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Depression as a moderator and a mediator of marital quality's effect on older adults' self-rated physical health

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ABSTRACT

Background: Depression and marital quality are both established correlates of physical health for older adults. However, there is a lack of research on the interaction between depression and marital quality on physical health, and on depression's role as a mediator of the mechanism by which marital quality affects physical health.
Objective: This study aims to test the moderation and mediation effects of depression on marital quality's impact on older adults' self-rated physical health.
Method: Data from the National Social Life, Health, and Aging Project (Wave 2) (N = 2118) were used to test a latent moderated mediation structural equation model. Marital quality was constructed as a latent variable with indicators measuring its various aspects.
Results: Depression had a significant moderating effect (β = .17, SE = .04, p < .001, 95% CI [.08, .25]) on marital quality's impact on self-rated physical health: when the level of depression was low, higher marital quality was strongly associated with better self-rated physical health, but when the level of depression was high, higher marital quality became slightly associated with poorer self-rated physical health. Moreover, depression was a significant partial mediator (β = −.27, SE = .03, p < .001, 95% CI [−.33, −.21]) of the effect of marital quality on self-rated physical health.
Conclusions: Depression plays an important role in explaining the mechanism by which older adults' marital quality affects their self-rated physical health. For marital quality to positively affect physical health, older adults need to attend to their personal mental health needs.

1. Introduction

Many studies point to the significant effect of marital quality on individuals' mental and physical health, particularly in older adults (e.g., Kiecolt-Glaser & Newton, 2001; Koball, Moiduddin, Henderson, Goesling, & Besculides, 2010; Manzoli, Villari, Pirone, & Boccia, 2007). Depression also correlates with a wide range of health outcomes. For instance, meta-analyses revealed that late-life depression is associated with an elevated risk of dementia and Alzheimer's disease (Diniz, Butters, Albert, Dew, & Reynolds, 2013), stroke morbidity and mortality (Pan, Sun, Okereke, Rexrode, & Hu, 2011), and metabolic syndrome (Pan et al., 2012).

Although the linear relationships between marital quality and health outcomes and between depression and health outcomes have been well established, there is a lack of research on the interaction effect between depression and marital quality on physical health, as well as contradictory evidence of depression's role as a mediator of marital quality's effect on physical health. For instance, a meta-analysis of 126 articles published over 50 years identified two studies that examined the moderation effect of depression on marital quality's impact on health outcomes, and found that marital dissatisfaction combined with high level of depressive symptoms was linked to worse health outcomes (Robles, Slatcher, Trombello, & McGinn, 2014). This review also found that depression might not be a significant mediator between marital quality and health, based on a small number of studies that offered inconsistent findings (Robles et al., 2014). Another review, however, suggested that depression mediates the impact of negative marital functions on health outcomes (Kiecolt-Glaser & Newton, 2001).

Using data from the National Social Life, Health, and Aging Project (Wave 2) (Waite et al., 2010-2011Waite ., - et al., 2011Waite et al., 2010-2011), this study attempts to better understand the effect of depression on the relationship between older adults' marital quality and their self-rated physical health. Gender, age, and education attainment were included in the model as covariates, based on literature highlighting the established relationships between these variables and older adults' physical health (Robles et al., 2014). The following hypotheses

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were tested: a) there is a significant interaction effect between marital quality and depression on older adults' self-rated physical health (more specifically, the higher that older adults' depression level is, the less that marital quality leads to good self-rated physical health); b) depression is a significant mediator of the impact of marital quality on older adults' self-rated physical health; c) higher marital quality is associated with better physical health in older adults; and d) depression is associated with poor self-rated physical health in older adults.

2. Method

2.1. Participants

The data used in this study are drawn from the National Social Life, Health, and Aging Project (Wave 2) (Waite et al., 2010-2011Waite ., -et al., 2011Waite et al., 2010-2011), which collected data on a nationally representative probability sample of community-dwelling individuals across the US. Only married participants at the time of the study are included in this analysis. Of the 2118 qualifying participants, 44.4% were female, and 55.6% were male; 81.3% self-identified as White/Caucasian, 10.7% as Black/African-American, and 7.6% as Asian, Pacific Islander, American Indian, or Alaska Native; 16.2% had less than a high school education, 24.2% had a high school diploma/equivalency, 32.2% had a vocational certificate, an associate's degree, and/or some college education, and 27.4% had a bachelor's degree or higher. Moreover, 26.2% of the participants reported having household assets between $100,000 and $499,999, followed by 24.7%, $500,000 or more. Participants' mean age was 71.92 years (SD = 6.83), with a range of 62–90 years.

2.2. Measures

2.2.1. Marital quality

To capture a comprehensive picture of marital quality, we included 12 indicators representing overall satisfaction, emotional connection, communication, togetherness, and sexual satisfaction in participants' marriage. First, two indicators measured participants' overall marital quality: "taking all things together, how would you describe your marriage with your current partner on a scale from 1 to 7?" (1 = very unhappy, 7 = very happy; M = 6.37, SD = 1.27), and "in general, how often do you think that things between you and your partner are going well?" (0 = never, 5 = all the time; M = 4.00, SD = .90).

Two indicators measured participants' emotional connection with their spouse: "how often can you open up to your partner if you need to talk about your worries?" (0 = never, 3 = often; M = 2.68, SD = .62), and "how emotionally satisfying do you find your relationship with your partner to be?" (0 = not at all, 4 = extremely; M = 2.99, SD = .98).

Furthermore, one indicator measured negative communication between the spouses using the mean of three items: "over the past 12 months, how often does your partner get on your nerves?", "how often does your partner make too many demands on you?", and "how often does your partner criticize you?" (0 = never, 3 = often; α = .65; M = 1.29, SD = .65). Another indicator measured if participants liked to spend free time doing things together with or separately from their partner (1 = together, 3 = separate; M = 2.34, SD = .69).

Additionally, six indicators measured participants' sexual satisfaction: "how physically pleasurable do you find your relationship with your partner to be?" (0 = not at all, 4 = extremely; M = 2.89, SD = 1.09), "to what extent do you feel your sex life is lacking in quality?" (0 = extremely, 3 = not at all; M = 1.73, SD = 1.17), "during the past 12 months, about how often did you have sex with your partner?" (0 = none at all, 5 = once a day or more; M = 1.11, SD = 1.22), whether the frequency of sex during the past 12 months was acceptable (1 = much more or less often than would like, 3 = about as often as would like; M = 2.06, SD = .88), how much sexual problems bothered participants (0 = extremely, 4 = not at all; M = 2.75, SD = 1.28), and whether participants had ever avoided sex because of sexual problems during the past 12 months (0 = yes, 1 = no; M = .69, SD = .46).

2.2.2. Depression

A shortened version of the Center for Epidemiological Studies Depression Scale (CES-D; Cornwell & Waite, 2009; Radloff, 1977) measured depression. This scale includes 12 items, such as "during the past week, I felt sad", "during the past week, I felt lonely", "during the past week, I felt that everything I did was an effort", and "during the past week, I felt depressed" (1 = rarely or none of the time, 4 = most of the time); α = .79. The mean score became the indicator score (M = 1.48, SD = .41).

2.2.3. Self-rated physical health

We used a one-item self-assessment to measure participants' self-rated physical health (i.e., "would you say your health is excellent, very good, good, fair, or poor?"; 1 = excellent, 5 = poor); M = 2.74, SD = 1.06. This one-item measure is widely used to assess health and demonstrates great validity and association with various health outcomes (e.g., Benyamini, Idler, Leventhal, & Leventhal, 2000; Cornwell & Waite, 2009; Johnson & Wolinsky, 1994; Nielsen, Siersma, Waldemar, & Waldorff, 2014).

2.3. Analytic strategy

All analyses were performed using Mplus version 7.1 (Muthén & Muthén, 1998-2012Muthén & Muthén, 1998-2012). We proposed a latent moderated mediation structural equation model (Model 1, see Fig. 1) with depression constructed as the moderator/mediator. The model was estimated using full information maximum likelihood with robust standard errors (Maslowsky, Jager, & Hemken, 2015; Muthén & Asparouhov, 2015). Data were standardized prior to analysis (Klein & Moosbrugger, 2000), as Mplus version 7.1 does not generate standardized regression coefficients for latent moderated structural equation models.

To assess model fit, we used five fit indices: the root mean square error approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI), the standardized root mean square residual (SRMR), and the χ^2 test. Models with RMSEA and SRMR values less than .10, CFI and TLI values greater than .90, and small χ^2 values are considered well fitting, although large sample sizes (as is the case in this study) might lead to large χ^2 values, which do not necessarily suggest poor model fit (Kline, 2011).

3. Results

Table 1 presents the correlation matrix of the observed variables. We first assessed the fit of the measurement model. The measurement model that includes all 12 indicators of marital quality demonstrated a poor fit: χ^2 (42) = 552.09, p < .001; RMSEA = .08, 90% CI [.070, .081]; CFI = .85; TLI = .80; SRMR = .06. After removing five indicators (i.e., whether participants like to spend free time with their partner, the frequency of sex, whether the frequency of sex was deemed acceptable, how bothersome any sexual problems were, and whether participants had ever avoided sex because of sexual problems) with poor factor loadings below .40, the measurement model demonstrated an excellent fit: χ^2 (12) = 21.73, p = .04; RMSEA = .02, 90% CI [.004, .033]; CFI = .995; TLI = .99; SRMR = .02. The seven remaining indicators of marital quality had standardized factor loadings ranging in size between .44 and .64. We then estimated the model without the interaction term (Model 0, see Fig. 1), and found that the model fit the data well: χ^2 (48) = 281.19, p < .001; RMSEA = .05, 95% CI [.043, .053]; CFI = .93; TLI = .91; SRMR = .05.

Next, we estimated the fit of the model with the interaction term

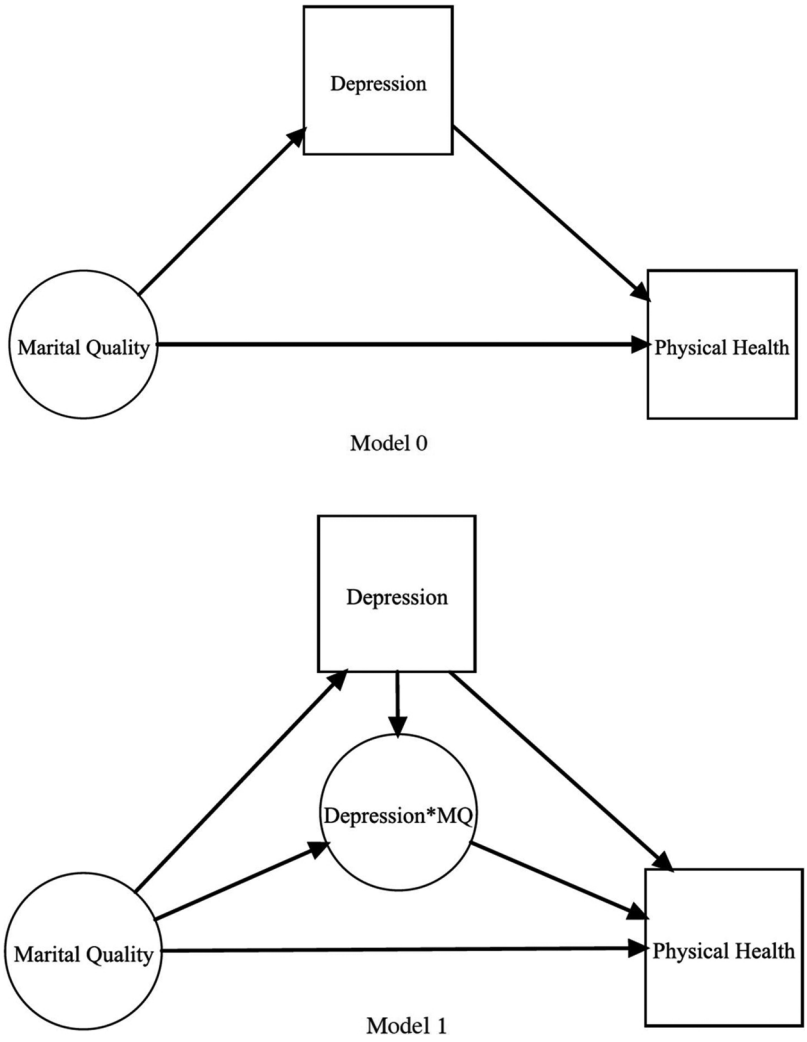

Fig. 1. Hypothesized Structural Models Without and With Latent Variable Interaction.
Note. Model 0 (top) includes the main effects of marital quality and depression for predicting physical health. Model 1 (bottom) includes the latent variable interaction of depression × marital quality (denoted as "Depression*MQ").

between marital quality and depression added (Model 1, see Fig. 1). The relative fit of Model 1 vs. Model 0 was determined using a log-likelihood ratio test (Maslowsky et al., 2015), as traditional model fit indices are not produced for latent moderated structural equations. The log-likelihood difference value (D) was calculated to be 368.90. Using a chi-square distribution ($df = 1$; the degree of freedom was determined by the difference between the number of free parameters in Model 0 and Model 1), which approximates the distribution of D values, this log-likelihood ratio test was found to be significant at $p < .001$, suggesting that Model 0 represented a significant loss in fit compared to Model 1. Therefore, because Model 0 presented a good fit, Model 1 was also deemed a well fitting model.

The interaction effect between marital quality and depression on self-rated physical health was significant ($\beta = .17$, $SE = .04$, $p < .001$,

Table 1
Correlations of the Observed Variables.

	1	2	3	4	5	6	7	8	9	10	11
1. Physical health	–										
2. Relationship happy	−.07*	–									
3. Emotionally satisfying	−.14*	.36*	–								
4. Things going well	−.09*	.36*	.39*	–							
5. Physically pleasurable	−.16*	.35*	.70*	.35*	–						
6. Quality of sex life	−.16*	.23*	.31*	.25*	.35*	–					
7. Negative communication	.10*	−.29*	−.33*	−.40*	−.28*	−.23*	–				
8. Can open up	−.09*	.29*	.33*	.29*	.29*	.20*	−.26*	–			
9. Depression	.37*	−.18*	−.25*	−.27*	−.24*	−.21*	.29*	−.19*	–		
10. Gender	−.02	−.09*	−.15*	−.08*	−.16*	.01	−.06*	−.04	.09*	–	
11. Age	.10*	.03	−.08*	.06*	−.07*	−.03	.008	−.03	.06*	−.10*	–
12. Education attainment	−.26*	.04	.14*	.02	.10*	.007	.03	.06*	−.13*	−.01	−.10*

Note. $N = 2118$. Gender was coded as 1 = male, 2 = female. * $p < .05$.

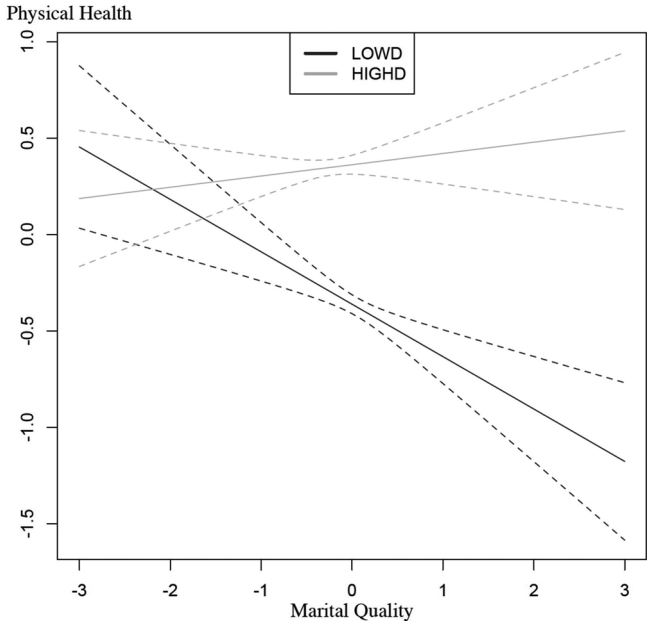

Fig. 2. Interaction of Depression and Marital Quality for Predicting Physical Health.

Note. The plot shows the effect of marital quality on physical health at 1 *SD* below (LOWD) and 1 *SD* above (HIGHD) the zero mean of depression, plotted over the marital quality range of −3 *SD* to +3 *SD*. To set the metrics of marital quality and depression, the variances of both variables are fixed at 1. The dotted lines show the corresponding 95% confidence bands. Physical health was coded as 1 = excellent, 5 = poor.

95% CI [.08, .25]). We plotted the interaction in R (R Core Team, 2013; Fig. 2), and found that when the level of depression was low (one *SD* below the zero mean of depression), higher marital quality was strongly associated with better self-rated physical health; however, when the level of depression was high (one *SD* above the zero mean of depression), higher marital quality was slightly associated with poorer self-rated physical health.

Moreover, higher level of depression was significantly associated with poorer self-rated physical health (β = .36, *SE* = .03, $p < .001$, 95% CI [.31, .41]), and higher marital quality was significantly associated with better self-rated physical health (β = −.11, *SE* = .05, $p = .04$, 95% CI [−.21, −.004]). The indirect effect of marital quality on self-rated physical health as mediated by depression was also significant (β = −.27, *SE* = .03, $p < .001$, 95% CI [−.33, −.21]). An indirect effect with a size of .25 may be considered large (Kenny, 2018).

Additionally, gender (β = −.05, *SE* = .02, $p = .02$, 95% CI [-.09, -.009]), age (β = .05, *SE* = .02, $p = .02$, 95% CI [.007, .09]), and education attainment (β = −.21, *SE* = .02, $p < .001$, 95% CI [−.25, −.17]) all had significant effects on participants' self-rated physical health. This result suggests that male, older, and less educated participants had poorer self-rated physical health, consistent with the reported findings in the literature (e.g., Baker, Leon, Smith Greenaway, Collins, & Movit, 2011; Glaesmer, Riedel-Heller, Braehler, Spangenberg, & Luppa, 2011; Hernández-Palacios, Ramírez-Amador, Jarillo-Soto, Irigoyen-Camacho, & Mendoza-Núñez, 2015).

4. Discussion

All four hypotheses were confirmed. The direct effects of marital quality and depression on older adults' self-rated physical health are congruent with the existing literature. The finding that suggests that depression is a significant mediator of the relationship between marital quality and self-rated physical health contributes to an area of literature that is characterized by inconsistent and limited evidence (Robles et al., 2014). Furthermore, previous studies provide mixed evidence of whether depression mediates the relationship between marital quality and physical health (e.g., Kiecolt-Glaser & Newton, 2001; Robles et al., 2014). The partial but large mediation effect of depression on marital quality's impact on older adults' self-rated physical health found in this study supports depression's role as a significant mediator of this relationship.

Moreover, we found that depression had a significant moderating effect on marital quality's impact on older adults' self-rated physical health. When the level of depression was low, marital quality's positive effect on good self-rated physical health seemed to hold, but this effect became slightly negative when the level of depression was high. We offer a couple of plausible explanations for this finding. First, it is possible that older adults with high marital quality have a significant investment in their partner's wellbeing and happiness. To actively maintain a high level of marital quality and attend to the partner's needs when one feels depressed might require extra effort and eventually, adversely affect the individual's physical health.

Relatedly, depressed older adults might worry about burdening their partner and affecting their partner negatively, particularly because their partner is also likely to be at a life stage that may require a high level of care. They might fear that their marital happiness is not likely to be sustainable, due to, for instance, their depression, old age, or their partner being negatively affected by their depression. Such worries may lead to anxiety and consequently, negative physical health outcomes (e.g., Wolitzky-Taylor, Castriotta, Lenze, Stanley, & Craske, 2010). Depressed older adults might also attempt to hide their depression (Sözeri-Varma, 2012) and suffering from their partner and/or avoid attending to their own mental health needs, thus deepening the toll on their physical health, particularly if the circumstances continue for an extended period of time. Furthermore, the disconnection between their depression (a primarily intrapersonal experience) and their marital quality (a primarily interpersonal experience) might also amplify the feeling of loneliness, which is closely associated with both depression and poor health outcomes for older adults (e.g., Mushtaq, Shoib, Shah, & Mushtaq, 2014). As such, physicians treating older adults may consider routinely screening for depression with brief and validated screening tools (e.g., the two-item Patient Health Questionnaires; Maurer, Raymond, & David, 2018). They may also consider actively incorporating on-site mental health clinicians as part of the treatment team (e.g., Kessler, 2012; Vickers et al., 2013), and/or making referrals to outside mental health professionals, especially those that are trained to address relationship issues, when depression and marital problems are observed. Such referrals can be particularly valuable in connecting older adults who may not otherwise initiate mental health services to the treatment they need, which treatment can in turn improve their physical health.

Despite its contributions, this study has a few limitations. First, relying on cross-sectional self-reported data, we could not make any longitudinal claims regarding the mediating or moderating effect of depression on marital quality's impact on self-rated physical health. In particular, the mediation effect could be interpreted in a reverse direction (i.e., depression mediates the effect of self-rated physical health on marital quality). This interpretation is plausible especially because the majority of studies on the relationships among older adults' marital quality, depression, and self-rated physical health either have only established the cross-sectional correlations of these variables or have provided evidence of causal relationships in both directions (e.g., Meader et al., 2011; Polyakova et al., 2014; Robles et al., 2014).

Moreover, meaningful group comparisons were not possible in this study because of the overrepresentation of White/Caucasian participants (81.3%) and the underrepresentation of other racial/ethnic groups. Given research indicating racial/ethnic differences in the diagnosis and treatment of depression (Akincigil et al., 2012) and in the attitudes toward seeking help for depression (Conner et al., 2010), it would be of interest for future research to investigate if depression

moderates and/or mediates the impact of marital quality on self-rated physical health in older adults similarly across different racial/ethnic groups.

Conflict of interest declaration

None.

The work described has not been published previously, is not under consideration for publication elsewhere, and its publication is approved by all authors. If accepted, the work will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder.

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