

Maternal Resources, Parenting, and Dietary Patterns Among Rural African American Children in Single-Parent Families

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Abstract A correlation study was designed to test the hypothesis that maternal education, perceived family resources, and the importance of family routines would be related to children's dietary patterns. Additionally, the study examined the hypothesis that dietary patterns would be associated with children's cognitive and physical abilities. The sample for this study included 159 African American single-mother families with a 6- to 9-year-old child living in rural areas, most of whom lived in poverty. Children's eating patterns were assessed using a self-report questionnaire administered to the mother in an interview format. Children's cognitive ability was measured by several subscales from the Woodcock Johnson Psycho-Educational Instrument and the Harter Perceived Competence Scale for children. For male children, the mother's higher education was related to more adequate eating patterns at home, and more perceived family resources were related to the likelihood of taking vitamin supplements. For female children, greater milk intake was positively related to cognitive outcomes, including applied problem, passage comprehension, calculation, synonym identification, antonym identification, and quantitative concept scores. Milk intake was clearly related to more optimal cognitive

development. The results of this study support the literature related to the importance of nutrition for cognitive and physical abilities in children.

Key words: maternal resources, dietary patterns, rural African American children, single-parent families.

INTRODUCTION

It is important to understand the linkages between maternal resources, parenting, and dietary patterns and the physical and cognitive development of children. This will lead to improved nursing practice with families in the community and ultimately healthier communities. African American children living in single-mother-headed households are at risk for negative outcomes. Single mothers have been found to experience more stressful life events than married mothers and are at higher risk for depression and anxiety (McLoyd, Jayaratne, Ceballo, & Barquez, 1994). The impact of economic status, marital status, and psychological distress of single mothers adversely affects their parenting behavior (McLoyd et al., 1994). Rural mothers have fewer job opportunities than those living in urban settings. According to Brody and Flor (1998), most jobs available to rural African Americans are labor intensive and pay low wages. African American children living in rural, economically stressed environments are faced with challenges different from those confronted by urban children living in impoverished conditions. Rojewski (1995) reported that children and

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adolescents living in rural environments have fewer educational opportunities and fewer extracurricular activities than their counterparts who live in urban settings.

However, African American families living in rural areas are an understudied population. From a study of single mothers living in the rural south, Brody and Flor (1998) found that 82% of the families in the sample lived at or below the poverty level. Furthermore, maternal education, religiosity, and adequacy of financial resources were linked to “no-nonsense” parenting, enhanced mother–child relationship quality, and greater maternal involvement in the child’s school activities. The findings indicated a positive relationship between maternal education, perceived adequacy of financial resources, and maternal school involvement. Religiosity was positively related to parenting. Child outcomes were not explored.

The study reported here was a part of a larger study in which children’s cognitive and psychosocial competencies were examined in relationship to maternal variables. Specifically, a family process model was tested that linked maternal education, maternal religiosity, and the adequacy of family financial resources to these child outcomes. This study was designed to examine, in particular, the linkages between children’s dietary patterns and their physical and cognitive competence in economically stressed, rural, single-parent African American families. The families were considered at-risk because most of them live at or below the poverty level and are single-mother-headed households.

THEORETICAL FRAMEWORK

The ecological systems perspective developed by Bronfenbrenner (1986) serves as the theoretical framework for this study. According to Bronfenbrenner, the family is viewed as an ecosystem. Any understanding of human development must consider the context in which social-

ization occurs. The environment is conceptualized as a series of four concentric levels that vary in terms of the proximity to the developing child. The first and closest level to the child is the microsystem. It includes the home, school, and peer group. The variables for study under the microsystem level include family routines, family resources, family structure, child’s cognitive ability, and the child’s physical competence. Each of these immediate environments provides a context in which children are actively engaged in reciprocal interactions.

The second level, the mesosystem, involves the amount of linkage that exists between the immediate environments (various microsystems). The variables for study under the mesosystem include the teacher’s perception of the child’s cognitive ability as well as the school as the site for two meals per day (breakfast and lunch). In other words, the mesosystem reflects the degree of involvement between the parent–child–home setting and the school–child setting. The microsystems and mesosystems are embedded in the third level, called exosystems.

Exosystems are those contexts that do not directly involve children. For example, an exosystem that has implications for parent–child relationship is the parent’s work setting. The variable for study under the exosystem is mother’s employment setting. Although the work setting does not directly involve children, it does impact them by affecting economic resources and the emotional and physical well-being of parents. Another domain in which children have limited access is the parents’ circle of friends (their social network).

The fourth level is the macrosystem, and it involves the basic “blueprint” of society that consists of culture, values, attitudes, and economic and political norms (Bronfenbrenner, 1979) (Fig. 1). The macrosystem refers to a vast array of social circumstances that influence parent–child experiences. These include the immediate social network (extended family members, neighbors, and

Microsystem (Home, school, and peer group)	Mesosystem (Linkages between home, school, and peer group)	Exosystem (Environments not directly involved with child)	Macrosystem (Culture, values, attitudes, etc.)
<hr/> <p style="text-align: center;">Variables</p> <ul style="list-style-type: none"> • Family routines • Family resources • Family structure • Child’s cognitive ability • Child’s physical competence 	<hr/> <p style="text-align: center;">Variables</p> <ul style="list-style-type: none"> • Teacher’s perception of child’s cognitive ability • Site of two meals per day - breakfast and lunch 	<hr/> <p style="text-align: center;">Variables</p> <ul style="list-style-type: none"> • Mother’s employment setting 	<hr/> <p style="text-align: center;">Variables</p> <ul style="list-style-type: none"> • Single African American mother

Figure 1. The family as an ecosystem (adapted from Bronfenbrenner, 1979).

friends), socioeconomic factors (adequate housing, income, and income supplements), the quality of schools, the nature of health care, and the parent's work environment.

LITERATURE REVIEW

Nutrition and Children's Health

According to Golden (1991), nutritional deficits rarely occur in isolation from covarying psychosocial, biological, and environmental stressors. Grantham-McGregor (1993) stated that the strongest predictions of developmental outcomes are made when based on the interaction of nutrition with environmental factors. These factors include low parental educational level, lower socioeconomic status, and negative patterns of parent-child interactions. Human intervention studies involving nutrition and environmental enrichment demonstrated the positive effects of environmental enrichment over and above the effects associated with nutrition (Grantham-McGregor, 1993).

Although chronic undernutrition is rare in the United States, it has been estimated that as many as 8% of 12 year olds experience food inadequacy (Kleinman et al., 1998). This has a profound effect on 12-year-olds' emotional and cognitive development. According to Pollitt (1995), breakfast at school does make a difference. It increases the probability that children will eat a well-balanced breakfast and thereby improves their educational and nutrition status. Iron deficiency with resulting anemia is known to have an adverse effect on cognition. Although the prevalence of iron deficiency anemia has decreased, continued efforts are needed to monitor children in low-income households (MMWR, 1996).

The American Dietetic Association (1999) reported that overweight is currently more of a problem than underweight and growth retardation. In light of this change, dietary guidelines for U.S. children have broadened from an earlier focus on underconsumption and deficiency to overconsumption, physical activity patterns, and prevention of chronic health problems. There is an immediate need for children in the United States to achieve adequate eating and physical activity patterns (Power, Lake, & Cole, 1997). This will allow them to attain healthy weights and prevent problems in later life such as hypertension, coronary artery disease, cancer, stroke, diabetes mellitus, and osteoporosis. Adequate dietary patterns with participation in regular physical activity promote optimal physical and cognitive development and decrease chronic health problems.

Trends in Current Eating Patterns

What are the trends in children's current eating patterns? Children aged 6 to 11 years have been reported as not

eating the recommended minimum amounts of five servings per day of fruits and vegetables (Kirby, Baranowski, Reynolds, Taylor, & Binkley, 1995). In the Bogalusa Heart Study, Nicklas (1995) reported an overall decrease in the total amount of milk, vegetables, soups, breads, grains, and eggs consumed by 10-year-old children. An increase was noted, however, in the total amount of fruits and fruit juices, carbonated drinks, poultry, and cheese consumed by these children. This study of children and adolescents found that most did not meet the recommended intake of food groups outlined in the food pyramid (Nicklas, 1995). For 2 to 19 year olds, it is estimated that approximately 70% did not meet recommendations for fruits, grain, meats, and dairy, and nearly 64% did not meet recommendations for vegetables. The data emphasized the need for a dietary approach that encourages fruits, vegetables, and grains and a lower fat consumption (Nicklas, 1995).

Farris, Hyg, Nicklas, Myers, and Berenson (1998) studied nutrient intake and food group consumption among 10 year olds by observing sugar intake levels from all food sources. Children with the highest level of sugar consumption indeed consumed greater quantities of beverages, milk, and candy. Children in the lowest total sugar consumption group consumed greater amounts of beef, poultry, mixed meats, and cheese. Surprisingly, the nutritional quality of children's diets high in sugar appeared to be adequate for vitamin and mineral intake.

Singleton and Rhoads (1982) reported on meal and snack patterns of Louisiana children. They found that 83% of students ate breakfast, and 15 percent of them ate breakfast at school. Furthermore, they found that when students missed a meal, the most frequently missed meal was breakfast. Children who ate school breakfast exhibited significantly higher energy and calcium, as well as higher magnesium intakes at breakfast, and exhibited higher calcium intakes over a 24-hr period than children who did not eat the school breakfast. With the introduction of school breakfast in 1981 to 1982, the number of students skipping breakfast decreased significantly. With each year, more Black children than Whites reported eating school breakfast (Nicklas, Farris, Boa, & Berenson, 1995).

Environmental and personal factors have an important influence on dietary behavior. Factors such as taste preferences, cultural norms, and food availability influence dietary behavior when it comes to making food choices (Hornack, Block, & Lane, 1997). Parents have a major influence on their children's eating patterns. Nutrient intakes aggregate in families with the strongest associations found between mothers and their children (Oliveria, Ellison, Moore, & Gillman, 1992). In addition, children's eating patterns are influenced by routines

within the family unit, such as number of meals eaten together (Vauthier, Lluch, LeComte, Artur, & Herbeth, 1996). The effect of television commercials on children's dietary pattern is an important national health issue. Food advertisements aimed at children are generally contrary to what is recommended for healthy eating (Kotz & Story, 1994). The high prevalence of food insufficiency and episodic hunger among low-income children (Kleinman et al., 1998) indicates a need for sustaining government-funding food programs. Examples of these public-assistance programs include food stamps, school breakfast, and school lunch.

HYPOTHESES

Consistent with the ecological systems model that guided this study, we hypothesized that maternal education, perceived family resources, and importance of family routines would be related to children's dietary patterns. In addition, we hypothesized that dietary patterns would be associated with children's cognitive and physical abilities.

METHODS

Design

This correlational study was designed to identify the links between dietary patterns and family variables such as maternal education, perceived family resources, and the importance of family routines in a group of rural single-mother-headed households. We also examined the link between dietary patterns and cognitive and physical abilities of the children. According to Brown and Pollitt (1996), inadequate nutrition can disrupt cognition and in early life can limit long-term intellectual development. Additional studies indicate that a strong prediction of developmental outcomes can be made based on the interaction of nutrition with environmental factors, such as low parental educational level, low socioeconomic status, and negative patterns of parent-child interaction (Sigman, Neumann, Jansen, Bwibo, 1989; Wachs et al., 1992).

Procedures

In a rural Georgia region, 159 African American single-mother-headed families with a 6- to 9-year-old child were recruited for the study. Families were recruited through community contacts. An African American staff member contacted African American community leaders such as pastors of churches and teachers and explained the research project to them. After understanding the project and developing a trusting relationship with the staff member, the community leaders contacted prospective families and informed them about the purposes of the

project. Each community leader gave the names of families who expressed interest in the project to the research staff member, who then contacted the families. Each family was paid \$100 for their participation in the study.

To enhance rapport and cultural understanding, African American students and community members served as home visitors to collect data from the families. Prior to data collection, the visitors received 1 month of training to administer the self-reported instruments. During the home visit, informed consents were obtained. One child from each family (the target child) was chosen to provide data for the study. The target child was required to be between 6 and 9 years old. Each mother consented for her own and her child's participation in the study, and the child assented to his or her own participation. The mother provided the name and location of the child's school and authorized the child's teacher to provide the researchers with information regarding the child's performance at school. At each home, self-report questionnaires were administered in an interview format to the mother and the target child. Each interview was conducted privately between each family member and the data collectors, with no family member present or able to overhear the conversation. The teachers were interviewed in the classroom.

Instruments

All participants completed the following instruments: (1) the Nutritional Component Scale (Brody & Flor, 1998), (2) the Woodcock Johnson Psycho-Educational Battery-Revised (Woodcock & Johnson, 1990), (3) Perceived Competence Scale for Children (Harter, 1982), (4) the Family Routines Inventory (Boyce, Jensen, James, & Peacock, 1983), and (5) the Family Resource Scale (Dunst & Leet, 1987). The instruments were administered in the home, and data were collected over a 2-hr time period.

The Nutritional Component Scale is a 27-item self-report questionnaire that measures growth and development and dietary patterns. For purposes of this study, only selected items assessing the child's dietary patterns were used. These items included number of meals eaten per day; number of glasses of milk, water, and tea consumed per day; and whether the diet was supplemented with vitamins. These variables were dichotomized to reflect adequacy of diet intake.

Several subscales from the Woodcock-Johnson Psycho-Educational Battery-Revised (Woodcock & Johnson, 1990) were used in this study: letter-word identification, applied problems, passage comprehension, calculation, synonym identification, antonym identifications, and quantitative concepts. These subscales were selected

because they have been validated for use in assessing language and mathematics achievement. An African American research assistant, trained to administer the subscales, carried out the assessments in each child's home. Cronbach alphas exceeded 0.80 for each of the subscales.

One indicator from Harter's (1982) Perceived Competence Scale for Children was used to obtain the teacher's report of cognitive performance and the mother's report of cognitive ability. The indicator was a global rating of the child's cognitive ability using this item: "How intellectually competent do you feel (the child) is?" Ratings were made by mothers and teachers using a 4-point Likert-type scale ranging from 1 (not at all competent) to 4 (very competent). Cronbach's alpha was 0.92 for this item.

Two additional indicators from the Perceived Competence Scale for Children were also used. The first indicator was a global rating of physical ability using this item: "How physically competent is your child in sports and outdoor games?" Mothers and teachers assigned ratings on a Likert scale, again ranging from 1 (not at all competent) to 4 (very competent). The second indicator was the mother's rating of her child's physical competence using six items from the physical subscale of the Perceived Competence Scale for Children. The items were presented and rated (1 [not at all] to 4 [very competent]) in the same manner as those of the cognitive subscale. One example of an item from the physical subscale is as follows: "My child does well at all kinds of sports." Cronbach's alpha was 0.88.

Fourteen items were selected from the Family Routines Inventory (Boyce et al., 1983), a 28-item scale designed to assess the degree to which children experience continuity or discontinuity in their day-to-day family routines. The score was derived from the mothers' reports on the frequency (almost never, 1 to 2 times a week, 3 to 5 times a week, and almost every day) of family routines, such as the following: "The parent has a regular play time with the children every day," "Children do their homework at the same time each day or night during the week," "Family has a 'quiet time' each evening when everyone talks or plays quietly," and "Working parent(s) come home from work at the same time each day." Cronbach's alpha for this scale is 0.67.

Finally, three subscales were used from the Family Resource Scale (Dunst & Leet, 1987). Mothers were asked to evaluate the adequacy of their families' financial resources using a 5-point Likert-type scale ranging from 1 (not at all adequate) to 5 (almost always adequate). The necessities subscale included 19 items for which the mother was asked to indicate the extent to which enough money was available for necessities (i.e., food for two

meals a day and heat for house or apartment). Cronbach's alpha for this subscale was 0.83. The general money subscale (i.e., money to pay monthly bills) consisted of three items, for which the Cronbach's alpha was 0.69. The money for extras subscale included four items used to determine the adequacy of resources for expenses such as entertainment and the purchase of resources for expenses such as entertainment and the purchase of personal articles. Cronbach's alpha for this subscale was 0.84.

DATA ANALYSIS AND RESULTS

Frequency distributions were computed to organize and summarize the data. To test our hypotheses, point-biserial correlation coefficients were calculated by gender.

Sample Characteristics

Of the 159 families included in the study, 64 of the mothers (40%) were employed outside the home, and 6 (4%) were employed while working from the home. With over half of the mothers unemployed ($n=89$, 56%), it was not surprising that income was low for this sample. For nearly two thirds of the families ($n=97$, 61%), the monthly income ranged from less than \$100 per month to \$1000 per month. The monthly income for another third of the families ($n=46$, 29%) ranged from \$1043 to \$1699 per month. Only 10% ($n=16$) of the families received a monthly income above \$1700. Three fourths ($n=124$, 78%) of the families had two or three children living in the home, and the remainder of the families had four or more children living at home. The amount of parental child support received per month ranged from 0 to \$570 for essentially all (99%) of the families.

Educational attainment was limited in this sample. Only 54 of the mothers (34%) had achieved a high school diploma. Nearly half (76) of the mothers had not completed high school (48%). Seventeen percent ($n=27$) had some college or trade school preparation, and only 2 mothers had college degrees.

Correlation Findings for Boys

For the male children, a number of items were significantly correlated (Table 1). Mother's education was positively correlated with adequacy of meals consumed per day ($rpb=0.258$, $p=0.028$). The use of vitamin supplements were correlated with both family resources ($rpb=0.303$, $p=0.009$) and the importance of family routines ($rpb=0.300$, $p=0.010$). Tea intake was significantly related to passage comprehension ($rpb=0.237$, $p=0.047$), synonym identification ($rpb=0.267$, $p=0.024$ L),

TABLE 1. *Correlations Between Selected Variables and Dietary Eating Patterns^a: Male Children*

Adequacy of	Meals	Milk	Water	Vitamins	Tea
Mother's education	0.258 ^b	-0.194	-0.111	0.171	0.223
Family resources	0.134	-0.064	-0.167	0.303 ^b	0.014
Importance of family routines	-0.008	0.035	-0.091	0.300 ^b	0.117
Letter-word identification	-0.208	-0.062	0.079	-0.086	0.075
Applied problems	-0.149	-0.041	0.231	-0.055	0.103
Passage comprehension	0.080	0.034	0.076	0.053	0.237 ^b
Calculation	0.056	0.011	0.004	0.081	0.169
Synonym identification	0.108	-0.018	0.040	0.018	0.267 ^b
Antonym identification	0.078	-0.060	0.058	0.090	0.230
Quantitative concepts	-0.005	0.054	0.011	-0.013	0.260 ^b
Cognitive ability	0.227	-0.081	0.005	0.045	-0.062
Physical ability	0.036	0.099	0.169	0.036	0.308

^aThe dietary eating patterns indicators (meals, milk, water, vitamins, and tea) were dichotomized variables reflecting adequacy of intake.

^b $p < 0.05$.

quantitative concepts ($rpb = 0.260$, $p = 0.030$), and physical ability ($rpb = 0.308$, $p = 0.026$).

Correlation Findings for Girls

For female children, several items were significantly related (Table 2). Milk intake was positively related to cognitive outcomes of applied problems ($rpb = 0.306$, $p = 0.0006$), passage comprehension ($rpb = 0.279$, $p = 0.012$), calculation ($rpb = 0.272$, $p = 0.014$), synonym identification ($rpb = 0.356$, $p = 0.001$), antonym identification ($rpb = 0.379$, $p = 0.001$), and quantitative concepts ($rpb = 0.218$, $p = 0.050$). However, milk intake was inversely related to the importance of family routines ($r = -0.217$, $p = 0.043$).

DISCUSSION AND CONCLUSIONS

The findings from this study supported our hypotheses. For male children, higher maternal education was clearly related to more adequate eating patterns in the home. Greater family resources and families in which routines were important clearly enhanced the likelihood that boys had vitamin supplements. Drinking sweetened ice tea is a cultural choice for most of the south and in male children. Drinking tea was positively related to cognitive outcomes such as passage comprehension, synonym identification, and quantitative concepts. Physical ability was also enhanced among tea drinkers. In other words, tea served as a stimulant for cognitive and physical development in male children.

TABLE 2. *Correlations Between Selected Variables and Dietary Eating Patterns^a: Female Children*

Adequacy of	Meals	Milk	Water	Vitamins	Tea
Mother's education	-0.126	0.047	-0.151	0.071	0.073
Family resources	0.018	0.076	-0.033	0.029	0.125
Importance of family routines	0.137	-0.217 ^b	0.116	-0.123	0.108
Letter-word identification	-0.065	0.211	-0.096	-0.005	0.011
Applied problems	-0.147	0.306 ^b	-0.217	0.025	0.100
Passage comprehension	0.099	0.279 ^b	0.153	0.048	0.040
Calculation	0.022	0.272 ^b	0.107	0.030	0.137
Synonym identification	-0.026	0.356 ^b	0.180	0.047	0.169
Antonym identification	0.032	0.379 ^b	0.126	0.060	0.126
Quantitative concepts	0.158	0.218 ^b	0.048	0.039	0.057
Cognitive ability	0.041	-0.156	0.137	-0.023	-0.043
Physical ability	0.061	-0.075	0.010	0.054	0.066

^aThe dietary eating patterns indicators (meals, milk, water, vitamins, and tea) were dichotomized variables reflecting adequacy of intake.

^b $p < 0.05$.

In female children, a higher milk intake was positively related to scores on applied problems, passage comprehension, calculation, synonym identification, antonym identification, and quantitative concepts. Milk intake was clearly related to cognitive development. Regardless of the social and economic resources of the family, female children who had adequate milk intake had more positive scores related to cognitive development than male children. The results of this study showed that both family resources and nutrition were important for cognitive and physical development. However, family economic, social, and educational resources are other influencing factors.

For low-income families, an adequate diet is difficult to achieve. They live in areas where supermarkets are scarce and grocery stores have difficulty carrying some of the perishable items that are needed through the month. The homes often have inadequate cooking and/or refrigeration facilities and, therefore, cannot prepare the store foods safely. It is to the credit of the low-income families in this sample that, in spite of difficulties, they maintained a linkage between home and school to support their dietary eating habits.

Implications for public health nurses should include teaching and counseling related to nutrition using the food guide pyramid. This activity is essential because of the obesity epidemic found in children in this country. The teaching should include helpful hints for choosing healthy foods. Also, physical activity needs to be emphasized to promote health and build strong muscles. Examples of these activities include walking, running, hiking, biking, jogging, and dancing. Counseling of low-income mothers should encompass referrals for governmental-funded food programs such as the Women, Infants, and Children's nutritional program.

Some questions remain unanswered and are areas for future research to improve dieting patterns in children. This study was enriched by contextual variables such as age, race, single-parent families, and rural environment. A greater understanding of family dynamics is needed. Do other rural Hispanic and White as well as non-Hispanic families have similar dietary patterns? Similarly, research is needed on the larger public context of food-assistance programs and their effect on dietary outcomes in children.

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