Predicting Sexual Decline and Dissatisfaction Among Older Adults: The Role of Partnered and Individual Physical and Mental Health Factors

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Objectives. To target improvement in older adult sexuality by understanding how a myriad of partnered and individual physical and mental health factors, often associated with aging, affect sexual unwellness.

Method. Data from the Wisconsin Longitudinal Study were used to conduct a case–control study on the risk factors for sexual unwellness (i.e., lack of sexual satisfaction, inability to maintain the sexual relationship) in older adults aged 63–67.

Results. Higher risk for lack of sexual satisfaction was associated with poor spousal health, a history of diabetes, and fatigue symptoms. In addition, being of male gender, being satisfied with marital support, and having better spousal health reduced the risk of being unsatisfied sexually. Also, higher risk for being unable to maintain the sexual relationship was independently associated with a higher education level, poorer self-rated health, better spousal health, a history of diabetes, prostate cancer, fatigue, sexual pain, and a history of depression.

Discussion. Results show the impact of several physical and mental health risk factors on the development of sexual unwellness in older adults. A gendered pattern also emerged, suggesting that women tend to be less sexually satisfied, as compared to their male peers, who tend to report sexual unwellness that is associated with individual health.

Key Words: Aging—Case–control—Chronic disease—sexual well-being.

OLDER adults are living healthier and longer than in previous decades, with aging minorities experiencing the greatest proportional increases (Greenberg, 2009; National Institute on Aging, 2007). This rapid shift in U.S. age distribution demands understanding the evolution and multidimensional nature of well-being for older adults to promote successful aging. What constitutes successful aging? It is adaptive and multidimensional in nature—physical, cognitive, emotional, and social—with a recent emphasis on both objective and subjective components (Depp, Vahia, & Jeste, 2010; Jeste, Depp, & Vahia, 2008; Pruchno, Wilson-Genderson, & Cartwright, 2010). Sexual well-being is an often-neglected dimension that may contribute directly and indirectly (via physical and emotional health) to successful aging. It encompasses components such as sexual interest, functioning, satisfaction, healthy intimate relationships, and sexual self-esteem. Definitions of sexual well-being vary greatly across research studies and often focus solely on sexual dysfunction (e.g., inability to perform, problems with the sexual response cycle), excluding several important aspects (Mona et al., 2011). However, sexual well-being is broadening to include areas such as sexual interest, sexual satisfaction, and psychosexual variables (Mona et al., 2011; Rosen & Bachman, 2008).

To demonstrate the relevance of sexuality to successful aging, older adults consistently identify sexual well-being as integral to overall quality of life (Davison, Bell, LaChina, Holden, & Davis, 2009; DeLamater & Sill, 2005; Laumann et al., 2006; Laumann, Das, & Waite, 2008Laumann et al., 2006). Additionally, sexual functioning, activity, interest, and satisfaction have been associated with physical benefits such as cardiovascular health, physical benefits of exercise, increased relaxation, and decreased pain sensitivity (Brody, 2006; 2010; Chen, Zhang & Tan, 2009; Davey-Smith, Frankel, & Yarnell, 1997; Jannini, Fischer, Bitzer, & McMahon, 2009). Sexual activity is also associated with emotional benefits such as decreased levels of depression, increased psychological well-being, overall quality of life, and self-esteem (Davison et al., 2009Brody, 2010; Cyranowski, Bromberger, Youk, Matthews, Kravitz, & Powell, 2004; Davison et al., 2009; Laumann et al., 2008; Levin, 2007). A study on the impact of sexual well-being and successful aging reported that older adult women who had higher levels of sexual activity and interest rated themselves higher on a subjective scale of successful aging (Thompson et al., 2011). This evidence suggests that sexual well-being probably plays a significant role in successful aging for older adults.

Promoting successful aging may be particularly relevant to individuals living with chronic physical and mental illnesses—diabetes, hypertension, depression, or cancer—due to the impact of these conditions on sexual functioning (DeLamater & Karraker, 2009; Lindau et al., 2007). For example, a prevalence study of older patients who recently experienced a heart attack (*N* = 792) showed that 48% reported perceived problems with sexual activity 1 month after discharge, and 70% of those continued to report problems with maintaining sexual activity 18 months after follow-up (Hoekstra, Jaarsma, Sanderman, van Veldhuisen, & Lesman-Leegte, 2011). A large, national cross-sectional study on older adult sexuality examined the association between diabetes and sexual functioning (Lindau & Gavrilova, 2010). They found that older women with diabetes were less likely to be sexually active than older men with diabetes and older women without diabetes. Also, older men with a history of diabetes were more likely to report orgasm and erectile problems than older men without diabetes (Lindau & Gavrilova, 2010). Additionally, a small cross-sectional study (*N* = 93) on the impact of psychological functioning on sexual well-being found that psychological well-being (i.e., lack of psychological distress symptoms) was predictive of overall satisfaction with sex life in women aged 40–70 (Dundon & Rellini, 2010).

The impact of cancer on sexuality is well documented, with several studies providing evidence that cancer is associated with sexual unwellness (Monga, 2002; Sadovsky et al., 2010; Tierney, 2008). Cancer and its treatments can be associated with erectile dysfunction (ED), vaginal dryness, painful intercourse, lowered desire, lowered sexual self-esteem, higher psychological and relationship distress, and other physical symptoms such as pain and fatigue that may impair sexual well-being (Tierney, 2008). Many of these findings are based on cross-sectional examinations of sexual risk factors, with few studies looking at the longitudinal development of sexual symptoms and fewer studies containing a comparison group without a cancer history. For the aging survivor, these effects may be in addition to those related to normal aging, such as chronic diseases, depression, and loss of partner (DeLamater & Karraker, 2009). However, we know very little about the sexual experience of aging survivors, with few studies to date addressing this dimension (Kagan, Holland, & Chalian, 2008).

A substantial and growing body of literature on older adult sexuality suggests that older adults are engaging in and enjoying sexual activities (Laumann et al., 2005; Lindau et al., 2007; Lindau & Gavrilova, 2010; Nusbaum, Singh, & Pyles, 2004). For example, prevalence data from the National Social Life, Health, and Aging Project (NSHAP) indicated that 73% of older adults aged 57–64 were engaging in sexual activity, which was comparable to the rates for a large study of adults aged 18–59. Furthermore, of those who reported being sexually active, 65% of women and men aged 65–74 reported frequent sexual activity with a partner (more than 2–3 times

per month;) (Lindau et al., 2007). With regard to sexual well-being, results from the Global Study of Sexual Attitudes and Behaviors (GSSAB)—a cross-sectional study of older adult sexual activity—indicated that sexual well-being was related to overall happiness, over and above health and physical activity (Laumann et al., 2006). Criticisms of the current literature on older adult sexuality include cross-sectional nature of the studies, lack of a comparison group, limited information on subgroups, limited definitions of sexual well-being and unwellness outcomes, and lack of consideration of a more comprehensive set of biopsychosocial risk factors (Karraker, DeLamater, & Schwartz, 2011; DeLamater, Hyde, & Fong, 2006; Karraker, DeLamater, & Schwartz, 2011).

To address these limitations, we used data from a prospective cohort study, the Wisconsin Longitudinal Study (WLS). This data set allowed us to address longitudinal research questions, employ a comparison group, expand sexual distress outcomes beyond frequency and specific sexual symptoms (e.g., ED), and consider a broad array of contributing factors because it includes a myriad of physical, social, emotional, and contextual variables. Additionally, of the prospective aging data sets available, the WLS provided comprehensive sexuality, relationship, and related health information.

The purpose of this study is to examine the impact of chronic physical and mental health risk factors on the decline of sexual well-being in older adults. It is hypothesized that chronic physical and mental health problems—including hypertension, diabetes, and cancer—will put older adults at higher risk for sexual unwellness, defined as both (a) lack of sexual satisfaction and (b) an inability to maintain their sexual relationships due to individual physical and mental health concerns.

METHOD

Design and Sample

The data for this case–control study come from the Wisconsin Longitudinal Study (WLS), a study of the life course from late adolescence through the early to mid-60s (Hauser, 2005). Briefly, the WLS follows a random sample of 10,317 men and women who graduated from Wisconsin high schools in 1957, along with randomly selected siblings. Interview data were collected from the original respondents or their parents via mail and telephone in 1957, 1964, 1975, 1992–1993, and 2003–2004, and from a selected sibling in 1977, 1993, and 2004–2005. These data cover social background, youthful aspirations, schooling, military service, family formation, labor market experiences, social participation, mental ability tests, measures of school performance, and characteristics of communities of residence, schools and colleges, employers, and industries, mental and physical health, religious activities and beliefs, and other sociodemographic information.

The WLS sample is broadly representative of White, non-Hispanic American men and women who have completed at

least high school education, leaving other groups underrepresented in this sample, particularly minorities (DeLamater, Hyde, & Fong, 2006; Hauser, 2005). The WLS is well suited for exploring the long-term effects of biopsychosocial risk factors due to its longitudinal nature, being a population-based sample of men and women selected without regard to health status and having participants from the same age cohort.

The current study includes data from the 1992–1993 and 2003–2004 data collection periods. Response rates for the 1993 (87.3%) and 2004 (85.6%) data collection waves were reported for completed interviews from the total sample of surviving respondents. Of the original 10,317 respondents, 48.4% were men ($N = 4,991$) and 51.6% were women ($N = 5,326$). The age of the participants in 2003–2004 ($N = 7,265$) ranged from 63 to 67 ($M = 64.36$, $SD = 0.71$), with the majority of respondents aged 64 (54.7%). In 1993, participants reported an average of 13.39 (SD = 2.15) years of education, with the majority attaining a high school degree (12 years, 63.3%).

Measurement

Case definitions.—The two dependent variables of interest represent different aspects of sexual unwellness: (a) lack of sexual satisfaction and (b) inability to maintain the sexual relationship. *Lack of sexual satisfaction* was defined as responding "not at all" to two questions related to the amount of physical pleasure and emotional satisfaction in the respondent's sexual relationship over the previous year, indicating a lack of physical or emotional satisfaction. Lack of emotional and physical satisfaction were highly correlated ($r = .986$, $p < .001$) and had previously been combined (e.g., DeLamater et al., 2006). Also, sexual satisfaction has been utilized in several studies to measure and indicate the presence or absence of sexual well-being (DeLamater et al., 2006; Laumann et al., 2006; Levin, 2007; Rosen & Bachman, 2008). *Inability to maintain the sexual relationship* was assessed by the respondents' answers to a set of four questions regarding the reason for decreasing or stopping sexual activity in the sexual relationship (i.e., physical health, emotional health, illness, and lack of interest). A "yes" to any of these indicated stopping or decreasing sexual activity and was considered an inability to maintain the sexual relationship. An inability to maintain previous sexual activity due to health or other personal problems has also been used in research on sexuality to denote sexual problems (Laumann et al., 2006; Mona et al., 2011). These two variables are directly related to the case definition for this study, which is a *sexually unwell older adult*. A case is defined as a community-dwelling older adult between the ages of 63 and 67, who graduated from a Wisconsin high school in 1957 and either (a) lacks sexual satisfaction or (b) has an inability to maintain sexual relationship due to individual physical or mental health problems.

Risk factors of interest.—Potential predictors were drawn from previous literature on risk factors for lack of sexual well-being in older adults. Chronic mental and physical health risk factors of interest include cancer diagnosis and type (on or prior to the year 2000), diabetes diagnosis (on or prior to the year 2000), history of hypertension (assessed in 2003), self-rated health (assessed in 2003), fatigue levels in the previous 6 months (assessed in 2003), sexual pain in the previous 6 months (assessed in 2003), and a history of depression (none, single episode, or recurrent). Relationship and spouse or partner variables of interest were assessed in the 2003 wave and include marital status, spouse health, and marital support satisfaction. Other variables of interest that have well-established relationships with sexual well-being include age, gender, and years of education.

Of note, cancer history is represented as either a dichotomous (i.e., cancer vs. no cancer history) or a site-specific (i.e., prostate, breast, genitourinary, and other) variable when sample size permitted. Furthermore, information about the year of diagnosis was available for histories of cancer and diabetes , which allowed for establishment of the temporal precedence of these risk factors prior to the onset of reported sexual unwellness in the sample. Year of diagnosis was not available for hypertension—thus an affirmative response indicated a diagnosis of hypertension by a physician at any time in the past.

Analysis

Nonresponse.—Nonresponse rates were calculated for (a) lack of sexual satisfaction (26%) and (b) inability to maintain the sexual relationship (43%). Due to the potential for nonresponse bias, preliminary analyses—logistic regressions—were conducted to examine predictors of nonresponse for both (a) lack of sexual satisfaction and (b) inability to maintain the sexual relationship (Ahern & Le Brocque, 2005). Both predictive models of nonresponse included demographic variables (age, sex, and education) and factors related to both the sexual-unwellness-dependent variables (marital support, spouse health, individual health, sexual pain, fatigue, and depression). This allowed for examination of the direct influence of each factor on response versus nonresponse to both *sexually unwell* measures.

Main analyses.—Descriptive statistics were completed for each of the two subsamples used in the analyses: (a) those responding to the lack of sexual satisfaction questions ($N = 4,187$) and (b) those responding to the inability to maintain sexual relationship questions ($N = 3,028$). This was followed by bivariate analyses using independent sample t tests and chi-square tests (see Table 1). Dummy variables

Table 1. Selected Characteristics of Cases and Controls by Sexual Unwellness: A Descriptive Analysis of the Wisconsin Longitudinal Study 1992 And 2003 Waves Of Data

	Lack of sexual satisfaction			Inability to maintain sexual relationship		
	Case (*n* = 362)	Control (*n* = 3,825)	*t* or χ²	Case (*n* = 1,513)	Control (*n* = 1,515)	*t* or χ²
Age (*M, SD*)	64.33 (0.71)	64.3 (0.67)	-0.63	64.3 (0.68)	64.33 (0.68)	1.00
Gender (*n, %*)	—		14.36**	—	—	6.48*
Women	202 (55.8%)	1,737 (45.4%)	—	684 (45.2%)	753 (49.8%)	—
Men	160 (44.2%)	2,088 (54.6%)	—	831 (55%)	760 (50.2%)	—
Education years (*M, SD*)	13.34 (2.03)	13.62 (2.29)	2.46**	13.71 (2.35)	13.42 (2.16)	-3.64**
Spouse/partner (*n, %*)	356 (98.3%)	3,587 (93.8%)	12.11**	1,446 (95.6%)	1,416 (93.5%)	5.47*
Marital support (*n, %*)	240 (66.3%)	3,310 (86.5%)	264.76**	1,278 (82.5%)	1,266 (87.4%)	1.61
Spouse health (*n, %*)	—	—	64.13**	—	—	9.37*
Poor (comparison)[a]	27 (7.5%)	94 (2.5%)	—	49 (3.2%)	73 (4.8%)	—
Fair	64 (17.7%)	381 (1.0%)	—	164 (10.8%)	188 (12.4%)	—
Good	171 (44.4%)	1,583 (41.4%)	—	678 (44.8%)	618 (40.8%)	—
Excellent	79 (20.5%)	1,358 (35.5%)	—	495 (32.7%)	467 (30.8%)	—
Self-rated health (*n, %*)	—	—	17.39**	—	—	148.02**
Poor (comparison)[a]	14 (3.8%)	61 (1.6%)	—	60 (4%)	6 (0.3%)	—
Fair	45 (12.4%)	377 (9.9%)	—	249 (16.5%)	95 (6.3%)	—
Good	219 (60.5%)	2,305 (60.2%)	—	891 (59%)	955 (63%)	—
Excellent	58 (16%)	843 (22%)	—	226 (14.9%)	365 (24.1%)	—
Diabetes (*n, %*)	42 (11.6%)	287 (7.5%)	7.79**	168 (11.1%)	85 (5.6%)	29.73**
Hypertension (*n, %*)	177 (48.9%)	1,680 (43.9%)	3.34	752 (49.7%)	634 (41.8%)	18.25**
Removal of uterus and/ or ovaries (*n, %*)	89 (44%)[a]	717 (41.3%)[a]	7.83**	281 (18.6%)	297 (19.6%)	0.522
Fatigue (*n, %*)	208 (57.5%)	1,643 (43%)	29.03**	821 (54.3%)	590 (38.9%)	69.11**
Sexual pain (*n, %*)	50 (13.8%)	554 (14.5%)	0.003	385 (25.4%)	94 (6.2%)	211.67**
Depression (*n, %*)	—	—	6.13*	—	—	12.64**
None (comparison)[a]	295 (81.5%)	3,252 (85%)	—	1,256 (83%)	1,310 (86.4%)	—
Single episode	25 (6.9%)	180 (4.7%)	—	90 (5.9%)	61 (4%)	—
Recurrent	21 (5.8%)	155 (4.1%)	—	80 (5.3%)	52 (3.4%)	—
Cancer Diagnosis (*n, %*)	19 (5.2%)	253 (6.6%)	1.06	127 (8.4%)	84 (5.5%)	9.23**
Cancer Site (*n, %*)	—	—	3.83	—	—	17.64**
None (comparison)[a]	327 (90.3%)	3,388 (88.6%)	—	1,319 (87.2%)	1,344 (88.7%)	—
Prostate	2 (0.6%)	51 (1.3%)	—	31 (2%)	9 (0.6%)	—
Breast	5 (1.4%)	74 (1.9%)	—	29 (1.9%)	30 (2.0%)	—
Genitourinary	2 (0.1%)	44 (1.2%)	—	20 (0.7%)	17 (1.1%)	—
Other	10 (2.8%)	83 (2.2%)	—	47 (3.1%)	28 (1.8%)	—

[a]Denotes the comparison category selected for automatically dummy-coded categorical variables.

*p < .05. ***p* < .01.

were automatically created for categorical variables with more than two categories, including self-rated health, spouse health, lifetime depression, and cancer site. Logistic regression was used to compare cases and controls, with odds ratios (ORs) indicating the increased or decreased odds of the sexual outcome for all chronic physical and mental health risk factors in the model. This allowed examination of the direct influence of each predictor variable on each *sexually unwell* measure while accounting for all other risk factors, as represented by the adjusted ORs. Analyses were conducted with SPSS 19.0.

RESULTS

Nonresponse

Lack of sexual satisfaction.—Logistic regression was used to assess predictors of nonresponse, with the full model being significant (χ² (14) = 212.01, *p* < .001). Older adults

were more likely to respond if they were men (OR = 1.81, 95% confidence intervals (CIs): 1.56, 2.11, *p* < .001), younger (OR = 0.77, 95% CI: 0.69, 0.85, *p* < .001), satisfied with their marital support (OR = 1.38, 95% CI: 1.10, 1.73, *p* = .01), had better spousal health (fair—OR = 1.49, 95% CI: 1.03, 2.16, *p* = .04; good—OR = 1.56, 95% CI: 1.12, 2.18, *p* = .01; excellent—OR = 2.12, 95% CI: 1.50, 3.00, *p* < .001), had excellent self-rated health (OR = 2.05, 95% CI: 1.26, 3.34, *p* < .01), had a single episode of depression (OR = 1.68, 95% CI: 1.14, 2.47, *p* = .01), and reported sexual pain in the previous 6 months (OR = 1.88, 95% CI: 1.47, 2.39, *p* < .001). In Table 2, standardized beta, *p* values, adjusted ORs, and CIs are provided for each variable in the model.

Inability to maintain the sexual relationship.—Logistic regression was used to assess predictors of nonresponse, with the full model being significant (χ² (14) = 75.86, *p* <

Table 2. Analysis of Nonresponse for Sexual Unwellness: Results of Logistic Regression Analysis of the Wisconsin Longitudinal Study 1992 and 2003 Waves of Data

	Lack of sexual satisfaction ($N = 4,535$)			Inability to maintain sexual relationship ($N = 4,534$)		
	Standardized beta	OR[a] (95% CI)	*p* Value	Standardized beta	OR[a] (95% CI)	*p* Value
Age	**-0.27**	**0.77 (0.69, 0.85)**	**<.001**	-0.08	0.92 (0.85, 1.01)	.08
Gender	**0.60**	**1.81 (1.56, 2.11)**	**<.001**	**0.17**	**1.18 (1.05, 1.34)**	**.01**
Education years	0.02	1.02 (0.98, 1.06)	.29	0.03	1.03 (1.00, 1.06)	.06
Marital support	**0.32**	**1.38 (1.10, 1.73)**	**.01**	-0.02	0.98 (0.80, 1.20)	.85
Spouse health						
Fair	**0.40**	**1.49 (1.03, 2.16)**	**.04**	-0.31	0.74 (0.52, 1.05)	.09
Good	**0.44**	**1.56 (1.12, 2.18)**	**.01**	**-0.41**	**0.66 (0.48, 0.92)**	**.01**
Excellent	**0.75**	**2.12 (1.49, 3.00)**	**<.001**	**-0.44**	**0.65 (0.46, 0.90)**	**.01**
Self-rated health						
Fair	-0.01	0.99 (0.61, 1.61)	.96	-0.10	0.91 (0.58, 1.42)	.67
Good	0.44	1.56 (0.99, 2.46)	.06	-0.04	0.97 (0.63, 1.48)	.87
Excellent	**0.72**	**2.05 (1.26, 3.34)**	**<.01**	-0.07	0.93 (0.60, 1.45)	.75
Fatigue	0.12	1.13 (.97, 1.32)	.12	0.10	1.10 (0.97, 1.25)	.13
Sexual pain	**0.63**	**1.88 (1.47, 2.39)**	**<.001**	**0.58**	**1.78 (1.49, 2.14)**	**<.001**
Depression						
Single episode	**0.52**	**1.68 (1.14, 2.47)**	**.01**	**0.31**	**1.36 (1.02, 1.82)**	**.04**
Recurrent	0.06	1.06 (0.75, 1.50)	.75	0.06	1.06 (0.79, 1.43)	.70

Notes: Significant findings, defined as significance level of $p < .05$, are bolded. CI = confidence interval; OR = odds ratio.
[a]Adjusted odds ratios.

.001). Older adults were more likely to respond if they were men (OR = 1.18, 95% CI: 1.05, 1.34, $p = .01$), reported sexual pain in the previous 6 months (OR = 1.78, 95% CI: 1.49, 2.14, $p < .001$), and had a single episode of depression (OR = 1.36, 95% CI: 1.02, 1.82, $p = .04$), They were less likely to respond if they reported poorer spousal health (good—OR = 0.66, 95% CI: 0.48, 0.92, $p = .01$; excellent—OR = 0.65, 95% CI: 0.46, 0.90, $p = .01$).

Main Analyses

Lack of sexual satisfaction.—Of the 4,187 participants, 362 (8.7%) were classified as cases, reporting a complete lack of sexual satisfaction in the previous 12 months. In univariate analyses, a higher proportion of cases than controls were women, had a spouse or partner; reported poorer spousal and personal health; reported a history of depression, diabetes, and removal of the uterus and/or ovaries (for women); and reported fatigue in the previous 6 months. A lower proportion of cases reported marital support than controls (see Table 1). Risk factors for lack of sexual satisfaction were grouped into four categories and entered into the predictive model separately: (a) background variables, (b) spouse variables, (c) personal health variables, and (d) mental health variables. Due to the small numbers of cases and controls by cancer site, cancer was coded as a dichotomous variable (cancer history vs. no cancer history) in this model. Each step added significant predictive value, and the final model was significant, (χ^2 (17) = 212.51, $p < .001$, Nagelkerke $R^2 = .13$), with overall accuracy of the model to classify cases and controls at 91.3%, low sensitivity (2.6%), and high specificity (99.8%).

With regard to lack of sexual satisfaction, few chronic physical and mental illness factors were found to pose a significant risk for sexual unwellness. An older adult at higher risk for lack of sexual satisfaction was independently associated with a history of diabetes (OR = 1.54, 95% CI: 1.02, 2.31, $p = .04$) and fatigue symptoms in the previous 6 months (OR = 1.39, 95% CI: 1.07, 1.81, $p = .01$). Being of male gender (OR = 0.71, 95% CI: 0.55, 0.93, $p = .01$), being satisfied with his or her marital support (OR = 0.17, 95% CI: 0.13, 0.23, $p < .001$), and having a spouse with "good" (OR = 0.60, 95% CI: 0.32, 0.94, $p = .03$) or "excellent" health (OR = 0.33, 95% CI: 0.19, 0.55, $p < .001$) reduced the risk of being unsatisfied sexually. In Table 3, standardized beta, p values, adjusted ORs, and CIs are provided for each variable in the model.

Inability to maintain the sexual relationship.—Of the 3,028 participants in the sample, 1,513 (50%) were classified as cases, reporting an inability to maintain their sexual relationship in the previous 12 months. Compared to controls, a higher proportion of cases were men; had a spouse or partner; reported poorer health and better spousal health; a history of depression, diabetes, and hypertension; and reported sexual pain and fatigue in the previous 6 months. A lower proportion of cases reported marital support than controls (see Table 1). Risk factors for inability to maintain a sexual relationship were grouped into four categories and entered into the predictive model separately: (a) background variables, (b) spouse variables, (c) personal health variables, and (d) mental health variables. There were sufficient numbers of cases and controls in each cancer type to be able to analyze the impact of cancer site on sexual unwellness

Table 3. Case–Control Analysis of Risk Factors for Sexual Unwellness: Results of Logistic Regression Analysis of the Wisconsin Longitudinal Study 1992 and 2003 Waves of Data

	Lack of sexual satisfaction ($N = 3,511$)			Inability to maintain sexual relationship ($N = 2,540$)		
	Standardized beta	OR[a] (95% CI)	*p* Value	Standardized beta	OR[a] (95% CI)	*p* Value
Age	0.10	1.11 (0.92, 1.33)	.29	-0.01	0.99 (0.87, 1.12)	.87
Gender	**-0.33**	**0.71 (0.55, 0.93)**	**.01**	-0.06	0.95 (0.79, 1.13)	.55
Education years	-0.004	1.00 (0.94, 1.06)	.91	**0.09**	**1.09 (1.05, 1.14)**	**<.001**
Marital support	**-1.76**	**0.17 (0.13, 0.23)**	**<.001**	-0.13	0.88 (0.66, 1.18)	.40
Spouse health						
Fair	-0.24	0.79 (0.44, 1.41)	.42	0.46	1.58 (0.97, 2.57)	.06
Good	**-0.60**	**0.55 (0.32, 0.94)**	**.03**	**0.73**	**2.07 (1.33, 3.23)**	**<.01**
Excellent	**-1.10**	**0.33 (0.19, 0.59)**	**<.001**	**0.83**	**2.28 (1.45, 3.59)**	**<.001**
Self-rated health						
Fair	-0.16	0.85 (0.40, 1.81)	.67	**-1.40**	**.25 (0.09, 0.66)**	**<.01**
Good	-0.24	0.79 (0.39, 1.61)	.52	**-2.25**	**0.11 (0.04, 0.27)**	**<.001**
Excellent	-0.27	0.77 (0.35, 1.68)	.51	**-2.78**	**0.06 (0.02, 0.17)**	**<.001**
Hypertension	0.12	1.12 (0.87, 1.45)	.38	0.13	1.14 (0.96, 1.36)	.13
Diabetes	**0.43**	**1.54 (1.02, 2.31)**	**.04**	**0.45**	**1.57 (1.13, 2.17)**	**<.01**
Cancer	-0.32	0.73 (0.43, 1.23)	.23	—	—	—
Cancer site						
Prostate	—	—	—	**0.83**	**2.30 (1.01, 5.24)**	**.05**
Breast	—	—	—	-0.28	0.75 (0.42, 1.35)	.34
Genitourinary	—	—	—	-0.02	0.97 (0.46, 2.07)	.95
Other	—	—	—	0.43	1.53 (0.86, 2.73)	.15
Fatigue	**0.33**	**1.39 (1.07, 1.81)**	**.01**	**0.26**	**1.29 (1.08, 1.54)**	**<.01**
Sexual pain	-0.21	.81 (0.57, 1.16)	.26	**1.56**	**4.75 (3.64, 6.18)**	**<.001**
Depression						
Single episode	0.35	1.42 (0.86, 2.34)	.18	**0.55**	**1.74 (1.18, 2.56)**	**<.01**
Recurrent	0.06	1.06 (0.61, 1.86)	.84	**0.58**	**1.79 (1.16, 2.77)**	**<.01**

Notes: Significant findings, defined as significance level of $p < .05$, are bolded. CI = confidence interval; OR = odds ratio.
[a]Adjusted odds ratios.

in this model (i.e., prostate, breast, genitourinary, and other types). Each step added significant predictive value, and the final model was significant, (χ^2 (20) = 405.06, $p < .001$, Nagelkerke R^2 = .20), with overall accuracy of the model to classify cases and controls at 66.1%, low sensitivity (56%), and good specificity (76.6%).

Several chronic physical and mental illness risk factors were significant predictors of sexual unwellness. An older adult at higher risk for being unable to maintain the sexual relationship was independently associated with a history of diabetes (OR = 1.57, 95% CI: 1.13, 2.17, $p < .01$), fatigue symptoms in the previous 6 months (OR = 1.29, 95% CI: 1.08, 1.54, $p < .01$), sexual pain symptoms in the previous 6 months (OR = 4.75, 95% CI: 3.64, 6.18, $p < .001$), and a history of depression—single episode (OR = 1.74, 95% CI: 1.18, 2.56, $p < .01$) and recurrent episodes (OR = 1.79, 95% CI: 1.16, 2.77, $p < .01$). Additionally, after controlling for all other variables in the model, older adults with a history of prostate cancer were 2.29 times more likely to be unable to maintain their sexual relationship than those without a history of prostate cancer (95% CI: 1.01, 5.23, $\beta = .83$, Wald = 3.88, $p = .05$). Protective factors included having "fair" (OR = 0.25, 95% CI: 0.09, 0.66, $p < .01$), "good" (OR = 0.11, 95% CI: 0.04, 0.27, $p < .001$), or "excellent" self-rated health (OR = 0.06, 95% CI: 0.02, 0.17, $p < .001$), all of which reduced the risk of being unable to maintain a sexual relationship.

Interestingly, higher education was associated with increased risk for sexual unwellness; however, the OR was very close to 1.0 (OR = 1.09, 95% CI: 1.05, 1.14, $p < .001$) and the standardized coefficient was at $\beta = .09$, indicating a very small effect. This may have been a statistical artifact and warrants replication in similar samples. Also, having a spouse with "good" (OR = 2.07, 95% CI: 1.33, 3.23, $p < .01$) or "excellent" health (OR = 2.28, 95% CI: 1.45, 3.59, $p < .001$) put an individual at higher risk for being unable to maintain his or her sexual relationship. In Table 3, standardized beta, p values, adjusted ORs, and CIs are provided for each variable in the model.

DISCUSSION

This study examined potential risk factors contributing to sexual unwellness over time in an older adult population utilizing a case–control methodology. Sexual unwellness was examined using two separate yet related constructs: *lack of sexual satisfaction* and *inability to maintain the sexual relationship* due to personal factors (e.g., personal health, interest, and emotional reasons). Several chronic physical and mental health factors were assessed, with an emphasis on the independent contribution of each while taking into account the impact of the other risk factors.

Approximately two-thirds (64.2%) of older adults who responded to the sexual frequency question are having sex—from once a month or less to once a day or more. This is consistent with the literature, suggesting many older adults continue to enjoy, value, and engage in sexual activity (Lindau et al., 2007). However, several physical and mental health challenges may interfere with sexual quality of life and decrease or stop sexual activity (DeLamater & Karraker, 2009). The prevalence of sexual unwellness in this study varied by definition: *lack of satisfaction* or *inability to maintain the sexual relationship*. Considerably fewer older adults were experiencing problems with having satisfying sexual experiences (8.7%), whereas half of the responders had difficulty maintaining their sexual activity. This illustrates the multidimensional nature of sexual well-being and captures differences between areas of sexual difficulty.

What contributes to sexual unwellness in this older adult sample? Previous studies found that physical and mental health concerns prevalent in the aging population—heart disease, diabetes, fatigue, pain, and depression—contribute to sexual problems (DeLamater et al., 2006; Laumann et al., 2009; Sadovsky et al., 2010; Tierney, 2008). As expected, in this sample, diabetes and fatigue symptoms were risk factors for both lack of sexual satisfaction and the inability to maintain the sexual relationship. However, hypertension was not predictive of risk in either case, which is inconsistent with previous studies that suggested cardiovascular diseases were frequently associated with sexual problems. It is possible that hypertension diagnosis is a poor indication of whether cardiovascular symptoms are controlled or uncontrolled, therefore they may not be actively affecting sexual function. Also, this may be due to the way in which sexual symptoms are represented in this study, as other studies showing a strong relationship between heart and sexual health looked at frequency and/or sexual dysfunction alone.

Among the risk factors for sexual unwellness, cancer poses a significant risk to sexual well-being, which has been well documented in pediatric and adult cancer survivors. However, the impact of cancer on the sexual well-being of older adult cancer survivors, in light of the other physical and mental health challenges associated with aging, is largely unknown. Given the prevalence of sexual problems in adult cancer survivors, it was hypothesized that a history of cancer would put older adults at further risk for sexual unwellness. Older adult men with a history of prostate cancer were 2.3 times more likely to be unable to maintain their sexual relationship, which was the only predictive role of cancer history in this sample (see Table 3). There are several possible explanations for the lack of additional risk associated with cancer history. First, the prevalence rate of cancer in this sample of older adults (7.2%) was low compared to the general population of older adults in a similar age cohort (20.4%; Centers for Disease Control and Prevention, 2010). Furthermore, we do not have information about the sexual side effects in individuals for whom cancer was the cause

of death, because they were censored from the data set prior to collecting sexual activity information. Also, additional variables (e.g., time since treatment; types and amounts of treatments received) known to moderate the relationship between cancer and sexuality were not available for analysis. These issues may explain the minimal risk of cancer history for sexual unwellness in this sample.

Overall, the profile of predictive risk factors differed depending on the definition of sexual unwellness. Several expected physical and mental health factors predicted decreasing or stopping of the sexual relationship and included diabetes, fatigue, depression, sexual pain, and poorer self-rated health. Previous studies have shown these to be predictive of reported problems with sexual functioning or frequency of sex in an older adult population, though often examining only one of these conditions per study (DeLamater et al., 2006; DeLamater & Karraker, 2009; Laumann et al., 2009; Lindau et al., 2007; Thompson et al., 2011). Poor physical health has been implicated as a key component of decline in sexual activity in older adults across national samples (Karraker et al., 2011). Notably, individuals reporting sexual pain were more likely to respond to this question, potentially inflating the influence of sexual pain as a predictor.

Lack of sexual satisfaction was much less common (8.7%) in this sample, and the ability of the model to predict cases (true positives) was very low, though the ability to predict controls (true negatives) was very high. Few physical and mental health factors were predictive of risk for developing lack of sexual satisfaction in this sample. In addition to fatigue and diabetes, significant predictors included being of female gender, lack of satisfaction with marital support, and poorer spousal health. It appears that lack of emotional or physical satisfaction with sex may be more related to partner than individual health factors. However, the strength of these conclusions is tempered by the low sensitivity of the predictive model for lack of satisfaction as well as the increased likelihood of women and those unsatisfied with marital support and poorer spousal health to respond to the question.

A pattern of sexual unwellness by gender emerged: a significantly higher proportion of older adult women reported a lack of sexual satisfaction, whereas a significantly higher proportion of older adult men reported being unable to maintain their sexual relationship. When controlling for all other variables, gender was independently predictive of risk for lack of sexual satisfaction, with women at higher risk. Similarly, large national and international studies have consistently shown that women report less sexual satisfaction compared to men (Laumann et al., 2006; Lindau et al., 2007). However, this study may give additional insight into this relationship by highlighting risk factors associated with this pattern. To illustrate, more older adult women reported lack of sexual satisfaction, which is associated with partner factors. Perhaps women are less sexually satisfied due

to the importance they give to relationship factors such as marital support and spousal health, compared to their male peers, who more often report sexual unwellness associated with individual health factors. Future studies should consider stratifying by gender to examine the potential patterns of risk factors for sexual unwellness in older adult women versus older adult men.

Limitations

Limitations to this study should be considered when interpreting and evaluating the results. Notably, the model to predict lack of sexual satisfaction had very low sensitivity, indicating a limited ability to accurately predict cases. The low frequency of unsatisfied individuals likely contributes to this, because it is difficult to accurately predict uncommon events. Future studies may improve accuracy by including additional predictive variables, such as more detailed relationship factors (e.g., communication, quality, and adjustment) (DeLamater & Karraker, 2009; Dundon & Rellini, 2010), sexual attitudes and expectations (Carpenter, Nathanson, & Kim, 2009), and sexual behavior variables (e.g., type and duration of encounter;) (Carpenter et al., 2009; Heiman et al., 2011).

The WLS is a longitudinal data set that utilized a randomly selected sample; however, it sampled only a cohort of high school graduates in Wisconsin, suggesting limited generalizability, especially to minority ethnic and racial groups (DeLamater et al., 2006), international populations, and adults older than 67. Also, sexual orientation information is not available, limiting our ability to understand the impact of being an aging sexual minority on sexual expression. An additional limitation is the vague definitions of both sexual pain and fatigue, measuring only the presence or absence in the previous 6 months. Future studies would benefit from more nuanced sexual pain and fatigue variables, including perceived impact, frequency, and magnitude of these symptoms as well as treatment-related information.

As noted, this study had high rates of nonresponse, with 43% of possible responders in a sexual relationship refusing to answer the questions related to inability to maintain their sexual relationship and 26% refusing to answer the sexual satisfaction questions. Given the pattern of gender differences in sexual unwellness, it is important to note that women were less likely to respond to sexual questions in general. Also, individuals with recent sexual pain were more likely to respond, which may have affected the overall rate of sexual unwellness reported.

Conclusion and Future Directions

Sexuality is integral to quality of life for many older adults. In order to understand broader aspects of decline in sexual well-being, this study examined lack of sexual satisfaction and the inability to maintain sexual activity in older adults (63 to 67 years old). A wide-ranging set of risk factors was incorporated in order to better predict the development of sexual unwellness. Previous studies examined these factors in isolation, included only a few factors in their analyses, and have often employed a cross-sectional design. Using a nested case–control design to examine a longitudinal data set, this study was able to assess the temporal impact of several physical and mental health risk factors on the development of sexual unwellness in older adults.

Patterns of risk emerged depending on how sexual unwellness was defined, suggesting that older adult sexuality is multidimensional and should be assessed more broadly than previous studies that looked only at dysfunction or frequency. Also, greater number of partnership factors than individual health factors were related to lack of sexual satisfaction, whereas individual health factors were prominent when predicting whether an older adult is decreasing or stopping sexual activity.

A nationally representative sample of older adults, including those beyond their 60s, may improve our understanding of how physical and mental health affects older adult sexuality. Our knowledge of the oldest cohorts is limited, and analyzing chronic health factors as they continue to age will improve our ability to predict associated risk for sexual unwellness across the aging trajectory. Similarly, sexuality was not assessed until this sample was aged more than 60; tracking the progression of sexual unwellness over time would allow us to see whether similar predictive relationships persist or whether they change. Focusing on longitudinal data sets that allow for temporal precedence, advanced modeling, and account for several risk factors is warranted. Of note, the WLS continues data collection on this cohort, and the NSHAP—a large national sample of older adults with extensive sexuality information—is in the process of collecting a second wave of data. Both data sets would allow for longitudinal analysis of a multidimensional sexual well-being.

This study has practical implications for clinicians working with older adults. Sexual concerns are prevalent, and older adults do not often spontaneously report them (Hirayama & Walker, 2011), indicating that they prefer the provider to address sexual functioning issues (Gott & Hinchcliff, 2003). Thus, there is a continued need for clinicians working with older adults to be open to discussing sexuality and assess the sexual health concerns of all of their patients.

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REFERENCES

Ahern, K., & Le Brocque, R. (2005). Methodological issues in the effects of attrition: Simple solutions for social scientists. *Field Methods*, *17*, 53–67. doi:10.1177/1525822X04271006

Brody, S. (2006). Blood pressure reactivity to stress is better for people who recently had penile-vaginal intercourse than for people who had other or no sexual activity. *Biological Psychology*, *71*(2), 214–222. doi:10.1016/j.biopsycho.2005.03.005

Brody, S. (2010). The relative health benefits of different sexual activities. *Journal of Sexual Medicine*, *7*, 1336–1361. doi:10.1111/j.1743-6109.2009.01677.x

Carpenter, L. M., Nathanson, C. A., & Kim, Y. J. (2009). Physical women, emotional men: Gender and sexual satisfaction in midlife. *Archives of Sexual Behavior*, *38*, 87–107. doi:10.1007/s10508-007-9215-y

Centers for Disease Control and Prevention. (2010). *Summary health statistics for U.S. adults: National Health Interview Survey, 2010. U.S. Department of Health and Human Services.* Retrieved from http://www.cdc.gov/nchs/data/series/sr_10/sr10_252.pdf

Chen, X., Zhang, Q., & Tan, X. (2009). Cardiovascular effects of sexual activity. *Indian Journal of Medical Research*, *130*, 681–688.

Cyranowski, J. M., Bromberger, J., Youk, A., Matthews, K., Kravitz, H. M., & Powell, L. H. (2004). Lifetime depression history and sexual function in women at midlife. *Archives of Sexual Behavior*, *33*, 539–548. doi:10.1023/B:ASEB.0000044738.84813.3b

Davey-Smith, G., Frankel, S., & Yarnell, J. (1997). Sex and death: Are they related? Findings from the Caerphilly cohort study. *British Medical Journal*, *315*, 1641–1644. doi:10.1136/bmj.315.7123.1641

Davison, S.L., Bell R.J., LaChina, M., Holden, S.L., & Davis, S.R. (2009). The relationship between self-reported sexual satisfaction and general well-being in women. *Journal of Sexual Medicine*, *6*, 2690–2697. doi:10.1111/j.1743-6109.2009.01406.x

DeLamater, J., Hyde, J.S., & Fong, M. (2006). *Sexual behavior at ages 62 to 67: A biopsychosocial approach. CDE Working Paper No. 2006–08,* Center for Demography and Ecology, University of Wisconsin-Madison.

DeLamater, J., & Karraker, A. (2009). Sexual functioning in older adults. *Current Psychiatry Reports*, *11*, 6–11. doi:10.1007/s11920-009-0002-4

DeLamater, J., & Sill, M. (2005). Sexual desire in later life. *Journal of Sex Research*, *42*, 138–149. doi:10.1080/00224490509552267

Depp, C. A., Vahia, I. V., & Jeste, D. V. (2010). Successful aging: Focus on cognitive and emotional health. *Annual Review of Clinical Psychology*, *6*, 527–550. doi:10.1146/annurev.clinpsy.121208.131449

Dundon, C. M., & Rellini, A. H. (2010). More than sexual function: Predictors of sexual satisfaction in a sample of women age 40–70. *Journal of Sexual Medicine*, *7*(2), 896–904. doi:10.1111/j.1743-6109.2009.01557.x

Gott, M., & Hinchliff, S. (2003). Barriers to seeking treatment for sexual problems in primary care: a qualitative study with older people. *Family Practice*, *20*(6), 690–695. doi:10.1093/fampra/cmg612

Greenberg, S. (2009). *A Profile of Older Americans: 2009*. Washington, DC: U.S. Department of Health and Human Services.

Hauser, R. (2005). Survey response in the long run: The Wisconsin Longitudinal Study. *Field Methods*, *17*, 3–29. doi:10.1177/1525822X04272452

Heiman, J. R., Long, J. S., Smith, S. N., Fisher, W. A., Sand, M. S., & Rosen R. C. (2011). Sexual satisfaction and relationship happiness in midlife and older couples in five countries. *Archives of Sexual Behavior*, *40*, 741–753. doi:10.1007/s10508-010-9703-3

Hirayama, R. & Walker, A.J. (2011). Who helps older adults with sexual problems? Confidants versus physicians. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *66B* (1): 109–118. doi:10.1093/geronb/gbq021

Hoekstra, T., Jaarsma, T., Sanderman, R., van Vedlhuisen, D. J., & Lesman-Leegte, I. (2011). Perceived sexual difficulties and associated factors in patients with heart failure. *American Heart Journal*, *163*(2), 246–251. doi:10.1016/j.ahj.2011.10.011

Jannini, E. A., Fischer, W. A., Bitzer, J., & McMahon, C. G. (2009). Is sex just fun? How sexual activity improves health. *Journal of Sexual Medicine*, *6*, 2640–2648. doi:10.1111/j.1743-6109.2009.01477.x

Jeste, D. V., Depp C. A., & Vahia, I. V. (2008). Successful cognitive and emotional aging. *World Psychiatry*, *9*, 78–84.

Kagan, S. H., Holland, N., & Chalian, A. A. (2008). Sexual issues in special populations: Geriatric oncology – sexuality and older adults. *Seminars in Oncology Nursing*, *24*, 120–126. doi:10.1016/j.soncn.2008.02.005

Karraker, A., DeLamater, J., & Schwartz, C. R. (2011). Sexual frequency decline from midlife to later life. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *66B*(4), 502–512. doi:10.1093/geronb/gbr058

Laumann, E. O., Das, A., & Waite, L. J. (2008). Sexual dysfunction among older adults: Prevalence and risk factors from a nationally-representative U.S. probability sample of men and women 57–85 years of age. *Journal of Sexual Medicine*, *5*(10), 2300–2311. doi:10.1111/j.1743-6109.2008.00974.x

Laumann, E. O., Glasser, D. B., Neves, R. C. S., & Moreira, E. D. (2009). A population-based survey of sexual activity, sexual problems and associated help-seeking behavior patterns in mature adults in the United States of America. *International Journal of Impotence Research*, *21*(3),171–178. doi:10.1038/ijir.2009.7

Laumann, E. O., Nicolosi, A., Glasser, D. B., Paik, A., Gingell, C., Moreira, E. . . GSSAB Investigators' Group. (2005). Sexual problems among women and men aged 40–80 years: Prevalence and correlates identified in the Global Study of Sexual Attitudes and Behaviors. *International Journal of Impotence Research*, *17*, 39–57. doi:10.1038/sj.ijir.3901250

Laumann, E. O., Paik, A., Glasser, D. B., Kang, J. H., Wang, T., Levinson, B. . . Gingell, C. (2006). A cross-national study of subjective sexual well-being among older women and men: Findings from the global study of sexual attitudes and behaviors. *Archives of Sexual Behavior*, *35*,145–161. doi:10.1007/s10508-005-9005-3

Levin, R. J. (2007). Sexual activity, health, and well-being—the beneficial roles of coitus and masturbation. *Sexual and Relationship Therapy*, *22*, 135–148. doi:10.1080/14681990601149197

Lindau, S. T., & Gavrilova, N. (2010). Sex, health, and years of sexually active life gained due to good health: Evidence from two US population based cross sectional surveys of ageing. *British Medical Journal*, *340*, 1–11. doi:10.1136/bmj.c810.

Lindau, S. T., Schumm, L. P., Laumann, E. O., Levinson, W., O'Muircheartaigh, C. A., & Waite, L .J. (2007). A study of sexuality and health among older adults in the United States. *New England Journal of Medicine*, *357*, 762–774. Doi:10.1056/NEJMoa067423

Mona, L.R., Syme, M.L., Goldwaser, G., Cameron, R.P., Chen, Clemency, C . . . Lemos, L. (2011). Sexual health in older adults: Conceptualization and treatment. In K. Sorocco & S. Lauderdale (Eds), *Cognitive behavior therapy with older adults: Innovations across care settings* (pp. 261–285). New York: Springer.

Monga, U. (2002). Sexual functioning in cancer patients. *Sexuality and Disability*, *20*(4), 277–295. doi:10.1023/A:1021609530248

National Institute on Aging. (2007). *Living Long & Well in the 21st Centruy: Strategic Directory for Research on Aging. NIH Publication Number: 07-6252*. Washington, DC: U.S. Department of Health and Human Services.

Nusbaum, M. R. H., Singh, A. R., & Pyles, A. A. (2004). Sexual healthcare needs of women aged 65 and older. *Journal of the American Geriatrics Society*, *52*(1),117–122. doi:10.1111/j.1532-5415.2004.52020.x

Pruchno, R.A., Wilson-Genderson, M., & Cartwright, F. (2010). Two factor model of successful aging. *Journals of Gerontology Series*

B: Psychological Sciences and Social Sciences, *65B* (6), 671–679. doi:10.1093/geronb/gbq051

Rosen, R. C., & Bachmann, G. A. (2008). Sexual well-being, happiness, and satisfaction in women: The case for a new conceptual paradigm. *Journal of Sex & Marital Therapy*, *34*, 291–297. doi:10.1080/00926230802096234

Sadovsky, R., Basson, R., Krychman, M., Morales, A.M., Shover, L., Wang, R. & Incrocci, L. (2010). Cancer and sexual problems. *Journal of Sexual Medicine*,*7*, 349–373. doi:10.1111/j.1743-6109.2009.01620.x

Tierney, D. (2008). Sexuality: A quality of life issue for cancer survivors. *Seminars in Oncology Nursing*, *24*, 71–79. doi:10.1016/j.soncn.2008.02.001

Thompson, W.K., Charoa, L., Vahia, I.V., Depp, C, Allison, M, & Jeste, D.V. (2011). Association between higher levels of sexual function, activity, and satisfaction and self-rated successful aging in older postmenopausal women. *Journal of the American Geriatrics Society*, *59*, 1503–1508. doi:10.1111/j.1532-5415.2011.03495.x