Poverty and Psychiatric Status

Longitudinal Evidence From the New Haven Epidemiologic Catchment Area Study

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• **We assessed the effect of poverty on psychiatric status using two waves of New Haven (Conn) Epidemiologic Catchment Area data. Poverty was defined using federal poverty guidelines; psychiatric status was assessed by the Diagnostic Interview Schedule (DIS). When examining the course of healthy respondents at the first interview, respondents in poverty had a twofold-increased risk (controlling for demographic factors) for an episode of at least one DIS/*DSM-III* Axis I psychiatric disorder. Rates of most specific psychiatric disorders were comparably higher for respondents meeting poverty criteria compared with those not in poverty, although these differences were not always statistically significant. The effects of poverty did not differ by sex, age, race, or history of psychiatric episodes.**

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Poverty, a persistent problem in the United States, is associated with a range of economic and social problems.[1,2] A well-documented correlate is the greater prevalence of mental health problems among lower socioeconomic groups.[3-11] Despite the large number of investigators and the consistency of their overall findings, questions remain about the nature of this association: (1) To what extent does poverty increase the risk of psychiatric episodes in healthy people? (2) How do the effects of poverty compare across a variety of psychiatric diagnoses? This study addresses these questions using longitudinal data from the New Haven (Conn) Epidemiologic Catchment Area (ECA) project to examine the risk of new (first or recurring) episodes of psychiatric disorders, as assessed by the Diagnostic Interview Schedule (DIS),[12,13] in groups defined by poverty status according to federal poverty guidelines.

Most prior studies of the relationships between socioeconomic status and psychiatric disorders have employed cross-sectional data and are inappropriate for estimating the magnitude of poverty's effects on the onset or recurrence of psychiatric episodes. In contrast, the current study uses longitudinal data to examine (1) whether persons not experiencing a recent psychiatric episode are at greater risk for a future psychiatric episode if living in poverty, and (2) the prospective effect of poverty on mental status while controlling for respondents' reports about prior psychiatric episodes.

Only recently have researchers been able to specify the cross-sectional relationships between socioeconomic status and specific psychiatric disorders.[6] In the past, community-based studies generally measured symptoms within the domain of a specific psychiatric disorder (in particular, depression[14]), aggregated measures of any psychopathologic conditions, or assessed the more general state of psychological distress or discomfort.[15] Considerable variation exists in the epidemiologic variables and clinical manifestations of the different psychiatric disorders defined by *DSM-III*,[16] suggesting that the relationship between poverty and any single measure should not be generalized across a range of psychiatric disorders. Moreover, because the prevalences of the specific disorders vary widely and there is a great deal of comorbidity among disorders, findings based on aggregate measures may well be weighted by the effects of the more prevalent disorders.

This study differs from other research on socioeconomic status and mental health by using federal guidelines to classify individuals as poor. Use of federally defined guidelines of poverty gives us the opportunity to examine the effects of socioeconomic status on mental health among a group already categorized as poor by government officials and already eligible for specific health and social service entitlement programs.

SUBJECTS AND METHODS

Data

Data for these analyses were collected as part of the first two waves of the New Haven ECA program. The ECA program is a collaborative multiwave study of the prevalence and incidence of major psychiatric disorders and the use of health and mental health services across five US sites.[17] These analyses are confined to the New Haven data to take advantage of information on household composition unavailable at the other sites and to emphasize the distribution of poverty and psychiatric problems in a defined geographic area.

Beginning in July 1980, New Haven ECA interviews were obtained from a multistage probability sample of 5034 adults aged 18

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years and older living in a 13-town region of the greater New Haven community. The methods used in the ECA project have been described in greater detail elsewhere.[17,18] The initial interview had an overall response rate of 77%. Approximately 6 months following the first interview, 81% (4068) of the original sample were reinterviewed. Individuals who did not complete the second interview did not differ from those included in these analyses by sex, age, race, or psychiatric status; they were, however, more likely to be missing income information at the first interview or to report incomes less than $5000 per year. Among those without income information and among low-income respondents, completion of the second interview did not differ by psychiatric status.

The number of respondents used in the current analyses was further reduced from 4068 to 3497 for two reasons. First, we considered only black and non-Hispanic white respondents in the ECA (n = 3958). By restricting the analyses to these two groups, we maintained sufficient numbers to differentiate the effects of poverty from race on mental health. An additional 462 respondents were eliminated from the analyses because they did not report information on their 1980 household income. Individuals excluded from the analysis for lack of income information did not differ from those included by race, current psychiatric status, or welfare status; they were, however, more likely to be female and older than 45 years.

Measures

Poverty status at the first interview was determined by comparing each respondent's reported total 1980 household income and household composition with the 1980 poverty guidelines.[19] The US poverty standard identifies families with inadequate economic resources to meet the daily demands of living. The poverty index uses a series of income thresholds set in relation to need, determined by family size, number of children, and age of householder.[20] These income thresholds are updated each year to correct for inflation. Total 1980 income (ie, when first interviewed) was assessed retrospectively at the second interview by asking respondents their "household's total income before taxes for the past year (1980), including salaries, wages, Social Security, welfare and any other income." Retrospective reporting allows for assessment of the total year's income (eg, from income tax forms) rather than asking for income at the first interview during the middle of that year. In contrast to the poverty guidelines, which are exact to the dollar level, the ECA respondents were asked their income at the nearest $1000 level (income levels substantially above poverty levels were rounded at larger increments); individuals were classified "in poverty" if their household income was below the poverty guidelines level for their age and number in household, rounded up to the nearest $1000.

Psychiatric status was assessed by the DIS, a semistructured interview administered by lay interviewers.[12,13] The DIS assesses the presence, duration, and severity of symptoms and excludes symptoms due to physical illness or medication use. Computer algorithms use the data from the DIS to generate psychiatric diagnoses consistent with the *DSM-III*.[16] These analyses examine eight Axis I psychiatric disorders or disorder groups assessed by the DIS and using *DSM-III* criteria without exclusions: alcohol abuse or dependence, bipolar disorder or mania, drug abuse or dependence, major depressive disorder, obsessive-compulsive disorder, panic disorder, phobia, and schizophrenic disorders (ie, schizophrenia or schizophreniform).

Our outcome measures of the eight DIS/*DSM-III* psychiatric disorder groups refer to meeting criteria for the DIS/*DSM-III* disorder at some point in the respondent's lifetime as well as reporting DIS symptoms for that disorder in the period between the first and second interviews (approximately 6 months). An aggregate measure of any of the disorders refers to meeting criteria (as defined above) for at least one of the psychiatric disorders at the second interview. To examine the effect of poverty at the first interview on subsequent psychiatric episodes among healthy people, individuals who met criteria for a psychiatric disorder within 6 months of their first interview were omitted from the analysis of each respective disorder. Among the remaining respondents, history was coded as having reported an episode of the respective disorder at any point in one's lifetime before the 6-month period before the first interview. In the analysis of the aggregate disorder variable, anyone reporting an episode of any of the eight DIS disorders within 6 months of the first interview was omitted from the analysis; history refers to past episodes of any of the disorders assessed.

Table 1.—Distribution of Poverty in Greater New Haven Community*

	Sample Size		In Poverty,
	No.	%	% of Total
Total	3495	100.0	7.9
Demographic variables			
Sex			
Male	1486	47.6	5.0
Female	2009	52.4	10.6
Age, y			
18-44	1242	55.3	7.7
45-64	607	30.9	6.1
65+	1646	13.8	13.2
Race			
White	3154	89.0	5.2
Black	341	11.0	30.3
Psychiatric status			
No recent DIS Axis I disorder	3064	85.2	7.1
Any recent DIS Axis I disorder	431	14.9	12.8

*DIS indicates Diagnostic Interview Schedule. Data are from New Haven (Conn) Epidemiologic Catchment Area. Sample numbers are unweighted. Percentages are weighted to the local population, not the total sample number.

Analysis

We first examined rates of each outcome variable stratified by poverty status. Next, multivariate logistic regression compared the risk of an episode between interviews for those in poverty with the risk for those not in poverty, controlling for demographic factors and psychiatric history. Demographic factors included sex, age (18 to 65 years vs 65 years and older), and race (white or black). The age categories were determined based on preliminary analyses. In the multivariate analyses, two-way interactions were tested between poverty and each demographic variable and with psychiatric history only on the effects of the most prevalent outcomes (ie, major depression, alcohol abuse, phobia, and the aggregate measure of psychiatric status). Population-attributable risk percent (PAR%) was calculated using the adjusted odds ratio (OR) as an estimate of relative risk (RR) and disorder-specific estimate of poverty in each at-risk group (p) in the following formula: $PAR\% = p(RR - 1)/[1 + p(RR - 1)]$.

The data were weighted in all these analyses to compensate for household size and nonresponse and to reflect more accurately the age, sex, and race of the greater New Haven community.[21,22] The complex sampling design and weighting strategy were considered in estimating SEs and conducting statistical tests by using Taylor Series Linearization with the RTILOGIT program.[23] When used with complex survey data, Taylor Series Linearization generally yields more conservative estimates of statistical significance than do procedures that assume simple random sampling.[24,25]

RESULTS

As noted in the "Subjects and Methods" section, the subsamples used in these analyses omitted respondents who at the first interview met criteria for specific DIS/*DSM-III* disorders and reported symptoms within the previous 6 months (ie, recent cases). Before any respondents were omitted from the sample (n = 3495), the poverty rate for the greater New Haven community was estimated as 7.9%, comparable with the published poverty rate of 8% for the State of Connecticut in 1979.[26]

The demographic characteristics of respondents and corresponding poverty rates are displayed in Table 1. Consistent with state and national trends,[19] poverty was not equally distributed across demographic groups. Women, the elderly, and blacks had high rates of poverty; blacks in the New Haven ECA are almost six times more likely to be in poverty than whites. Psychiatric status at the first interview was differentially distributed by poverty status, with 12.8% of all recent cases falling within the poverty status, compared with 7.1% of noncases ($P < .01$).

Table 2 presents results from weighted logistic regression models

Table 2.—Effects of Poverty on 6-Month Rate of Specific DIS/*DSM-III* Disorders or Disorder Groups*

	At Risk	Cases			Adjusted OR			PAR%
		All	Poor	Not Poor	A	B	C	
Any DIS Axis I disorder								
No.	3064	246	35	211	...	...	...	
Estimate, %		9.4	15.2	9.0	1.82†	1.92†	...	6.0
SE/95% CI		0.7	3.1	0.7	1.14-2.54	1.12-3.28	...	
Alcohol abuse/dependence								
No.	3389	66	9	57	...	...	...	
Estimate, %		3.0	5.7	2.8	2.10	2.25	2.41	9.7
SE/95% CI		0.5	2.5	0.5	0.82-5.42	0.98-5.16	0.99-5.89	
Bipolar/mania								
No.	3465	26	5	21	...	...	...	
Estimate, %		1.0	1.9	0.9	2.15	2.13	2.73	11.3
SE/95% CI		0.2	1.0	0.2	0.61-7.54	0.41-11.07	0.55-13.52	
Drug abuse/dependence								
No.	3461	14	2	12	...	...	...	
Estimate, %		0.7	1.0	0.6	1.52	2.82	3.27	14.5
SE/95% CI		0.2	0.7	0.2	0.31-7.40	0.70-11.30	0.77-18.16	
Major depression								
No.	3404	133	24	109	...	...	...	
Estimate, %		4.3	7.9	4.0	2.06†	2.29†	2.51‡	10.4
SE/95% CI		0.5	0.2	0.4	1.05-4.04	1.19-4.43	1.32-4.78	
Obsessive-compulsive								
No.	3382	22	5	17	...	...	...	
Estimate, %		0.8	2.0	0.7	2.83	3.70	4.39	20.1
SE/95% CI		0.2	1.0	0.2	0.86-9.34	0.70-19.48	0.87-22.15	
Panic disorder								
No.	3402	12	1	11	...	...	...	
Estimate, %		0.3	0.4	0.3	1.27	1.17	1.23	1.7
SE/95% CI		0.1	0.4	0.1	0.17-9.50	0.09-15.81	0.09-17.53	
Phobia								
No.	3232	102	19	83	...	...	...	
Estimate, %		3.1	4.4	3.0	1.49	1.77	1.98†	6.7
SE/95% CI		0.04	1.3	0.4	0.82-2.73	0.97-3.22	1.07-3.65	
Schizophrenia								
No.	3467	4	3	1	...	...	...	
Estimate, %		0.1	1.5	<0.1	79.84§	...	...	...
SE/95% CI		0.1	0.9	<0.1	7.79-818.4	...	...	

*DIS indicates Diagnostic Interview Schedule; OR, odds ratio; PAR%, population-attributable risk percent (proportion of new episodes in the at-risk population resulting from poverty); and CI, confidence interval. Sample numbers are unweighted; estimates are weighted. Under adjusted OR, column A includes unadjusted OR; column B, OR adjusted for age, sex, race, and history of outcome diagnosis; and column C, OR comparing specific psychiatric disorder with disorder-free (DIS Axis I) respondents, adjusted for age, sex, race, and history of outcome diagnosis.

†$P<.05$.

‡$P<.01$.

§$P<.001$.

predicting the effects of poverty on each of the specific DIS/*DSM-III* disorders and on the aggregate measure of psychiatric status. The table presents the between-interview rates of each disorder for individuals in the poverty and nonpoverty groups (among those who did not report an episode of the relevant disorder during the 6 months before the first interview). For each disorder, the risk of each episode by poverty status was compared using ORs; column A gives unadjusted ORs, and column B adjusts the odds for demographic factors (age, sex, and race) as well as history of the disorder.

Among individuals who did not meet criteria for any of the eight DIS/*DSM-III* Axis I disorders at the first interview, 9.4% reported at least one of the disorders at the second interview. Respondents who met poverty status guidelines at the first interview were 1.82 times more likely than the nonpoor ($P<.05$) to meet criteria subsequently for a new DIS episode (column A). Adults in poverty were 1.92 times more likely than the nonpoor ($P<.05$) to report a new episode of at least one of the psychiatric disorders, controlling for demographic factors and history of a disorder (column B).

With the exception of schizophrenia, the unadjusted OR for the effect of poverty on the specific disorders ranged from 1.27 for panic disorder to 2.83 for obsessive-compulsive disorder (column A). Two of the relationships reached statistical significance: major depressive disorder (OR = 2.06, $P<.05$) and schizophrenia (OR = 79.84, $P<.001$). Although statistically significant, the number of new schizophrenia cases (four) was so low that the estimate of risk was viewed as preliminary and adjusted ORs were not estimated. Several of the other ORs, while not significant, exceeded 2.0, suggesting that low prevalences may have decreased the power of our observations: alcohol abuse (OR = 2.10), bipolar disorder or mania (OR = 2.15), and obsessive-compulsive disorder (OR = 2.83).

Adjusting the ORs to account for demographic factors and reported history of each disorder (column B) generally increased or minimally affected the observed relationship with poverty. The effects of poverty on alcohol abuse or dependence approached statistical significance (OR = 2.25; 95% confidence interval, 0.98 to 5.16), and the effects on major depression remained significant.

Table 3.—Percentage of New Cases Meeting Criteria for Any Subclinical Symptoms (SCS) at First Interview*

	Poor		Nonpoor	
	Total Cases	% SCS	Total Cases	% SCS
Alcohol abuse/dependence	9	0.0	57	17.5
Bipolar/mania	5	20.0	21	28.6
Drug abuse/dependence	2	50.0	12	16.7
Major depression	24	12.5	109	11.0
Panic	1	0.0	11	18.2
Schizophrenia	3	0.0	1	0.0

*Data are unweighted; SCS for each disorder defined in text.

In the discussion above, the outcome measures compare individuals with a specific psychiatric disorder with the rest of the community, ie, with individuals who were either disorder free or who reported a different type of psychiatric disorder. This approach is comparable with many epidemiologic reports in the psychiatric literature and is, therefore, useful for comparative purposes. But because our findings indicate that poverty increases the risk of a variety of psychiatric disorders, our inclusion of disordered individuals into our comparison groups is likely to provide conservative estimates of the effects of poverty status on psychiatric illness. Column C of Table 2 presents the effects of poverty status on each disorder compared with meeting criteria for none of the other DIS/*DSM-III* disorders assessed; the ORs adjust for age, race, and sex as well as history of the disorder. As expected, the ORs increase. The table shows that poverty increased the OR for each disorder to approximately 2.0 or more, with the exception of panic disorder (OR = 1.23, not significant). The effect of poverty on major depression and phobia was statistically significant; the OR for alcohol was marginally significant.

We questioned whether these observed effects of poverty status on subsequent psychiatric episodes were consistent for subgroups as defined by sex, age, race, or psychiatric history. It was statistically feasible to test for such interactions only on the more prevalent disorders (ie, >2.0%): alcohol abuse or dependence, major depression, phobia, and the aggregate measure. We observed no statistically significant interaction between poverty and any of the demographic factors with any of the four outcomes. A statistical interaction between history and poverty proved significant only for phobia ($P<.001$). In this case, the effect of poverty in the group reporting prior episodes of phobia was greater than twice that observed in the group without a history.

The impact of poverty on rates of new episodes of each psychiatric disorder is estimated in the final column of Table 2 using the PAR%. For the aggregate measure of disorder, 6% of all new cases occurring in the 6-month period to the at-risk population were a consequence of poverty in the population. Among the other disorders in which the effect of poverty approached significance, approximately 10% of new episodes of major depression, 10% of alcohol abuse, and 7% of phobia in the respective at-risk populations could be attributed to the effects of poverty. These figures indicate, for example, that during the 6-month interview period, more than 1200 new episodes of major depression in the greater New Haven adult population were a result of poverty.

Although persons who reported a recent psychiatric episode at the first interview were excluded from each analysis, it may still be possible that the poor included in the analysis were initially in worse mental health. We examined this question by comparing by poverty status the proportions of new cases who reported recent subclinical symptoms at the first interview (Table 3). Subclinical conditions were defined as meeting criteria for at least one relevant *DSM-III* symptom group (bipolar and major depressive disorders) or *DSM-III* criteria (drug and alcohol abuse, panic, and schizophrenia) for the respective disorder within 6 months of the first interview. Subclinical conditions were not determined for phobia or obsessive-compulsive disorder because a single symptom in the DIS is sufficient to meet diagnostic criteria.

In general, most new psychiatric episodes did not occur to individuals reporting symptoms at the first interview. With the exception of drug abuse, where the single subclinical case represents half the new cases, 20% or less of the new cases in the poverty group reported subclinical symptoms at the first interview. These figures are comparable with, if not lower than, the nonpoor group, where 28.6% or less of the new cases reported subclinical symptoms at the first interview.

COMMENT

Longitudinal analyses of the New Haven ECA data indicate that individuals who meet poverty status guidelines are at increased risk for new episodes of psychiatric illness. Furthermore, the effects of poverty on psychiatric status are generally nonspecific; the poor are at increased risk for each of the specific disorders assessed except panic disorder, although not all of these relationships reach statistical significance. Nevertheless, the direction of effects is comparable, and the estimates reach a minimal magnitude. These increased risks remain even when controlling for history of episodes.

The effects of poverty on mental health are equally severe for the young and old, men and women, and blacks and whites. Our analyses of the aggregate measure of psychiatric status and alcohol abuse, major depression, and phobia revealed no statistical interactions between poverty status and age, sex, or race. Although the effects of poverty on mental health are comparable across subgroups of the population, the risk is far from equitable. Poverty is more prevalent among women than men, the old than the young, and blacks than whites. These analyses indicate that beyond the economic hardships, poverty also puts these groups at increased risk for mental or emotional problems.

Since lifetime diagnoses using the DIS have been the subject of criticism,[27,28] we have not presented the effects of poverty status on first incidence of psychiatric disorders. We are confident that by omitting individuals who report recent episodes at the first interview, we were examining the effects of poverty on a group of individuals who at the time they reported poverty status were also reasonably healthy. Because of evidence of some underreporting of past episodes,[28] however, the effects of poverty on new episodes of each of the disorders while controlling for history may be exaggerated. We did omit all persons with any reported lifetime history of each respective disorder; the estimated ORs for the effect of poverty on each disorder except phobia are comparable with those reported in Table 2. The reduced effect of poverty on phobia is consistent with the interaction between poverty and history of phobic episodes reported earlier.

This study takes advantage of advances in psychiatric epidemiologic case identification and of a precisely defined indicator of socioeconomic status to generate further support for the social causation hypothesis in the relationship between socioeconomic status and mental illness. Particularly important in this context is that poverty guidelines indicate more than personal income of an individual but also environmental and economic conditions for an entire household. A next step for future research is to investigate the aspects of poverty that affect psychiatric status. As noted recently by Dohrenwend,[29] an important goal of such research is to understand the linkages between the social phenomenon of poverty and individual experiences. Studies of individual processes are needed, for example, to determine the extent to which poverty increases the risk of mental disorders by increased exposure to negative events[14,30] and whether the risk is greatest during the transition into poverty. Family studies[31] are needed to determine whether our results are a by-product of generational drift of vulnerable families into poverty.

Although these analyses indicate that poverty affects the risk of a variety of psychiatric disorders, these findings might also be interpreted in light of the poor validity between the

DIS and clinicians' diagnoses for many specific disorders and the relatively higher agreement for aggregate psychopathologic condition.[32,33] It is possible that many of the DIS symptoms reported by the poor are indicative of a single syndrome related to the stress of living in an impoverished environment. For example, the repetitive behavior of persons diagnosed by the DIS with obsessive-compulsive disorder, a disorder with particularly poor validity, may reflect an attempt to remain safe in a dangerous neighborhood. Investigation into the nature of psychiatric problems for poor individuals assessed by the DIS as cases would further our understanding of psychiatric nosology and processes.

These analyses have addressed only one side of the question in the socioeconomic status–mental illness conundrum. The effects of psychopathologic condition on socioeconomic status continue to merit further investigation. Such an analysis is beyond the scope of this study, in part because our poverty measure may be inappropriate for this kind of investigation. Poverty status is a household measure, affected by earnings of all family members and by household composition. The effects of psychiatric problems on an individual's socioeconomic status are better assessed by using individual indicators such as personal income, educational attainment, job loss, or marital change.[34] These might change, yet poverty status could remain unaffected if the individual remains or becomes financially supported by other household members.

This study demonstrates that individuals with incomes below the federal poverty level are at increased risk for a number of psychiatric disorders. Since 1980, the percentage of adults living in poverty has not changed significantly.[35] What has changed is the availability of state-financed mental health services for the poor. In an effort to conserve scarce resources, states have targeted mental health services to individuals with severe and prolonged psychiatric illness at risk for hospitalization. While addressing an important public health need, this policy has also resulted in the de facto dismantling of many of the mental health services previously available to low-income individuals. Our findings indicate that poor populations would benefit from access to a full range of mental health prevention, early intervention, and treatment programs. Furthermore, the utility of these programs will necessitate a better understanding of the role of poverty in precipitating or exacerbating psychiatric disorders.

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