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The Association Between Hardship and Self-Rated Health: Does the Choice of Indicator Matter?

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Abstract

Introduction—The purpose of this study was to investigate the association between four specific forms of hardship (difficulty paying bills, ongoing financial stress, medication reduction due to cost, food insecurity) and self-rated health among older men and women.

Methods—Cross sectional logistic regression analysis was conducted using the 2010 wave of the Health and Retirement Study Leave Behind Questionnaire (N=7,619) to determine the association between four hardship indicators and self-rated health. Hardship indicators (difficulty paying bills, ongoing financial stress, medication reduction due to cost, food insecurity) were dichotomized (0=no hardship, 1=yes hardship) for this analysis.

Results—After adjusting for socio-demographic factors, participants reporting difficulty paying bills had a 1.8 higher odds of reporting poor self-rated health (95% CI: 1.57, 2.15) and those reporting taking less medication due to cost had a 2.5 times higher odds of poor self-rated health (95% CI: 1.97, 3.09) compared to those not reporting these hardships. When stratified by gender, and adjusting for socio-demographic factors, men who took less medication due to cost had a 1.93 higher odds of low self-rated health (95% CI: 1.39, 2.67) and women who took less medications due to cost had a 2.9 higher odds of reporting poor self-rated health (95% CI: 2.23, 2.70) compared to women not reporting these hardships.

Conclusions—Research in this area can provide greater conceptual and measurement clarity on the hardship experience, and further elucidate the pathway between specific hardships and poor health outcomes to inform intervention development.

Keywords

Gender differences; Hardship; Health; Measurement; Self-rated health

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INTRODUCTION

The association between socioeconomic status (SES) indicators such as education, income, and occupational status on health has been well-established. For example, studies have shown that there is an association between low levels of SES and poor health outcomes¹: and this association has been noted both at the individual level and the ecological level.²⁻⁶ Yet, despite this well-established association, traditional measures of SES do not capture the differential experience of SES that results from the disparate demands on financial resources across households.⁷⁻⁸ Therefore, many researchers have called for an expanded conceptualization and operationalization of SES to include other indicators such as wealth, debt, and hardship.⁹⁻¹² Measures of hardship have been suggested as useful indicators to identify those in need, as they provide insight into the relationship between household needs and available resources and actual living conditions.¹³⁻¹⁵ However, there is no consensus on a definition or measurement of hardship.¹⁶⁻¹⁷ Hardship can be experienced across several domains such as ability to pay bills, chronic financial stress, consumer debt, food hardship (often referred to as food insecurity), and medication need.¹⁸⁻²⁰ Forty-eight percent of older adults in the United States are at-risk of experiencing some form of hardship.²¹ Yet, few studies have highlighted the potential differential association across various domains of hardship (e.g., food insecurity, financial stress/hardship, medical debt) and health related outcomes. At present, there is a lack of clarity around how to measure these constructs of financial well-being, and it is unclear which specific hardships are most important for intervention development.

Hardship and Health

Self-rated health has been found to be an important predictor of a person's overall health and well-being. It has also been shown to be correlated with several poor health outcomes such as functional ability²², premature mortality²³⁻²⁴, chronic conditions²⁵⁻²⁶, and lower healthcare utilization.²³ Self-rated health has often been shown to be socioeconomically patterned, where those with lower SES are more likely to report poorer self-rated health;²⁷ therefore, it is not surprising that hardship has also been shown to be negatively associated with self-rated health.²⁸⁻³⁰ However, given the inconsistent definitions and measurements of hardship used, it is difficult to compare across studies to better understand the influence that specific domains of hardship have on the self-reported health status of the population in general, and older adults in particular. Nevertheless, these studies indicate, across various samples, that indicators of hardship are robust correlates of health;³⁰⁻³⁴ however, what remains understudied is whether within samples, various domains of hardship are differentially associated with health, especially among older adults.

Hardship and Health by Gender

There are differences in health between men and women due to biological, social, and behavioral factors³⁵; and various indicators of socioeconomic circumstances can differentially influence health across the life course.³⁶ More specifically, some studies have highlighted the differential association between hardship and health between men and women. European studies have shown that for women, hardship is a stronger predictor of

poor health outcomes than traditional measures of socioeconomic status.^{37–38} Studies in the United States, using the Health and Retirement Study have shown a similar pattern, with hardship predicting poor health outcomes stronger for women than for men, even after controlling for traditional measures of SES.^{39–40}

The aims for this study were to determine the differential association between a summed measure of hardship and health; the association between four individual indicators of hardship and health; and to determine the differential association between hardship and health for men and women. Our specific research questions were: (1) Is hardship associated with self-rated health? (2) Are specific indicators of hardship differentially associated with self-rated health? and (3) Does the association between specific indicators of hardship and self-rated health vary by gender?

METHODS

Data Source and Study Sample

The data used for this study were from the 2010 wave of the Health and Retirement Study (HRS)⁴¹, a nationally representative sample with a focus on the economic, health, demographics and the retirement process of noninstitutionalized US adults aged 50 years and older. Data for the HRS is collected bi-annually and has been collected since 1992. The HRS is a multistage area probability sample of US households, with oversampling for African Americans, Latinos and Florida residents. *More detailed information on the HRS has been described elsewhere.^{41–42}

Beginning in 2004, HRS has collected psychosocial information about participant's life circumstances, subjective well-being and lifestyle as part of a biennial wave from a rotating (random) 50% sample of the core panel who have completed the face-to-face interviews.⁴³ Questionnaires were left with respondents at the end of the interview and asked to mail them back to the study office. In addition to the public use HRS data files, we merged data from the RAND Center for the Study of Aging for respondent socioeconomic data. The analytic sample for this study included respondents who also completed the psychosocial leave behind survey (N=7,619).

Measures

Outcome Variable—Self-rated health was measured in the HRS using a single question: “In general, how would you say your health is: excellent, very good, good, fair or poor?”⁴⁴ We dichotomized this variable into two categories: excellent/very good/good versus fair/poor.

Independent Variable—*Hardship* variables were selected based on items in the HRS measuring hardship across three domains: 1) financial; 2) food; 3) medication need. These domains were selected based on previous recommendations for measures of hardship to assess consumption of essential goods and services.^{45–46} Hardship was operationalized

*Note: Oversampling of Floridians in the HRS was based on a decision influenced by congress specifying that special attention must be given to area with both "high densities and numbers of older populations."

using 4 indicators: *difficulty paying bills*, *ongoing financial strain*, *food insecurity* and *medication need*. *Difficulty paying bills* was measured using the following question: “How difficult is it for you/your family to meet monthly payments on your/your family’s bills? Ongoing *financial strain* was measured by asking respondent to “Indicate whether or not financial strain is current or an ongoing problem that have lasted 12 months or longer.” *Food insecurity* was measured by asking “In the last 12 months, did you ever eat less than you felt you should because there wasn’t enough money to buy food? *Medication need* was measured by asking “Have you ended up taking less medication than was prescribed for you because of cost? We coded responses (0=no or not difficult, 1=yes or difficult). In addition, the responses across these indicators were summed to create a hardship score. The hardship score was dichotomized as those who reported 2 or more hardships = hardship vs. those who reported 1 or 0 = no hardship.

Model Covariates—Demographic characteristics measured were gender (male or female), age categories (50–64, 65–74, 75–84, 85+), race (White, African American or Latino), marital status (married/partnered, separated/divorced/widowed, or single) and employment status (employed, unemployed or out of workforce). Socioeconomic status was measured as education (<12years, 12 years, more than 12 years), and annual household income. All covariates were treated as confounders. These covariates were selected because previous studies have indicated that they are associated with financial hardship and self-rated health: age⁴⁷, gender⁴⁰, race^{48–49}, marital status^{50–51} employment status⁵² and SES.⁵³

Statistical Analyses

Bivariate and multivariable statistical tests were performed. Logistic regression was used for the statistical analyses using STATA version 14.0.⁵⁴

We estimated 3 nested models using a dichotomized hardship variable as the primary predictor. We also estimated another 3 nested models using each hardship indicator individually as the primary predictor. Model 1=baseline with hardship and self-reported health unadjusted for covariates; Model 2= model 1 plus demographic factors (age, gender, race, marital status and employment status); and Model 3=model 2 plus socioeconomic factors (education, income). Next, we stratified our dataset by gender and repeated the aforementioned modeling strategy for both men and women.

RESULTS

Descriptive statistics and the results of bivariate analyses are presented in Table 1. Over 58% of the sample consisted of women and 75% were white. Seventy-four percent of the male sample were married and almost 53% of women were married. Thirty-five percent of males were still working compared to 33% of females. Thirty-one percent of men completed high school compared to 35% of females. Male respondents mean household income was reported \$75, 505, while women reported \$58, 251. Thirty-one percent of men in the sample reported difficulty paying bills, while 36% of women reported having difficulty paying bills. Compared to men, women reported higher levels of ongoing financial stress (48%), greater food insecurity (almost 10%) and taking less medications due to cost (13%).

The results of the multivariable analyses are in Tables 2A/B, 3A/B, and 4A/B. Tables 2A/B consists of the results using the full sample and Tables 3A/B and 4A/B consists of the results for the gender stratified models.

Regression models (full sample)

Table 2 presents results from logistic regression models testing the associations between having hardships and self-rated health (Table 2A) and each individual indicator of hardship and self-rated health (Table 2B). In the fully adjusted model (Table 2A, Model 3), older adults who reported 2 or more hardships had a 1.35 greater odds of reporting poor self-rated health (95% CI: 1.25, 1.46) compared to those reporting 1 or less hardships. In Table 2B, Model 3, we examined each hardship indicators individually and its association to self-rated health. We found that older adults who had difficulty pay bills had a 1.84 greater odds of reporting poor self-rated health (95% CI: 1.57, 2.15), ongoing financial strain had 1.59 greater odds of reporting poor self-rated health (95% CI: 1.34, 1.90), those who reported food insecurity had a 1.69 greater odds of reporting poor self-rated health (95% CI: 1.35, 2.12) and those who took less medication due to cost had a 2.47 greater odds of reporting poor self-rated health (95% CI: 1.97, 3.09).

Regression models (stratified by men)

Tables 3A/B provide results for adjusted and unadjusted models stratified by men only in the sample. The fully adjusted model of hardships as the primary predictor in Table 3A suggests that men who reported 2 or more hardships had a 1.24 higher odds of reporting low self-rated health compared to those reporting 1 or less hardships (95% CI: 1.11, 1.39). Table 3B presents the fully unadjusted and adjusted models for the association between each of the four hardship indicators and self-rated health for men. The largest effect was seen for men who reported taking less medication due to cost, with those men having a 1.93 higher odds of reporting low self-rated health (95% CI: 1.39, 2.67) compared to men not reporting this hardship.

Regression models (stratified by women)

Tables 4A/B provide results for adjusted and unadjusted models stratified by women only in the sample. The fully adjusted model with hardships as the primary predictor in Table 4A suggests that women who reported 2 or more hardships had a 1.43 higher odds of reporting low self-rated health compared to those reporting 1 or less hardships (95% CI: 1.29, 1.60). Table 4B presents unadjusted and adjusted models between each of the four hardship indicators and self-rated health for women. Similar to the results among men, the largest effect was seen among women who reported taking less medication due to cost, with those women having a 2.9 higher odds of reporting low self-rated health (95% CI: 2.23, 3.70) compared to women not reporting this hardship.

DISCUSSION

This study builds on existing research that expands the notion of current socioeconomic (SES) indicators (education, income, and occupational status) socioeconomic circumstances to include measures of hardship. Previous research has shown that hardship is an important

predictor of a person's overall health and well-being^{17, 48, 55} and may also capture other dimensions of economic deprivation not captured by traditional measures of SES.

In this study, we examined the association between hardships (dichotomized into 2 or more vs. 1 or less) and individual indicators of hardship and self-rated health. Using data from the Health and Retirement Study (2010)⁴¹, the first aim was to determine whether hardship was associated with self-rated health among older adults. Our findings indicate that there is a robust association between health and the number of hardships experienced as well as individual indicators of hardship across multiple domains (financial, food, and medication need). These associations remained statistically significant even after controlling for demographic characteristics and traditional indicators of socioeconomic status (i.e. household income, educational attainment, employment status).

These findings complement other studies^{49, 56} who also examined the association between hardship and self-rated health. Savoy et al⁴⁹ reported that financial hardship (operationalized as financial strain) may lead to poorer health outcomes specifically among black adults, while Tucker-Seeley et al⁵⁶ found that hardship was strongly associated with self-rated health among low-income housing residents, even after controlling for traditional indicators of SES. Though different measures of hardship were used in each study, their results highlight that indicators of hardship are robust correlates of health across populations. The current study among older adults is consistent with those previous findings.

Our second research aim was to determine whether specific indicators of hardship were differentially associated with self-rated health. We found that while the dichotomized hardship variable and each individual indicator of hardship were statistically significant, the strength of that association differed across indicators of hardship. Those reporting that they had taken less medication due to cost had the strongest likelihood for also reporting low self-rated health. To our knowledge, there are no other studies that have examined hardship and self-rated health among older adults using several individual indicators of hardship. However, one study similar in nature by Chi & Tucker-Seeley⁴⁰ examined gender differences in financial hardship and self-reported oral health. They too examined four individual hardship domains, however, only two of them were similar to the ones used for this study. After controlling for all demographic, sociodemographic factors and physical health, they found those reporting food hardship experiences had a greater odds of reporting low self-rated oral health, and women reporting three or more hardships (range was 0–4) had a greater odds of reporting low self-rated oral health. The current study extends these previous efforts by explicating the association between multiple indicators of hardship and self-rated physical health. Examining each individual hardship indicator as well as the dichotomized variable of 0–1 versus 2 hardships or more experienced further elucidates the pathway between the hardship experience and health to uncover the strength of the association between specific domains of hardship and health. Such information on the strength of the association can inform policy priority setting and intervention development.

Our third aim was to determine whether the association between specific indicators of hardship and self-rated health varies by gender? Similar to the Chi and Tucker-Seeley⁵⁶ results related to self-rated oral health, we expected to see a gendered difference in the

association between hardship and health. However, unlike Chi and Tucker-Seeley⁵⁶, results for self-rated oral health, our results indicated that both the models with hardships dichotomized as well as each individual indicator of hardship was statistically significantly associated with low self-rated physical health in our full sample as well as in the gender stratified models. Though earlier work examining gender differences in exposure and vulnerability to financial strain found that women had greater exposure to financial strain which impacted their ability to maintain sense of control which then lead to greater distress;⁵⁷ our results suggest that for the domains of hardship measured in this study, the association between hardship and self-rated health are similar between older men and women.

The extensive literature showing the positive association between low-socioeconomic status and poor health⁵⁸, as well as studies testing the relationship between specific hardships and health highlight the importance of material resources (i.e. money) to provide a sense of financial security and to protect health. However, what differentiates a focus on hardships reported by the individual from a focus on his/her reported low-socioeconomic status is that measures of hardship are attempting to capture an individual's actual living condition⁵⁹; that is, how socioeconomic status is actually lived. Having material resources and purposefully utilizing those resources (e.g. buying food and medication) to avoid hardships creates the social context where healthy behavioral decisions can be made.⁶⁰⁻⁶¹ Additionally, access to fewer household material resources forces attentional resources to be directed toward meeting basic needs such as paying for shelter, food, and healthcare, with little room for financial mistakes or slack.⁶² The need for such precision over time may cause psychological distress, which could lead to poor mental⁶³⁻⁶⁴ and physical health.²⁸ While we didn't assess hardships over time in this study, the current study builds on the existing evidence that the hardship experience (whether short or longer-term) influences the health outcomes of older adults.^{28, 39}

LIMITATIONS

Perhaps one of the most important limitations that should be noted is that there is currently no consistent or standardized way of measuring hardship which may contribute to the variation in results across studies. Another limitation is that this is a cross sectional study and we are unable to determine the causal relationship between hardship experiences and low self-rated health. Future longitudinal studies could investigate whether a change in hardship over time influences self-rated health among older adults.

CONCLUSIONS

Several studies have documented the longstanding association between socioeconomic circumstances and health;^{58, 65-67} and researchers have noted that the optimal indicators to capture the association between socioeconomic circumstances and health may differ depending on the population under study, health outcomes of interest, and the socioeconomic pathway of interest.⁶⁸⁻⁶⁹ Indicators of hardship have been shown to be robust correlates of several poor health outcomes among older adults, even after controlling for traditional indicators of SES such as educational attainment and household income.^{28,39,56,70} Further explication of the socioeconomic environment to include the experience of

hardship across multiple domains, such as food,⁷¹ financial,^{27–28} and healthcare-related,^{72–73} has clearly highlighted the substantial influence financial hardships have on health and well-being. While the specific indicator seems to be less important for cross-sectional investigations, as all of these hardships are strongly associated with poor health outcomes, the identification of the specific hardship is relevant for intervention and policy development efforts that attempt to target the hardship experiences of individuals and their families.

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Conflict of Interest Statement:

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Table 1

Frequency distributions across socio-demographic characteristics and bivariate analyses testing the difference between men and women (unweighted) (N=7,619)

Characteristics	Men	Women	<i>p</i> -value
Demographics			
Age (years)			.178
50–64	42.87%	44.92%	
65–74	29.65%	28.01%	
75–84	20.95%	20.05%	
>85	6.53%	7.02%	
Race (%)			<.001
White	79.05%	74.48%	
African American	12.57%	17.64%	
Latino	3.87%	3.42%	
Other	4.52%	4.47%	
Marital Status (%)			<.001
Married/Partner	74.31%	52.80%	
Separated/Divorced	20.52%	42.59%	
Single	5.17%	4.60%	
Employment Status (%)			.006
Employed	35.73%	32.52%	
Unemployed	14.38%	14.08%	
Not in Workforce	49.89%	53.41%	
Education			<.001
<High School	17.92%	18.09%	
High School	30.89%	34.69%	
More than High School	51.19%	47.22%	
Income (mean, SD)	75, 505 (8,396)	58, 251 (10, 873)	<.001
Hardships (%)			
Difficulty Paying Bills	30.95%	35.69%	<.001
Ongoing Financial Strain	44.63%	48.13%	0.002
Food Insecurity	6.90%	9.82%	<.001
Taking Less Medications	8.48%	13.15%	<.001
Health			
Physical Health (self-reported health)			0.30
Fair/Poor	25.13%	26.19%	
Good/Excellent	74.87%	73.81%	

TABLE 2

A. Odds Ratio Estimates for Self-Rated Health by Hardship (summary score) among Older Adults: Health and Retirement Study 2010 (N=7, 575)			
Characteristics	Model 1 ^a OR (95% CI)	Model 2 ^b OR (95% CI)	Model 3 ^c OR (95% CI)
Self-Rated Health			
Hardship ^d	1.55 (1.45, 1.65) ***	1.43 (1.33, 1.54) ***	1.35 (1.25, 1.46) ***

B. Odds Ratio Estimates for Self-Rated Health by Hardship (individual indicators) among Older Adults: Health and Retirement Study 2010 (N=7, 575)			
Characteristics	Model 1 ^a OR (95% CI)	Model 2 ^b OR (95% CI)	Model 3 ^c OR (95% CI)
Self-Rated Health			
Individual forms of hardship			
Difficulty Paying Bills	2.64 (2.30, 3.03) ***	2.13 (1.82, 2.48) ***	1.84 (1.57, 2.15) ***
Ongoing Financial Strain	2.09 (1.79, 2.44) ***	1.78 (1.50, 2.11) ***	1.59 (1.34, 1.90) ***
Food Insecurity	3.20 (2.63, 3.89) ***	2.00 (1.61, 2.48) ***	1.69 (1.35, 2.12) ***
Taking Less Medications - cost	3.29 (2.77, 3.91) ***	2.79 (2.26, 3.44) ***	2.47 (1.97, 3.09) ***

* =0.05;

** =0.01;

*** =<0.001

Note: CI=Confidence Intervals; OR=Odds Ratios

^a Model 1: baseline model (hardship and self-rated health)

^b Model 2: model 1 + demographic characteristics (age, gender, race/ethnicity, marital status, employment status)

^c Model 3: model 2 + sociodemographic characteristics (education, household income)

^d Hardship is defined as a summary score of all 4 binary indicators: 1) difficulty paying bills; 2) ongoing financial strain; 3) food insecurity; 4) taking less medications due to cost. The scores were dichotomized. Those with 0 or 1 hardship were compared to those with 2 or more hardships.

TABLE 3

- Odd Ratio Estimates for Self-rated health by Hardship (summary score) Among Older Men (Gender-Stratified Models): Health and Retirement Study 2010			
	Model 1^a OR (95% CI)	Model 2^b OR (95% CI)	Model 3^c OR (95% CI)
Self-Rated Health			
Hardship ^d	1.44 (1.30, 1.60) ***	1.33 (1.18, 1.49) ***	1.24 (1.11, 1.39) ***

B - Odd Ratio Estimates for Self-rated health by Hardship (individual indicators) Among Older Men (Gender-Stratified Models): Health and Retirement Study 2010			
Characteristics	Model 1^a OR (95% CI)	Model 2^b OR (95% CI)	Model 3^c OR (95% CI)
Self-Rated Health			
Individual forms of hardship			
Difficulty Paying Bills	2.25 (1.85, 2.73) ***	1.87 (1.49, 2.34) ***	1.58 (1.27, 1.98) ***
Ongoing Financial Strain	1.88 (1.48, 2.39) ***	1.58 (1.21, 2.07) ***	1.42 (1.08, 1.85) ***
Food Insecurity	2.91 (1.92, 4.42) ***	1.92 (1.25, 2.95) ***	1.58 (1.02, 2.47) ***
Taking Less Medications - cost	2.83 (2.06, 3.90) ***	2.20 (1.59, 3.04) ***	1.93 (1.39, 2.67) ***

Note: CI=Confidence Intervals; OR=Odds Ratios

*
=0.05;

**
=0.01;

=<0.001

^aModel 1: baseline model (hardship and depressive symptoms)

^bModel 2: model 1 + demographic characteristics (age, gender, race/ethnicity, marital status, employment status)

^cModel 3: model 2 + sociodemographic characteristics (education, household income)

^dHardship is defined as a summary score of all 4 binary indicators listed above. The scores were dichotomized. Those with 0 or 1 hardship (reference group) were compared to those with 2 or more hardships.

TABLE 4

A - Odd Ratio Estimates for Self-rated health by Hardship (summary score) Among Older Women (Gender-Stratified Models): Health and Retirement Study 2010			
Characteristics	Model 1 ^a OR (95% CI)	Model 2 ^b OR (95% CI)	Model 3 ^c OR (95% CI)
Self-Rated Health			
Hardship	1.64 (1.49, 1.80) ***	1.51 (1.37, 1.68) ***	1.43 (1.29, 1.60) ***

B - Odd Ratio Estimates for Self-rated health by Hardship (individual indicators) Among Older Women (Gender-Stratified Models): Health and Retirement Study 2010			
Characteristics	Model 1 ^a OR (95% CI)	Model 2 ^b OR (95% CI)	Model 3 ^c OR (95% CI)
Self-Rated Health			
Individual forms of hardship			
Difficulty Paying Bills	3.00 (2.45, 3.68) ***	2.32 (1.87, 2.88) ***	2.03 (1.63, 2.54) ***
Ongoing Financial Strain	2.27 (1.85, 2.79) ***	1.93 (1.56, 2.39) ***	1.74 (1.39, 2.18) ***
Food Insecurity	3.39 (2.61, 4.39) **	1.95 (1.45, 2.62) ***	1.68 (1.23, 2.28) ***
Taking Less Medications - cost	3.60 (3.00, 4.33) ***	3.21 (2.54, 4.05) ***	2.87 (2.23, 3.70) ***

Note: CI=Confidence Intervals; OR=Odds Ratios

* =0.05;

** =0.01;

*** =<0.001

^aModel 1: baseline model (hardship and depressive symptoms)

^bModel 2: model 1 + demographic characteristics (age, gender, race/ethnicity, marital status, employment status)

^cModel 3: model 2 + sociodemographic characteristics (education, household income)

^dHardship is defined as a summary score of all 4 binary indicators listed above. The scores were dichotomized. Those with 0 or 1 hardship (reference group) were compared to those with 2 or more hardships.