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Relationship of Maternal Age to Risk Factors and Infant Outcomesfor Children of Young Mothers

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RELATIONSHIP OF MATERNAL AGE TO RISK FACTORS AND INFANT

OUTCOMES

FOR CHILDREN OF YOUNG MOTHERS

BY

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ABSTRACT

The purpose of this study was to broaden the field of research on the developmental risks associated with the infants of young mothers by identifying age-related differences within this group of mothers and their associated influences on children's outcomes. A sample of young mothers was developmentally separated into three maternal age groups: 13-15, 16-18, and 19-21. Data on the family's available resources, maternal utilization of social support, the environment of the home, and the infant's developmental progress at six months were combined to examine their relationship to maternal age. In addition, further analysis was completed to identify differences surrounding these maternal, child and environmental variables between the three developmentally derived groups of young mothers.

Results revealed a moderate age group prediction based on the combination of maternal, child and environmental variables that was diminished by the lack of group differences found when examining the variables more in depth. Possible explanations for the lack of group differences as well as implications for practice and further research are discussed.

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STATEMENT OF THE PROBLEM

There are increasingly large numbers of adolescent mothers in the United States who are ill prepared for motherhood. However, age-related differences that may exist within this group have not been sufficiently studied. The importance of the current study is to look more descriptively at a population of young mothers. By examining differences in areas of support and resources, the home environment and child development, the study looks at potential age-related differences within this group of mothers and their associated influences on the children. The proposed study is an attempt to contribute to the current knowledge base surrounding various influences on adolescent mothers. Support for age-related differences on these variables may provide information to better the quality and age-appropriateness of early intervention services provided to at-risk groups of young mothers and their children.

JUSTIFICATION AND SIGNIFICANCE

One quarter of children under two years old in the United States, nearly 2 million children, live in poverty. Approximately one-half of these live in families with adolescent mothers (Halpern, 1993). There are increasingly large numbers of adolescent mothers in the United States who are ill-prepared for motherhood, placing them as well as their children at significant risk for developmental, academic, psychological and behavioral problems (Brooks-Gunn & Furstenberg, 1986; Whitman, Borkowski, Schellenbach, & Nath,

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1987). Infants of adolescent mothers are more likely to be raised in homes suffering from the effects of poverty (Osofsky, Hann, & Peebles, 1993) and are less likely to reap the benefits of stimulating and positive interactions with their mothers (Stevenson, Barratt, & Roach, 1995).

The deficit in the research has been a more specific look at the population of young mothers. Only recently have the differences that may exist within this group been studied (Cooper, Dunst, & Vance, 1990; Cornwell, 1992; Samuels, Stockdale, & Crase, 1994). Considering the vast changes inherent in the developmental stages of adolescence (Osofsky, Osofsky, & Diamond, 1988), it may be inappropriate to conceptualize all young mothers as a homogenous group, obscuring age-related differences (Shapiro & Mangelsdorf, 1994).

Based on a developmental model of adolescence, the purpose of the current study was to identify age-related differences within young mothers as they relate to the degree of developmental risk of their children. Younger adolescents and older adolescents can be characterized by different stages of development and crisis (Cooper, Dunst, & Vance, 1990; Cornwell, 1992; Osofsky, Osofsky, & Diamond, 1988). Younger adolescence can be conceptualized by a girl's entrance into pubescence and sexual activity. Older adolescents may be more concerned with developing relationships and moving away from the family. An older adolescent desires to see herself as an adequate rival to her mother and thus may be more prepared for motherhood

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(Osofsky, Osofsky, & Diamond, 1988). Previous research supports the division of early and late adolescence at age sixteen such that those adolescents between the ages of 13-15 are considered younger adolescents and those falling in the age range of 16-18 years are considered older adolescents. Rationale for this age division includes the suggestion that older adolescent mothers are more likely to have attained a higher level of education and therefore have more realistic expectations of their infants and better parenting behaviors (Cooper, Dunst, & Vance, 1990; Nitz, Ketterlinus, & Brandt, 1995). Older adolescents have also been found to have less difficulty in problem-solving situations and thus better equipped to handle the everyday trials and tribulations of parenthood (Shapiro & Mangelsdorf, 1994; Landy, 1984; Whitman, Borkowski, Schellenbach, & Nath, 1987). In addition, research supports that those young parents over the age of sixteen have more positive views of their infants as well as more positive parenting attitudes overall (Larsen & Juhasz, 1985; Cooper, Dunst, & Vance, 1990).

Developmental/Cognitive Outcomes

The potential causes of poor developmental outcomes for children of adolescent mothers may include the young mothers' unrealistic expectations of their children, the mothers' achievement level, and the compromised environment these children are often raised in (Whitman, Borkowski, Schellenbach, & Nath, 1987; Stoiber & Houghton, 1994). Development and cognition in children of adolescent mothers is often delayed in social and

language domains (Rauch-Elnekave, 1994), and the delays may not be apparent until the end of infancy (Brooks-Gunn & Furstenberg, 1986).

Low achievement and cognitive functioning of adolescents may lead to seeking out other sources of fulfillment, which for many adolescent girls is childbearing (Whitman, Borkowski, Schellenbach, & Nath, 1987). Young adolescents, with inherently less opportunity for educational attainment are placed at a greater disadvantage for being ill-prepared for parenthood.

Adolescent mothers' unrealistic expectations concerning their infants' development and behavior may function to mediate the quality of parenting, which in turn influences the child's development (Stoiber & Houghton, 1994). Young adolescents, often with less education of child development, are more prone to pinching and teasing their infants (Osofsky, Osofsky, & Diamond, 1988). Adolescent mothers' lack of empathic awareness is positively related to the number of developmental delays among their children (McKenry, Kotch, & Browne, 1991). In addition, less stimulating environments have been shown to have a direct effect on the cognitive development of children. Bradley and Caldwell (1984) suggested that homes low in child stimulation correlate highly with children's three year IQ scores.

Adolescent offspring have relative delays in language and social domains (Rauch-Elnekave, 1994). Differences between children of adolescent and adult mothers become more visible as children get older. Children of adolescent mothers tend to have lower IQ scores at age 4 years and poorer

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academic achievement in school, as well as lower IQ scores at 7 and 12 years (Elster et al., 1983).

Instrumental Resources

Adolescent mothers are often deprived of instrumental resources such as food, clothing, time, money, and access to support networks. The contributing factor to this deprivation is often economic disadvantage. Two-thirds of all children ages birth to three years born to mothers under the age of 22 live below the poverty line in the United States (Adams, Adams-Taylor, & Pitman, 1989). Approximately one million children living in poverty live in families with adolescent mothers. Poverty often places young mothers and their infants in physically neglecting and isolating communities denying them sufficient prenatal and postnatal health care. Poverty restricts access to sources of social support, increases exposure to high crime and violence and situations which necessitate moving frequently (Halpern, 1993).

The intense stress on adolescent mothers in a situation of economic disadvantage often places them in a position that compromises their parenting. The correlates of economic disadvantage consume the adolescent's physical and mental energy and decrease a sense of control over one's life and the lives of children (Halpern, 1993).

When the risk variable of poverty is coupled with that of adolescent parenting, the potential for increased developmental delays, behavioral maladjustment and low school achievement for the children is heightened

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(Dubow & Luster, 1990). In addition, infants raised by economically disadvantaged adolescent mothers are more likely to suffer from the lack of a secure attachment to their mother (Spieker & Bensley, 1994).

Personal Support Systems

Adolescent mothers benefit from various sources of social support. Social support can be received from the adolescent mother's mother, the father of the child, friends of the adolescent mother, or parenting groups and professionals. Although support is generally seen as beneficial for the young mother, there seem to be differences within the groups of mothers on which of these support systems is perceived to be the most beneficial to them. Perhaps these group differences are age-related and can be partially explained by the differing developmental stages within adolescence (Shapiro & Mangelsdorf, 1994).

Specific grandmother support has been seen to have a significant influence on the outcome of adolescent mothers as well as their children (Osofsky, Hann, & Peebles, 1993). In one study, eighty-nine percent of adolescent mothers identified their own mothers as a source of support. Interestingly, 36% of this sample also identified their own mothers as a source of conflict (Nitz, Ketterlinus, & Brandt, 1995). Research suggests that a primary developmental challenge of adolescence is shifting away from relational investments with family members to more of an emphasis on peers and dating. Thus, familial social support for older adolescents may hinder their

parenting role identification and development of sense of autonomy, causing a source of conflict for these mothers. Younger adolescents may still be dependent on this support from the family and place less importance on their sense of autonomy. Research suggests that for those adolescent mothers who experience a sense of conflict with their own mother, it can be mediated by other sources of support such as peers and the father of the child (Shapiro & Mangelsdorf, 1994).

Mixed findings have revealed that, in some cases, adolescent mothers perceive their family to be more supportive than their friends (Schilmoeller & Baranowski, 1985), and in other findings the adolescents perceived a supportive peer network to be more important (Garcia Coll, Hoffman, Van Houten, & Oh, 1987; Nitz, Ketterlinus, & Brandt, 1995). Research has suggested that although peer support is associated with more positive maternal behaviors, the practice of adolescent mothers seeking help in childcare from other adolescents may have an adverse influence on the development of their children (Garcia Coll, Hoffman, Van Houten, & Oh, 1987).

Mixed findings have also been shown for adolescent mothers on the benefits of the child's father as a source of social support. Forty-nine percent of adolescent mothers perceived their child's father as a helpful source of information; however, almost as many adolescents (43%) perceived the child's father to be a source of conflict. Research suggests that this degree of conflict may be due to an adolescent's strive for individuation and identity formation

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(Nitz, Ketterlinus, & Brandt,1995). However, support from the child's father has also been shown to be a significant predictor of parenting adjustment, and older mothers are more likely to have more contact with their child's father. Thus, delay of childbearing, even in the adolescent years, may bring a more positive outcome for the child (Samuels, Stockdale, & Crase,1994).

Home Environment

Adolescent mothers are often shown as providing less optimal home environments when compared to non-adolescent mothers (Garcia Coll, Hoffman, & Oh, 1987). The organization of the temporal and physical environment for mothers who are economically deprived is often variable and in some cases erratic, and adolescent mothers are shown to interact less and less appropriately with their infants.

Adolescent mothers, especially the youngest mothers, spend less time in caretaking activities for their infants, and the quantity as well as quality of the adolescent mothers' verbal interactions with their infants is poorer than the verbal interactions of non-adolescent mothers. Non-adolescent mothers use less restriction and punishment (more positive interaction methods) and provide more daily variety to stimulate their infants (Garcia Coll, Hoffman, & Oh, 1987; Passino et al., 1993; Stevenson, Barratt, & Roach, 1995). The youngest adolescents may represent the group most at-risk for poor maternal interactive behaviors.

Adolescent mothers, when compared to non-adolescent mothers, have lower total scores on the Home Observation for Measurement of the Environment (HOME), specifically on subscales reflecting maternal behaviors, such as emotional responsiveness, and avoidance of restriction and punishment (Garcia Coll, Hoffman, & Oh, 1987). Longitudinal examination of the relationship between the home environment and cognitive development suggest that HOME scores taken at 6 months of age correlate highly with IQ scores at 36 and 54 months of age (Bradley & Caldwell, 1988). Favorable HOME scores have been related to a decreased probability that children exhibit future behavioral or cognitive problems (Dubow & Luster, 1990).

Implications

The occurrence of multiple stressors in the population of young mothers and their children necessitates a multidimensional conceptualization of the potential risks and outcomes that the young mothers and their children experience. The current deficit in the research is in providing a view of the differences within groups of young mothers and the relationship of these differences to the development of their children. Considering the cognitive and psychological differences of younger and older adolescents (e.g., Osofsky, Osofsky, & Diamond, 1988), it may prove fruitful to look more closely at the multiple stressors that these groups experience as they transition into motherhood. This study is intended to expand our current knowledge base on the developmental risks associated with the infants of young mothers by further

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examining potential age-related differences within this group of mothers and their associated impact on the children.

<u>Questions Addressed in the Study</u>

Based on past research, when taking a more age-descriptive look at the population of adolescent mothers, as well as comparing them to a group of young adult mothers, the following questions are examined:

1. Do the youngest mothers (13-15) and the oldest mothers (19-21) significantly differ on the proposed variables, indicating that the youngest mothers have less favorable outcomes?

2. How does the combination of infant's developmental level, family resources, family support, and the quality of the home environment relate to maternal age in a sample of young mothers and their infants?

    2.A. Is there a correlation between the above variables such that less positive information indicates the youngest mothers (13-15), and more favorable information indicates the oldest mothers (19-21)?

<div align="center">METHOD</div>

<u>Participants</u>

Participants were 51 young mothers who delivered their first child between the ages of 14-21 in the State of Rhode Island. The current study was conducted in cooperative agreement with the Rhode Island Department of Health and Kent County Visiting Nurses Association. These agencies are responsible for the comprehensive Statewide developmental screening system

that Rhode Island provides for each child born in the State. Those children who are identified at birth as being at risk for developmental disabilities are followed by the aforementioned agencies and referred for appropriate Early Intervention services. The screening of each neonate born to a mother under the age of 19 inherently places the child at risk, identifying these families to be followed up with a comprehensive home visit done by Kent County Visiting Nurses Association. The home visit incorporates the measures utilized in this study and is referred to in the State as Level 2 Screening.

The subjects were divided into three groups by age. The first group consisted of younger adolescent mothers (age 13-15; n=10). The second group included older adolescent mothers (age 16-18; n=22). The third group consisted of young adult mothers (age 19-21; n-19). Adolescent mothers were split into an older and younger group in order to examine differences that may be related to the phase of adolescence. The third group of young adult mothers (19-21 years old) was included in order to determine if the findings were significant for adolescents alone. Because children of mothers in the 19-21 year old group would not have been identified to be at risk due to maternal age this group was selected for the study based on information from similar maternal risk variables (i.e., maternal education).

Procedure

The Rhode Island Department of Health provided an anonymous list of young women aged 21 years and younger who gave birth in Rhode Island in

the years of 1996-1997. This list was coded by individual identification numbers and also provided demographic information on each parent-child dyad that was utilized for determining the child's developmental risk status.

From this original list of 3,977 mothers (193 younger adolescent, 1,353 older adolescent, 2,431 young adult), a clean subset of participants was selected. Table 1 depicts the number of participants rejected based on selection criteria.

Table 1.   Participant Selection Criteria and Rejection Rate

SELECTION CRITERIA	# OF 13-15'S REJECTED	# OF 16-18'S REJECTED	# OF 19-21'S REJECTED
Not determined risk positive (19-21's only)			585
Twins	1	6	2
Prior Births	6	221	425
Low Birth Weight (<2500g)	25	147	206
Known Established Conditions	6	6	5
Maternal Non-residence	11	8	21
Maternal drug/mental health/disability history	15	190	207
Days spent in NICU	9	29	87
TOTAL # REJECTED	73	607	1,538
TOTAL # SELECTED	120	746	893

It is noted that the number of participants rejected across specific criteria is proportional across groups.

From the total numbers of participants selected to include in the study, a two-step process was done to identify those that had received a Level 2 home visit from a visiting nurse between the ages of 6-8 months of age. First, a search was done by child's date of birth within the statewide database, matching individual identification numbers to identify the children's names as well as their mothers. The names were then entered into a second VNA database to identify which of the families received a Level 2 home visit and the location of their file. Due to time constraints for this phase of the study and limited availability of the VNA's computers for this purpose, a total of 58 children were identified for the file review phase (out of a total of 692 names entered).

File reviews were completed for each of the 58 participants to collect information that was gathered by the visiting nurse during the Level 2 home visit. This information consisted of the four instruments utilized as predictor variables in the study analysis. Data were recorded on a coding sheet utilizing the participants unique identification numbers assigned to them by the VNA. The participants' unique identification numbers from the Statewide Newborn Screening was also recorded so that participant's demographic data would be able to be linked to their Level 2 follow up data. Seven of these files contained

gross amounts of incomplete data and those participants were rejected, resulting in a total sample size of 51.

<u>Instruments</u>

The following four instruments are administered by Kent County Visiting Nurses' Association under the Department of Health as part of a comprehensive developmental screening system and comprise the four predictor variables for the study.

(1) The Family Resource Scale (Dunst & Leet, 1987) measures the adequacy of resources available in households with young children. The scale encompasses 31 items rated on a 5-point Likert-type scale, from not at all adequate (1) to almost always adequate (5). The scale items are ordered from the most to the least basic resources.

Studies have been completed on the reliability and validity of the scale. Coefficient alpha computed from the average correlation among the items was .92, the split-half reliability estimate was .95, and the test-retest reliability estimate of the scale was r=.52 when the scale was administered two to three months apart. Estimates of the criterion validity of the instrument was assessed in regard to the relationship between the total score of the scale and personal well being (r=.57) as well as the relationship between the total score and maternal commitment to caring for their children (r=.63). In addition, factor analysis of the instrument yielded a seven factor solution that accounted for 75% of the variance. The seven factors are as follows: 1) basic needs

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resources 2) financial resources, 3) time for family, 4) extra family support, 5) child care resources, 6) special child care resources and 7) personal growth and luxury resources.

(2) The Family Support Scale (Dunst, Trivett, & Jenkins, 1984) measures the helpfulness of various sources of support when raising a young child. The scale comprises 18 items, plus 2 items that are respondent-initiated, rated on a 5-point Likert-type scale, from not at all helpful (1) to extremely helpful (5). Coefficient alpha computed from the average correlation among the 18 items was .77, split-half reliability estimate was .75, and test-retest reliability estimate for the scale, when taken one month apart, was .75 for the average of the items, and .91 for the total scale score. The criterion validity of the instrument was estimated with respect to the relationship between the total scale score and personal well being (r=.28). In addition, factor analysis done for the scale yielded a six-factor solution that accounted for 62% of the variance. The four factors include: 1) family support, 2) informal support, 3) community support and 4) formal support.

(3) The Home Observation for Measurement of the Environment Inventory (Caldwell & Bradley, 1984) measures the quality and quantity of social, emotional, and cognitive experiences available to a young child in their home. The instrument is a combination observation-interview technique. The infant version of the instrument is utilized with children from birth to three and consists of 45 items that are scored in a binary yes-no manner. The 45 items

are clustered into six subscales: 1) emotional and verbal responsivity of the mother, 2) acceptance of child (previously named avoidance of restriction and punishment), 3) organization of the physical and temporal environment, 4) provision of appropriate play materials, 5) maternal involvement with child, and 6) opportunities for variety in daily stimulation. The reliability of the instrument has been investigated in terms of inter-observer agreement, internal consistency, and stability over time. Internal consistency estimates for the subscales ranged from .44 to .89, and the total scale internal consistency estimate was .89. Stability measures taken when children were 6 months, 12 months, and 24 months of age showed a moderate to high degree of stability for all subscales, ranging from r=.27 to r=.77. In addition, Caldwell and Bradley (1984) reported that 12-month HOME scores correlate moderately with 36-month Stanford-Binet mental test scores (r=.58).

(4) The Mullen Scales of Early Learning (Mullen, 1989) is a measure that is used with infants birth to 14 months, 30 days, and assesses five areas of child development including gross motor, visual receptive, visual expressive, language receptive, and language expressive. Age scores, T-scores and Developmental Stage are reported for each of these five areas. A T-score of below 40 in any of these areas is considered risk suspect.

The reliability of the instrument has been investigated in terms of internal consistency, test-retest reliability, and inter-scorer reliability. Internal consistency estimates for the five scales ranged from .75 to .83. Test-retest

reliability was conducted with two age groups. Reliability results for 1-24 month olds ranged from .82 to .96 for the five scales. For 25-56 month old children, retest reliability estimates ranged from .71 to .79. Inter-scorer reliability estimates for the instrument ranged from .91 to .99. In addition, the instrument demonstrates acceptable construct validity in terms of developmental progression of scores and intercorrelations between T-scores. The scales of the Mullen were found to correlate moderately with the Bayley Mental Development Index (range .53 to .59) but less well with the Bayley Psychomotor Development Index (range .21 to .52) supporting the validity of each cognitive Mullen scale as a measure of cognitive ability.

Infant developmental level was assessed with the Mullen Scales of Early Learning. Due to the fact that there was no scale total available, the individual subscales of Gross Motor, Language Expressive, Language Receptive, Visual Expressive and Visual Receptive were utilized. Higher T-scores indicate more advanced development in all areas measured.

Availability and use of family resources was assessed with the Family Resource Scale. Higher numbers depict more adequacy in resources. The maximum item score is 5.0 and the total score represents the mean of the individual scores. Family support was measured with the Family Support Scale, in which the higher the figure (maximum item score 5.0), the more helpful sources of support are to the mother. Similar to the Family Resource Scale, the total score is obtained from the mean of the individual items. The

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quality of the home environment was assessed with the Home Observation for Measurement of the Environment (HOME). Scores represent the total number of quality indicators present in the home. A higher score depicts a higher level of quality in the home environment with a maximum total score of 45.

RESULTS

The data from the 51 participants were analyzed initially to describe the population being studied. Descriptive information about the young mothers who participated in the study is contained in Table 2. Their ages ranged from 14-21. Group 1 (ages 14-15) consisted of 10 mothers; 22 young mothers were in group 2 (ages 16-18); and group 3 included 19 mothers (ages 19-21). The mean age for the sample was 17.78 years, with the mean age for group 1 - 14.90, Group 2 – 17.41, and Group 3 – 19.74. Table 2 also includes information on maternal education, prenatal care, marital status, race, delivery type and mother's preferred method of feeding her infant.

Significant differences between groups were found on two variables in these descriptive data. As expected, the older mothers had attainted a higher level of education [Group 1 mean – 8.20, Group 2 mean – 10.05, Group 3 mean – 11.22, F (2,45) = 11.25, p < .0001]. Under the category of feeding type, the youngest mothers were found to breastfeed their children a greater percentage of the time (Group 1 – 80%, Group 2 – 22.73%, Group 3 – 31.58%, Chi Square = 10.16, p = .037). Differences between groups were not significant for any other demographic variables.

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Table 2.   Maternal Demographic Means and Percentages Across Groups

	GROUP 1 (N=10)		GROUP 2 (N=22)		GROUP 3 (N=19)		TOTAL (N=51)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	14.90	.32	17.41	.73	19.74	.93	17.78	1.93
Education level	8.20	1.48	10.05	1.79	11.22	1.48	10.10	1.93
Month prenatal care began	3.60	1.26	3.10	1.33	3.06	1.73	3.19	1.47
# of prenatal visits before 36 weeks	8.0	2.79	7.11	2.08	7.59	2.67	7.48	2.44
	GROUP 1 (N=10)		GROUP 2 (N=22)		GROUP 3 (N=19)		TOTAL (N=51)	
	#	%	#	%	#	%	#	%
MARITAL STATUS Single	10	100	18	81.82	18	94.74	46	90.20
RACE								
White	5	50	13	59.09	14	73.68	32	62.70
Black	1	10	1	4.55	0	0	2	3.90
Hispanic	3	30	8	36.36	3	15.79	14	27.50
Southeast Asian	1	10	0	0	0	0	1	2.0
Cape Verdean	0	0	0	0	2	10.53	2	3.90
DELIVERY TYPE								
Vaginal delivery	9	90	18	81.82	11	57.89	38	74.50
Vaginal delivery with forceps or vacuum	0	0	2	9.09	4	21.05	6	11.70
Cesarean delivery	1	10	2	9.09	4	21.05	7	13.70
FEEDING TYPE								
Breast	8	80	5	22.73	6	31.58	19	37.30
Bottle	2	20	16	72.73	12	63.16	30	58.80
Both	0	0	1	4.55	1	5.26	2	3.90

Table 3.   Infant Demographic Means and Percentages Across Groups

	GROUP 1 (N=10)		GROUP 2 (N=22)		GROUP 3 (N=19)		TOTAL (N=51)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Gestational Age in weeks	39.40	1.35	39.18	1.33	39.79	.92	39.45	1.21
Birth Weight in grams	3179.9	285.8	3184.5	489.7	3253.6	348.1	3209.3	400.3
Apgar scores at 5 minutes	8.90	.32	8.95	.65	8.84	.83	8.90	.67
	GROUP 1 (N=10)		GROUP 2 (N=22)		GROUP 3 (N=19)		TOTAL (N=51)	
	#	%	#	%	#	%	#	%
SEX								
Female	4	40	8	36.36	11	57.89	23	45.10
Male	6	60	14	63.64	8	42.11	28	54.90

Descriptive information on the newborns of these 51 young mothers is found in Table 3. Forty five percent of the infants were females and 55% were males. Birth weights ranged from 2552 to 4225 grams, with a mean of 3209.33 grams. Apgar scores at five minutes ranged from 6 to 10 with a mean of 8.90. Differences between groups were not significant for any child demographic variable.

Analysis of Variance Results

The current research question was designed to assess whether the younger adolescents differed from the young adult mothers on individual subscale items of the predictor variables. Because a missing value for a single

variable caused the entire case to be eliminated from the cell, there would have been too few cases to conduct the analysis without making some adjustment. In addition, missing values were scattered throughout cases and variables so that deletion would have caused substantial loss of data. Due to the small size of the sample, the most stringent method of estimating missing values was chosen to enhance accuracy of the analysis. For each missing variable, cases with complete data were utilized as independent variables to predict the missing values with multiple regression (Tabachnick & Fidell, 1989). Due to the small sample size and potential distortion of error variance with the use of a MANOVA procedure, separate one-way ANOVA's were conducted, rather than a MANOVA, to assess the significance of group differences. Seventeen separate one-way ANOVA's were performed to determine the mean differences between groups. Maternal age group functioned as the independent variable. The seventeen dependent variables are listed in Tables 4, 5 and 7.

Table 4.   Means and Standard Deviations of Social Support Across
            Groups

SUPPORT FROM	GROUP 1 (N=10)		GROUP 2 (N=22)		GROUP 3 (N=19)		TOTAL (N=51)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Family	3.10	.69	3.41	.73	3.14	.86	3.25	.77
Community	1.96	.97	1.67	.86	2.01	.85	1.86	.87
Informal	2.00	.68	2.14	.81	2.23	.93	2.15	.83
Formal	2.82	.68	2.89	1.11	2.43	1.05	2.70	1.02

Group means and standard deviations for subscales of support received can be found in Table 4. There were no group differences found for amount of support received from various groups.

Table 5.   Means and Standard Deviations of Resources Across Groups

RESOURCES	GROUP 1 (N=10)		GROUP 2 (N=22)		GROUP 3 (N=19)		TOTAL (N=51)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Basic	4.32	.49	4.30	.51	4.43	.44	4.35	.47
Financial	3.50	.74	3.56	.88	3.61	.71	3.57	.78
Time for Family	4.30	.58	4.12	.82	4.04	.79	4.12	.76
Family Support	3.20	.95	3.48	.98	3.49	1.11	3.43	1.01
Child Care	3.70	1.23	3.45	1.30	2.34	1.39	3.08	1.42
Growth and Luxury	3.19	.77	3.40	.62	3.21	.93	3.29	.77
Special Child Care	2.80	1.48	2.94	1.73	2.42	1.57	2.70	1.60

Table 6.   Summary Table of One –Way Analysis of Variance – Child Care Resources

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
Between Groups	2	17.10	8.55	4.93	.0114
Within Groups	47	81.58	1.74		
Total	49	98.68			

Table 7.   Means and Standard Deviations of subscales of the HOME

HOME SUBSCALES	GROUP 1 (N=10)		GROUP 2 (N=22)		GROUP 3 (N=19)		TOTAL (N=51)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Acceptance	6.20	.63	6.68	.99	5.95	1.08	6.31	1.01
Responsivity	10.30	1.49	9.71	2.10	9.89	1.73	9.90	1.83
Organization	5.40	1.26	5.27	.83	5.84	.50	5.51	.86
Play Materials	6.60	1.71	7.10	1.41	7.68	1.16	7.22	1.42
Involvement	4.20	1.81	5.18	.96	4.95	1.13	4.90	1.25
Variety	2.90	1.37	3.36	1.65	3.37	1.21	3.27	1.43

Group means and standard deviations for subscales of resources received are listed in Table 5. Results revealed that younger adolescent mothers as well as older adolescent mothers reported significantly more resources in the area of child care than the young adult mothers, F (2,47) = 4.93, p < .01. A summary table of these results can be found in Table 6.

Table 7 contains the means and standard deviations of subscales of the HOME. Results did not support group differences on any of the HOME subscales.

<u>Discriminant Analysis Results</u>

A discriminant analysis was performed to answer the second research question – Among the variables of infant developmental level, family resources, family support, and the quality of the home environment, which variables in combination discriminate among the three age groups – younger adolescents (13-15), older adolescents (16-18), and young adults (19-21)? Thus, the analysis examined whether scores that represent young mothers' available resources, support, home environment and their children's developmental level could be combined to reliably distinguish between maternal age group at the time of the birth of her child.

Table 8 displays the means for these variables across groups. Of these variables only the measure of Language Expressive was found to be significantly different among the three groups, as shown by one-way analysis of variance. Results revealed that children of young adult mothers exhibited significantly more expressive language skills than did children of younger adolescent mothers. These data are contained in Table 9.

The discriminant analysis revealed two functions resulting from a combination of the variables of young mothers' available resources, support, home environment and their children's developmental level. The first function discriminating among the three groups was found to be significant at the .0126 level with 71% of the variance explained by this function. The second function

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did not significantly discriminate among the groups. Table 10 presents these results.

Table 8.   Means and Standard Deviations for Age Groups of Infant Developmental level, Family Resources, Family Support, and Quality of the Home Environment.

VARIABLE	GROUP 1 (N=10)		GROUP 2 (N=22)		GROUP 3 (N=19)		TOTAL (N=51)	
	Mean	S.D.	Mean	S.D.	Mean	SD	Mean	SD
Infant Developmental Level								
Gross Motor	52.20	7.86	50.86	4.26	52.89	9.45	51.88	7.19
Language Expressive	50.10	6.77	51.86	4.17	55.95	6.87	53.04	6.17
Language Receptive	51.90	4.58	52.68	4.45	55.11	7.52	53.43	5.85
Visual Expressive	50.60	5.70	53.82	3.40	50.63	6.91	52.00	5.52
Visual Receptive	51.20	8.22	54.91	3.40	56.74	8.18	54.86	6.72
Family Resources	3.76	.45	3.92	.46	3.74	.59	3.82	.51
Family Support	2.59	.58	2.65	.60	2.57	.66	2.61	.61
Quality of Home Environment	35.60	5.68	37.09	4.05	37.79	3.71	37.06	4.27

Table 9.   Wilks' Lambda and Univariate F-Ratio's

VARIABLE	WILKS' LAMBDA	F-RATIO	SIGNIFICANCE
Gross Motor	.98	.41	.67
Language Expressive	.85	4.09	.02*
Language Receptive	.95	1.32	.28
Visual Expressive	.92	2.20	.12
Visual Receptive	.91	2.35	.11
Family Resources	.97	.74	.48
Family Support	1.00	.08	.92
Quality of Home Environment	.97	.86	.43

Table 10.   Cononical Discriminant Functions

FUNCTIONS	EIGENVALUE	CANONICAL CORRELATION	WILKS' LAMBDA	SIGNIFICANCE
1	.61	.62	.50	.0126*
2	.25	.45	.80	.1902

Five of the dependent variables were identified as defining the first function. These factors were language expressive, language receptive, family resources, gross motor, and family support. These results are contained in Table 11.

Table 11.   Standardized Canonical Discriminant Function Coefficients

VARIABLES	FUNCTION 1	FUNCTION 2
Language Expressive	.45	
Language Receptive	.27	
Family Resources	-.20	
Gross Motor	.16	
Family Support	-.07	
Visual Receptive		.53
Visual Expressive		.34
Quality of Home Environment		.32

Table 12.   Canonical Discriminant Functions at Group Means

GROUP	FUNCTION 1	FUNCTION 2
1	-.21	-.98
2	-.73	.31
3	.95	.16

Table 12 displays the discriminant functions when evaluated at group means. According to these group means, on the average, adult mothers have the highest discriminant function scores and the youngest mothers have the lowest discriminant function scores.

Table 13 presents information on predicted group membership, when groups are identified by the discriminant function. Forty percent of the younger

adolescent group, 81.8% of the older adolescent group and 73.7% of the young adult mothers were predicted by the discriminant function. Overall prediction of group membership was 70.59%.

Table 13.   Predicted Group Membership from Discriminant Function

PREDICTED GROUP MEMBERSHIP				
Group	# of Cases	1	2	3
1	10	4 (40%)	5 (50%)	1 (10%)
2	22	1 (4.5%)	18 (81.8%)	3 (13.6%)
3	19	2 (10.5%)	3 (15.8%)	14 (73.7%)

DISCUSSION

The importance of the current study is to look more descriptively at a population of young mothers. By examining differences in areas of support and resources, the home environment and child development, the study looks at potential age-related differences within this group of mothers and their associated influences on the children. The proposed study is an attempt to contribute to the current knowledge base surrounding various influences on adolescent mothers. Analysis was completed to examine the extent to which younger adolescent mothers, older adolescent mothers and young adult mothers differ on these variables. In addition, analysis examining these multiple factors in combination was completed to examine their aggregate relationship to the maternal age groups.

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Results initially served to describe the population being studied. When examining the preliminary analysis for the sample, it was surprising to find that the youngest mothers were more likely to be breast feeding their children. This may indicate that the sample was skewed with those young mothers who had better maternal role attainment. It also may be speculated that more of the younger mothers lived with family and stayed home with their children, whereas the older mothers were more apt to go back to work. No differences were found in amount of prenatal care received between groups, suggesting that there was an equal level of responsibility shown to seek out prenatal care from all adolescent mothers, regardless of age.

Surprisingly, little variation was found in exploring the first research question concerning whether group differences existed on the measures of family support, resources, the home environment and child's developmental outcomes. The elevated mean age of the youngest adolescent mothers in the sample (M=14.90) may have lessened the effect of group differences within the study variables. It was proposed that the youngest mothers may have needed or received the most support in response to having the fewest available resources. Results indicated that this was not the case. The youngest mothers not only did not report receiving more support than the oldest mothers but also reported that resources and support were meeting their needs. One possible explanation for the presence of resources and supports for the youngest mothers is that they and their children are more

likely to be living at home with their own parents, where a network of supports already exists (Adams, Adams-Taylor, & Pittman, 1989). In fact, the adolescent mothers reported significantly more adequacy of resources in child care than did the young adult mothers, suggesting that the younger mothers may have more of a tendency to live at home with their parents who assist in daily child care. Demographic information was unavailable for the extent of the infant's father in providing support to the young mother. Thus, it seems that the youngest mothers did not need a higher level of support than the oldest mothers and in addition, had a sufficient amount of resources to assist them with every day living.

It was also somewhat surprising that there were no group differences found on the measure of the HOME. Previous research has suggested that the organization of the temporal and physical environment for young mothers is often variable and in some cases erratic. In addition, adolescent mothers are shown to interact less and less appropriately with their infants (Garcia Coll, Hoffman, & Oh, 1987; Passino, Whitman, Borkowski, Schellenbach, Maxwell, Keogh, & Rellinger,1993); Stevenson, Barratt, & Roach, 1995). For the mothers in the sample there were no differences between the physical environment of the home nor in the mother's interactions with their infants. Again, the somewhat surprising lack of differences in the physical environment of the home for the youngest mothers may be attributable to a high percentage of these mothers and infants residing in the

adolescent's parent's home. This finding may also be slightly skewed by the elevated mean age of the youngest group of mothers.

Recent research supports the importance of maternal responsiveness and parent–child interaction on children's developmental outcomes. Specifically, research suggests that it is the level of parental responsiveness that is most associated with children's developmental outcomes when considering the relationship of maternal–child interaction with early intervention services provided to at-risk families (Mahoney & Wheeden, 1997; Mahoney et al., 1998; Shonkoff et al., 1992). The results of the current study did not support the proposal that the youngest mothers interacted less appropriately with their infants, as measured with the HOME. This may, in part, be explained by the unique characteristics of the small sample size. It may also indicate that young mothers who keep themselves healthy and have healthy infants are more responsible and more responsive to their children. It is surprising then, considering that there were no differences found in the mother's emotional and verbal responsivity to their children, that the children of the youngest mothers displayed significantly lower levels of expressive language than the children of the oldest mothers. This may provide some support for a more mature style of interaction between the oldest mothers and their children that was not particularly assessed in the measure of the HOME. The ability to follow the child's lead, provide greater opportunities for verbal

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expression, and model more appropriate verbal styles may have been greater in the young adult mothers, as compared to the young adolescent mothers.

The present study provides tentative support for a relationship between maternal age of adolescent mothers and available family supports and resources, the families' home environment, and children's developmental outcomes. Although the results of the discriminant analysis reveal that there are several variables that, when considered in aggregate, can discriminate between age groups of young mothers, it is recommended that the results be interpreted with caution due to the small sample size and extent of missing data corrected for in the study. With that being said, it does seem that variables measuring children's communication and gross motor skills, as well as available family resources and supports have a stronger ability to classify young mothers based on age than the child's visual skills and the quality of the home environment. The function discriminating between the groups correctly classified 40.0% of the younger adolescent group, 81.8% of the older adolescent group, and 73.7% of the young adult group. Overall prediction of group membership was 70.59%, suggesting that to some degree these groups can be considered as separate entities.

Limitations

There are several important limitations to the study to consider when interpreting the results. First, due to the difficulties encountered in the data collection, the sample size was smaller than anticipated. The number of

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subjects with appropriate data available to review was small and the completeness of the data reduced the sample size even further. This small sample size made some of the statistical analyses, particularly the discriminant analysis, less reliable. In addition, the small sample size severely limits the generalizability of the study results. It may be argued that the sample somewhat represents a self-selected sample in that the young mothers in the study are those that agreed to have a nurse visit their family when their children were approximately six months old. In addition, those families with higher risk status tend to change residences more often and may not be able to be located for the six-month follow-up data collection. In this respect, the sample may not be a representative sample from the population of young mothers.

The potential bias of the individual visiting nurses may be considered a limitation of the study. It is possible that there were individual differences among home visitors in administering and interpreting the data utilized for this study. The unavailability of reliability data between these home visitors as well as a lack of information on the visitors' specific training in administering these measures hinders the generalizability of the results. Within the sample size there were a substantial number of missing variables to deal with in the analysis. Although the most stringent method of dealing with missing values was utilized, this is an additional factor to consider in interpreting the reliability of the results.

The fact that the study sample consisted of only healthy mothers and healthy infants was helpful in controlling for the influence of confounding variables in the analysis but also considerably limits the generalizability of the results. Research has shown that children of adolescent mothers are at higher risk than children of adult mothers for prematurity and birth complications as well as long term developmental delays (Brooks-Gunn & Furstenberg, 1986; Whitman, Borkowski, Schellenbach, & Nath, 1987; Stoiber & Houghton, 1994). A final limitation to the study may be the fact that data were collected for only one time point, just six months following the infant's birth. Research suggests that delays in development for children of adolescent mothers may not be apparent until the end of infancy or beginning of toddlerhood (Brooks-Gunn & Furstenberg, 1986).

Despite the limitations cited within the study it is important to highlight that significant findings were revealed in the discriminant analysis. A moderate level of significance was maintained when looking at the relationship of mothers' level of resources, support, home environment, and infants developmental level to mothers age group. The fact that this significance was established despite the small sample size, elevated mean age of the youngest mothers, and other sources of unreliability in the data, provides support for the existence of maternal age-related differences within a group of young mothers and their children.

<u>Conclusions and suggestions for further research</u>

The current study provides tentative support that a combination of variables measuring young mothers' available resources and supports and their children's developmental outcomes in early distinguishes among age groups of young mothers. Considering the relative weakness of the predictive power found between these variables and maternal age and the lack of group differences, it may be likely that for a sample of healthy young mothers and healthy infants, maternal age is only one of several defining factor in observable group differences. In addition, several serious limitations to the study are recommended to be improved upon in future research.

It is important for the reliability of the data to include a larger sample size in any studies done in the future. In addition to sample size, there are other factors to consider in ensuring that the sample is as representative of the population as possible. Perhaps most importantly, the current study seems to indicate that perhaps a sample of healthy young adolescent mothers who deliver healthy infants are just as capable of getting through the first six months of parenting as are healthy young adult mother-infant dyads. In this respect, it is recommended that future research studies be conducted to examine similar effects with a population of adolescent mothers with health issues (including mental health) and infants with health issues (including prematurity).

In addition to including health-related risk factors in the sample, it would be helpful for further research to consider more long term effects within an adolescent sample of mothers and their children. Because many delays in children who are at risk due to environmental factors, such as young maternal age, do not appear until later in childhood (Brooks-Gunn & Furstenberg, 1986), it is important to note that the early months of life may be a grace period for the emergence of developmental delays. Although the current results suggest that the youngest mothers seem to be as capable as the older mothers in getting through the first several months, it is the long-term effects that need to be considered. Thus, children of the youngest mothers may remain to be at risk although there are small differences in their cognitive characteristics and family dynamics in the first few months of life.

Lastly, the limited amount of specific age-related differences found in the current study may provide support for a relationship-focused, rather than child-focused model of early intervention. Because few differences were discovered in looking at mothers and infants separately, the emphasis in future studies might be placed on the interactions between this dyad. Research on the follow-up of these dyads should be comprehensive and longitudinal to address the complexity of the population and shed more light on best practice for intervention with young mothers and their children.

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