Poverty Experience, Race, and Child Health

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SYNOPSIS

Objectives. Studies that examine children's poverty and health at one point in time do not account for some children experiencing poverty briefly and others living in poverty for much of their lives. The objective of this study was to determine how duration of poverty and child race are related to child health.

Methods. To assess these relationships, we analyzed data from the Panel Study of Income Dynamics and its Child Development Supplement. Ordinary least squares regression was used to estimate bivariate and multivariate models predicting caregiver-rated child health. The regression models assessed the statistical effect of the proportion of childhood in poverty and child race on child health, controlling for child sex, age, parental education, whether the household includes two parents, and family poverty in the last year.

Results. Increasing proportion of childhood in poverty is associated with worse health status. In addition, African American children are more likely than white children to have lower-rated health status. The analysis does not support the hypothesis that poverty more strongly affects the health of African American children.

Conclusions. Increasing exposure to family poverty negatively affects child health. Future research would benefit from more studies that utilize longitudinal measures of childhood poverty. We suggest that public policies to reduce childhood poverty exposure would improve child health.

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In 2002, over 12 million children in the United States, more than 16%, lived below the official poverty line.[1] Importantly, some of these children will experience poverty briefly, while others will experience poverty for most of their childhood. These variations fall, in part, along racial lines. Among white children, 74% never experience poverty and only 1% endure more than nine years of poverty. In contrast, only 21% of African American children escape poverty and approximately half experience it for more than nine years.[2] Additionally, compared to white families in poverty, African American families in poverty have greater disadvantage in material resources, are more likely to reside in neighborhoods of concentrated poverty, and experience more exposure to health risks.[3,4]

Children in poverty face many problems. Family poverty is associated with poor nutrition, exposure to worse environmental conditions, reduced access to health care, and worse outcomes from disease.[5,6] Not surprisingly then, research finds that children whose families are in poverty are less likely to have optimal physical health.[7] Children who spend a greater proportion of childhood in poverty are expected to experience diminished health through increased exposure to poor health conditions as well as potentially more dire conditions. The wide variation in poverty exposure suggests that it is important to assess poverty with longitudinal data that can accurately capture duration of poverty experiences.

Only a few studies have assessed duration of exposure to poverty when studying children's physical health. In general, these studies find that there is a weak to nonexistent relationship between duration of family poverty and child health.[8] One exception is that stunting (extremely short stature) is found to be affected by longer duration of poverty.[9] However, other measures, such as physical limitations affecting school participation, wasting (extremely underweight), and a number of other illnesses over an interval, do not show an association with longitudinal measures of poverty exposure.[9,10] While this research has the advantage of using longitudinal assessments of poverty, it has relied on measures of major health problems. These health measures may overlook many of the health troubles experienced by children. For example, children suffer from health conditions that do not restrict school attendance or growth, or may not be counted as days of illness (e.g., asthma or high blood lead levels). In order to draw conclusions about the relationship between child health and exposure to poverty, research is needed that employs a child health measure that globally assesses child health.

Given the greater difficulties faced by poor African American families compared to poor white families, an additional question is whether the effect of poverty varies by race. For stunting, overweight, and mother's rating of child's health, poverty appears to be more strongly harmful to the health of white children than African American children.[9,11,12] In contrast, poverty has a stronger negative effect on asthma and high blood lead levels for African American children than white children.[13] Possible explanatory factors, such as exposure to pollution or access to health care, are not included in these studies. Nonetheless, they point to the possibility that the effect of poverty on children varies by race.

In sum, research in this area generally relies on cross-sectional measures of poverty and produces inconclusive results. To better understand this relationship, additional research examining duration of exposure to poverty is required. We expect that increased exposure to poverty is associated with worse child health. Further, we expect that the more difficult conditions faced by poor African American families leads to worse health among African American children compared to white children with equivalent poverty experience. To evaluate these hypotheses, we analyzed data from a national panel data set. Specifically, we assess whether the proportion of childhood spent in poverty and child race are associated with caregiver-rated child health status. Clarifying this relationship is essential to understanding the health effects of poverty and developing appropriate public policies.

METHODS

Data

We used the Panel Study of Income Dynamics (PSID) and its Child Development Supplement (CDS) as the basis for this analysis. The PSID has collected detailed socioeconomic and demographic data from a national sample of households nearly annually since 1968. An oversample of poor households provides sufficient cases for a study of poverty dynamics and contains a sizable number of African Americans. Analysis of these data suggests that attrition does not bias weighted parameter estimates.[14] This analysis compares white and African American children. Asian Americans, Pacific Islanders, Native Americans, and Latinos were not included in the original sample in substantial numbers, precluding a more comprehensive examination of racial and ethnic differences.

In 1997, the PSID supplemented its core data collection with the CDS. The CDS included survey items about the development of up to two of the 0- to 12-year-old children in the PSID families. The CDS covers a wide range of issues, including questions about child health. Of the 2,705 families in the PSID with children ages 0 to 12, 2,394 families (88%) participated, providing information on 3,563 children.[15] Because each child can be linked to the PSID by her/his family identifier, we reconstructed the family poverty experience of each child. For each child in the CDS, every available year of PSID data from the year in which the child was born until 1997 was merged with 1997 CDS data. Those for whom there were no previous income data, including 694 whose families had been newly recruited into the PSID, were not included, leaving 2,785 children.

Measures

Dependent variable. In the CDS, caregivers (typically mothers) were asked, "In general, would you say [child's] health is excellent, very good, good, fair, or poor?" As shown in other national data sets, few caregivers rated the child's health as "poor."[16] The four cases of "poor" health were eliminated from the analysis because estimates based on this category would be imprecise. Many studies have shown that self-rated health is a very good indicator of health for adults.[17]

Extensive research has not been conducted on the predictive power of caregiver-rated health for children. However, there is empirical support for the validity of the measure.[18]

Explanatory variables. The proportion of time poor variable indicates the proportion of years of the child's life that the family was in poverty. We constructed this variable in several steps. For each year of a child's life, we created a dichotomous measure indicating whether the child's family was in poverty. We used an income-to-needs ratio of 1.25 and below to indicate a household in poverty. The PSID consistently collects a more thorough range of income sources, which can result in an underestimate of the number of poor households when the more conventional income-to-needs ratio of 1.00 is used.[19,20] The higher poverty threshold used in the analysis adjusts for this.

Next, we counted the number of years that each child experienced poverty. To calculate the proportion of time in poverty, we divided this count of years by the number of years of income data for that child. Data were missing for less than 2% of the child-years. Preliminary analysis comparing continuous and categorical forms of the variable suggested that the continuous measure is an accurate and more parsimonious method for measuring duration of poverty. As a result, we employed a continuous measure of poverty exposure in the analysis.

The race of the child was reported by the caregiver who responded to the CDS. For this analysis, we compared the effect of poverty for white and African American children only.

Control variables. To control for the potential effect of the education of the child's caregiver on the child's health, we controlled for the education of the caregiver. Education was measured in years. Single-parent mothers have been found to report worse child health than their peers.[21] Therefore, we included household structure in the multivariate models as a dichotomous variable. Two-parent households were the reference group for all others. Because recent poverty may strongly influence a child's health, poverty in the most recent year was included as a control variable. Finally, the age and sex of the child were included in the multivariate models.

Analytic plan

The data were analyzed using Stata version 7.0.[22] A weight included in the data set was applied to produce unbiased estimates of the effects of family poverty on child health. In addition, the PSID includes variables that can be used to produce unbiased estimates of the standard errors, which is necessary when complex sampling techniques have been used. For example, more than one child from a single family can be selected for this sample, resulting in clustering effects that can bias estimates of the standard errors. We made one other adjustment in estimating the standard errors. Sixty-three primary sampling units were the only unit in a stratum, while the general rule of thumb is for at least two units per stratum. We had two options: either delete the single units or reassign them to another stratum. The 63 units were deleted, which had no appreciable effect on the results.

Our dependent variable, caregiver-rated child health, pointed to multiple potential statistical techniques. We considered ordinal logistic regression models, but preliminary analysis showed that the proportional odds assumption was violated by the models. Multinomial logistic regression models, which simultaneously estimate binary comparisons among the categories of the dependent variable, were a good choice for these data. Yet preliminary analysis showed that ordinary least squares regression models produced similar results and are more easily interpreted; thus, we present ordinary least squares regression results here.

RESULTS

Table 1 shows the weighted percentage distribution and unweighted frequency distribution of the sample. Overall, children were nearly equally divided between girls and boys, with an average age of about 6 years, and three-fourths of the children were in two-parent households. The average education of household heads was 13.4 years. Approximately two in 10 children experienced family poverty in the most recent year. Finally, white children constituted 80% of the weighted distribution.

Approximately 35% of the children had ever experienced poverty—approximately 27% of white children and 73% of African American children (not shown). The average proportion of time in poverty was 0.19 of the years of a child's life, including those years with no time spent in poverty. The mean proportion for white children was 0.11 and for African American children 0.50 (not shown). Overall, most children's health was given a positive rating. Approximately 85% of the childrens' health was rated excellent or very good, which is similar to other national data sets.[16,23]

Table 1. Distribution of dependent and independent variables

	Percentage	Unweighted N
General health		
Excellent	54.34	1,330
Very good	31.81	886
Good	12.34	413
Fair	1.51	56
Race		
White	81.61	1,404
Black	18.39	1,166
Household type		
Two parent	74.04	1,786
Not two parent	25.96	916
Sex		
Male	50.84	1,365
Female	49.16	1,337
Poverty last year		
Yes	19.94	728
No	80.06	1,974
	Mean	*Standard error*
Proportion time in poverty	.19	0.01
Age in years	6.13	0.09
Education of head of household in years	13.37	0.06

Table 2 presents the results from the regression analyses. Model 1 shows the bivariate relationship between child health status and proportion of time spent in poverty. The results show that greater proportion of years poor is associated with worse health status ($p<0.01$). Model 2 presents the coefficient comparing African American and white children's health. The results indicate that African American children's health was rated significantly lower than white children's health ($p<0.01$).

Next, Model 3 presents the simultaneous effects of proportion of childhood in poverty and race while holding constant child sex and age, parental education, household type, and recent poverty. We found that both indicators remained significant ($p<0.01$), though with diminished magnitude of effect. A final model, not shown, assessed the interaction between the poverty exposure and race and found that the interaction is not statistically significant ($p=0.57$). In other words, the effect of greater proportion of time in poverty is similar for white and African American children.

Figure 1 presents the effect of proportion of childhood in poverty for African American and white children, adjusting for the control variables in Model 3. Increasing proportion of childhood in poverty is associated with diminished health for both white and African American children, and African American children have worse health for all poverty experiences. For example, an average African American child with no exposure to poverty has health similar to an average white child who lived in poverty for 50% of her life.

DISCUSSION

In our assessment of the relationship between child health status and proportion of childhood spent in poverty, we

Figure 1. Child health status by proportion of life in poverty and race
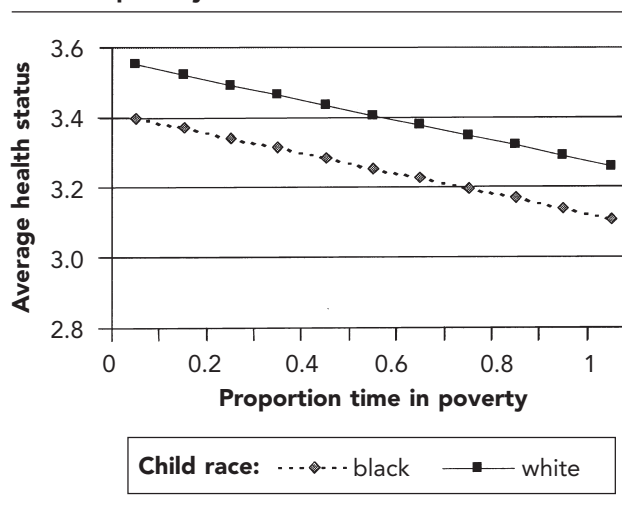
found that increased poverty exposure is associated with poorer child health. That is, children who have spent a greater proportion of their childhood in poverty are more likely to be in worse health. This finding adds to our understanding of the poverty/health relationship because most existing studies rely on cross-sectional measures of poverty that cannot capture the extent of the poverty experience. This finding also suggests that extant research on poverty duration that has employed measures of severe health outcomes may have been unable to capture the health effects of increasing poverty exposure.

In addition to assessing the relationship between child health and poverty experience, we examined the effect of race. As expected, the results indicate that African American children suffer poorer health compared to white children. We also hypothesized that, because African American families in poverty live, on average, in worse material circumstances than poor white families, exposure to poverty might have a more serious effect on the health of African American children. The analysis did not support this hypothesis. Increased proportion of childhood in poverty has equivalent effects for white and African American children. Nonetheless, it is important to keep in mind that greater exposure to poverty is a more common problem for African American children than for white children. The average racial difference in child health under the circumstances in which children *actually live* is shown in the bivariate model (Model 2). The multivariate model (Model 3) and Figure 1 show the difference that would exist if African American and white children had *equivalent* poverty experiences, household structures, parental education, and so forth. Of course, in the United States, white and African American children do not have equivalent resources and risks.

In assessing the meaning of these findings, it is important to recognize that greater duration of poverty may not simply indicate greater exposure to the same risks. Conceptualizing poverty in terms of duration reminds us that not all people who are poor at any particular time have the same experience; some have been in poverty briefly while others have

Table 2. Regression coefficients for models predicting child health

	Model 1	Model 2	Model 3
Explanatory variables			
Proportion time in poverty	−0.64		−0.29
	(0.04)[a]		(0.04)[a]
Black race (white=excluded)		−0.39	−0.15
		(0.02)[a]	(0.03)[a]
Control variables			
Female (male=excluded)			0.04
			(0.04)
Age of child in years			0.00
			(0.00)
Education of head in years			0.03
			(0.01)[a]
Not two parent household			−0.08
			(0.05)
Poverty last year			−0.11
			(0.10)
Constant	3.50	3.45	3.11
	(0.01)[a]	(0.01)[a]	(0.19)[a]
R-squared	0.07	0.04	0.09
N	2,549	2,549	2,549

Note: Adjusted standard errors in parentheses

[a]$p<0.01$

been poor a long time. Duration of poverty may affect experiences. For example, families in poverty may not be able to afford good housing. Those who are chronically poor not only live in poor housing for a longer period of time, they are more likely to live in extremely poor housing for a longer period of time. Consequently, future research should specify how greater duration of poverty affects child health, with attention to the distinct effects of increased exposure to health risks and variation in the magnitude of the risk. Furthermore, this example points out that by dichotomizing poverty in this study, we have overlooked variation in the severity of the poverty experience. Future research should determine whether assessing the depth of a family's poverty provides additional insight into the effect of family poverty on child health.

A potential limitation of this study is the measurement of child health by caregiver rating. Ideally, child health would be assessed by a battery of clinical measures and self-assessments. A study combining multiple health measures with longitudinal income data would be an ideal but expensive project. In the absence of ideal data, future research should assess the validity and predictive power of caregiver ratings of child health. Caregiver ratings of child health are associated with caregiver health,[21] which may be due to bias in ratings or a high correlation in the health status of a caregiver and his/her children. While there is empirical support for the validity of the caregiver report measure when compared with other types of assessment,[18] more evaluation of the measure would improve interpretation of results.

Another possible limitation of this study is that worse child health might result in lower family income. In research on adult health, the idea that health affects economic status has been referred to as social drift.[4] For adults, research suggests that while there may be an effect of health on income, the causal direction moves primarily from income to health status.[4] While we acknowledge that poor child health can affect family income,[24,25] we expect that our results are robust to this effect because our preliminary multinomial logistic regression analysis shows an effect of duration of poverty even for children with the highest rated health.

Future research should further refine measurement of children's poverty experience. For example, the timing of exposure to poverty might prove to be an important factor in predicting the effect of poverty. The notion that the timing of poverty matters to child development is born out of studies on child outcomes like cognitive development and completed schooling.[8,26] To date, there is no definitive research on the effect of the timing of poverty on children's physical health.[6]

Research on family poverty suggests that increased exposure to poverty may affect child health through a complex web of mechanisms. Researchers have pointed out that eliminating any particular health risk will not improve population health over time.[27] Given the number and magnitude of the health problems faced by poor families, including potential multiple disease pathways and sources of morbidity, simply addressing one problem will not reduce morbidity and mortality in the long run. Improving the health of children requires policies that address the problem of childhood poverty.

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