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THE RELATIONSHIP OF ANTHROPOMETIRC MEASURES OF HISPANIC CHILDREN UP TO AGE 5, ECONOMIC STATUS AND PARENTAL STATURE

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Abstract

Using data from the Hispanic Health and Nutrition Examination Survey, 1982 - 1984 of the Nutritional Center for Health Statistics (NCHS), the heights, weights and arm circumferences of 217 Mexican-American children ranging from six to sixty months were examined to assess the influence of birth weight, parental stature, and economic status on the growth patterns of Mexican-American children living with both parents.

Heights, weights, and arm circumferences were converted to standardized values of height-for-age, weight-for age, and arm circumference-for-age using norms developed for Anglo-American children (1).

Correlation and contingency table and analysis were performed to test hypotheses concerning factors found associated with the stature of children in earlier studies.

While reltionships among childhood stature and birth weight, parental stature, and economic status were in the expected direction, few were statistically significant due to the small number of cases in the analyses. Definitive conclusions concerning these relationships require a much larger sample of families.

Introduction

For many years, mortality rates in the age group 1-5 years have been used as an indicator of the severity of health problems, primarily malnutrition and

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infection, in children of developing countries(2). Although it is known that the precision and reliability of these vital statistics records are variable from country to country , and indeed from region to region within a country, the reported mortality rates are revealing. Some countries have reported infant mortality rates in excess of 100 per thousand live births and mortality rates for children 1-5 years of age above 10 per thousand population compared with developed countries where the rates are usually less than 15 per thousand (3). As this age group (1-5 years) is normally characterized by rapid growth and high nutritional needs, the stature of children is often used as an index of risk for malnutrition and mortality.

A number of non-nutritional factors also influence the growth of children (4). Among the more important factors are heredity, disease, socio-economic status, urbanization, physical activity, season of the year, and climate (5). In developoing countries with borderline nutrition, children are often small, and it is often encluded that under - nutrition is responsible. However , not all differences in stature among populations of children are the result of poor nutrition. Chronically under-nourished children are often of short stature, all short children cannot be assumed to be under-nourished, as many hereditary, health, and socio-economic factors interact with nutrietns in determining growth processes. Nevertheless, the prevalence of small - for - age children identified by nutritional stauts surveys in the United States is usually interpreted to indicate that significant numbers are at least at risk of undernutrition (6).

The objective of this study was to evaluate the growth status of Hispanic children in United States, from birth to 5 years of age, using the Hispanic HANES (HHANES) data.

The study attempted to resolve the following hypotheses: Birth weight is predictive of subsequent growth of Hispanic children. Hispanic children in HHANES tend to have a "short but stocky" pattern of growth. There is a relationship between Hispanic children's height and weight and their parents' stature. Economic status is a predictor of the height and weight of Hispanic children up to age five.

Materials and methods

The source of data for this research is the Hispanic Health and Nutrition Examination Survey conducted by National Center for Health Statistics (NCHS) from July 1982 through December 1984 (7).

HHANES used a multistage, stratified probability sampling design. The general structure of the HHANES sample was similar to that of the previous Nationsl Health and Nutrition Examination Surveys (8).

The study group used for this investigation was 217 Mexican-American children, aged 0-5 years, who participated in the HHANES survey, who were matched with their parents, and for whom socioeconomic and statural information is available on both of their parents.

Results

Some 1819 families with children 0-5 years of age were identified among the 2997 interview records extracted from the Hispanic data set. At least two adults were present in 1102 of these 1819 families. Only 217 of the families with at least two adults included both mother and father as required by the plan for the study. The following results were obtained from analysis of interviews and physical measurements for thses 217 families.

The correlations between birth weight and three indicators of stature (height for age, weight for age , and arm circumference for age) for the 115 children who had complete sets of measurements are presented in Table 1. As expected, stature variables are strongly intercorrelated and all the intercorrelations are statistically significant at P>.01. Correlations between birth weight and indicators of stature are very much lower than correlations among indicators of stature and are statistically significant in only two cases. The correlation between birth weight and arm circumference for age is not statistically significant.

In fact, fully three-quarters of the boys and girls were either above the median height for age and above the median weight for age or below the median height and below the median weight for age. Of the remaining children (just 25

percent) both boys and girls were about as often above the median height for age and below the median weight for age as below the median heigh for age and above the median weight for age. The results hold for girls as well.

The correlations between parents height and weight and the three indicators of stature (height, weight and arm circumference) for the 115 children who had complete sets of measurements are presented in Table 4. Only three of the correlations in Table 4 are statistically significant (P<01) and in no case is the correlation very large.

The correlations between per capita income and the three indicators of stature (height, weight and arm circumference) for the 115 children with complete data are shown in table 5.

We conclude that there is no relationship between the economic status and the stautre of children in this sample.

Discussion

While the results of this study are not inconsistent with the earlier studies , they do not confirm those earlier results in that no substantial relationships were found in this study between age-and sex-adjusted stature of the children and the stature of their parents, the economic condition of their families or their birth - weight.

The height for age, weight for age and arm circumference distributions of this sample of Mexican-American children approximate the NCHS standards. Weight for age is very close to the NCHS distribution, while height for age and arm circumference for age show slight preponderances of lower values. The slightly low value for mean height for age could be due, in part, to genetic factors. However, it has generally been considered that the principal causes of growth stunting in the developing wolrd are nutritional inadequacies complicated by a high prevalence of infectious diseases. These nutritional and environmental factors probably could be factors contributing to the slightly low height for age and these are circumference for age seen in the study children, as could be

genetic factros. However, the differences are minimal.

The correlations between parents' heights, weights and the three indicators of childhood stature (height, weight and arm circumfernece) showed that all three correlation were statistically significant, but in no case was the correlation very large.

Children sampled for this study were required to be living with both their parents in an intact Hispanic family with at least one child under five years of age. It is possible that the sample of children selected for this study was so restricted that there was not enough variation in their stautre to identify the influence of factors which might become apparent in a less homogeneous sample. Perhaps these two-parents families are more stable and the environmental factors are not a significant determinant of their children's growth patterns. It is also possible that the stature of Hispanic children living with both parents in the United States is not, in fact, related to the stautre of their parents, the economic condition of their families, or their birth weight. Unfortunately, neither of these last two explanations can be either accepted or rejected on the basis of the evidence available from this study.

Whether or not the stature of children is related to the stature of parents, the economic condition of families and the birth weight of children in Mexican-American families living in the United States can only be answered by conducting the study with a very much larger sample of children and parents. No other course of action will allow us to determine whether the factors associated with differences in the stature in children in earlier studies are also associated with the growth of Mexican-American children to the same extent and with the same strength.

Table 1- Parson product moment correlation coefficient between birth weight and subsequent indices of stature.

Variables	Birth weight	Height for age	Weight for age	Arm circumference for age
Birth weight	1.00	.26*	.29*	.15
Height for age	.26*	1.00	.71*	.48*
Weight for age	.29*	.71*	1.00	.83*
Arm circumference for age	.15	.47*	.83*	1.00
115 Cases		* P<.01		

Table 2- Growth pattern in male children

Category	Height for age					
Weight for age	Below Median		Above Median		Total	
	Number	Percent	Number	Percent	Number	Percent
Below Median	24	77.4	7	22.6	31	100
Above Median	10	25.6	29	74.4	39	100

Table 3- Growth pattern in female children

Category	Height for age					
Weight for age	Below Median		Above Median		Total	
	Number	Percent	Number	Percent	Number	Percent
Below Median	27	81.8	6	18.2	33	100
Above Median	8	23.5	26	76.5	34	100

Table 4- Pearson product moment correlation coefficient between relative indices of parental and child stature.

Children			
Variable	Height	Weight	Arm Circumference
Mother's height	.14	.15	.30*
Mother's weight	.20	.31*	.38*
Father's height	.16	.14	.02
Father's weight	.08	.17	.09

115 Cases * P<.01

Table 5- Pearson product moment correlation between relative indices of indices of statire and family income.

Children			
Variable	Height	Weight	Arm Circumference
Per capita in come	.005	.05	-.07

115 Cases

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