Perception of Unmet Basic Needs as a Predictor of Depressive Symptoms Among Community-Dwelling Older Adults

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Background. In previous studies we found that, among older adults (≥64 years), perception that basic needs were not being met increased mortality risk and risk for functional decline. In this study, we determined, controlling for reported income and functional status, if perceived inadequate basic needs predicted depressive symptoms.

Methods. Repeated-measures analysis was used to determine, during three intervals in a 10-year longitudinal study (the Duke Established Populations for Epidemiologic Studies of the Elderly, n = 4162 at baseline), if perceived inadequate basic needs at the beginning of each interval predicted more depressive symptoms at the end of the interval. We included time invariant covariates known to be associated with depressive symptoms—age, sex, race, and education. We also included time-varying covariates at the beginning of the three intervals—income, cognitive status, functional status, depressive symptoms, and interval.

Results. In the repeated-measures controlled analyses, the perception of inadequate basic needs was a highly significant predictor of future depressive symptoms (p < .0001). Race, education, baseline depression, baseline function, interval, and income were also significant predictors of depression. The interaction between interval and depression was not significant.

Conclusions. The perception that one’s basic needs are not being met predicted future depressive symptoms in a highly controlled analysis. These results suggest that perception of inadequate basic needs, even when income and other known correlates of depression are controlled, is a strong predictor of future depressive symptoms.

In a previous study (1), we found that perceived inadequacy of one’s basic needs being met (such as inadequate housing and not having enough money in emergencies) predicted mortality during a 10-year follow-up among community-dwelling elderly persons. This finding reinforces previous studies that document perceptions of well-being as strong predictors of mortality and adverse health outcomes (2). For example, both self-perception of poor health and self-perception of poor social support have been significant predictors of mortality in controlled studies of community samples (2,3). Thus, self-perceptions across several domains have been found to be associated with health outcomes in the elderly population. Depressive symptoms have been frequently correlated with self-perceptions of lack of well-being (4–6).

Self-perceptions of health and social support have been studied most frequently (7). Other self-perceptions, however, such as economic security and well-being, may also be important predictors of health outcomes. Given the strong and persistent association between indices of socioeconomic status (SES) and health outcomes (8), including depressive symptoms and major depression (9), it might be expected that self-perception of deficits in economic resources (e.g., not meeting basic needs) would also contribute to adverse health outcomes, and our previous studies document this association (1–10).

Among the most important basic needs of older adults are economic security, adequate housing, and a safe environment. Local neighborhood resources are likely to be more important for persons of lower income because more affluent people have greater mobility allowing them to travel farther to obtain needed services and healthful products and to engage in extended social support networks (11). Neighborhood crime also impacts the health of older adults (12). The disparity in mortality between socioeconomic groups in the United States is widening according to the National Morbidity Followback Study. Persons of lower SES were at greater risk for death compared to persons of upper SES (13).

Despite an overall decline in death rates in the United States, this disparity in mortality by SES has increased for men and women (with women having lower SES than men) as well as for whites and blacks (with blacks having lower SES than whites) (12). In addition to actual social and economic well-being, the individual’s perception of economic hardship appears to place an additional burden on elders and contributes to the disparity in mortality. Wilkinson (14,15) reports that many of the socioeconomic determinants of health reveal their effects through psycho-social pathways. The association between SES and health could therefore be relative as well as absolute. For example, life expectancy has been found to increase as the distribution of income in countries becomes more egalitarian, whereas it is relatively unrelated to actual average income (15).
We therefore sought to determine if the perception of inadequate basic needs (problems related to insufficient income, inadequate housing, and unsafe neighborhoods) among older adults was a significant predictor of depressive symptoms in a community sample of elders, the Duke Established Populations for Epidemiologic Studies of the Elderly (EPESE) (16,17). Many variables are associated with subsequent depressive symptoms in older people, including depressive symptoms at the time of initial assessment, older age, female sex, functional impairment, and cognitive impairment (16). Therefore, any association between perceived basic needs and depressive symptoms should be adjusted for these covariates. We hypothesized that perceived inadequacy in basic needs would predict an increase in depressive symptoms 3–4 years later over three intervals throughout a 10-year period in a repeated-measures analysis. We also hypothesized that we would find no interaction between the intervals and the association between basic needs and depression, despite the increase in depressive symptoms over time among elderly persons (16). That is, we did not expect the effect of basic needs on depression to change over time.

Methods

Participants

Data for this study derive from the Duke EPESE (16,17). This population survey was part of a multicenter, collaborative epidemiologic investigation of physical, psychological, and social functioning of persons 65 years of age and older living in (i) East Boston, Massachusetts, (ii) Iowa and Washington counties, Iowa, (iii) New Haven, Connecticut, and (iv) the North-central Piedmont of North Carolina. The Duke EPESE (North Carolina) sample consisted of community residents selected from five contiguous Piedmont counties (one of which was predominantly urban and the other four predominantly rural). The Duke EPESE was a 10-year prospective cohort study. The current study focuses on data from the four in-person interviews: 1986/87 (baseline); 1989/90 (Time-2); 1992/93 (Time-3); and 1996/97 (Time-4). The sampling design has been described previously (17). Briefly, the study used a four-stage probability sample of 4162 people 65 years old or older living in (i) East Boston, Massachusetts, (ii) Iowa and Washington counties, Iowa, (iii) New Haven, Connecticut, and (iv) the North-central Piedmont of North Carolina. The Duke EPESE (North Carolina) sample consisted of community residents selected from five contiguous Piedmont counties (one of which was predominantly urban and the other four predominantly rural). The Duke EPESE was a 10-year prospective cohort study. The current study focuses on data from the four in-person interviews: 1986/87 (baseline); 1989/90 (Time-2); 1992/93 (Time-3); and 1996/97 (Time-4). The sampling design has been described in detail previously (17). Briefly, the study used a four-stage probability sample of 4162 people 65 years old or older (4136 were white or black). Those participants who self-designated their race as other than white or black (n = 26) were combined with the white participants. Though proxy respondents were interviewed, data from these participants were not included in the study.

Measures

A comprehensive demographic section assessed age, sex, race, education, and family income of participants at baseline. Three demographic variables at baseline were designated their race as other than white or black (n = 4136 were white or black). Those participants who self-designated their race as other than white or black (n = 26) were combined with the white participants. Though proxy respondents were interviewed, data from these participants were not included in the study.

Participants were asked to select the income category that best represented their family income during the last year using one of 11 categories. The categories were as follows: 1 ($0–$1,999), 2 ($2,000–$2,999), 3 ($3,000–$3,999), 4 ($4,000–$4,999), 5 ($5,000–$6,999), 6 ($7,000–$9,999), 7 ($10,000–$14,999), etc., to 11 (≥$40,000). Each participant was then assigned a yearly income based on the midpoint of each of the frequency categories (e.g., category 1 income was $999.50). Income was then entered as a variable with a range from $999.50 to $44,499.50.

A total of 1.6% and 18.9% of the respondents were missing data on years of education and income, respectively, at baseline. We used stochastic regression imputation methods to impute values with age, sex, race, employment status, housing conditions, financial status, urban residence, marital status, occupational prestige, and a dummy variable for housewife (as well as income and education) as predictors. Although housing conditions and financial resources were used in the imputation procedure, these factors were only part of the set of variables used.

Cognitive status.—Cognitive status was assessed by the 10-item Short Portable Mental Status Questionnaire (SPMSQ) (18). This scale assessed items such as knowledge of day, date, current and previous president, mother’s maiden name, current address or phone number, and a serial subtraction task. Errors across items were summed to give each participant a scale score on the measure. Higher scores on the scale indicate more cognitive difficulties. The scale was dichotomized with participants making 3+ errors designated as mild to moderately cognitively impaired (those who had true cognitive impairment [seven or more errors] were not included because we didn’t have depression scores).

Functional status.—Functional status was measured by using three items from the Rosow-Breslau functional health scale (19). These items pertained to the following: doing heavy housework unaided, walking up and down a flight of stairs unaided, and walking one-half mile unaided. Respondents indicated if they could do each of the tasks unaided, and responses were coded 0 (No) or 1 (Yes). Responses across the three items were summed and coding reversed such that higher scores indicated poorer physical functioning, resulting in a possible range of 0–3. Values were imputed for participants with missing data (4.3% of the sample), based on responses to other measures of functional status obtained in the interview.

Depressive symptoms.—Depressive symptoms were assessed using a modified version of the Center for Epidemiologic Studies Depression Scale (CES-D) (20). Specifically, a dichotomous response scale was used for each item coded 0 (No) or 1 (Yes). The correspondence of CES-D score determined by the usual method of scoring and by this modified approach is very high (16). The participant’s responses across the 20 items were summed to create a CES-D scale score [0–20], with higher scores indicating more depressive symptoms. CES-D score was used in these analyses as a continuous variable.

Basic needs.—Five items were used to assess participants’ perception of difficulties meeting their basic needs, such as safety, financial needs, and adequate housing (1). To assess
safety, participants were asked “How safe from crime is your neighborhood?” To assess financial needs, respondents were asked, “How well does the amount of money you have take care of your needs?” and “Do you have enough financial resources to meet emergencies?” To assess housing, participants were asked if their housing was adequate and if their house had enough heat. Responses were summed and recoded so that the possible range of scores was 1 (no perception of inadequacy of basic needs) to 11 (each basic need was perceived to be met poorly), with higher scores indicating that perceived basic needs were not being met. The mean score was 3.85 (mode = 4) with a standard deviation of 1.7. Twenty-eight percent of the participants had a score of 5 or greater. The scale was used as a continuous variable in the analyses described below. If a participant did not answer any of the items on the scale, the scale was coded as missing.

To review the means or frequency distribution of the variables in the study, we identified an initial analysis sample which consisted of all participants who had a baseline basic needs score and a Time-2 CES-D score (n = 2710). A mixed models repeated-measures design (using PROC MIXED in SAS) (21) was used to test the hypothesis that perceived inadequate basic needs predicted depressive symptoms at the follow-up assessment, controlling for depressive symptoms at the same time that perceived basic needs was assessed. Three intervals were used in the model: Baseline basic needs predicting depressive symptoms at Time-2; Time-2 basic needs predicting depressive symptoms at Time-3; and Time-3 basic needs predicting depressive symptoms at Time-4. A mixed models repeated-measures analysis not only provided the opportunity to use more data to test our hypothesis, but also allowed us to adjust for correlated measures over time. Time-invariant covariates included age (a continuous variable), sex, race, and education. Time-varying covariates included (coded as 0, 1, or 2) income, cognitive status, functional status, depressive symptoms, and interval.

RESULTS

The means and frequency distributions for the variables included in the analysis are presented in Table 1. Compared to the overall sample at baseline, the analysis sample (as would be expected given that they could participate 3 years later) exhibited minimal (though statistically significant) trends toward being younger, female, better educated, reporting more income, less cognitively impaired, less depressed and describing fewer functional impairments and fewer problems meeting basic needs. None of the variables used in the model were correlated at higher than 0.4 except for correlations of the same variables over time. (For example, the correlation of basic needs at baseline with Time-2 was .53 and baseline with Time-3 was .49.) In Table 2, baseline variables are examined for their association with Time-2 depression score using one-way analysis of variance. As can be seen, basic needs and each of the covariates are predictors of Time-2 depression in these bivariate analyses.

To explore further if perceived inadequate basic needs predicted a higher depression score 3 years later in controlled analyses, we performed a linear regression analysis using baseline variables to predict Time-2 depression. Basic needs was the independent variable, and the covariates included age, sex, race, education, functional status, cognitive status, income, and baseline depression. In this analysis, the unadjusted $R^2 = .27$. Basic needs was a significant predictor at the <.01 level. Baseline depression ($p < .0001$), functional impairment ($p < .0001$), fewer than 9 years of education ($p < .001$), white race ($p < .05$), and female sex ($p < .05$) were significant predictors of depression score 3 years later.

We then proceeded to use a repeated-measures mixed model analysis across our three intervals to examine the effect of basic needs over time. The within-person variance in basic needs over time was almost equivalent to the between-person variance in a simple repeated-measures model with only basic needs entered. Three intervals were included (baseline to Time-2, Time-2 to Time-3, and Time-3 to Time-4). The full model included basic needs as a time-
varying independent variable predicting depressive symptoms at the follow-up of each interval with age, sex, and race as time-invariant covariates. Depressive symptoms, income, cognitive impairment, functional status, and interval were entered as time-varying covariates. For example, for the interval Time-2 to Time-3, reported income at Time-2 predicted depression at Time-3. The independent variable (basic needs) and covariates were all significant \((p < .05)\) predictors of follow-up depressive symptoms except for age, sex, and cognitive impairment. When age, sex, and/or cognitive impairment were removed as covariates, the model fit the data less well (the Bayesian Criterion \([BIC]\) increased). Therefore, both variables were left in the final model (see Table 3). In addition, previous literature, as noted above, implies that these three variables are associated with depressive symptoms \((16)\).

We created nine interaction terms for each main effect times basic needs. A likelihood ratio test comparing the model with the interaction terms with the main effects model was significant \(\chi^2(9) = 19.6, \ p = .02\). Each nonsignificant interaction term was removed in a stepwise manner (the term with the highest \(p\) value being removed at each step until only \(p\) values of \(< .05\) remained). The only interaction term that remained in the model was baseline depression \(\times\) basic needs \((\text{estimate} = -0.01449, \ p = .0120)\). This interaction suggests that, if depression scores at the beginning of the interval were higher, then basic needs were slightly less likely to predict depression scores at the end of the interval. We elected not to include this term in the model presented in Table 3.

Given that two items in the basic needs scale assessed financial need and financial need alone has been frequently associated with depression \((22)\), we ran some additional analyses to determine if financial need alone was responsible for the observed association. The two items based on financial need were combined into a scale, and the three items based on needs not directly financial (safety, adequate housing, and adequate heat in their houses) were combined into a second scale. The main effects repeated-measures analysis for these two models showed that each of these scales was a highly significant predictor of depression. Therefore, we included the full five-item basic needs scale that we have used in previous work.

**Discussion**

In a large biracial sample of community-dwelling older adults in which data were collected at four intervals over a 10-year period, we found that participants’ perceptions that their basic needs were not being met \((\text{e.g., inadequate housing, financial difficulties, unsafe neighborhood})\) predicted depressive symptoms over a 10-year period. In our previous research, we found that such perceptions were predictive of physical dysfunction \((10)\) as well as mortality \((1)\). Thus it appears that perceived problems meeting basic needs play a unique role in the physical and mental health of older adults.

One of the most consistent findings in epidemiological studies is the association between SES and depression \((9)\). Chronic resource deficits may serve as a daily stressor, and the perceived burden of not meeting basic needs appears to be an important contributor to depression in older adults. Whereas lower SES affects an individual’s exposure to virtually all known psychosocial risk factors \((9)\), this study documents the importance of considering the perception of inadequate financial means as well as other perceived inadequacies in basic needs as well as reported or actual income and education.

This study possesses many strengths including a large sample followed over 10 years. Though attrition is relatively high \((as would be expected when following a sample of community-dwelling elders)\), the use of repeated-measures analysis permits us to maximize our use of the existing data. We have no reason to believe that the participants in the follow-up assessments are significantly different than those who refuse or who are lost to follow-up, except that they are somewhat younger and more healthy at baseline. The scales used in the study have been used in many previous analyses and have proved to be reliable and informative.

In interpreting the current study’s results, it is important to consider several methodological limitations. First, the measures are self-report, yet most community-based surveys of depression and socioeconomic risk factors are based on self-report. An underlying depressive illness prior to baseline \((as well as their lower income and problems meeting basic needs)\) may have contributed to the participant’s depressive symptoms at baseline. As we did not ask the respondents about whether they had a history of depression prior to the first interview, we could not rule out this possibility. However, given the consistent association of the socioeconomic factors with depression across the longitudinal data, it seems likely that perceived problems meeting basic needs are influencing the depressive symptoms.

Furthermore, this study considered frequency of CES-D depressive symptoms, not diagnosis. Thus, our findings may
not generalize to clinical diagnosis of depression. Though the use of a continuous scale to measure the burden of depressive symptoms provides more power for the analysis, some might insist that analyses other than those focusing on the specific diagnoses of major depression and/or dysthymic disorder would not be of relevance to psychiatrists. This view, however, is being challenged in the psychiatric literature (23–25). Specifically, the “permeability” of the criteria does not support the reification of the diagnosis; therefore, the burden of depressive symptoms is of importance, especially when evaluating population samples in whom major depression in later life may be infrequent yet the symptom burden is much higher (26).

Conclusion
Just as subjective ratings of health status are predicative of long-term health outcomes, subjective experiences of resource deprivation may also be predicative of both health and mental health functioning. Our research has shown that there is accumulating evidence that perceived problems meeting basic needs play a unique role in the subsequent health and mental health of older adults.

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