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Support Buffers Financial Strain's Effect on Health-Related Quality of Life

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Abstract

Objectives—Financial strain represents a perceived inability to meet financial needs and obligations and is associated with poorer health outcomes. Distinct facets of perceived social support may mitigate the deleterious effects of financial strain on health. The present study examined the extent to which appraisal, belonging, and tangible social support ameliorate the effects of financial strain on health-related quality of life (HRQoL).

Methods—A community sample ($N = 238$; 67.2% female; $M_{Age} = 43.4$ years, $SD = 13.1$) completed in-person surveys as part of a larger study of health behaviors.

Results—Greater financial strain and less social support were associated with poorer HRQoL. Additionally, both appraisal and belonging support moderated the effects of financial strain on

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Human Subjects Approval Statement

All procedures were approved by the Institutional Review Boards of the University of Texas Southwestern Medical Center, the University of Texas Health Science Center at Houston, and the University of Houston. Informed consent was obtained from screened eligible participants prior to data collection.

Conflict of Interest and Disclosure Statement

All authors of this article declare they have no conflicts of interest.

some HRQoL components, such that higher appraisal and belonging support were associated with diminished effects of financial strain on HRQoL.

Conclusions—These findings suggest nuanced associations between financial strain and HRQoL. Implications for prevention and intervention programs are discussed.

Keywords

financial strain; social support; health-related quality of life; buffering effect

INTRODUCTION

Financial strain refers to difficulty affording food, clothing, housing, major items (eg, car), furniture/household equipment, leisure activities, and bills¹ and represents an undesirable mismatch between income and the combination of expenses and accumulated debt.² In this way, financial strain does not represent objective measures of socioeconomic status (SES), but rather income inadequacy relative to expenses. Importantly, financial strain is related to, but distinct from, income and other traditional SES indicators.^{3–5} As evidence of its distinction, there is considerable variation in the severity of financial strain experienced by people of a similar income strata.⁶ Additionally, unlike traditional, objective measures of SES, financial strain is applicable to individuals of all SES strata. Heightened financial strain can negatively impact self-esteem and personal control.^{7,8} Theoretical models of stress posit that the chronic stress that develops as a byproduct of financial strain can lead to poorer health outcomes, including cardiovascular disease, elevated blood pressure, overall poor physical health, and depression.^{1,6,9,10}

Despite the strong association between financial strain and health outcomes, little work has examined how financial strain may impact health more broadly. Specifically, extant work has focused on presence of disease, whereas health is comprehensively defined as a ‘state of complete physical, mental, and social well-being—not merely the absence or presence of disease or infirmity’.¹¹ Thus, it is important to not only examine objective measures of health, but also consider health-related quality of life (HRQoL). HRQoL is a multidimensional assessment of well-being and health status that captures both physical and mental health, and thus can help determine how disease, injury, and disability impact physical and mental health problems that are not disease or disorder-specific.¹² Indeed, poorer HRQoL is associated with higher mortality rates and a higher prevalence of disability.^{13,14} This construct can also aid in identifying subgroups with relatively poor perceived health across multiple domains and may inform interventions that target these subgroups.¹² Despite the clear utility and importance of examining HRQoL determinants, little work has been devoted to this effort.

Robust evidence indicates that lower SES, as measured by either objective or subjective measures, is associated with poorer HRQoL.^{15,16} Interestingly, subjective measures of SES (eg, subjective social status) have been shown to predict HRQoL even after controlling for objective measures of SES,¹⁵ suggesting that subjective measures may capture elements of SES that uniquely relate to poor HRQoL. Conceptually, financial strain may contribute to poorer HRQoL after accounting for traditional, objective SES items because this construct

taps into an element of subjective SES that is not assessed by traditional SES items (eg, inadequate income to expenses ratio).¹⁷ Indeed, initial empirical evidence suggests that greater financial strain contributes to poor self-rated health (1 element of HRQoL) after controlling for objective SES.^{18,19} Thus, despite overlap between subjective and objective financial strain,²⁰ the uniqueness of subjective financial strain appears to affect HRQoL to a greater extent. However, this line of research has been limited to only one aspect of HRQoL. Given that improving HRQoL and identifying its determinants is a central public health goal,¹² it is imperative that work focus on elucidating determinants of poor HRQoL across its multiple dimensions. Moreover, identifying modifiable determinants of HRQoL may provide clinicians with avenues to address potential health disparities.

In addition to evaluating determinants of HRQoL, there may be utility in identifying buffers that mitigate the adverse effects of financial strain on HRQoL. Most notably, perceived social support is posited to buffer the effects of stressful events on health.^{21–23} For instance, social support by partners of unemployed job seekers is associated with lower relationship discord and depressive symptoms in both partners.²⁴ Moreover, in line with theoretical models of chronic stress, empirical data indicates that the negative impact of financial strain on mental health outcomes, including depressive symptoms,²⁵ and poorer self-rated health,²⁶ is offset by greater social support. In addition to a potential buffering effect of social support, greater social support is also empirically associated with decreased stress and improved health behavior²⁷ as well as inversely related to poor HRQoL.²⁸ This evidence suggests personal and social factors may work in tandem to modulate the relationship between financial strain and HRQoL.

Despite promising initial evidence supporting the premise that social support may counteract the impact of financial strain on health, no research has examined the stress buffering effects of perceived social support on the association between financial strain and HRQoL. Notably, previous work maintains that specific dimensions of social support may be more or less effective as coping resources in the presence of financial strain, yet little effort has been devoted to elucidating these potentially differential effects. As some research has found social capital, encompassing both community resources as well as family and friend connections, mitigates the adverse impacts of financial strain on self-rated health,⁶ the extent to which tangible versus emotional resources more or less buffer these relationships remains unknown. Such findings have the ability to more directly inform clinical efforts toward fostering specific forms of social support for individuals experiencing financial strain. Thus, the current work has the potential for high practical utility and theoretical significance.

The current study addressed these gaps by examining the relation between financial strain, perceived social support, and 4 indicators of poor HRQoL (ie, self-rated health, poor mental and physical health days, and activity limited days due to poor physical or mental health) among a diverse community sample of adults. Consistent with extant theoretical and empirical work that posits related, yet unique dimensions of social support,²⁹ the current study examined 3 dimensions of perceived social support (ie, appraisal, belonging, and tangible support) separately. It was hypothesized that greater financial strain and lower perceived social support, across each dimension of perceived social support, would relate to poorer HRQoL outcomes. Additionally, consistent with the stress-buffering hypothesis,²¹ it

was hypothesized that the effect of financial strain on HRQoL would depend on level of perceived social support. Specifically, we hypothesized that financial strain would be more strongly related to HRQoL among those with low, as opposed to high, levels of perceived social support.

METHODS

Participants

A total of 248 adults were recruited from the Dallas metropolitan area through flyers posted for a health behavior study on the University of Texas Southwestern campus and local advertising circulars.³⁰ A convenience sampling approach was used. Individuals were eligible to participate in the study if they were at least 18 years of age, possessed a valid home address, a functioning telephone number, and demonstrated > 6th grade English literacy level on the Rapid Estimate of Adult Literacy in Medicine (REALM).^{31,32} Of those screened, 10 were excluded because they were not able to demonstrate the minimum literacy level, leaving a total study sample of 238 participants.

Measures

Socioeconomic status/demographic variables—Sex, race/ethnicity (Non-Hispanic White vs. Non-White), age (years), years of education (0 = No formal schooling to 20 = Post-graduate degree), health insurance status (0 = no health insurance, 1 = any health insurance), and past year family income (0 = Less than \$5000 to 8 = \$100,000 or greater) were assessed. Consistent with previous work,¹⁵ years of education and past year family income were treated as continuous variables.

Financial strain questionnaire—The financial strain questionnaire (adapted from an economic strain measure)¹ is an 8-item questionnaire used to assess participants' difficulty with affording food, clothing, housing, major items, furniture, leisure activities, and bills. Items were rated on a scale from 0 to 4 (eg, no difficulty, some difficulty, great difficulty, and could not afford). Total scores could range from 0 to 24, with higher scores indicating greater financial strain ($\alpha = .91$).

Interpersonal support evaluation list—The Interpersonal Support Evaluation List (ISEL-12)²⁹ is a 12-item self-report measure of the perceived availability of social support, which contains 3 subscales. The appraisal (advice or guidance) subscale measures the perceived availability of others with whom one can talk about problems. The belonging (empathy, acceptance, concern) subscale measures the perceived availability of others' with whom one may engage in activities. Finally, the tangible support subscale measures the perceived availability of material aid (help or assistance, such as material or financial aid). Items are rated on a 4-point scale, and scores range from 4 to 16 on each subscale. For the present study, the appraisal ($\alpha = .80$), belonging ($\alpha = .84$), and tangible support ($\alpha = .82$) subscales were utilized, with higher scores indicating greater social support.

Health-related quality of life—Items to assess health related quality of life (HRQoL) were drawn from the Behavioral Risk Factor Surveillance System survey.³³ Items assessed

(a) self-rated health; (b) poor physical health days; (c) poor mental health days; and (d) activity limited days due to poor physical or mental health. Self-rated health was assessed with a single item with which participants rated their health on a 5-point scale from poor (1) to excellent (5). Consistent with prior work,^{18,34} self-rated health was dichotomized (0 = poor, fair; 1 = good, very good, excellent). This item has been shown to prospectively predict mortality across studies.¹⁴ The number of poor physical health days during the past month was assessed with the question: “Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?” The number of poor mental health days during the past month was assessed by: “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?” Lastly, participants reported the number of days in the previous 30 days in which poor physical or mental health limited their ability to perform usual activities. These items have demonstrated excellent to moderate retest reliability.³⁵

Procedure

Data were collected as part of a quasi-experimental intervention study that examined the short-term impact of a mobile phone intervention on sedentary time in a diverse community sample.³⁰ Interested individuals contacted the research office and were briefly pre-screened for basic eligibility criteria, including at least 18 years of age, possessing a valid home address, and having a functioning telephone number (see Participants section above); those eligible at the pre-screener were scheduled to attend the initial study visit. The details of the study were reviewed at the first visit, eligibility was verified via the REALM, and written informed consent was obtained from all participants. Eligible participants completed study questionnaires on laptop computers and some participated in the intervention. Briefly, the intervention study was a post hoc addition to a study designed to characterize proximal predictors of health behavior using mobile phone–based ecological momentary assessment. See Kendzor and colleagues³⁰ for additional details of the study design. Participants received a \$50 gift card and a parking token for the completion of the initial visit. The current study was approved by the Institutional Review Boards of the University of Texas Southwestern Medical Center, the University of Texas Health Science Center at Houston, and the University of Houston. The current study is based on secondary analyses of the initial visit (pre-intervention) data. Data collection began in December 2012 and concluded in November 2013.

Analytic Strategy

Sample descriptive statistics and zero-order correlations among study variables were examined. Next, the main and interactive effects of financial strain and perceived social support on HRQoL were tested. Self-rated health was examined with a logistic regression (Model 1). The 3 other dimensions of HRQoL (i.e., poor physical health days, poor mental health days, and activity limited days due to poor physical or mental health) were examined using generalized estimating equations (GEE) wherein they were treated as a multivariate outcome (Model 2). GEEs were employed because of the interest in the marginal expectations.³⁶ More specifically, we were interested in the average estimated number of poor HRQoL days across all 3 days items for a set of predictors. A benefit to this analytic

approach is that it reduces the potential for spurious findings by limiting the number of separate analyses needed to study HRQoL items with commensurate responding. Thus, 2 outcomes were of interest in the present study: (1) dichotomous self-rated health and (2) multivariate outcome created from the 3 days HRQoL items. The 3 poor health days HRQoL items (ie, poor physical health days, poor mental health days, and activity limited days due to poor physical or mental health) exhibited a negative binominal distribution; thus a negative binominal distribution was specified with a log link for the GEEs and an unstructured correlation structure was specified for each GEE. Coefficients were exponentiated to derive Rate Ratios (RR), which can be interpreted as percent increases or decreases in outcomes for each unit increase in the predictor. Three separate logistic and 3 separate GEE models were conducted to examine each dimension of social support (appraisal, belonging, and tangible support) as independent moderators of the associations between financial strain and HRQoL. The predictor and moderators were centered to improve interpretability. The predictor, moderator, interaction term, and covariates, including sex, race, age, education, health insurance status, and past year family income, were simultaneously entered into the model. For GEE models, the rate of change, percent increases or decreases in outcomes for each unit increase in the predictor, was examined at 1 SD above and below the centered moderator for each analysis. A Bonferroni correction was employed to decrease rate of Type 1 error. Based on this correction, level of significance was adjusted to .017 (ie, .05/3) for the logistic regression parameters as well as the GEE parameters.

RESULTS

Descriptive Analyses

The majority of participants were African American (51.7%) and female (67.2%) with an average age of 43.4 ($SD = 13.1$) years. See Table 1 for participant characteristics. Zero-order correlations among all study variables are presented in Table 2. Overall, financial strain was negatively correlated with the 3 social support subscales and correlated with all 4 HRQoL items (ie, negative correlation with self-rated health and positive correlations with number of poor mental and physical health days and activity limited days). Social support subscales positively correlated with one another, and were significantly correlated with HRQoL items (ie, positive correlation with self-rated health and negative correlations with number of poor mental and physical health days and activity limited days). All HRQoL items were correlated with one another. Specifically, weak negative correlations emerged between self-rated health and all other HRQoL items (r s range: -0.26 to -0.34), and moderate positive correlations emerged between poor physical health days, poor mental health days, and limited activity due to poor health days (r s range: 0.44 to 0.57).

Financial Strain and Self-rated Health

Three logistic regression models were conducted with self-rated health as the outcome and financial strain, social support (each dimension entered separately in its respective model), the interaction term, and covariates as predictors. The first model included the appraisal subscale and was significant ($\chi^2(9) = 54.20$, $p < .001$, $Pseudo R^2 = .19$). The conditional main effects, ie, effect of predictor when interacting predictor is zero, of financial strain and

appraisal support were significant. Specifically, greater financial strain was associated with greater odds of reporting poor/fair self-rated health, and less perceived appraisal support was associated with greater odds of reporting poor/fair self-rated health. The interaction term, ie, financial strain by appraisal support, was non-significant; see Table 3.

The second model included the belonging subscale and was significant ($\chi^2(9) = 48.66$, $p < .001$, *Pseudo R*² = .17). The conditional main effects of financial strain and belonging support were significant. Specifically, greater financial strain was associated with greater odds of reporting poor/fair self-rated health, and less perceived belonging support was associated with greater odds of reporting poor/fair self-rated health. The interaction term, ie, financial strain by belonging support, was non-significant; see Table 3.

The third model included the tangible subscale and was significant ($\chi^2(9) = 45.88$, $p < .001$, *Pseudo R*² = .16). The conditional main effect of financial strain was significant, and the conditional main effect of tangible support was non-significant. Specifically, greater financial strain was associated with greater odds of reporting poor/fair self-rated health. The interaction term, ie, financial strain by belonging support, was not significant; see Table 3.

Financial Strain and Multivariate Days Outcome

Model with appraisal support as moderator—Table 4 displays the results of the GEE analyses that examined the remaining HRQoL dimensions (ie, poor physical health days, poor mental health days, and activity limited days due to poor physical or mental health) as a combined outcome in a multivariate framework and financial strain, social support (each dimension entered separately in its respective model), the interaction term, and covariates as predictors. Conditional main effects revealed that greater financial strain and less perceived appraisal support were associated with a greater number of HRQoL days in the past month. The interaction term between financial strain and the appraisal subscale was significant. Examination of rates of change revealed a significant rate of change between financial strain and poor HRQoL days among participants with high perceived appraisal support ($RR = 1.14$, $p < .001$). Interpretation of the Rate Ratio suggested that for each unit increase in financial strain, participants with high perceived appraisal support experienced 14% more poor HRQoL days. Financial strain was not significantly associated with rate of change in poor HRQoL days among participants with low perceived appraisal support ($RR = 1.02$, $p = .17$). See Figure 1.

Model with belonging support as moderator—Conditional main effects revealed that greater financial strain and less perceived belonging support were associated with a greater number of poor HRQoL days in the past month. The interaction term between financial strain and the belonging subscale was significant. Examination of rates of change revealed a significant rate of change between financial strain and poor HRQoL days across participants with low and high perceived belonging support ($RR = 1.04$, $p = .011$ and $RR = 1.09$, $p < .001$, respectively). Interpretation of the rate ratio suggests that for each unit increase in financial strain, participants low on belonging support reported 4% more poor HRQoL days. Among participants high on belonging support, a 1 unit increase in financial strain was associated with 9% more poor HRQoL days. See Figure 1.

Model with tangible support as moderator—Conditional main effects revealed that greater financial strain and less perceived tangible support were also associated with more poor HRQoL days in the past month. The interaction term between financial strain and perceived tangible support was non-significant ($p > .05$). See Figure 1.

DISCUSSION

Current findings provide preliminary evidence for the deleterious effect of financial strain on health-related quality of life, the benefit of social support on health-related quality of life, and the buffering agency of social support dimensions for the negative impact of financial strain on health-related quality of life among a diverse community sample of adults. Importantly, the current study extends existing literature by examining associations between financial strain, social support, and health-related quality of life assessed across all 4 CDC HRQoL items. Specifically, self-rated health was evaluated individually, and poor physical and mental health days and days with limited activity resulting from poor physical or mental health were examined as a single multivariate outcome of health-related quality of life (ie, poor health days outcome). Consistent with hypotheses, greater financial strain was associated with poorer health-related quality of life across both outcomes. In partial support of hypotheses, less appraisal and belonging social support were related to both poorer health-related quality of life outcomes, but tangible support was only associated with the days outcome. Finally, results indicated a significant moderating role of the appraisal subscale and belonging subscale for the relation between financial strain and health-related quality of life outcome that concurrently assessed poor physical and mental health days as well as days with limited activity resulting from poor physical or mental health (ie, poor health days outcome). Importantly, these relations were significant after controlling for theoretically-relevant covariates, including sex, race, age, education, health insurance status, and income.

Findings indicated that financial strain and facets of social support were significantly associated with health-related quality of life within the current sample. Consistent with previous work, financial strain and appraisal and belonging dimensions of social support were related to self-rated health.^{26,37} Interestingly, the tangible support subscale was not related to self-rated health. Extant work among college students also indicated a non-significant association between tangible support and self-rated health.³⁷ This may reflect offsetting effects of receiving tangible support, which may provide practical assistance but may also be associated with shame and stigma.^{38,39} Thus, perceiving that one has emotional support and a perception of belonging to a community may be more salient predictors of self-rated health than perceiving one is able to receive material support if needed, which may be associated with negative self-conscious emotions. Additionally, current results indicated that financial strain and social support not only negatively impact self-rated health, but also the poor health days outcome. Although the current study focused on subjective health across multiple domains, current findings largely align with empirical work on objective measures of health. Given the extensive evidence indicating an association between objective and subjective measures of health,^{40,41} current findings may, in part, stem from a central conceptual factor that subjective and objective measures of health share. Nevertheless, these findings bolster support for influential theoretical models of stress, social

support, and health and extend this work by highlighting the salience of subjective health across multiple domains. Together, the current work underscores the importance of financial strain and social support as social determinants of poor health among adults.

Although it was hypothesized that all 3 dimensions of social support would buffer against the negative impact of financial strain on health-related quality of life, inconsistent moderating effects were observed. Specific to self-rated health, none of the social support dimensions had a significant impact on the negative association between financial strain and this outcome. Thus, whereas financial strain and 2 dimensions of social support (ie, appraisal and belonging) uniquely related to self-rated health, there was no interaction between these determinants. Extensive work has implicated a robust association between financial stressors and poorer self-rated health.^{14,19,42} As such, the benefit of general social support may not be strong enough to combat this association. Importantly, however, other research suggests that perceived social support related to specific groups (eg, church-based social support) may be more pertinent to the relation between financial strain and self-rated health than perceived social support more generally (ie, not organization specific).²⁶ Because the current measure of social support was intended to assess general social support across each of the 3 dimensions and did not specify a specific group/organization it is possible that different findings may have emerged had we assessed social support across specific areas of life. Future research may consider examining how group/organization-specific (eg, church, work place, family) social support may moderate the impact of financial strain on self-rated health.

In partial support of hypotheses, the appraisal and belonging support dimensions moderated the relation between financial strain and the poor health days outcome. High appraisal and belonging social support had the strongest buffering effect when lower financial strain was reported. Thus, findings highlight that perceived availability of others and belonging support may be most impactful when lower levels of financial strain are experienced. Additionally, tangible support did not emerge as a significant moderator. Previous work has reported mixed findings regarding tangible support as a buffer against poor health outcomes.^{25,43} Consistent with Krause and colleagues,²⁵ tangible support may not be as relevant of a social support dimension to protect against deleterious effect of financial strain on health as the other dimensions. Specifically, in contrast to other stressors related to poorer health outcomes, the effects of financial strain may be more fundamentally related to psychosocial factors rather than tangible factors, as supported by the present findings. Additionally, for some individuals, financial strain is chronic.⁴⁴ The perception that others are available to offer material or financial support may be perceived as a short-term solution to a chronic problem, and may not get to the crux of how financial strain negatively impacts health. Continued research is needed to further delineate and corroborate the present findings.

Theoretically, the present findings add to the rich and ever expanding literature on social capital theory⁴⁵ by bridging the typically disparate areas of research focused on economic and social inequality and social networks. The present study, unique from extant work, highlights how one's *perception* of their financial adequacy can impact health and the effect of social capital or support has on these relations. Moreover, the current data are largely incongruent with the neo-materialistic perspective, which suggests that inadequate access to

resources accounts for the relation between social determinants of health, such as financial strain, and poor health.^{46–48} Indeed, that tangible social support did not emerge as a buffer against the negative influence of financial strain on poorer health-related quality of life, and appraisal and belonging support demonstrated moderating effects for the aforementioned relation, to a degree, provides evidence for the appropriateness of taking a psychosocial approach to understanding these associations. For example, psychosocial factors more closely related to affect, such as perceived guidance and acceptance from others, may be more likely to offset deleterious effects of financial strain on health-related quality of life rather than perceived financial support; thus, it does not appear that the mere inadequacy of money leads to poorer health.

Clinically, current findings underscore the impact of financial strain on poor health-related quality of life among a diverse community sample, and highlight the importance of emotional and belonging social support. Based on these data, it may be advisable for community prevention and intervention programs targeted toward individuals at risk of or living with moderate to lower levels of financial strain to integrate money management education and skills training with psychoeducation on the potential positive benefits of social support for coping. This might include programs reaching the newly divorced, education associated with bankruptcy filings, credit counseling, and other debtor or debt consolidation counseling/programming. Considering the recent economic crisis, it may be beneficial for such programs to develop and disseminate educational materials and skills training opportunities that discuss the detrimental impact of financial strain and the associated stress on physical and mental health, as well as provide a platform where those experiencing financial strain have the opportunity to practice behaviors that may lead to decreased financial strain, including budgeting, identifying and discussing needs from wants, and tracking money spent. The nature of these programs and groups may in and of themselves provide an opportunity to develop social support, particularly appraisal and belonging support, from others experiencing similar difficulties. Indeed, for in-person groups addressing the aforementioned aspects of financial strain, such discussions may have the added benefit of facilitating a sense of connectedness and support among group members, which may ultimately act as a protective factor against poor health-related quality of life.

Although not a primary aim of the investigation, there are several noteworthy findings from the current data. First, it is noteworthy that the social support dimensions were related, but distinct constructs. Indeed, these constructs shared approximately 40–58% of the variance. Similarly, the variance shared between each social support dimension and financial strain varied (appraisal: 16%; belonging: 10%; tangible: 18%). This observation provides additional empirical evidence for the distinctiveness of the social support dimensions as well as the uniqueness of financial strain from social support constructs. In light of the current findings for the unique buffering effects and the limited shared variance with one another and disparate overlap with financial strain, the current study provides additional empirical evidence that these 3 dimensions of social support are distinct and should be considered individually in empirical work. Second, present findings provided additional support for the uniqueness of financial strain and income. Specifically, these constructs shared 46% of their variance; suggesting that these dimensions of SES are related, yet distinct constructs. As

further evidence for their unique properties, tests of multicollinearity were explored. Guidelines to identify multicollinearity suggest a tolerance value of less than .10 or .20 and a variance inflation factor (VIF) value of greater than 10 may indicate multicollinearity (see⁴⁹ for review). Across all models, the tolerance and VIF statistics did not indicate multicollinearity (financial strain: tolerance range [.44-.46], VIF range [2.17–2.28]; income: tolerance range [.43-.44], VIF range [2.26–2.31]). Thus, the present data provide further evidence for the uniqueness of financial strain and income, and also underscore the importance of considering both dimensions of SES when examining their impact on health outcomes.

There are several limitations to the current study. First, the present work was cross-sectional and therefore causality cannot be determined. Future work is needed to prospectively determine directional effects of the observed associations. Indeed, a longitudinal design would provide clearer, more robust information about these relations. Second, the current study relied on self-report measures and outcomes derived from single item measures. Future research could benefit by utilizing multi-method approaches and minimizing the role of method variance in the observed relations as well as employing a structural equation modeling approach to examine relations. Although a more parsimonious multivariate model was employed to 3 of the 4 health-related quality of life items in the present study, a structural equation model may be a useful tool to comprehensively model HRQoL across all 4 items. Indeed, this is an important area for future research given recent work that has identified a unidimensional latent HRQoL construct across the 4 items (see⁵⁰). Additionally, the currently employed HRQoL measure captures very specific, and albeit somewhat limited, dimensions of HRQoL. Despite the numerous advantages of the presently employed measure,⁵¹ alternative measures of HRQoL, such as the Short Form Survey Instrument⁵² or the WHO Quality of Life Assessment,⁵³ may offer more comprehensive evaluations of this construct and should be explored in future studies. Along similar lines, future research would benefit from examining the proposed relations using objective measures of social support, as the current study included only measures of perceived social support.

Third, the current study focused on social support as a moderator and did not examine potential mediation pathways that may further explain relations between variables. Thus, despite the current study being guided by influential theoretical work, current findings cannot refute the possibility that the studied variables may operate through an indirect pathway that leads to poorer health-related quality of life, potentially through perceived stress.⁵⁴ To comprehensively evaluate the potential mediating pathways that may explain the observed relations, future work should be devoted to examining a conceptual moderated-mediation model that considers the effect of financial strain and social support in addition to potential mediators, such as perceived stress, on health-related quality of life outcomes. Fourth, the current sample size did not permit inclusion of additional variables that may have influenced findings. Therefore, it will be important for future research to examine the present pattern of findings in a larger sample wherein additional potential confounds, including substance use,⁵⁵ exercise,⁵⁶ and chronic illness,⁵⁷ can be controlled. Similarly, considering the secondary data analysis nature of the present study, an a priori power analysis was not conducted. To ensure adequate power to detect effects for more complex models, an a priori power analysis should be conducted prior to data collection.

Finally, participants in the present study represented a convenience sample of adults from a single metropolitan area (Dallas, TX) who were willing to participate in a paid research study. As a result, relative to reports from the Census Bureau for the ethnic breakdown and median income of this area,⁵⁸ the present study over-sampled African Americans and adults from lower income strata, and under-sampled non-Hispanic Whites and Hispanic. Thus, although the sample benefitted from racial/ethnic diversity, the generalizability of results may be limited, in part, due to selection bias. Indeed, participants who enrolled in the present study may have been more motivated to participate for compensation relative to general community members and/or may have had a specific interest in sedentary behavior intervention studies. As such, the present findings should be interpreted as preliminary evidence for the observed relations; yet, potential biases resulting from the present sample may preclude generalizability beyond the present sample. In an effort to extend current findings to a broader population, additional research is needed to evaluate the observed pattern of findings in a community sample more representative of the population from which it is derived as well as using data derived from a population-based survey study.

The present study contributes to the wider literature by providing preliminary evidence for social support as a protective element against the deleterious effects of stress on health outcomes, specifically, health-related quality of life among a community sample of adults. Moreover, the current research extends previous literature by highlighting the importance of considering social support as a multi-faceted construct with differential predictive abilities with regard to health outcomes and as a buffering agent for stress. Perceptions that one's peers, family, or friends provide social support through emotional or physical connections may be more influential on health than perceptions that one can receive material or financial support, even when experiencing stress related to financial difficulties. Prevention and intervention programs aimed at reducing the negative effects of financial strain may benefit from strengthening healthy social bonds that encourage perceptions of availability and belonging support.

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Figure 1.

Predicted number of poor health days across high and low levels of social support dimensions across levels of financial strain. Financial strain was centered at the mean. Social support was recentered at 1 standard deviation above and below the mean to derive high and low values, respectively.

Table 1**Participant Characteristics**

	M(SD)/N[%]	Range
Sex		
Men	78 [32.8]	--
Women	160 [67.2]	--
Race		
African American	123 [51.7]	--
Non-Hispanic White	73 [30.7]	--
Hispanic	28 [11.8]	--
Asian	8 [3.4]	--
American Indian	2 [0.8]	--
Multiracial	4 [1.7]	--
Age	43.4 (13.1)	19–68
Education (years completed)	13.7 (2.4)	5–20
Health Insurance		
No Health Insurance	93 [39.1]	--
Any Health Insurance	145 [60.9]	--
Family Income for Past 12 Months		
Less than \$5000	58 [24.4]	--
\$5000–11, 999	31 [13.0]	--
\$12,000–15,999	16 [6.7]	--
\$16,000–24,999	21 [8.8]	--
\$25,000–34,999	18 [7.6]	--
\$35,000–49,999	29 [12.2]	--
\$50,000–74,999	27 [11.3]	--
\$75,000–99,999	18 [7.6]	--
\$100,000 or greater	18 [7.6]	--
Financial Strain Score	10.9 (7.7)	0–24
Perceived Social Support		
Appraisal Subscale	13.2 (3.1)	4–16
Belonging Subscale	12.6 (3.1)	4–16
Tangible Support Subscale	13.0 (3.0)	4–16
Health-related Quality of Life		
Self-Rated Health (% <i>poor/fair</i>)	66 [27.7]	--
Poor Physical Health Days	2.8 (5.9)	0–30
Poor Mental Health Days	4.5 (7.0)	0–30
Limited Activity Due to Poor Health Days	2.1 (5.0)	0–30

Note. N = 238; M(SD) = Mean (Standard Deviation). Education: 0 = no formal schooling to 20 = post-graduate degree); Financial strain: Financial Strain Questionnaire;¹ Perceived social support: Interpersonal Evaluation List subscales;²⁹ Health-related quality of life: Behavioral Risk Factor Surveillance System items.³³

Table 2

Correlations among Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Sex	--													
2. Race	.06	--												
3. Age	-.01	.10	--											
4. Education	.07	-.36***	-.28***	--										
5. Health Insurance	-.14*	.27***	.13*	-.25***	--									
6. Income	.11	-.26***	-.17**	.54***	-.45***	--								
7. Financial Strain	.05	.21**	.25***	-.46***	.40***	-.68***	--							
8. Appraisal Subscale	.15*	-.08	-.18**	.30***	-.10	.26***	-.40***	--						
9. Belonging Subscale	.10	.08	-.20**	.10	.01	.09	-.32***	.63***	--					
10. Tangible Support Subscale	.14*	.03	-.17**	.22**	-.09	.27***	-.42***	.72***	.76***	--				
11. Self-Rated Health ^a	-.05	-.19**	-.22***	.20**	-.06	.12	-.30***	.35***	.28***	.25***	--			
12. Poor Physical Health Days	-.02	-.08	.21**	-.16*	.02	-.16*	.23***	-.13*	-.15*	-.23***	-.34***	--		
13. Poor Mental Health Days	.02	-.05	.03	-.09	.04	-.11	.20**	-.26***	-.25***	-.30***	-.31***	.44***	--	
14. Limited Activity Due to Poor Health Days	.07	-.03	.11	-.20**	-.05	-.11	.29***	-.23***	-.22**	-.29***	-.26***	.45***	.57***	--

N = 238;

p < .001,**
p < .01,*
p < .05.

Note. Point-biserial and biserial correlations were conducted for correlations that included a dichotomous variable and continuous variable whereas Pearson's correlations were conducted for correlations that included 2 continuous variables. All non-dichotomous variables were treated as continuous (see⁵⁹). Sex: 0=men and 1=women; Race: 0=Non-Hispanic White and 1=Non-White; Education: 0 = no formal schooling to 20 = post-graduate degree; Insurance Status: 0= Any health insurance and 1=No health insurance; Annual family income: 0 = less than \$5,000 to 8 = \$100,000 or greater; Financial strain: Financial Strain Questionnaire;¹ Appraisal, belonging, and tangible support subscales: Interpersonal Evaluation List subscales;²⁹ Self-rated health (0=poor/fair and 1=good/very good/excellent), poor

physical health days, poor mental health days, and limited activity due to poor health days: Behavioral Risk Factor Surveillance System items.³³ Financial strain, appraisal subscale, belonging subscale, and tangible support subscale are scored such that larger values represent more optimum outcomes; poor physical health days, poor mental health days, and limited activity due to poor health days are scored such that smaller values represent more optimum outcomes.

ρ Correlations between the continuous self-rated health item and other health-related quality of life items (ie, poor physical health, poor mental health, and limited activity days) evinced consistently lower correlations relative to observed correlations among poor physical health, poor mental health, and limited activity days (r 's range: -0.29 to -0.39).

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Odds ratio results from logistic regression analyses for main and interactive effects of financial strain and dimensions of perceived social support on self-rated health.

Table 3

<i>Appraisal Subscale as Moderator</i>					
	<i>OR</i>	<i>SE</i>	<i>p</i>	95% CI	
				Lower	Upper
Sex	0.617	0.229	.193	0.298	1.276
Race	0.384	0.162	.023	0.168	0.878
Age	0.972	0.014	.049	0.946	1.000
Education	1.054	0.095	.563	0.883	1.258
Insurance Status	1.152	0.438	.710	0.547	2.428
Income	0.822	0.080	.043	0.679	0.994
Financial Strain	0.908	0.030	.003	0.852	0.968
Appraisal Subscale	1.236	0.077	.001	1.094	1.397
Financial Strain * Appraisal	0.996	0.007	.603	0.982	1.011
<i>Belonging Subscale as Moderator</i>					
	<i>OR</i>	<i>SE</i>	<i>p</i>	95% CI	
				Lower	Upper
Sex	0.675	0.246	.282	0.330	1.381
Race	0.343	0.145	.011	0.150	0.784
Age	0.975	0.014	.068	0.949	1.002
Education	1.101	0.098	.277	0.925	1.310
Insurance Status	1.132	0.425	.740	0.543	2.363
Income	0.835	0.080	.061	0.691	1.008
Financial Strain	0.906	0.029	.003	0.850	0.966
Belonging Subscale	1.185	0.074	.007	1.049	1.339
Financial Strain * Belonging	0.993	0.008	.402	0.978	1.009
<i>Tangible Support Subscale as Moderator</i>					
				95% CI	

<i>Appraisal Subscale as Moderator</i>						
95% CI						
	<i>OR</i>	<i>SE</i>	<i>p</i>	Lower	Upper	
	<i>OR</i>	<i>SE</i>	<i>p</i>	Lower	Upper	
Sex	0.670	0.245	.274	0.327	1.373	
Race	0.348	0.147	.012	0.153	0.795	
Age	0.970	0.013	.031	0.944	0.997	
Education	1.068	0.094	.451	0.900	1.268	
Insurance Status	1.196	0.442	.628	0.580	2.468	
Income	0.820	0.078	.037	0.680	0.988	
Financial Strain	0.903	0.029	.002	0.848	0.962	
Tangible Subscale	1.111	0.075	.120	0.973	1.267	
Financial Strain * Tangible	1.005	0.008	.561	0.989	1.021	

Note. N=238. Sex: 0=men and 1=women; Race: 0=Non-Hispanic White and 1=Non-White; Education: 0 = no formal schooling to 20 = post-graduate degree; Insurance Status: 0= Any health insurance and 1=No health insurance; Annual family income: 0 = less than \$5,000 to 8 = \$100,000 or greater; Financial strain: Financial Strain Questionnaire; ¹ Appraisal, belonging, and tangible support subscales: Interpersonal Evaluation List subscales;²⁹ Self-Rated Health (0 = poor/fair and 1 = good/very good/excellent); Behavioral Risk Factor Surveillance System items.³³

Results from GEE analyses for main and interactive effects of financial strain and dimensions of perceived social support on health-related quality of life outcomes.

Table 4

Appraisal Subscale as Moderator					
	b	SE(b)	p	95% CI	
				Lower	Upper
Sex	.420	.130	.001	.165	.674
Race	-.624	.138	<.001	-.894	-.354
Age	.008	.005	.087	-.001	-.018
Education	-.034	.031	.280	-.095	.027
Insurance Status	-.413	.139	.003	-.686	-.141
Income	.013	.033	.698	-.051	.077
Financial Strain	.073	.010	<.001	.051	.096
Appraisal Subscale	-.156	.021	<.001	-.199	-.113
Financial Strain * Appraisal	.018	.003	<.001	.013	.023
Belonging Subscale as Moderator					
	b	SE(b)	p	95% CI	
				Lower	Upper
Sex	.249	.134	.063	-.014	.512
Race	-.355	.145	.015	-.639	-.070
Age	.007	.005	.139	-.002	-.017
Education	-.078	.032	.015	-.141	-.015
Insurance Status	-.292	.145	.044	-.577	.008
Income	.011	.035	.751	-.057	.079
Financial Strain	.064	.012	<.001	.040	.087
Belonging Subscale	-.100	.023	<.001	-.145	-.055
Financial Strain * Belonging	.008	.003	.006	.002	.014
Tangible Support Subscale as Moderator					
				95% CI	

Appraisal Subscale as Moderator						
	<i>b</i>	<i>SE(b)</i>	<i>p</i>	95% CI		
				Lower	Upper	
Sex	.261	.135	.053	-.003	.527	
Race	-.384	.145	.008	-.669	-.100	
Age	.008	.005	.107	-.002	-.018	
Education	-.080	.032	.013	-.144	.017	
Insurance Status	-.245	.145	.092	-.530	.040	
Income	.054	.034	.115	-.013	.122	
Financial Strain	.058	.012	<.001	.035	.082	
Tangible Subscale	-.126	.024	<.001	-.173	-.078	
Financial Strain * Tangible	.004	.003	.210	-.002	.009	

Note. N=238. Sex: 0=men and 1=women; Race: 0=Non-Hispanic White and 1=Non-White; Education: 0 = no formal schooling to 20 = post-graduate degree; Insurance Status: 0= Any health insurance and 1=No health insurance; Annual family income: 0 = less than \$5,000 to 8 = \$100,000 or greater; Financial strain: Financial Strain Questionnaire;¹ Appraisal, belonging, and tangible support subscales: Interpersonal Evaluation List subscales;²⁹ Poor physical health days, poor mental health days, and limited activity due to poor health days; Behavioral Risk Factor Surveillance System items.³³