to increase the risk for perinatal birth complications (PBCs) in her offspring (McNeil, 1988; Silverton, Mednick, & Harrington, 1988; Walker & Emory, 1983). Maternal psychopathology may increase the likelihood of PBCs as a function of the mother's competence, life circumstances, and emotional adjustment, yet these features may be more related to chronicity than to any specific psychiatric disorder (Masten & Garmezy, 1985; Sameroff & Seifer, 1980). PBCs are sometimes related to problems of neurological and psychological development (Als, Lester, & Brazelton, 1979; Emory, 1991), and offspring of schizophrenic parents who experienced perinatal complications are at greater risk for developmental disorders than offspring of psychiatrically normal parents who may also have a history of perinatal complications (McNeil & Kaij, 1984; Walker & Emory, 1983; Wrede, Mednick, Huttunen, & Nilsson, 1984).

PBCs are one of many etiological factors, along with the caretaker's behavior and other environmental features, that may have effects on the child's development. Thus, findings on the importance of both environmental variables and features of the mother's mental status suggest a mechanism whereby maternal psychopathology may increase birth complications.

The role played by ethnicity in this set of relations has not been extensively studied. IQ scores of African-American and Caucasian-American offspring of schizophrenic women have been compared (Sameroff & Seifer, 1980; Worland, Weeks, Weiner, & Schechtman, 1982), but there is virtually no evidence that the incidence of PBCs is greater within any particular ethnic group. However, PBCs do not have the same type of relation to developmental outcome across different ethnically homogeneous subpopulations. The Collaborative Perinatal Project (CPP) has revealed sufficiently divergent patterns of correlations between PBCs and developmental outcome for Black and White Americans to preclude generalizations across groups (Broman, Nichols, & Kennedy, 1975).

Maternal age, poverty, and marital status are related to PBCs among normal populations but vary with ethnicity (Ricciuti, 1977; Scott, Field, & Robertson, 1981). A positive psychiatric history in pregnant women is associated with less emotional support, more marital conflict or divorce, and more chronic stress (McNeil, 1988; Zax, Sameroff, & Bibigian, 1977). However, the preponderance of studies of European-American, middle-class, intact families leaves unanswered questions about the relations among sociodemographic variables and perinatal complications in births to schizophrenic women from other ethnic backgrounds (McNeil, 1988).

Our study extends earlier work and focuses on measures of maternal competence in a sample of low-income, predominantly African-American, schizophrenic, depressed, and well women. It was predicted that infants born to schizophrenic women would have more PBCs than those born to control subjects and that women's less optimal functioning, poorer premorbid competence, younger age, and single parent status would be associated with more PBCs.

Method

This investigation is part of a larger study of offspring of emotionally disturbed women in a low socioeconomic status (SES), predominantly African-American sample (Goodman, 1987; Goodman & Brumley, 1990; Goodman & Johnson, 1986). Participants in the study were women who had a diagnosis of schizophrenia or depression or who had no disturbance and who had given birth to at least one child within the previous 5 years. Disturbed women were recruited from inner-city outpatient clinics. Eligibility for disturbed women was determined by a psychiatrist-assigned current diagnosis of schizophrenia or mood

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disorder based on an unstructured diagnostic interview guided by criteria from the Diagnostic and Statistical Manual of Mental Disorders (3rd ed.; American Psychiatric Association, 1980). Two experienced psychologists independently and without knowledge of subjects' status reviewed 30 randomly selected case records and confirmed the diagnosis in 85% of the cases. For the remaining cases, at least one of the psychologists confirmed the original diagnosis. Women were eliminated from the sample if there was any evidence of current or past alcohol or drug abuse. Many of the women had been prescribed psychotropic medications. However, patterns of use were often sporadic and difficult to determine. Therefore, information on psychotropic medication is not included here.

The well women were recruited from well-baby clinics in the same neighborhoods as the mental health centers. Screening determined that they had no history of having experienced or sought treatment for psychiatric disturbance or for drug or alcohol abuse.

Records for 127 births of the subjects' youngest children were available. Eleven women had two children less than 5 years old; for these families, birth data on both siblings are included here. (Because of a concern for the nonindependence of events, data were analyzed both with and without the siblings. Because the pattern of results was not different, analyses with sibling data are reported.) The final sample included 61 schizophrenic mother-child pairs (57 mothers), 33 depressive mother-child pairs (28 mothers), and 33 well mother-child pairs (31 mothers). Sixty-one of the offspring were boys, and 66 girls.

Measures and Procedures

Global Assessment Scale (GAS; Endicott, Spitzer, Fleiss, & Cohen, 1976). The GAS is a single rating scale (0-100) for evaluating a person's level of functioning during a designated time frame, and higher scores indicate better functioning. The GAS is widely used and has been reported to have good reliability and validity, including correlations with measures of overall severity of illness and a relation to rehospitalization (Endicott et al., 1976).

The GAS was completed for each mother by a mental health aide after 8-10 hr of testing and interviewing. Each of the 10 case vignettes provided by Endicott et al. (1976) was scored, and the aides were trained to score the vignettes within the same 10-point interval; the aides were trained to a criteria of $> .90$ on this basis. Maintenance of adequate ($> .80$) reliability with additional case vignettes was checked at regular intervals throughout the data collection period. The rating was based on the period around the pregnancy and immediately postpartum. The GAS rating was made within a year of the child's birth for 46% of the sample, and the remainder were made up to 5 years later. In most cases, hospital or mental health center records from that same time period were available, independently rated with GAS, and used to modify the GAS score made on the basis of the mother's interview.

Premorbid Social Competence Scale (Zigler & Phillips, 1960). The Premorbid Social Competence Scale is a psychometrically sound index of cognitive, interpersonal, and social functioning based on biographical variables (Tanaka & Bentler, 1983a, 1983b; Zigler & Levine, 1981). The scale score is an average of scores from 1 to 3 on each of six variables: age, intelligence, education, occupation, employment history, and marital status. Low scores reflect less social effectiveness.

Shipley-Hartford Scale (Shipley, 1940). Each mother's IQ was tested with the Shipley-Hartford Scale. Correlations between the Shipley IQ and the full scale Wechsler Adult Intelligence Scale IQ have been reported to be between .78 and .90 (Paulson & Lin, 1970).

Birth records. Birth records, completed by staff attending the delivery, were the source of information for the tabulation of a PBCs total score in Littman and Parmelee's (1974) procedure. The total PBCs score is a standardized score derived from a raw score of the number of 41 pregnancy variables that occur in optimal condition. Although birth records are not a perfect source of information for completing Littman and Parmelee's scale, they are sufficient to obtain a score on each item. Hospital staff are generally informed that records are often used for research purposes, and the importance of accuracy and completeness are stressed.

Results

The three diagnostic groups were comparable on race (93% African-American), socioeconomic status (70% in Hollingshead's, 1975, lowest category), marital status (75% in single-parent families), and number of children. The groups differed on education, $\chi^2(3, N = 103) = 16.46, p < .002$, IQ, $F(2, 110) = 4.27, p < .02$, and age, $F(2, 133) = 4.18, p < .02$. Mean comparisons with the Student-Newman-Keuls procedure indicated that more well women had completed high school (68%) than had either schizophrenic (40%) or depressed (27%) women. The well women also scored significantly higher on IQ ($M = 89$) than the schizophrenic group ($M = 74$). The depressed women were significantly younger ($M = 23.00$ years, $SD = 5.75$) than either the schizophrenic ($M = 26.00$ years, $SD = 5.06$) or well women ($M = 27.00$ years, $SD = 6.29$).

All of the birth variables were tested for the effect of child's sex. Because none of the analyses were significant, boys' and girls' data were combined for all of the remaining analyses. Comparisons among the three groups on four indexes of perinatal status (the PBCs score, birth weight, gestational age, and Apgar score) and two indexes of prenatal care (number of visits and when care began) were conducted with one-way analyses of variance (Table 1). Mother's diagnosis was significantly related to two of the perinatal status variables and one of the prenatal care variables.

Among the perinatal status variables, depressed women's babies weighed significantly less than well women's babies, $F(2, 126) = 3.62, p < .03$ (Scheffe test, $p < .05$). There was no effect of the mother's diagnosis on birth weight when they were controlled for the effects of severity of impairment (GAS) and for mother's education, age, and IQ. In all cases, assumptions in regard to parallel slopes were met. More severely disturbed women, $F(1, 125) = 9.87, p < .002$, and older women, $F(1, 125) = 7.07, p < .009$, had babies with lower birth weight.

In contrast, schizophrenic women's babies scored the lowest Apgar scores at 5 min and significantly lower than the well women's babies, $F(2, 126) = 3.73, p < .03$ (Scheffe test, $p < .05$). Controlling for the severity of disturbance and the demographic variables did not alter the significance of the relation between mother's diagnosis and the babies' Apgar scores.

Of the two prenatal care variables, the month in which prenatal care began was significantly related to mother's diagnosis, $F(2, 126) = 2.89, p < .05$. Schizophrenic women began care significantly later than did either depressed or well women (Scheffe test, $p < .05$). However, the controls eliminated the relation between mother's diagnosis and the month in which prenatal care began. Lower IQ mothers began prenatal care later, $F(1, 125) = 3.88, p < .05$.

In addition, GAS was a significant covariate in the relation between mother's diagnosis and the PBCs score, $F(1, 109) = 5.94, p < .02$, even though diagnosis itself was not significantly
related to PBCs. More severely disturbed women had more PBCs than did less severely impaired women. To investigate the characteristics that distinguish the persons with the most negative neonatal outcome, a series of t tests and chi-square tests on the presence of outliers were conducted. Such analyses are preferable to traditional between-groups comparisons of means of children with schizophrenic parents versus others in that only 10%-15% of children with schizophrenic parents are at risk for schizophrenia (Winters, Stone, Weintraub, & Neale, 1981). For simplicity's sake, the only independent variable included in the outlier analyses was total PBCs score. Outliers, defined as those with scores below the first quartile (PBCs score less than 89), were compared to the remaining group. This criterion placed 9.45% of the children in the outlier group. Mother's diagnosis, age, IQ, degree of disturbance (GAS), premorbid social competence, marital status, and SES were the dependent variables.

Outlier analyses indicated that infants with the lowest PBCs scores were more likely to have schizophrenic mothers (62%) than depressed mothers (23%) or well mothers (15%). Furthermore, infants with the lowest PBCs scores were born to mothers who were younger, t(12) = 2.67, p < .009, had lower IQ, t(101) = −2.63, p < .02, had lower levels of functioning (GAS), t(12) = −2.79, p < .01, were single parents, χ²(3, N = 116) = 7.96, p < .05, and had lower SES, t(109) = 2.21, p < .04. Finally, there was a nonsignificant trend for children with the lowest PBCs scores to have been born to women with lower premorbid social competence, t(104) = 2.76, p < .06.

Next, the data were analyzed to test directly whether mother's age, IQ, marital status, social competence, or degree of disturbance was related to the incidence of pregnancy and birth complications. Correlational analyses were conducted to test the degree of relation between these variables and PBCs in the groups of schizophrenic and depressed mothers. A number of small but significant correlations were found.

For schizophrenic mothers, older mothers had babies who were significantly smaller (r = −.21, p = .05) and had more pregnancy and birth complications overall (r = −.31, p = .005). Schizophrenic mothers who were single had babies who were born significantly earlier (r = −.29, p = .03) and had lower Apgar scores (r = −.37, p = .03). Finally, greater severity of disturbance in schizophrenic mothers was associated with more pregnancy and birth complications overall (r = .27, p = .02).

For depressed mothers, babies born earlier and with lower birth weights were associated with mothers' younger age (r = .34, p = .05, and r = .55, p = .001, respectively), lower IQ (r = .35, p = .05, and r = .33, p = .05), and lower premorbid social competence (r = .43, p = .02, and r = .46, p = .009). Marital status and severity of disturbance were unrelated to birth variables in depressed mothers.

A series of stepwise multiple regression analyses were performed in an effort to assess the independent contribution of diagnostic, sociodemographic, and maternal competence variables to perinatal outcome. The predictor variables were maternal diagnosis, severity, IQ, age, premorbid social competence, SES, and marital status. Dependent variables included the four indexes of perinatal status (birth weight, gestational age, Apgar score, and total PBCs score) and the two indexes of prenatal care (number of visits and when care began). The results revealed that severity, premorbid social competence, and SES were significant predictors for three of the four perinatal status variables related to fetal development. Gestational age was independently predicted by SES (R = .32, R² = .05, p < .003); birthweight was predicted by premorbid social competence (R = .22, R² = .05, p < .03). However, the total PBCs score was significantly predicted by the mother's severity of disturbance (R = .22, R² = .05, p < .03). A different set of predictors, mother's diagnosis and IQ, was significant for the two measures associated with maternal awareness and compliance with fetal health promoting behaviors, that is, when they began prenatal care and the number of prenatal visits (R = .25, R² = .06, p < .02, and R = .37, R² = .11, p < .004). Schizophrenic and lower IQ mothers sought less prenatal care.

Discussion

This study of low-income, predominantly African-American women supports earlier findings that the competence of severely emotionally disturbed women is a strong predictor of perinatal complications (Garmezy, 1974). Mothers with lower IQ, no husband or boyfriend, and poor premorbid social competence, in combination with lower levels of functioning, had the most complicated births regardless of diagnosis. These maternal variables, individually or in various combinations, were

<table>
<thead>
<tr>
<th>Birth information</th>
<th>Schizophrenic</th>
<th>Depressed</th>
<th>Well</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n M</td>
<td>n M</td>
<td>n M</td>
<td>n M</td>
<td></td>
</tr>
<tr>
<td>Gestational age (in weeks)</td>
<td>45 37.89</td>
<td>29 37.42</td>
<td>31 39.12</td>
<td>105 38.12</td>
</tr>
<tr>
<td>Began prenatal care (in months after conception)</td>
<td>48 3.94</td>
<td>30 3.00</td>
<td>32 2.91</td>
<td>110 3.38*</td>
</tr>
<tr>
<td>No. prenatal visits</td>
<td>46 8.87</td>
<td>27 10.45</td>
<td>28 8.96</td>
<td>101 9.32</td>
</tr>
<tr>
<td>Birth weight (in grams)</td>
<td>61 3.000</td>
<td>33 2.763</td>
<td>34 3.211</td>
<td>128 2.995*</td>
</tr>
<tr>
<td>Apgar score at 5 min</td>
<td>32 8.78</td>
<td>23 8.83</td>
<td>26 8.96</td>
<td>81 8.85</td>
</tr>
<tr>
<td>Perinatal birth complications score</td>
<td>61 118.52</td>
<td>33 119.48</td>
<td>34 123.94</td>
<td>128 120.21</td>
</tr>
</tbody>
</table>

aF(2,109) = 3.14, p < .05 (schizophrenic women began care later than others). bF(2,125) = 5.39, p < .006 (births to depressed women were smaller than births to well women).
related to initiating prenatal medical care and to perinatal outcome, that is, birth weight, Apgar scores, and the total PBCs score. Thus the stage is set for initiation of a diathesis-stress interaction that results in phenotypic expression of genotypic vulnerability (Walker & Emory, 1983).

Our hypothesis of greater PBCs among expectant schizophrenic mothers in relation to those among the control subjects in this sample of African-American women was supported. Babies with the most perinatal complications were more likely to have schizophrenic mothers. Schizophrenic mothers also had babies with the lowest Apgar scores, and both schizophrenia and IQ were significant predictors of when prenatal care began. Our results fail to replicate those from Zax et al.'s (1977) sample, one third of which was African-American. That is, although general competence and symptom severity are important, they do not overpower the effects of diagnosis. Furthermore, it is important to note that psychological and sociodemographic variables showed a different pattern of relations within schizophrenic versus depressed groups of mothers. For schizophrenic mothers, being older and single and having the lowest level of functioning were associated with more perinatal complications. In contrast, for depressed mothers, being younger and having lower IQ and lower premorbid competence were related to more perinatal complications.

Some limitations of the study must be kept in mind as one interprets these findings. First, the pregnancy complications data were obtained from hospital records rather than collected specifically for this particular study. In this sense, the study is in the model of those that have used the follow-back method, with all of its inherent advantages and disadvantages (Garmezy, 1974). However, the hospital from which the data were obtained is a university-affiliated medical center that routinely contributes data for research purposes from their medical records. Second, women in the study may have been using street drugs during their pregnancies, despite an effort to screen for that variable. Any effects of such street drug use on our findings are unknown. Third, a large number of statistical tests were run, and many of the effect sizes are small. Ideally, the study will be replicated on a larger scale. Realistically, this is a difficult sample to study, and researchers will probably need to interpret these findings in the context of related findings on low SES samples, if not findings that are from predominantly African-American samples.

Longitudinal research aimed at identifying at-risk offspring of psychiatrically disturbed parents must perhaps focus more narrowly on the subset of disturbed women with the lowest general competence. Although obstetrical complications may not be the primary etiological agent in schizophrenia, they are a risk-enhancing variable that must be taken seriously. Although the frequency of PBCs may not always be higher in babies born to psychiatrically disturbed women, those babies born to psychotic women with perinatal complications may be at the greatest risk for disordered development (McNeil, 1988; McNeil & Kaij, 1984; Walker & Emory, 1983; Wrede et al., 1984).

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Tanaka, J. S., & Bentler, P. M. (1983). Factor invariance of premorbid intelligence and IQ were significant predictors of when prenatal care began. Our results fail to replicate those from Zax et al.'s (1977) sample, one third of which was African-American. That is, although general competence and symptom severity are important, they do not overpower the effects of diagnosis. Furthermore, it is important to note that psychological and sociodemographic variables showed a different pattern of relations within schizophrenic versus depressed groups of mothers. For schizophrenic mothers, being older and single and having the lowest level of functioning were associated with more perinatal complications. In contrast, for depressed mothers, being younger and having lower IQ and lower premorbid competence were related to more perinatal complications.


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In January 1993, *Neuropsychology*, which has been published by the Educational Publishing Foundation (a subsidiary publishing program of the American Psychological Association), will be published by the American Psychological Association. The Publications and Communications Board of the APA has appointed Nelson Butters as editor of *Neuropsychology*. As of January 1, 1992, manuscripts should be submitted to

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