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Do consequences of hardship narrow in later life? The impact of hardship on self-rated health among older adults

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ABSTRACT

Purpose: The purpose of this study was to investigate the association between hardship and self-rated health among older adults and determine whether this association differed by age.
Methods: Using data from the 2014 Survey of Income and Program Participation, we conducted logistic regression analysis to examine the association between hardship and self-rated health among adults aged 55 years and older in the United States, and the moderating effect of age on this relationship. Analyses were weighted using replicate weights provided by the survey. Indicators of hardship were dichotomized (1 = experienced hardship, 0 = no hardship).
Results: Analyses indicated that individuals who were unable to pay utility bills, unable to pay rent or mortgage, or who experienced food insecurity had higher odds of reporting fair or poor health relative to those not experiencing these hardships. The association between hardship and self-rated health was moderated by age.
Conclusions: Hardship is directly relevant to health outcomes as it signals unfulfilled needs experienced by individuals lacking adequate economic resources. This study contributes to our understanding of the role of age in the association between hardship and self-rated health.

Introduction

Economic circumstances play an important role in the well-being of older adults. Adequate economic resources not only ensure that older adults' basic needs are met but also facilitate a healthy lifestyle in later life. The consequences of not possessing adequate economic resources are manifold, including not only failing to pay utility bills and mortgage or rent but also falling into debt and potentially having to forgo necessary medical care [1,2], which may, in turn, lead to shortened life expectancy and a cascade of negative health outcomes [3,4]. Indeed, a wide-ranging and growing body of literature documents the impact of economic circumstances on older adults' physical, cognitive, and psychological health [1,5–7].

Reports of hardship reflect the consequence of inadequate economic resources in terms of ability to afford necessities including food, housing, transportation, and medical care [8,9]. Studies indicate that hardship in the form of food insecurity and unmet medical need is associated with higher risk of mortality [10]. Research also suggests that hardship such as insecurity in food and housing is associated with depression, anxiety, and a variety of physical symptoms later in life [1].

Self-rated health has been widely used to assess health outcome and disparities [11] and its predictive validity for mortality has been well established [12]. For example, self-rated health is shown to be associated with chronic conditions [13] and morbidity onset [14] and is seen as a predictor of mortality among older adults [15,16]. Research demonstrates that hardship is associated with poorer self-rated health [17,18], and the strength of this association differs across indicators of hardship (e.g., difficulty paying bills, food insecurity, and financial stress) [19].

Despite well-documented associations between indicators of hardship and self-rated health [20–22], little is known about whether hardship has a similar impact on self-rated health across older age groups. Two sets of evidence lead us to hypothesize that the association between hardship and self-rated health may be weakened among the oldest people. First, studies suggest that older adults use peer comparison mechanisms in evaluating their own health. That is, they evaluate their health based not just on their chronic conditions or other objective circumstances but also in reference to the health of others, or to what they feel can

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reasonably be expected given their age [23,24]. If the oldest adults are reflecting less on circumstances and more on peer comparisons or expectations, the association between current experiences of hardship and perceived health may be attenuated. Moreover, research using the life-course perspective indicates that individuals who survived to old age have either been spared hardship earlier in life or possessed personal and social resources that protected them from the deteriorating effect of hardship on health [25,26]. This research also implies that hardship may have less impact on health among the oldest adults relative to their younger counterparts. Accordingly, we hypothesize that the association between hardship and self-rated health is attenuated among older cohorts relative to younger ones, reflecting the moderating function of age.

The objectives of this study are twofold. First, we seek to determine the association between measures of hardship and self-rated health, using both specific indicators of hardship (food insecurity, difficulty paying utility bills, difficulty paying rent or mortgage) and a hardship index. Second, we examine differences in the strength of hardship's effect on self-rated health across age groups, as the moderating effect of age in the association between hardship and self-rated health has received limited attention. Our research questions are as follows: (1) Are specific measures of hardship differentially associated with self-rated health? (2) Is the association between hardship and self-rated health moderated by age?

Methods

Data source

We used data from the Survey of Income and Program Participation (SIPP). The SIPP was a longitudinal household survey conducted by the U.S. Census Bureau that provided a nationally representative sample for examining income dynamics and participation in government transfer programs of individuals and households, as well as their family and social context [27]. The 2014 SIPP was among the few nationally representative data sets that included both self-rated health and hardship indicators and had a relatively large sample size with oversamples of low-income households who were most exposed to risks of hardship. Data for all variables were obtained from the core data set of the 2014 SIPP wave 1, which consisted of a multistage stratified sample of 53,070 housing units from 820 sample areas that represented the civilian, noninstitutionalized population of the United States [27].

Study sample

The study sample consisted of adults aged 55 years and older during the reference year of 2013. A two-stage sample design was used by the U.S. Census Bureau to select the SIPP sample: (1) selection of primary sampling units and (2) selection of addresses within primary sampling units [27]. The 2014 SIPP also included a state expansion sample of 13,800 addresses selected from 16 states and oversamples of low-income households [27]. To account for this complex survey design and to avoid biased estimates as a result of unweighted analyses, the study was conducted with replicate weights applied to the data in accordance with the SIPP 2014 Users' Guide [27,28]. The sample contained 20,852 observations and was representative of the U.S. population aged 55 years and older, after replicate weights were applied.

Measures

Dependent variable

Respondents were asked to evaluate their own health and assign one of the five ratings from worst to best: poor, fair, good, very good, and excellent. In this study, health status was operationalized as a dichotomous variable and was classified as 0 = excellent/very good/good and 1 = fair/poor.

Independent variable

Based on prior research [29,30], a set of indicators was included to measure the status and type of hardship experienced during the reference year. Hardship associated with the ability to pay utility bills was assessed with the question "Was … unable to pay the utility bills?" (1 = yes, 0 = no). Hardship relating to housing was assessed with the question "Was … unable to pay rent or mortgage?" (1 = yes, 0 = no). Hardship relating to food was assessed with the question "Did you ever cut the size of your meals or skip meals because there wasn't enough money for food?" (1 = yes, 0 = no). To capture the multidimensionality of the hardship experience as suggested by Carle et al [31], we used a composite measure of hardship to assess its impact on self-rated health. Doing so also makes it less likely that we underestimate the extent of hardship as households allocate resources differently in times of economic distress [29,32]. Thus, an additional indicator was created to capture the status of having any type of hardship, similar to prior literature [33–35], coded 1 if at least one of the aforementioned types of hardship was reported, and 0 if none was reported.

Covariates

A set of covariates was selected based on prior research considering the relationship between economic well-being and self-rated health [21,36,37]. Age was measured in years as of the respondent's last birthday at the time of survey and used to identify three age groups (1 = age 55 to 64 years [reference category in regression analyses], 2 = 65 to 74 years, and 3 = 75 years and older). Education was assessed with a dichotomous indicator for which 1 captures education at high school or more and 0 captures education less than high school. Gender (1 = female, 0 = male), marital status (1 = married, 0 = widowed/divorced/never married/separated), and race and Hispanic ethnic status were also included (1 = non-Hispanic white [reference category in regression analyses], 2 = non-Hispanic black, 3 = non-Hispanic Asian, 4 = non-Hispanic other race, and 5 = Hispanic [any race]). A measure assessing household net worth was transformed by the natural log to account for skewness in the data after a constant was added so that all values were one dollar or more. Employment status was measured by an indicator for which 1 signals that the respondent was employed during the reference month of the survey, and 0 indicates that the respondent was not employed. Needs-adjusted income was assessed by the household income-to-poverty ratio. The household income-to-poverty ratio was calculated by dividing the household's income over the poverty threshold for the appropriate household size during the reference year. To limit the impact of outliers on the analyses, we used a technique similar to the one mentioned in the study by Burkhauser et al [38] and top-coded the income-to-poverty ratio at the 95th percentile. In the regressions, the income-to-poverty ratio was included as a continuous variable. The status of health insurance coverage (private or public) was also assessed with a dichotomous indicator (1 = insured, 0 = not insured). Finally, a growing body of literature illuminates the protective effect of resources such as homeownership against experienced hardship [33]. In this study, homeownership was included as a control variable and was assessed with a dichotomous indicator on tenure of residence (1 = residence owned or being bought by someone in the household; 0 = residence rented or occupied without payment of rent).

Analytical strategy

We began the analysis by describing the sample: weighted mean and standard deviation were used to describe continuous variables; weighted percentages were used to describe categorical variables. We then used logistic regression models to examine the association between hardship and self-rated health by regressing self-rated health on each type of hardship along with a set of covariates. Finally, the moderating effect of age for the association between hardship and self-rated health was examined by including an interaction term between age and the experience of one or more types of hardship.

Results

Table 1 reports descriptive statistics for the study sample. Approximately 27% of respondents reported fair or poor health. About 6% were unable to pay utility bills, 4% unable to pay rent or mortgage, 5% cut the size of meals or skipped meals because there was not enough money for food, and 11% reported having at least one of the aforementioned types of hardship. Approximately 47% of the sample aged between 55 and 64 years, 31% aged between 65 and 74 years, and 23% aged 75 years and more, and mean age was 67 years. For the other covariates, 76% percent were non-Hispanic white, 10% non-Hispanic black, 4% non-Hispanic Asian, 9% Hispanic, and 2% non-Hispanic other race. The mean income-to-poverty ratio was 4.4, suggesting that the average respondent lived in a household in which income was 4.4 times the federal poverty line. About 86% attained high school or higher levels of education. More than half of the sample (54%) were women and 62% were married. About 40% were employed, 92% were covered by either private or public health insurance, 80% were homeowners, and median net worth was $212,370. Table 1 also reports characteristics of the sample by self-rated health status. Among those who reported fair or poor health, 12% were unable to pay utility bills, 7% unable to pay rent or mortgage, 11% were food insecure, 20% reported having at least one hardship, and the mean income-to-poverty ratio was 3.1. In comparison, among adults whose self-rated health was excellent, very good or good, the mean income-to-poverty ratio was 4.8, and the reported prevalence of hardship was substantially lower: 4% (utility bills), 3% (rent or mortgage), 3% (food), and 8% (at least one).

Table 2 shows the proportions of the sample experiencing hardship by age group and suggests that compared to their younger counterparts, those in the older age groups are less likely to report any type of hardship. Among adults aged 55 to 64 years, 8% were unable to pay utility bills, 6% unable to pay rent or mortgage, 7% were food insecure, and 14% reported having at least one of the aforementioned hardships. Relative to adults aged 55–64 years, the self-reported prevalence of hardship among adults aged 65 to 74 years was lower: 5% (utility bills), 3% (rent or mortgage), 4% (food), and 9% (at least one). Still lower prevalence of hardship was recorded for those aged 75 years and older: 4% were unable to pay utility bills, 3% were unable to pay rent or mortgage, 2%

Table 2
Hardship by age group

Hardship	Age group		
	55 to 64	65 to 74	75 and older
Unable to pay utility bills	8.3%	5.2%	3.6%
Unable to pay rent or mortgage	5.9%	2.9%	2.5%
Food insecurity	6.9%	4.0%	2.2%
Any hardship (at least one)	14.1%	9.2%	6.4%

Percentage is weighted.
Number of observations = 20,852.

Table 1
Study sample characteristics

Characteristics	Full sample		SRH = Fair/poor		SRH = Excellent/very good/good	
	Mean or %	SD	Mean or %	SD	Mean or %	SD
Self-rated health (fair/poor)	27.0%					
Hardship						
Unable to pay utility bills	6.3%		11.5%		4.4%	
Unable to pay rent or mortgage	4.2%		6.9%		3.2%	
Food insecurity	5.0%		10.8%		2.8%	
Any hardship (at least one)	10.8%		19.9%		7.5%	
Age (y)	67.2	9.2	68.7	9.8	66.6	8.9
Age group						
55 to 64 y	46.9%		41.2%		49.0%	
65 to 74 y	30.5%		29.3%		31.0%	
75 y and older	22.6%		29.5%		20.0%	
Race/ethnicity						
Non-Hispanic white	75.7%		67.8%		78.6%	
Non-Hispanic black	9.9%		13.8%		8.4%	
Non-Hispanic Asian	4.2%		4.4%		4.1%	
Non-Hispanic other race	1.7%		2.5%		1.5%	
Hispanic	8.5%		11.5%		7.4%	
Income-to-poverty ratio	4.4	3.2	3.1	2.5	4.8	3.3
Education (high school or higher)	86.1%		74.4%		90.4%	
Female	53.9%		54.6%		53.7%	
Married	61.8%		53.1%		65.1%	
Employed	39.6%		19.1%		47.2%	
Net worth (median)	$212,370		$84,730		$275,800	
Net worth (Log)	14.7	0.3	14.6	0.2	14.7	0.4
Insured (private or public coverage)	92.2%		91.0%		92.6%	
Homeowner(s)	80.4%		70.4%		84.1%	
Number of observations	20,852		6260		14,592	

Mean, SD, and percentage are weighted.
SD = standard deviation; SRH = self-rated health.

experienced food insecurity, and 6% reported at least one of these indicators of hardship.

To examine whether hardship was associated with self-rated health, we estimated a series of logistic regression models including hardship and covariates. Table 3 shows the results of separate logistic regression models for each type of hardship. Results indicated that individuals reporting food insecurity had the highest odds of reporting fair or poor health (odds ratio [OR] = 2.560; 95% confidence interval [CI] = 2.197, 2.983), followed by significant impact from those who reported difficulty paying utility bills (OR = 2.100; 95% CI = 1.808, 2.439) and those who reported difficulty paying rent or mortgage (OR = 1.664; 95% CI = 1.371, 2.017). Table 4 presents the results of logistic regression analysis in which self-rated health was regressed on having experienced any type of hardship and controls. Experiencing one or more types of hardships was shown to be a significant predictor of fair or poor self-rated health (OR = 2.164, 95% CI = 1.938, 2.418).

Our hypothesis that age moderates the relationships between hardship and self-rated health was supported by results in Table 5. The results for the hardship and age interactions showed that the oldest adults (age 75 years and older) had lower odds of reporting fair or poor health (OR = 0.642, 95% CI = 0.494, 0.835) relative to younger adults, despite reporting experience of hardship, reflecting an attenuated association between hardship and self-rated health among the oldest cohort.

Discussion

The first objective of the study was to investigate whether people who reported hardship were more likely to report poor health. We found that the association between hardship and self-rated health was consistent across all types of hardship considered, including food insecurity, inability to pay utility bills, inability to pay mortgage or rent, and experiencing any one or more of the aforementioned types of hardship. Consistent with recent findings reported by Marshall and Tucker-Seeley [19], our study confirmed that experiencing hardship was negatively associated with self-rated health. We expected to find these relationships, given the growing body of literature demonstrating that poorer economic circumstances were related to a myriad of negative health outcomes, including, but not limited to physical pain, cognitive problems, as well as psychological and functional limitations [5–7,39,40].

As our second objective, and building on previous literature, we examined the moderating function of age in the association between hardship and self-rated health. Compared with younger cohorts, the association between hardship and self-rated health was attenuated among older cohorts, thereby providing support for the age moderation hypothesis. It should be noted that this moderation effect of age was only statistically significant among the oldest cohort (75 years and older). Although we were unable to test for the mechanisms accounting for this attenuation of effect, attenuation was anticipated by prior research suggesting that the oldest adults draw less on objective circumstances such as chronic disease in evaluating their health status [23,24], as well as by research noting that the oldest adults may have developed personal and social resources that protected them from the effect of hardship (e.g., [25,26,33,41]). We note that a wide array of personal resources relevant to hardship and self-rated health was controlled in this study, including homeownership, education, employment, health insurance coverage, and wealth [6,21,31,33,42,43]. Although all of these controls were found to be associated with self-rated health, the effect of reported hardship remained statistically significant.

Table 3
Results for self-rated health regressed on individual hardship indicators and controls

Hardship	Self-rated health	
	OR	95% CI
Unable to pay utility bills	2.100*	1.808, 2.439
Unable to pay rent or mortgage	1.664*	1.371, 2.017
Food insecurity	2.560*	2.197, 2.983

Control variables include age (group), gender, race/ethnicity, income-to-poverty ratio, education, marital status, employment status, net worth, insurance status, and homeownership.
Results based on weighted data.
* $P < .001$.

Table 4
Regression results for self-rated health regressed on any hardship

Characteristics	OR	95% CI
Any hardship	2.164‡	1.938, 2.418
Age group §		
65 to 74 y	0.781‡	0.703, 0.868
75 y and older	0.958	0.863, 1.064
Race/ethnicity ‖		
Non-Hispanic black	1.162*	1.024, 1.318
Non-Hispanic Asian	1.166	0.948, 1.435
Non-Hispanic other race	1.317*	1.036, 1.674
Hispanic	1.117	0.974, 1.281
Income-to-poverty ratio	0.923‡	0.902, 0.945
Education (high school or higher)	0.526‡	0.469, 0.591
Female	0.859‡	0.806, 0.915
Married	0.971	0.876, 1.076
Employed	0.310‡	0.277, 0.347
Net worth (Log)	0.473‡	0.328, 0.681
Insured (private or public coverage)	1.237†	1.065, 1.436
Homeowner(s)	0.764‡	0.672, 0.868

Results based on weighted data.
* $P < .05$.
† $P < .01$.
‡ $P < .001$.
§ Reference category: age 55 to 64 years.
‖ Reference category: Non-Hispanic white.

Table 5
Regression results of self-rated health with interaction terms for any hardship and age group

Characteristics	OR	95% CI
Any hardship	2.380‡	2.063, 2.747
Age group §		
65 to 74 y	0.795‡	0.710, 0.890
75 y and older	0.999	0.894, 1.116
Race/ethnicity ‖		
Non-Hispanic black	1.162*	1.024, 1.319
Non-Hispanic Asian	1.175	0.956, 1.445
Non-Hispanic other race	1.318*	1.036, 1.678
Hispanic	1.117	0.974, 1.282
Income-to-poverty ratio	0.924‡	0.903, 0.945
Education (high school or higher)	0.525‡	0.467, 0.589
Female	0.859‡	0.806, 0.916
Married	0.971	0.877, 1.076
Employed	0.310‡	0.277, 0.347
Net worth (Log)	0.473‡	0.329, 0.680
Insured (private or public coverage)	1.248†	1.075, 1.448
Homeowner(s)	0.765‡	0.673, 0.869
Any hardship × age (65–74)	0.910	0.712, 1.164
Any hardship × age 75+	0.642†	0.494, 0.835

Results based on weighted data.
* $P < .05$.
† $P < .01$.
‡ $P < .001$.
§ Reference category: age 55 to 64 y.
‖ Reference category: Non-Hispanic white.

Our finding that the association between hardship and self-rated health was attenuated among those aged 75 years and older is intriguing, and several factors could underlie this result. One possibility is that in assessing their own health, the oldest respondents reflect less on objective experiences, such as their accumulating chronic conditions, and more on comparison with peers [23,24]. Under those circumstances, experiences of hardship may be less relevant to self-assessments of health among those in their mid-70s and beyond. Another possibility is that the factors driving reported experiences of hardship may themselves be different across age groups, partially accounting for the reported findings. For example, our expectations of economic circumstances may differ by age, triggering an age-graded response to hardship in terms of self-rated health. People at midlife may find the experience of hardship especially disorienting, given where they are in the life course, with many still working for pay and having financial responsibility for adolescent or young adult children. In comparison, individuals in their late 70s and beyond may have developed a measure of resilience [44] that serves to buffer the potential impact of hardship on their health.

This study is limited in several ways. First, while our findings demonstrate that older adults who experience hardship are more likely to have poor self-rated health, the relationship between hardship and self-rated health could be bidirectional as individuals with poorer self-rated health may suffer from physical and/or mental health issues that could raise the risk of experiencing hardship. Second, given limitations in the data, we did not control for psychological well-being, which is shown to be related to self-rated health in old age [45]. No causal inferences may be made from this cross-sectional study. Despite these limitations, the study contributes to the literature on economic circumstances and health as it identifies differences across age groups in the association between experiences of hardship and self-rated health.

A number of questions suggested by this study merit consideration in future research. First, it is established that costs of living vary considerably by geographic location, with some areas in the United States requiring much higher income than other regions for older adults to make ends meet [46]. This geographic variability in cost of living, however, is not reflected in our study, given limitations in the data. It is worth exploring in future research to what extent geographic variability in cost of living helps explain aspects of the relationship between hardship and health, as the amount of income needed for individuals to afford basic expenses such as utility bills, food, and housing may differ by location. Second, as existing research suggests, social networks not only serve as a protection against material hardship in times of economic distress [41] but also influence the ways in which people evaluate their health based on comparisons to individuals within their social circle [23]. Investigating the role of social capital in the associations between hardship and self-rated health in future research may also prove worthwhile.

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