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ABSTRACT

The purpose of this study was to examine the social support network of mothers with high risk infants and the relation between support and mother-infant interactive behavior. Two issues were investigated: who gave what kind of support to the mother as a function of her infant's birth status; and the relation between type of support and mother-infant interaction in risk and nonrisk dyads. Subjects were 90 infants and their mothers who participated in a longitudinal study on the consequences of high risk birth. Infants were classified by maturity and health into four diagnostic groups: healthy and sick preterm and healthy and sick term. Families participating were all poor, inner city residents of New York City. Sixty-five percent were Hispanic and 28 percent were Black. The remaining seven percent were Caucasian. Results indicate that the number of persons giving support and the type of support given is related to the health status of the child at birth. This differential support may mediate the mother's interactive behavior with her infant during the early months of life. Support to the mother of a sick infant, whether that support involves goods or services, seems to positively reinforce the mother's behavior toward her infant, facilitating more proximal and less distal interaction during the early months of infancy. (RH)

The Relationship between social support, infant risk status and mother-infant interaction

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Abstract

The pattern of social support as reported by mothers with high risk infants and the relationship between support and infant parent interaction was examined. Data on the number of persons who provided goods, services, advice and financial support to mothers with either a healthy preterm, sick preterm, healthy term or sick term infant were collected as well as data on mother-infant interactive behaviors at three months of age. The data revealed that mothers of sick preterm infants reported receiving the least number of goods and mothers of sick infants reported receiving the least services. There were, also, significant relations between type of support and mother-infant behavior at three months. Overall, mothers receiving goods were more proximal with their infants while mothers receiving services spent more time playing with their three-month olds. Mothers of sick infants who report more people giving services were more proximal to their infant, while mothers of well infants who report more people giving services were more playful. The data reveal the relation between high risk birth and postnatal illness on the response of the mother's social network and on her interaction with her infant.

The relationship between social support, infant risk status and mother-infant interaction

The purpose of this study was to examine the nature of the social support network of mothers with high risk infants and the relation between support and mother-infant interactive behavior. Two issues were investigated: First, who gave what kind of support to the mother as a function of her infant's birth status; and second, the relation between type of support and mother-infant interaction in risk and nonrisk dyads.

The importance of social networks for providing assistance during a crisis has been a subject of continued investigation (Drabek & Boggs, 1975; Gibson, 1972; Litwak & Szelengi, 1969; Sussman, 1953). Depending on the nature of the crisis and the type of stress, different groups such as neighbors, friends, or kin have been observed to provide assistance (Litwak & Szelengi, 1969). For example, neighbors and friends are more likely to give help in the form of services for day to day problems of short duration. Kin are more often the ones who give assistance in major crises such as recovery from illness. Many investigators have noted that support also varies as a function of social class with the middle classes providing support in the form of money or gifts and working class support coming in the form of services (Adams, 1964; Komarovsky, 1967; Lee, 1979; Schorr, 1960; Troll, 1971).

The birth of a preterm or sick infant is acknowledged as a stressful event (Beckwith & Cohen, 1978; Goldberg, 1979; Holmes, Nagy, Slaymaker, Sosnowski, Prinz, & Pasternak, 1982). Parents initially must deal with the possible mortality of their newborn infant, as well as with prolonged hospitalization and the possibility of subsequent developmental problems. In this regard, the response of the social network seems crucial. Relatives and friends may be hesitant or unsure as to the type of support they can provide to parents whose

infant may or may not live or whose birth condition may lead to a developmental handicap. The response of the social network may support the mother during these stressful periods or, lack of response may isolate the mother. A recent study by Crinic, Greenberg, Ragozin, Robinson, and Basham (1983) illustrates the role social support may play in mediating stress surrounding the birth of a high risk infant. Maternal life stress, social support, life satisfaction and satisfaction with parenting were assessed in mothers of preterm and full term infants. In addition, mother-infant interactive behavior was observed when infants were four months of age. Both degree of stress and social support significantly predicted interactive behavior. Mothers with greater social support were more positive in their attitudes and interaction with their infants. There were, however, no differences between term and preterm dyads.

The sample of preterm infants in the Crinic et al. (1983) study were reported to have no major medical complications. Use of a healthy preterm sample may be one reason for the lack of preterm/term differences in that study. Previous research has found that high risk infants who were sick in the postnatal period are more irritable and less responsive than infants with few medical complications (Field, 1979; Greene, Fox, & Lewis, 1983). Having a sick high risk infant may considerably alter the response of the social network and the level of stress of the parents. It therefore seems important to investigate differences in the pattern of social support and its relation to mother-infant interaction between high risk infants who are healthy and those who experience medical complications in the postnatal period.

Methods

Subjects. The subjects of this study were 90 infants and their mothers who participated in a longitudinal study on the consequences of high risk birth. The infants were classified by maturity and health into four diagnostic groups: healthy and sick preterm and healthy and sick term. All the infants from the four groups exhibited no obvious congenital or gross neurological abnormalities. Forty-six infants who were each born with a gestational age of less than 36 weeks as measured by the Dubowitz exam (Dubowitz, Dubowitz, & Goldberg, 1970), who were singleton birth and appropriate for dates and who were less than 2200 grams in weight were included in the preterm group. Twenty of the 46 preterm infants experienced respiratory distress syndrome (RDS) in the postnatal period and were assigned to the sick preterm group. RDS was defined by a characteristic chest x-ray and at least three of the following four criteria which were observed persisting beyond four hours of life: 1) respiratory rate greater than 60 breaths

per minute; 2) excitatory grunting; 3) chest wall retractions; 4) cyanosis while breathing room air. The mean birth weight for the sick preterm group was 1414.04 (SD = 403.50) and the mean gestational age was 31.3 (SD = 2.8). Twenty-six of the preterm infants experienced no RDS or postnatal medical complications and were assigned to the healthy preterm group. The mean birth weight of this group was 1781.8 (SD = 324.4) and the mean gestational age was 33.1 (SD = 2.6). The term sample consisted of 44 infants; 20 term infants underwent birth asphyxia during the postnatal period (sick term group $\bar{X}$ birth weight = 3337.6, SD = 633.2). Birth asphyxia was defined with the following criteria: 1) Apgar score of 4 or less at 5 minutes; 2) respiratory assistance for a minimum of four hours and 3) evidence of metabolic acidosis (pH less than 7.2 in blood gas during the first hour of life). These infants were assigned to the sick term group. The remaining 24 term infants were all healthy with Apgar scores of 9 or 10 at five minutes and were assigned to the healthy term group ($\bar{X}$ birth weight = 3583.0, SD = 589.7).

Mothers who had given birth to a preterm infant or a sick term infant were contacted two to three days after the birth of their child. At that time the scope of the longitudinal study was presented to them and their signed consent was obtained. The group of healthy term infants and their mothers was selected from the general neonatal population of the same hospital from which the high-risk infants were obtained. Mothers of these infants were matched with mothers of the three risk groups according to income, occupation, and education of both parents as well as family size and ethnicity. Analyses by diagnostic group of infant showed no differences in parental education, age, marital status, occupation, income or family size.

The families in this study were all poor, inner city residents of New York City. Sixty-five percent were Hispanic in ethnicity while 28% were Black. The remaining 7% were Caucasian. Most of the families were small in size and comprised of husband, wife, and two children (including the infant in the study). Mothers and fathers were on the average 27 and 33 years of age respectively; both parents had an average of 12 years of education. The majority of the families had at least one member who was employed, and had lived at their current residence for at least one year prior to the birth of the infant in this study. The extent to which networks of the diagnostic groups were different prior to our observations was not possible to determine.

Network Interview

At three months, infant and mother came to the laboratory for a detailed neurological, psychological and medical assessment. At that time, the mothers were interviewed concerning the nature of their social network and the type of support they had received in the past three months. A standard questionnaire was administered, individually, to each mother (in the language of her choice, Spanish or English). A series of questions were asked to provide information on who gave what kind of support. Within each of four categories of support (goods, services, money, and advice) the mother was asked to name any person, their relationship to her (e.g., relative, friend, neighbor, co-worker) and what was given. The mothers were given a description of the type of support for each category: Goods (e.g., clothing, furniture, baby supplies); Services (e.g., baby-sitting, household chores); Advice (e.g., medical, parenting information, emotional); and Financial (i.e., amount of money). These four content categories

were derived from pilot interviews which were open-ended and inquired about the sources of assistance mothers of preterm infants received and seemed to match the areas covered by other researchers (e.g., Lee, 1979). The mother reported the identity of any person who may have provided each kind of assistance. After the mother had completed her list she was always asked if there was anyone else she could think of who had provided assistance in a category. The intention of the interview was to provide a measure of the range of support the mother received. It did not tap directly the mothers perception of the adequacy of support.

In this report we focus on the contributions of father, relatives, and friends because these categories of people were reported with sufficient frequency to provide reliable data for analysis. The category entitled "relatives" is a composite score derived from the sum of all the grandparents, aunts, uncles, cousins, that is all kin of either the father or mother. A "total number of people" category was also used and consisted of the sum of all persons reported by the mother as giving a particular kind of support. The "total people" category thus included family members, relatives, friends, neighbors, and any other persons such as co-workers, clergy or godparents who were reported by the mother to give support. The "friends" category was the sum total of persons reported by the mother as a friend.

Mother-Infant Interaction at Three Months

As part of their three-month assessment mother and infant were videotaped together for a 15-minute session. Mothers were instructed to use the time to play or care for their infants as they normally would at home. A standard set of play materials was made available. The videotapes were coded with a behavioral

checklist by observers naive to the infant birth history. The checklist, developed by Lewis and Lee-Painter (1974) allowed behavior to be coded every 10 seconds as occurrence, initiation or response. Summary variables were computed from the discrete infant and maternal behaviors. A complete description of the coding method and discrete and summary behaviors is presented in Greene, et al. (1983). The summary measures used in the current study were: Maternal proximal behavior, distal behavior and play behavior.

Results

Infant Risk Status and the Mother's Support Network

Table 1 presents the mean number of people (i.e., father, relatives, friends) who gave each type of support (i.e., goods, services, advice, and money) by the risk status of the infant and for the total sample. In general, across all types of support, the data revealed, that relatives were the people most often mentioned, and across all categories of people, goods was the type of support given most frequently. Analyses of variance with infant maturity (preterm/term) and health status (sick/healthy) as factors were performed for each type of support with the number of people who gave support as the dependent measure. The results of these analyses revealed significant effects for goods and services but not for advise and money. A significant main effect of maturity was found for the goods category such that mothers of term infants reported more people giving goods than mothers of preterm infants ($F(1,86) = 5.24$, $p < .03$). This main effect was qualified by the significant interaction of maturity and health on total number of people giving goods ($F(1,86) = 4.33$, $p < .05$). Mothers of sick term infants reported the most people giving goods while mothers of sick preterm infants reported the

fewest people giving goods (Scheffe, $p < .05$). A greater number of friends were reported to give goods to the term compared to the preterm group ($F(1,86) = 4.54$, $p < .03$). This main effect was also qualified by a significant interaction of maturity and health ($F(1,86) = 9.90$, $p < .03$). The sick preterm group reported fewer friends giving goods compared to the sick term group (Scheffe, $p < .05$). Finally, the category of services was related to health status of the infant. The number of persons giving services revealed a significant main effect for health ($F(1,86) = 4.08$, $p < .05$) with mothers of healthy infants reporting more people giving services than mothers of infants who were ill in the postantal period.

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Network Support, Infant Risk Characteristics and Maternal Behavior

In order to examine the relation of infant birth status and network variables to maternal behavior, stepwise regression analyses were conducted. Initially correlations between social support variables, infant characteristics (gestational age, birthweight, postnatal complications score) and maternal behavior were computed in order to identify significant relations between these variables for the regression analyses. The number of significant correlations between three maternal summary behaviors (proximal contact, distal contact, and play) and the support variables exceeded the number expected by chance and these significant relations were examined in the regression analyses. The variables of gestational age and postnatal complications score (PCS) were also utilized in the regression analyses as indices of infant birth status. Higher PCS scores indicated greater number of medical complications in the postnatal period. Three types of regression analyses were performed.

In the first set of regression analyses each of the network variables was entered stepwise as a predictor of maternal behavior for the whole sample. Only total number of people giving goods and total number of people giving services accounted for a significant portion of the variance in each of the three maternal summary behaviors, and thus subsequent analyses focused on these relations. In the second set of regression analyses the network variables of total people giving goods and total people giving services along with infant gestational age and the infant PCS were entered stepwise as predictors of maternal behavior for the total sample. In the third set of analyses, separate regression analyses were performed for the sample split on infant health status. In these analyses the network variables and infant gestational age were used as predictors of maternal behavior. In the following section, the results of these regression analyses are presented by maternal outcome behavior for the total sample followed by results for the sick and healthy groups.

Maternal Proximal Behavior

For the total sample, stepwise regression analyses indicated that the total number of people giving goods was the best predictor of proximal maternal behavior. Total people giving goods accounted for 13% of the variance in maternal proximal behavior (R^2 = .35, $F(1,85)$ = 11.90, p < .001). None of the other predictor variables (either total persons giving services, infant gestational age or PCS) alone or in combination accounted for a significant portion of the variance in maternal proximal behavior. The data indicated that mothers who reported more people giving goods spent more time in proximity to their infant. When the analyses were repeated separately for the sick and healthy groups, the relation between total persons giving goods and maternal proximal behavior was

replicated (Well: R^2 = .37, $F(1,40)$ = o.43, p < .02; Sick: R^2 = .35, $F(1,41)$ = ?.54, p < .02). However, the data also revealed that, for the sick but not the healthy infant group, total people giving services accounted for 12% of the variance in maternal proximal behavior (R^2 = .35, $F(1,41)$ = 5.63, p < .02). Mothers of sick infants, who reported more people giving services, were more proximal to their infant during the free play interaction. Gestational age alone or in combination with either of the network variables did not account for additional significant variance in maternal proximal behavior.

Distal Behavior

For the total sample, the stepwise regression analysis revealed that total people giving goods was the best predictor of maternal distal behavior accounting for 13% of the variance (R^2 = .36, $F(1,83)$ = 12.04, p < .001). Neither of the infant variables nor the other support variable alone or in combination accounted for a significant portion of the variance in maternal distal behavior. Thus, mothers who reported more people giving goods were less distal from their infant during the interaction session.

The predictive relation between total people giving goods and maternal distal behavior held true for both the sick (R^2 = .42, $F(1,41)$ = 8.79, p < .01) and the healthy (R^2 = .29, $F(1,40)$ = 3.95, p < .06) groups although the relation is stronger for the sick (18% of the variance) than for the healthy group (8% of the variance). No other network variable or birth status variable alone or in combination accounted for a significant portion of the variance in maternal distal behavior.

Play Behavior

For the total sample, total people giving services is the best predictor of maternal play behavior, accounting for 14% of the variance (R^2 = .38,

$\underline{F}(1,83) = 13.67$, $\underline{p} < .001$). Neither infant gestational age, PCS, or the network variable total people giving goods, alone or in combination accounted for a significant portion of the variance in maternal play behavior.

When the sick and healthy samples were analyzed separately the relation between total people giving services and maternal play behavior remained for the healthy but not the sick group. For the healthy group, total people giving services predicted 23% of the variance in maternal play behavior ($R^2 = .48$, $\underline{F}(1,40) = 12.23$, $\underline{p} < .001$). None of the predictor variables accounted for a significant portion of the variance in maternal play behavior for the sick group.

Infant Smile

Although the number of significant relations between network variables and infant behavior were few and did not exceed the number expected by chance, the data revealed a strong relation between total people giving services and infant smile behavior. Stepwise regression analysis for the entire sample (using infant gestational age, PCS, and total people giving support as predictors and infant smile as outcome) revealed that both PCS and total people giving services accounted for a significant portion of the variance ($R^2 = .47$. $\underline{F}(2,82) = 11.56$, $\underline{p} < .001$). PCS accounted for 15% of the variance while total people giving services accounted for an additional 6% of the variance in infant smile.

When the analysis were repeated for the sick and healthy groups separately, the relation between postnatal complications and service support was clarified. For the sick group, total number of persons giving services did not account for a significant portion of the variance in infant smile. Rather, infant gestational age was the best predictor of infant smile ($R^2 = .31$, $\underline{F}(1,41) = 4.42$, $\underline{p} < .04$). Among infants who were sick, the more mature the infant the greater the frequency

of smiling during the interaction. For the healthy group the combination of gestational age and total persons giving services best predicted infant smile, accounting for 27% of the variance (R^2 = .51, $F(2,39)$ = 7.05, p < .01). Gestational age accounted for 15% of the variance in infant smile behavior while total people reported giving services significantly accounts for another 12%. These data indicate that, for infants who did not suffer postnatal complications in the postnatal period, maturity at birth and number of people reported to give services accounted for a significant portion of the variance in infant smile.

Discussion

The purpose of this study was two fold: first, to describe, for a high-risk population, the type of support and the number of persons who gave support, as reported by the mother; and second, to examine the relation between support and the mother's behavior toward her infant.

Social Support and Birth Status

The results of this study suggest that infant birth status is related to the social support of the mother. Overall, goods was the type of support most often given and relatives were the group of persons most frequently mentioned as giving support. But, infant birth status mediated these general findings. Specifically, having a premature infant and especially a sick preterm infant was related to the number of persons giving goods. Mothers of sick premature infants reported fewer friends and fewer total people giving goods than mothers' the other groups. The tenuous status of the sick preterm may contribute to this pattern of support. Sick premature infants may be perceived as more fragile and less viable during the early months of life and people may be more

reluctant to give gifts in such an uncertain situation. In turn, mothers of sick preterm infants may feel more isolated from their support network. This may be reflected in the mother's report of not receiving as many goods (i.e., baby supplies or presents) as mothers in the other groups. Mothers of sick term infants, however, reported the largest number of people giving goods. In their case, the infants may be perceived as likely to survive their illness and people may be willing to give support to them.

Services, in the sense of baby sitting or house care, may represent a more ongoing type of support which requires more interpersonal interaction between mother and service provider. While prematurity status did not influence the number of persons reported giving services, health of the baby was related to total persons reported giving services. Mothers of sick infants reported fewer persons giving services than mothers of well infants. This finding suggests that mothers of sick infants may be at-risk for the kinds of stress that could make them feel inadequate as mothers (Battle, 1974; Kogan, Tyler, & Turner, 1974). Sick infants may make more unusual and frequent caregiving demands. Previous data have revealed that infants who were ill in the postnatal period were less affectively responsive, smiling less and crying more than healthy infants (Greene, et al., 1983). Thus, mothers of sick infants may have received fewer services when in fact they may have needed help in order to adequately care for their infant and maintain a sense of well-being.

Since, data on the support network prior to the infant's birth was not collected in this study, caution must be noted in making inferences about the relation between infant birth status and the social support system. It is possible that support networks differed by infant risk category prior to the infant's

birth and that these differences are reflected in the current data. However, mothers in this sample did not differ on demographic characteristics known to be related to network structure (e.g., SES or family composition) reducing the possibility of the influence of pre-morbid network characteristics.

Social Support and the Mother-Infant Interaction

Variations in social support and infant birth status seemed to be related to three aspects of the mother's interactive behavior with her infants: her proximal, distal and play behavior. Total people reported giving goods was consistently related to proximal maternal behavior. Irrespective of either the health or maturity of the infant at birth, mothers reporting more people giving goods spent more time in proximity to their infants during the interaction session. Recent research has demonstrated that for the very young infant proximal rather than distal stimulation is related to infant cognitive and social development (Coates & Lewis, 1984). Proximal stimulation includes caregiving behaviors and involves tactile and kinesthetic stimulation. Studies have found that mothers of sick high risk infants frequently engage in these proximal behaviors (cf. Greene, et al., 1983). Provision of goods may provide the mother with needed supplies and act as an acknowledgement of her infant as part of the social network. Mothers of sick high risk infants may be encouraged by the provision of goods to care for their infants.

Total persons reported giving services was also related to maternal proximal behavior in the sick infant group. Although mothers of sick infants, and particularly sick preterm infants, may be most at-risk for receiving needed services,

those that received these services were more likely to provide proximal stimulation to their infant. Again, provision of support to a mother of a sick infant may reaffirm her faith that her infant will survive and encourage her caretaking behavior.

Maternal distal behavior is observed most frequently at three months among mothers of sick preterm infants (DiVitto & Goldberg, 1978; Greene, et al., 1983). Some mothers may view their infant as fragile while others may find it difficult to interact with a less than totally responsive infant. In the current study, distal behavior was affected by total persons reported giving goods. The more people a mother reported as giving goods, the less distal behavior exhibited during the interaction. Importantly, this relation was strongest for the mothers of sick infants, demonstrating again that receiving goods from the social network may reaffirm the infant's recovery.

The mother's play behavior was most strongly related to total persons reported giving services. Mothers reporting a large number of persons giving services spent more time in play interaction. However, this relation was strongest for the healthy infant group. As reported earlier, mothers of healthy infants reported more people giving services than mothers of sick infants. These services may serve to free up the mother's time so that she may concentrate on her infant. Thus, it is not surprising that mothers receiving these services play more with their infants and that healthy infants, whose mothers report more people giving services, smile more during the interaction.

The data presented above describe a complex pattern between the type of social support, the infant's birth status and the mother's interactive behavior. At the center of this pattern is the infant's health status during the postnatal period. The data seem to indicate an interaction between infant health status,

response of the social network to that status and the mother's behavior. In the case of infants who were very ill in the postnatal period (the sick preterm group) the response of the network is cautious (less goods, and less friends giving goods). This was associated with less proximal and more distal behavior on the part of the mother. When the network responded more positively to the birth of a sick infant (providing goods and services) this was associated with increasing proximal and decreasing distal maternal behavior. Thus, the social network's response may be seen as a mediating factor in high risk infant-mother interaction (cf. Crockenberg, 1981; Weinraub & Wolf, 1983).

While these data describe the number of persons giving support and the type of support given as reported by the mother they do not address the important issue of maternal satisfaction with the support. Other studies (e.g., Crinic, et al., 1983) have demonstrated the importance of maternal satisfaction in relation to social support. The current data although finding significant relations between number of persons giving support and maternal behavior may be limited in using only mother's report of number of persons and type of support and not the degree of satisfaction with that support.

In sum, the results indicate that the mother's social network is related to the health status of the child at birth in the number of persons giving support and the type of support given. This differential support may mediate the mother's interactive behavior with her infant during the early months of life. Support to the mother of a sick infant, whether it be goods or services, seems to positively reinforce the mother's behavior toward her infant, facilitating more proximal and less distal interaction during the early months of infancy.

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	GOODS				SERVICES					ADVICE					MONEY					
	HP	SP	ST	HT	TOTAL SAMPLE	HP	SP	ST	HT	TOTAL SAMPLE	HP	SP	ST	HT	TOTAL SAMPLE	HP	SP	ST	HT	TOTA SAMP
Father	.05	.08	0	0	.03	.59	.54	.65	.58	.60	.27	.36	.30	.25	.30	.08	0	.09	0	.0
Relatives	2.59	2.29	2.85	3.41	2.79	1.22	1.13	.95	1.63	1.24	1.05	1.13	.80	.79	.94	1.27	1.45	1.67	1.75	1.5
Friends	1.90	.75	2.85	1.50	1.70	.36	.20	.35	.25	.29	.36	.37	.50	.25	.37	.60	.19	.52	.61	.4
TOTAL PEOPLE	4.90	3.41	7.10	5.08	5.04	2.68	2.13	2.15	3.13	2.53	2.00	2.42	2.10	1.50	2.00	2.30	1.48	2.76	2.72	2.3

TABLE 1. Mean number of people reported to give support by type of support by diagnosis and for total sample.

HP = Health Preterm N = 26

SP = Sick Preterm N = 20

ST = Sick Term N = 20

HT = Healthy Term N = 24