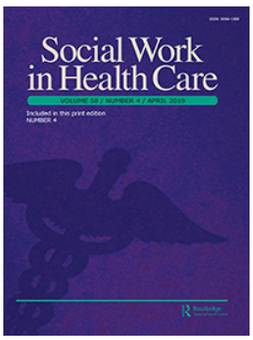

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Social Work in Health Care

ISSN: 0098-1389 (Print) 1541-034X (Online) Journal homepage: https://www.tandfonline.com/loi/wshc20

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To cite this article: Man Hung, Maren Wright Voss, Jerry Bounsanga, Tyler Graff & Wendy C. Birmingham (2019) Assessing spousal support and health in an aging population: support and strain amidst changing social dynamics, Social Work in Health Care, 58:4, 345-367, DOI: 10.1080/00981389.2019.1569577

To link to this article: https://doi.org/10.1080/00981389.2019.1569577

SOCIAL WORK IN HEALTH CARE
2019, VOL. 58, NO. 4, 345–367
https://doi.org/10.1080/00981389.2019.1569577

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Assessing spousal support and health in an aging population: support and strain amidst changing social dynamics

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ABSTRACT

This study examined the role of relationship quality on physical and psychological health among older adults. It included 2,298 adults aged 50 and older who participated in the Midlife in the US national longitudinal study of health and well-being. We assessed the effect of spousal support and strain on psychological and physical health, controlling for age, education, income, depression levels and prior health. Results indicated that spousal support and strain affected psychological health but not physical health. Despite prior research showing an association between marital quality and physical health, this study did not support the conceptualization that relationship quality measured by spousal support or strain has a direct effect on long-term health in this sample of older adults. This study does not preclude the presence of a mediated or moderated association between relationship quality and physical health. Higher levels of spousal support are associated with positive psychological health among adults over age 50 while spousal strain is associated with negative psychological health. This study supports the premise that relationship quality has an ongoing impact on the psychological health of mature adults, bolstering arguments to include psychological health screening and couples relationship education among health services provided to older adults.

ARTICLE HISTORY
Received 10 January 2018
Revised 28 November 2018
Accepted 8 January 2019

KEYWORDS
Marriage; relationship processes; social support; social strain; psychological health; aging

Introduction

Prior research on social support has focused on the structural features of social relationships such as the number and type of social resources (i.e., group memberships or existence of family ties). For many adults, marriage is their most significant social relationship, making marital relationships

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a fruitful avenue for investigating support-related health outcomes. Indeed, marriage has been among the most researched social relationships in the health/social support literature. Marital status has been reliably linked to better physical health (Hughes & Waite, 2009; Waite, 1995; Waite & Gallagher, 2000), and lower morbidity and mortality (Gordon & Rosenthal, 1995; Gove, Hughes, & Style, 1983; Johnson, Backlund, Sorlie, & Loveless, 2000) compared to unmarried counterparts. Marriage is also linked to better psychological health. Those with spouses exhibit better psychological well-being than those without (Brown, 2000; Williams, Frech, & Carlson, 2010), although this can vary by gender (Scott et al., 2009). The effects of marital status on psychological health have been found to be stronger than social factors such as education, income, employment status and number of children (Lamb, Lee, & DeMaris, 2003). A recent review found evidence suggesting that the link between social relationships and health was as predictive of disease as known risk factors such as smoking and lack of physical exercise (Holt-Lunstad, Smith, & Layton, 2010). Among older adults, married individuals over age 50 fare better than their peers in the number of chronic illnesses, number of physician visits, and number of days in a skilled nursing facility (Prigerson, Maciejewski, & Rosenheck, 2000).

But not all marriages are created equal and perhaps more importantly, not all significant intimate relationships receive a marriage label. This strong body of literature has been based on traditional views and attitudes toward marital relationships. In recent years, marriage as a societal construct has undergone change and revision. Data from the Pew Research Center from 2012 states that record numbers of adults have never been married, now at 20% of adults age 25 and older (Wang & Parker, 2014). To put this in perspective, in 1960 only about one-in-ten adults in that age range had never married. Marriage may be becoming less of a social or personal priority. Societal shifts raise questions about the shifting role of marriage and if it will continue its widespread role as a stress buffering health advantage. Using data from the U.S. Census and a Pew Research Center survey, Wang & Parker found most younger adults (ages 18 to 29) are more likely to say that society is just as well off if people have priorities other than marriage and children (67%). Most adults (ages 30 to 49) express the same sentiment (53%). But the sentiment shifts for older adults (age 50 and older), with the majority (55%) endorsing the importance of marriage. And yet despite these stated views, cohabitation in the place of marriage among those aged 50 and older has more than doubled from 1.2 million in 2000 to 2.75 million in 2010 (Brown, Bulanda, & Lee, 2012). For adults of all ages who are currently divorced, widowed, or living with a partner, most indicated they do not want to or are not sure they would want to marry again (Wang & Parker, 2014).

In concordance with changing attitudes regarding the importance of marriage, a review of marriage studies confirms a changing dynamic. Health differences between the married, the previously married, and the never married are changing. Specifically, over the past 30 years the trend line for the health of the divorced and widowed appears to be increasingly negative compared to married individuals, yet differences in health between married and those never-married are diminishing (Liu & Umberson, 2008). Evidence suggests that older cohabitators have higher levels of relationship quality and stability than younger cohabitators (King & Scott, 2005), raising questions about whether or not these changing sentiments and relationship dynamics are impacting those aged 50 and older.

These differing qualities of cohabitation among older adults suggests that prior research showing greater depression among cohabitators (Brown, Bulanda, & Lee, 2005; Shapiro & Keyes, 2008) may not be as relevant to an older sample. These changing ideals also suggest that studying relationship quality more broadly than within the marriage context is increasingly important given the current societal trends. While older individuals may cling to attitudes that marriage is a societal ideal, changing sentiments may be affecting the personal advantages obtained or perceived through marriage or intimate partnerships. Society's changing attitudes toward marriage suggest the importance of taking a second look into the physiological and psychological health advantages of relationship status and relationship quality among older adults.

Background

The overarching theoretical framework guiding our study is the biopsychosocial model (Engel, 1977) which asserts that an individual's social relationships influence their physical and psychological health through biological and psychological pathways. Further, the stress buffering hypothesis of social support suggests a mechanism by which positive social support can reduce the appraisal of stress and thus improve health (Cohen & Wills, 1985). The added framework of the stress/social support hypothesis can account for both the protective and detrimental effects of relationship quality (Burman & Margolin, 1992; Robles & Kiecolt-Glaser, 2003).

Relationship quality

Research indicates that the quality of relationships matter for health: for intimate relationships to be advantageous, they must be of high quality (Robles, Slatcher, Trombello, & McGinn, 2014). Relationship quality as a general construct can be further divided into the independent effects of positive relationship quality (support) and negative relationship quality

(strain) (Walen & Lachman, 2000). Research indicates that close relationships often have both positive (i.e., support) and negative (i.e., strain) aspects (Rook, 1984). Marital quality has historically been defined on a single dimension of marital satisfaction; but marital satisfaction overlooks the multidimensionality of the marital relationship, which can contain both aspects of support and strain (Campo et al., 2009; Fincham & Linfield, 1997).

Marital strain (e.g., conflict, irritations, disagreements, hostility) is particularly harmful, as negative aspects are more highly associated with reports of well-being than the positive aspects of relationships (Rook, 1984). This may be because negative interactions occur less frequently and may be more intense (Newsom, Nishishiba, Morgan, & Rook, 2003). Thus, per the stress/social support hypothesis, it is important to examine the effects of both support and strain as factors influencing the health benefits of spousal relationships, particularly if looking at relationships of long duration where cumulative effects may explain health differences.

Theories from gerontological researchers suggest people become better self-regulators of emotions and are less likely to recall emotionally negative information as they age (Carstensen, 2006). If this is true of intimate relationships, spousal relationships among older adults may be less straining despite negative interaction patterns. Yet other research suggests relationship quality remains stable over time (Caughlin & Huston, 2006). Birditt, Jackey, and Antonucci (2009) found relationships with the same spouse (versus those who acquired new spouses) were consistently negative or increased in negative quality over time. Birditt et al. suggests this stability or increase of negativity over time may be the result of learned patterns of interaction. Uncertainty regarding the lifespan influences and consistency (or lack there-of) of relationship quality suggests a need to look generationally and longitudinally at relationship quality.

Health impact of relationship quality

Recent investigations into the health benefits of marriage thus have examined both positivity and negativity in marital relationships. Not surprisingly marital quality, and not simply marital status, has proven to be important in these health changes (Kiecolt-Glaser & Newton, 2001; King & Reis, 2012; Robles et al., 2014). Support and strain in the marital relationship have effects that extend past the moment-to-moment interactions, and have been shown to predict next-day affective reports (DeLongis, Capreol, Holtzman, O'Brien, & Campbell, 2004). Research has also found that marital quality has measurable effects on self-rated health (Choi, Yorgason, & Johnson, 2015) and cardiovascular function (Cundiff, Birmingham, Uchino, & Smith, 2015; Donoho, Seeman, Sloan, & Crimmins, 2015). Findings also suggest that poor quality marriages are worse for health than single status in terms of stress level and depression (Holt-Lunstad, Birmingham, & Jones, 2008). Relationship quality is predictive of higher blood

pressure if both spouses report negativity in the relationship (Birditt, Newton, Cranford, & Ryan, 2016).

Yet the findings are not conclusive, as other research has not always shown a significant interaction between perceptions of marital support and self-rated health (Umberson, Williams, Powers, Liu, & Needham, 2006). For example, one study shows marital strain has an effect on inflammation and obesity that is robust, yet the benefits of marital support are mostly eliminated when adjustments are made for other covariates related to marital status (Yang et al., 2016). Some of the inconsistency in findings certainly relates to differences in methodological approaches. Robles, et al. conducted a review of 50 years' worth of research on the health effects of marriage quality, and found consistent effects that marital quality was related to better health outcomes (Robles et al., 2014), but also noted the importance of taking into account bi-directional factors like depression. Some research supporting marital health effects accounts for prior depression levels (Bookwala, 2005; Donoho et al., 2015), yet the majority of studies on marital quality and health have not controlled for depression levels at either baseline in longitudinal analysis or at the cross-sectional point of analysis (Kiecolt-Glaser & Newton, 2001). Given that depression has a known negative effect on physical health in aging (Wagner & Short, 2014) as well as among the general population (Katon & Sullivan, 1990; Katon, Sullivan, Russo, Dobie, & Sakai, 1993), it is a potential confounding variable that needs to be considered in studies of marriage and health among older adults.

Longitudinal effects

Studies conducted on marital quality have tended to be cross-sectional surveys rather than of longitudinal design (Yorgason & Choi, 2016). Reviews have demonstrated cross-sectional analysis occurs at a rate of two to one (Robles et al., 2014) and as much as four to one in past research (Kiecolt-Glaser & Newton, 2001). Longitudinal studies of marital quality can better examine the long-term effects of supportive marital interactions (i.e., helping during times of trouble or expressing appreciation) and straining marital interactions (i.e., regular arguments, criticisms, or making too many demands) that may have cumulative effects on health. It has been noted that these interactions are not one-time events, but that the varied effects of supportive relationships build over time (Uchino, Bowen, Carlisle, & Birmingham, 2012) and this is especially true in the enduring and intensive relationship pattern of marriage. Cumulative advantage/disadvantage theory (Merton, 1968, 1988) states that long-term exposure to a particular status (e.g., supportive marriage/straining marriage) may have an effect on the accumulation process. This accumulation can influence health outcomes

and potentially explain how the quality and duration of marriage could positively or negatively affect an individual's health.

An assessment of marriage at mid-life has found that emotional effects (i.e. depressive symptoms) are sensitive to current marital disruption, while slow-developing physical health effects (i.e. chronic conditions and mobility changes) are more evident at follow-up from past marital disruption (i.e., divorce or widowhood) (Hughes & Waite, 2009). Much of the prior research on marital quality has examined individuals with average sample ages from the late 30's to early 40's (Kiecolt-Glaser & Newton, 2001) with a more recent review finding a mean age of 50 across studies (Robles et al., 2014). It has been noted the physiological benefits of social integration are particularly important in the life-cycle at both the younger, developmental years, and again in later aging (Yang et al., 2016).

Older adults as an important sub-population

Older adults compose 15% of the US population, and the composition is projected to rise to 22% by 2050 (PRB, 2018). Worldwide, adults aged 60 and older are expected to total 2 billion by 2050. People are living longer, and most people can expect to live into their 60's and beyond (WHO, 2018), yet older individuals do not have better health than their parents. Cardiovascular disease, diabetes, and dementia are common conditions of older age (WHO, 2018). Higher marital quality has been associated with better cardiovascular outcomes in younger and middle-age individuals (Birmingham, Uchino, Smith, Light, & Butner, 2015), but may also be an important resource in the health of mature individuals as they deal with the stresses related to aging (e.g. chronic illness, fixed-incomes, care-giver burden, etc.).

While marital strain is predictive of poorer health in both older and younger adults, the negative health effect may be stronger for older populations. Marital strain has been associated with increases in negative self-ratings of health in older adults (Choi & Marks, 2006; Umberson et al., 2006). Marital quality (i.e., support/strain) had a stronger relationship with cardiovascular risk in older subjects and among older women in particular (Liu & Waite, 2014). Research conducted with younger-to-middle-aged couples may not allow inferences to older couples who face different and often greater health challenges. Bookwala (2005) performed a cross-sectional examination of older Americans (mean age 60.5 years and average marriage length of 38 years) and found marital strain predicted the presence of poorer health measured by physical symptoms, chronic conditions, and physical disability. A longitudinal analysis of this age group would help to determine if this effect holds after controlling for important baseline covariates.

The purpose of the present study is to help clarify the role of relationship quality on health in older adults through a longitudinal follow-up of a mature

population while controlling for previously identified confounders of depression symptoms, prior health, and demographic variables. The present study uses the stress/social support hypothesis to explore the association between measures of spousal support and strain on physical health and psychological health in a population of older adults. We hypothesize that in our sample of older adults: (1) higher levels of spousal support, as an indicator of relationship quality and social support, will be related to improved scores on physical and psychological health outcomes; (2) higher levels of spousal strain as an indicator of a lack of relationship quality will be associated with poorer physical and psychological health outcomes; and (3) first marriages of longer duration will demonstrate stronger cumulative physical health effects of spousal support and spousal strain.

Data and methods

Survey design

The current study accessed the Midlife in the United States National Longitudinal Study of Health and Wellbeing (MIDUS) (http://midus.wisc.edu/). The longitudinal data set contains over 6,000 variables measuring the behavioral, psychological, and social factors that impact health and wellbeing in a sample of over 7,000 middle-aged and mature Americans across the multiple waves and samples of data collection. Along with psycho-social indicators and demographic data, the dataset includes self-reported measures of health, medical service utilization, and diagnosed medical conditions. The baseline data were collected in 1995 and 1996 (MIDUS wave I) with a longitudinal follow-up between 2004 and 2006 (MIDUS wave II). The MIDUS I telephone interview by random digit dial (RDD sample) had a response rate of 70%. After phone interview, respondents were asked to complete a mailed questionnaire in addition to the telephone interview. Of these initial responders, 86% completed the mailed questionnaire which included questions on marital support and strain, yielding an overall response rate of 60.7%.

Of the 3,487 RDD participants in the MIDUS I dataset, 2,298 adults aged 50 and older answered questions related to spousal support and depression symptoms and 2,175 answered questions at the MIDUS II follow-up about psychological and physical health (see Figure 1). The 123 cases with missing health follow-up data did not differ significantly from the initial sample with average age (62.8 years), race as White (94.5%), education as some college or more (63.2%), and male (49.9%). All respondents self-identified as being in a relationship applicable to the spouse and partner survey and were included based on this self-report of having a significant partner relationship. If, for example, an individual was widowed or never married, their decision to

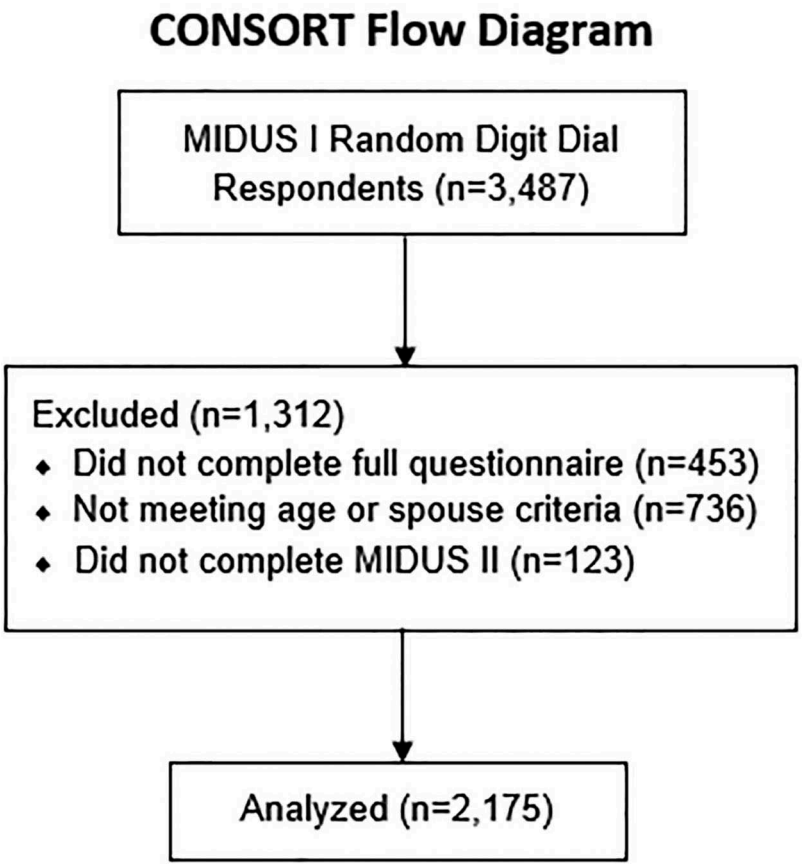

Figure 1. MIDUS I consort diagram.

complete the spouse/partner survey reflects their conception that their spousal relationship is of ongoing relevance to their personal situation with potential health consequences as supported by the stress/social support hypothesis and literature review. This self-definition of a significant spousal relationship is more fitting with the current shifting societal understandings of marriage relationships and the higher rates of cohabitation among older adults, and is more appropriate to a current analysis of marital relationship effects than strict exclusionary criteria based on marital status.

Measures

The first measure of relationship quality was assessed using an indicator of spousal support at baseline (MIDUS I). Spousal support was operationalized as the perception of caring and understanding by the spouse and measured with the summed composite of six scored items (Walen & Lachman, 2000). The items included "How much does your spouse or partner really care

about you?", "How much does he or she understand the way you feel about things?", "How much does he or she appreciate you?", "How much do you rely on him or her for help if you have a serious problem?", "How much can you open up to him or her if you need to talk about your worries?", and "How much can you relax and be yourself around him or her?" Each item was scored on a 1 to 4 Likert scale with higher scores indicating higher levels of spousal support. The composite score of spousal support was created by taking the average score of the six items, and ranged from 1 to 4. The summed composite of spousal support was highly correlated ($r = -.76$, $p < .001$) with a global measure of marital satisfaction where respondents rated their marriage on a 5 point scale (1 = excellent, 5 = poor). The Cronbach alpha for the spousal support scale from the RDD sample was alpha = .86.

As a second measure of relationship quality at baseline (MIDUS I), we examined negative straining behaviors assessed using a composite of six scored items related to marital/partner strain at baseline, scored on a 4 point Likert scale (Schuster, Kessler, & Aseltine, 1990). Items included "How often does your spouse or partner make too many demands on you?", "How often does he or she argue with you?", "How often does he or she make you feel tense?", "How often does he or she criticize you?", "How often does he or she let you down when you are counting on him or her?", and "How often does he or she get on your nerves?". The composite score of spouse/partner strain was created by taking the average score of the six items, and ranged from 1 to 4, from often to never. Items were reverse-coded (1 = never and 4 = often) so that higher scores reflect higher levels of spousal strain. The Cronbach alpha for the spousal strain scale from the RDD sample was .81.

Physical health was indicated with a global measure of self-rated health. Physical health at baseline as a covariate (MIDUS I) and at follow-up as an outcome variable (MIDUS II) was measured with a single question; "Using a scale from 0 to 10 where 0 means "the worst possible health" and 10 means "the best possible health," how would you rate your health these days?" Single item global health assessments have been shown to be good predictors of future functional ability, future health care expenditures and mortality (Bierman, Bubolz, Fisher, & Wasson, 1999; Bowling, 2005; Idler & Kasl, 1995). Self-reported number of doctor-diagnosed chronic conditions, self-reported number of prescription medications, and self-reported doctor-diagnosed blood pressure were included as additional measures of physical health status at follow-up (MIDUS II). Psychological health at follow-up (MIDUS II) was measured with a single question; "Would you say your *psychological or emotional health* is excellent, very good, good, fair, or poor?" Psychological health was scored on a 5-point scale, where 1 is excellent and 5 is poor, with lower scores reflecting better psychological health. While bias in

self-reports of health status have been expressed as a measurement concern, particularly for individuals outside the labor force, if controls for baseline indices of psychological and physical health are incorporated into the model the use of self-report outcome measures do not appear to produce over- or under-estimates of health status (Leroux, Rizzo, & Sickles, 2012).

Covariates

Depression at baseline (MIUDS I) was assessed based on self-report answers to questions related to depressed affect and anhedonia. Seven questions with yes or no answers related to depressed affect, with 4 or more positive answers coded as depressed affect (Kessler, Mickelson, Walters, Zhao, & Hamilton, 2004). Six questions (answered yes or no) assessed anhedonia, with 4 or more positive answers coded as anhedonia present (Kessler et al., 2004). Questions addressed components of depression including interest level, energy, sleep, appetite, concentration, feelings of worth, and thoughts of death without reference to feelings of depression. A summed composite score for depressive symptoms ranged from 0 to 7 based on combined depression and anhedonia subscales (Kessler et al., 2004).

Prior health was assessed using the self-rated global health measure listed above as measured at MIUDS I. Other covariates were also drawn from the MIDUS I survey and included education level (coded as less than high school, high school graduate, some college, some graduate school, and graduate degree) as well as age at the time of survey, gender, race (coded as White or non-White, ethnicity as Hispanic or non-Hispanic), and household income (total income reported in the household over the past 12 months). These covariates have been widely used in the literature as determinants of health outcomes (Chen, Rizzo, & Rodriguez, 2011). Lowered marital quality has been associated with female gender (Robles et al., 2014), race, and ethnicity (Bulanda & Brown, 2007). The covariates assessed for relevance were drawn from the literature. Covariates were included in the final regression model if there was a significant association with the dependent variable (spousal support or spousal strain). Covariates relevant to the study hypothesis (i.e. age and gender) were consistently included in the regression analysis even when not significantly associated with the dependent variables.

Statistical analyses

Descriptive statistics were reported as means and standard deviations for continuous variables, and as percentages for categorical variables. Independent samples t-test and one-way ANOVA were used to compare spousal support across different sub-groups of the population: gender,

ethnicity, race, education level, diagnosis of hypertension, and marital status. Univariate regression analyses were used to assess the associations between spousal support and strain along with individual demographic covariates and health variables at baseline (MIDUS I) to health outcomes at follow-up (MIDUS II). Spousal support and strain levels were drawn from MIDUS I at baseline as the predictor of future health outcomes. Though these measures of relationship quality could vary over time between baseline and follow-up reporting, analysis of MIDUS scales have shown measurement invariance across age and time-points (Zimprich, Allemand, & Lachman, 2012). Covariates were selected based on literature review, but the multivariate models were adjusted so that only those variables showing significance in the univariate models were included in the final analysis as described below. The contribution of length of marriage was analyzed in the sample as a whole. The average marriage length of sample was over 31 years.

Multiple regressions were conducted: (1) to examine the association between spousal support and strain on physical health; (2) to examine the association between spousal support and strain on psychological health. These outcomes were checked against other reported health outcomes including the number of chronic conditions and reported diagnosis of high blood pressure to determine robustness of the findings. Regressions were run for the entire sample as well as for the subsample of respondents reporting only one marriage to determine robustness of findings in regards to marriage history or length. Descriptive statistics were run for the unweighted sample to provide information about respondents completing the MIDUS surveys. All regression analysis were run using the trimmed population weight (i.e., PFNWT) supplied with the MIDUS survey data to reflect a nationally representative sample while adjusting for the top and bottom 5% of extreme cases. SAS 9.4 was used for all analyses with two-tailed p-values less than 0.05 considered as significant.

Results

The unweighted sample included 2,175 (94.7%) individuals who reported being currently married, 19 (0.8%) as separated, 78 (3.4%) as divorced, 7 (0.3%) as widowed, and 18 (0.8%) as never married but co-habiting (see Table 1). From this sample, 1,699 were in their first marriage, with an average length of 31.9 years (SD = 10.4; range = 1–58) while average marriage length of entire sample was 31.4 years (SD = 10.9; range = 1–58). Mean age of the sample was 62.6 years (SD = 8.8; range = 50–83); 51.2% (n = 1176) were female while 94.9% (n = 2165) identified as White and 2.4% (n = 54) identified as Hispanic, with 5.1% (n = 116) of the sample as non-White. The sample had 16.9% (n = 388) reporting a graduate level education, an

Table 1. MIDUS II demographic and health status (without population weights).

Variables	Mean ± Standard Deviation	Median	Range	Sample Size	Sample Percentage
Age	62.6 ± 8.8	61	50–83		
Race					
White				2165	94.9%
Non White				116	5.1%
Ethnicity					
Spanish Hispanic				54	2.4%
Gender					
Female				1176	51.2%
Male				1122	48.8%
Household Income	88.3K ± 66.4K	70.0K	0–300.0K		
Education Level					
Less than High School				200	8.7%
High School graduate				643	28.0%
Some College				667	29.1%
College Graduate				398	17.3%
Graduate School				388	16.9%
Health Measures					
Depression Level	0.5 ± 1.6	0	0–7		
Physical Health	7.6 ± 1.5	8	0–10		
Mental Health	2.2 ± 0.9	2	1–5		
Number of Chronic Conditions	2.6 ± 2.4	2	0–29		
Number of Prescription Medication	1.9 ± 1.7	2	0–12		
High Blood Pressure					
Yes	1046 (45.8)			1046	45.8%
No	1239 (54.2)			1239	54.2%
Marital Status					
Married	2175 (94.7)			2175	94.7%
Separated	19 (.8)			19	0.8%
Divorced	78 (3.4)			78	3.4%
Widowed	7 (.3)			7	0.3%
Never Married	18 (.8)			18	0.8%
Length of Relationship	31.4	10.9	1–58	2,175	26.1%
Length of First and Only Marriage Respondents	31.9	10.4	1–58	1,699	73.9%

additional 17.3% (n = 398) graduating from college, and 29.1% (n = 667) reporting at least some college education, for a total of 63.3% with at least some college education. From the MIDUS II survey, there were 1,699 (73.9%) of the sample who reported having only one marriage, while 476 (26.1%) reported partner relationships that include divorce, re-marriage, and never married

For cross-group comparisons, spousal support and spousal strain levels were compared between each subcategory of demographic, and the unweighted sample statistics are reported (see Table 2). A significant difference between groups was only evident by gender (support: $p < .01$; strain: $p < .001$) and by marital status (support: $p < .01$; strain: $p < .05$). Race,

Table 2. Spousal support and strain levels among sample subgroups.

		Spousal Support		Spousal Strain	
Variables		Mean ± SD	p-value	Mean ± SD	p-value
Gender	Male	3.7 ± 0.5	<0.01	2.2 ± 0.6	<0.001
	Female	3.5 ± 0.6		2.3 ± 0.7	
Ethnicity	Non Spanish Hispanic	3.6 ± 0.6	0.76	2.2 ± 0.6	0.187
	Spanish Hispanic	3.6 ± 0.5		2.1 ± 0.6	
Race	White	3.6 ± 0.6	0.55	2.2 ± 0.6	0.497
	Non White	3.6 ± 0.6		2.2 ± 0.6	
Education	Less than High School	3.6 ± 0.5	0.73	2.2 ± 0.6	0.577
	High School graduate	3.6 ± 0.6		2.2 ± 0.6	
	Some College	3.6 ± 0.6		2.2 ± 0.6	
	College Graduate	3.6 ± 0.5		2.2 ± 0.6	
	Graduate School	3.6 ± 0.6		2.3 ± 0.6	
Marital Status	Married	3.6 ± 0.5	0.01	2.2 ± 0.6	0.034
	Separated	3.0 ± 1.0		2.6 ± 0.8	
	Divorced	3.5 ± 0.7		2.2 ± 0.7	
	Widowed	4.0 ± 0.0		1.9 ± 0.9	
	Never Married	3.5 ± 0.8		2.3 ± 0.7	

ethnicity, education level, and income had no significant between group differences in levels of spousal support or spousal strain.

Next, a series of regression analyses were run to examine the effects of demographics, spousal support and spousal strain at MIDUS I on health status at MIDUS II on all individuals, regardless of marriage subgroup status (i.e., first marriage or all marriages). In univariate analysis using simple linear regression, spousal support at baseline had no significant association with physical health at the 7–10 year follow-up ($b = .16$; $p = .13$) while spousal strain had a significant negative association ($b = -.23$; $p < .05$) (results available upon request).

The significant factors affecting physical health were entered into the final multivariate regression model (see Table 3). Age and gender were included in the model, although not significant in univariate analysis, because of the study hypotheses and based on strong evidence from literature review. After controlling for age, gender, education level, income, prior depression symptoms, and prior health, the spousal support variable showed no significant association with physical health for either first marriages ($b = .00$; $p = .99$) or all marriages ($b = -.05$; $p = .56$). Spousal strain also had no significant effect on physical health in the final regression model for either first marriages ($b = -.07$; $p = .49$) or all marriages ($b = -.03$; $p = .67$). Additional regression analyses were conducted to assess the effect of spousal support/strain on other measures of physical health including number of chronic conditions, number of prescription medications, and blood pressure, with no significant effects identified (results available upon request).

A series of regression analyses were run to examine the effect of spousal support and spousal strain at baseline on psychological health status at follow-up for all marriage categories. In this univariate analysis, spousal

Table 3. Multivariate analyses of factors associated with overall physical health.

	First Marriages			All Marriages		
Variables	(b)	95% CI	p-value	(b)	95% CI	p-value
Model 1:						
Spousal Support	.00	−.20, .20	.99	−.05	−.23, .12	.56
Age	−.01	−.02, .00	.16	−0.01	−.02, .00	.25
Gender	−.29	−.52, −.06	<.05	−.28	−.48, −.08	<.01
Education Level	.21	.11, .31	<.0001	.18	.09, .26	<.0001
Household Income	.00	−.00, .00	.25	.00	.00, .00	<.05
Depression Level	−.07	−.14, −.00	<.05	−.07	−.13, −.01	<.05
Prior Overall Health	.56	.47, .64	<.0001	.57	.50, .64	<.0001
Model 2:						
Spousal Strain	−.07	−.25, .12	.49	−0.03	−.19, .12	.67
Age	−.01	−.02, .00	.15	−0.01	−.02, .00	.24
Gender	−.30	−.53, −.07	<.05	−.28	−.48, −.09	<.01
Education Level	.21	.11, .31	<.0001	.18	.09, .27	<.0001
Household Income	.00	−.00, .00	.25	.00	.00, .00	<.05
Depression Level	−.07	−.14, −.00	<.05	−0.01	−.13, −.01	<.05
Prior Overall Health	.55	.47, .63	<.0001	0.56	.50, .63	<.0001

support (b = −.30; p < .0001) and spousal strain (b = .29; p < .0001) were significantly related to overall psychological health (results available upon request). Ethnicity and race were non-significant in the univariate analysis for psychological health outcomes and were removed from the final model. Age, though non-significant, was kept in the analysis because of the study focus on effects related to age. After controlling for age, gender, education, income, prior depressive symptoms, and prior health, spousal support at baseline was significantly associated with overall psychological health at follow-up (b = −.19; p < .001) for all marriages such that greater support was associated with better psychological health (see Table 4). Spousal strain also showed a significant negative effect on psychological health (b = .20; p < .0001) for all marriages. The subgroup of respondents in their first marriages showed a similar effect for spousal support (b = −.19; p < .001) and for spousal strain (b = .15; p < .01), after controlling for age, gender, education, prior depression symptoms, and prior health.

Discussion

Marriage can be both a source of support and a source of strain, with consequent health effects (Broadhead et al., 1983; Holt-Lunstad et al., 2008; Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015; Holt-Lunstad et al., 2010; House, Landis, & Umberson, 1988; Robles et al., 2014; Seeman, 1996; Uchino, Cacioppo, & Kiecolt-Glaser, 1996). A robust literature shows strong links between health outcomes and marital status (Kiecolt-Glaser & Newton, 2001); but quality matters (Robles et al., 2014). Yet despite the robustness of these findings, gaps in the literature remain, as much of the research has not

Table 4. Multivariate analyses of factors associated with mental health.

	First Marriages			All Marriages		
Variables	(b)	95% CI	p-value	(b)	95% CI	p-value
Model 1:						
Spousal Support	−.19	−.31, −.09	<.001	−.19	−.28, −.09	<.001
Age	.00	−.00, .01	.46	.00	−.00, .01	.26
Gender	−.02	−.15, .11	.75	−.06	−.17, .06	<.32
Education	−.14	−.19, −.08	<.0001	−.07	−.13, −.03	<.01
Income	−.00	−.00, .00	.22	−.00	−.00, −.00	<.01
Depression Level	.06	.02, .10	<.01	.07	.04, .10	<.0001
Prior Overall Health	−.16	−.20, −.11	<.0001	−.15	−.18, −.11	<.0001
Model 2:						
Spousal Strain	.15	.05, .26	<.01	.20	.11, .29	<.0001
Age	.00	−.00, .01	.56	.00	−.00, .01	.29
Gender	−.02	−.15, .11	.72	−.06	−.17, .05	<.31
Education	−.13	−.19, −.08	<.0001	−.08	−.12, −.03	<.01
Income	−.00	−.00, .00	.15	−.00	−.00, −.00	<.01
Depression Level	.06	.02, .10	<.01	.07	.03, .10	<.0001
Prior Overall Health	−.16	−.20, −.11	<.0001	−.14	−.18, −.11	<.0001

controlled for confounding variables such as depression, and little research has been longitudinal in design.

There is a sizeable body of literature looking specifically at the effects of marital support in older adults (Birditt et al., 2009, 2016; Bookwala, 2005, 2016; Carr, Cornman, & Freedman, 2015; Carr, Freedman, Cornman, & Schwarz, 2014), yet older adults' changing views on marriage and intimate relationships may alter formerly seen effects. Using a longitudinal national sampling of older adults, we examined spousal support and spousal strain as measures of relationship quality to assess effects on health status. We incorporated all older adults who reported on support and strain from a spousal relationship, regardless of marital status, as a method of accommodating social trends in cohabitation and marriage among aging populations. Contrary to our expectations, we found no effect of spousal relationship quality on the physical health of older adults. Our findings are inconsistent with cross-sectional examinations of marital quality in the first wave of the MIDUS data, which found an effect of marital quality on physical health (controlling for depressive symptoms and other demographic variables with a cross-sectional study design) (Bookwala, 2005). When we incorporated the same measure of marital strain into our regression model, we found no significant contribution of spousal relationship quality on physical health outcomes in the 7–10 year follow-up wave after controlling for prior health and depression symptoms at baseline.

While no physical health effect was found, our study findings support prior findings on the association of marital quality and psychological well-being (Choi et al., 2015; Proulx, Helms, & Buehler, 2007; Robles et al., 2014). Both linear and multivariate regression found a significant effect of spousal

support on self-reported psychological health, consistent with a stress-buffering hypothesis. Spousal strain similarly was associated with poorer psychological health. This effect remained after accounting for prior levels of depressive symptoms. Statistically controlling for baseline depression levels suggests there is a unique contribution of these components to participant well-being at 7–10 year follow-up.

In this sample of older adults, prior health and depressive symptoms accounted for the association between relationship quality and physical health outcomes. When considering the emotionally charged and potentially immediate effects of relationship strain (Hughes & Waite, 2009), it is not surprising to find changes in psychological health status without observable changes in physical health. Our results support the role of bidirectional factors such as depression on marital quality and health outcomes (Benazon & Coyne, 2000; Robles et al., 2014), confirming the importance of longitudinal analysis. The 7–10 year extended follow-up period, selected to look for robust effects of spousal relationship quality on health, provides a wider interval of time in which intervening life variables (i.e. stressful events or behavior changes) explain more between group differences. The differences related to spousal relationship quality were only one of many factors impacting health outcomes.

As we attempted to study the cumulative effects of relationship stress under the stress-buffering hypothesis, we found no differences in health effects when looking at first marriages of longer duration. However, the mean length of marriage (31.9 years for first marriages and 31.4 years for all marriages) indicates the two groups in this sample did not differ sufficiently in marital length to draw conclusions about whether marital length impacted our findings. The two-group similarity in this sample did not allow us to draw meaningful conclusions regarding our third hypothesis; that is, that longer-term marriages would show cumulative and stronger health effects of spousal relationship quality. It is worth noting the limitations of the study. The MIDUS sample is notably limited in its demographic diversity. Initial examination of the demographic status of subjects completing the spousal support questions in the MIDUS I survey demonstrate that individuals age 50 and over had a higher than average income (median = 70.0K, mean = 88.3K, SD±66.4K). Similarly, the racial and ethnic make-up of the MIDUS sample was not reflective of the US population.

The inconsistency of our findings with prior research may be related to the expanded definition of *relationship* in the study that was used to address changing societal trends. Our sample included individuals who self-reported a relationship of personal relevance, which would include both marital and cohabitating relationships. While some research finds no differences between married and cohabitating couples (Barr & Simons, 2014; Drefahl, 2012; Uecker, 2012) other research has found important differences (Coan,

Schaefer, & Davidson, 2006), For example, cohabitation for older adults offers many of the benefits of marriage, such as an intimate partnership, but without the legal commitment of marriage. In other words, cohabitation allows older individuals to retain autonomy over finances, the ability to continue to receive Social Security or retirement benefits, and secure their assets for their own family/children. This lack of financial integration can have implications for feelings of permanence. Of particular importance, cohabitation does not convey the same expectation for caregiving that marriage conveys (Noel-Miller, 2011). As couples in midlife and old age face different health challenges (Berg & Upchurch, 2007), a knowledge that one might not necessarily be held accountable for future caregiving, or that one cannot necessarily count on the partner for future caregiving, may alter the dynamics of the relationship. In fact, many older women desire neither cohabitation nor marriage, and instead prefer male companionship that does not involve co-residence (De Jong Gierveld & Merz, 2013), while men prefer co-residential relationships (McWilliams & Barrett, 2014). Thus participants may be reporting ongoing relationships of personal relevance within which there is no cohabitating. Such relationships may be fundamentally different than co-residing relationships, and thus alter the physiological benefits received from living with an intimate other.

The lack of effect on physical health in our research may also be potentially related to the cumulative effects of social integration that have been identified in a mid-life age group. Of interest, prior work on the MIDUS sample (Yang et al., 2016) similarly found a limited effect of social variables on biomarkers of health compared to data within other surveys containing a greater age-range in the sample (National Health and Nutritional Examination Survey). In a life course theory, they hypothesized that increased social embeddedness in this mid-life age range might explain the results, as there is more similarity than difference in social support levels at this life stage. The present analysis was restricted to older adults in the MIDUS sample, but likewise limited to those reporting on spousal relationships that likely continue a trend of social embeddedness from midlife. This potential restriction in the range of support levels within this sample could explain our null findings.

The current study is limited by the measures taken from the MIDUS survey. The measures of spousal relationship quality in the MIDUS survey, while validated (Schuster et al., 1990; Walen & Lachman, 2000), still possess important limitations. The measure of spousal support involved intensity-based responses while the measure of marital strain used responses based on frequency. Nevertheless, this variation in measurement approach did not impact the robustness of the findings, which remained consistent across measures. This study applied a single question of self-reported health as the outcome measure. Generally, the single-question assessment of global health while reliable, is not well understood (Jylhä 2009). In a review of the accuracy of self-reported health

measures Newell, Girgis, Sanson-Fisher, and Savolainen (1999) found substantial differences (21%–60% inaccuracy rate) between the prevalence of health behaviors estimated from self-report data and from corresponding gold standard data. While this inaccuracy may account for the lack of findings for physical health outcomes, prior research has found that when controls for prior health are included in a statistical model, bias resulting from self-reported health is minimal and becomes statistically non-significant (Leroux et al., 2012).

Conclusions and practical implications

Athough we did not find an association between marital quality and physical health outcomes, this analysis does not preclude the presence of a mediated or moderated association between marital quality and physical health outcomes, a conceptualization that might explain findings from other researchers. The results of this study do support prior evidence that levels of spousal support and strain are associated with psychological health.

Our findings further suggest that inclusion of relationship quality assessments into routine care of older adults, with an eye to improving those relationships, may lead to better health outcomes. Our results show that relationship quality continues to exert influence on psychological health, and spousal strain particularly, continues to impact psychological health. Those in strained relationships experienced measurable declines after extended follow-up, suggesting an ongoing impact of relationship strain that should be considered important in health evaluations.

However, *intimate relationships* can include a variety of relationships, not all of which are spousal. Older adults are increasingly choosing cohabitation, or intimate relationships without co-residing, and these relationships may or may not contribute to physical and psychological health in different ways. Older adults may define these relationships with different terms. Health care providers may dismiss them as "non-spousal", or not even inquire beyond "are you married" and so, miss an important health-contributing relationship. Clinicians and health care providers need to be educated on the changing societal definition of *intimate relationships* in order to properly assess and understand the contributing factors in their patient's lives. It is important as well, for researchers to determine if and how these relationships differ in terms of health benefits.

Acknowledgments

This investigation was supported by the Quality Outcomes Research and Assessment (http://QualityOutcomesResearch.com) at the University of Utah and the Population Health Research Foundation, with funding in part from the National Center for Research Resources and the National Center for Advancing Translational Sciences, National Institutes of Health, through Grant 5UL1TR001067.

Funding

This work was supported by the NIH National Center for Advancing Translational Sciences [5UL1TR001067];

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