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Association between higher levels of sexual function, activity, and satisfaction and self-rated successful aging in older postmenopausal women

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Abstract

Objectives—To determine if measures of successful-aging are associated with sexual activity, satisfaction, and function in older post-menopausal women.

Design—Cross-sectional study using self-report surveys; analyses include chi-square and t-tests and multiple linear regression analyses.

Setting—Community-dwelling older post-menopausal women in the greater San Diego Region.

Participants—1,235 community-dwelling women aged 60-89 years participating at the San Diego site of the Women's Health Initiative.

Measurements—Demographics and self-report measures of sexual activity, function, and satisfaction and successful aging.

Results—Sexual activity and functioning (desire, arousal, vaginal tightness, use of lubricants, and ability to climax) were negatively associated with age, as were physical and mental health. In contrast, sexual satisfaction and self-rated successful aging and quality of life remained unchanged across age groups. Successful aging measures were positively associated with sexual measures, especially self-rated quality of life and sexual satisfaction.

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Conclusions—Self-rated successful aging, quality of life, and sexual satisfaction appear to be stable in the face of declines in physical health, some cognitive abilities, and sexual activity and function and are positively associated with each other across ages 60-89 years.

Keywords

Sexual Activity; Sexual Satisfaction; Sexual Function; Post-menopausal Women; Self-Rated Successful aging

Introduction

Sexual activity, function, and satisfaction have been posited as an integral component of overall well-being among post-menopausal women^{1;2}. For example, higher levels of sexual activity have been correlated with better physical^{2;3} and mental health¹, and higher levels of marital adjustment⁴. Similarly, higher sexual satisfaction has been associated with better mental health⁵, higher relationship quality⁴ and general psychological well-being⁶, while sexual dysfunction is less likely to occur among women in good physical and emotional health^{5;7-9}.

Whether sexual activity, function, and satisfaction, which are influenced by physical, social, and emotional factors, are also associated with self-rated successful aging remains unknown. Previous work suggests that older adults' perceived successful aging relates to other indicators of cognitive, emotional, and physical health^{10;11}. Here, we examined associations between self-perceived successful aging, other measures related to successful aging, and sexual activity, function, and satisfaction in a cohort of community-dwelling women (ages 60-89 years) enrolled at the San Diego site of the Women's Health Initiative (WHI) study who also completed a successful aging survey in 2005^{12;13}.

The WHI is a major ongoing research program that began enrollment in 1993 to address the most common causes of death, disability and quality of life in 161,808 generally healthy post-menopausal women¹⁴. A study originating from the Observational Study (OS) of the WHI evaluated potential correlates of sexual satisfaction, assessed with a single dichotomous item, in 46,525 sexually active women ages 50 to 79 years. This study found that sexual satisfaction was unrelated to physical health but modestly related to mental health¹⁵.

Based on prior reports, we hypothesized that sexual activity, function, and satisfaction, would decrease with age. We further hypothesized that measures of successful aging, including self-rated successful aging and quality of life, depressive symptoms, and SF36 physical, mental, and social functioning would be positively associated with higher sexual activity, function, and satisfaction in post-menopausal women, and that this association would remain significant across ages 60-89 years.

Methods

Study Population

The study sample includes women from the San Diego clinical center of the WHI, a large NIH-funded multi-center study of the predictors of morbidity and mortality among post-menopausal women¹⁶ who were followed for an average of seven years between 1994 and 2005. A detailed description of the WHI methodology is available in prior publications¹⁶. Inclusion criteria were post-menopausal status, plan to reside in the area for at least 3 years, no medical conditions predictive of survival less than 3 years or complicating disorders such as substance abuse disorders, and ability to provide written consent. The WHI included an observational study and three separate clinical trials, involving hormone replacement therapy, dietary modification, and calcium/vitamin D supplementation^{14;17}. Women enrolled in the clinical trials were not eligible to enroll in the OS.

At their final study visit, 3,653 San Diego WHI subjects were invited to participate in a study of successful aging (SA). For enrollment, women were either consented at their final clinic visit or mailed the questionnaire and consent form. Overall, 2,017 women returned the SA survey questionnaire. We have previously published reports using data collected with this questionnaire^{12;13}. For the current study, we conducted analyses on the subsample of 1,235 English-speaking women, aged 60-89 years old who returned the SA survey with a signed consent form and who were also administered the items from the sexuality questionnaire analyzed in this report. The Institutional Review Board of the University of California, San Diego approved this study.

Measures

Demographics—Participants' age and marital status were current at the time of the SA survey in 2004-2006. Educational attainment and ethnicity were obtained from the baseline (enrollment) visit of the WHI study between 1993 and 1998. All other measures were taken from the SA survey.

Measures related to Sexual Activity, Function, and Satisfaction—We developed the sexuality questionnaire by adapting items from the Female Sexual Function index and the McCoy Female Sexuality Questionnaire^{18;19} and adding additional items by consensus among investigators and in consultation with clinicians in the Departments of Geriatrics and Geriatric Psychiatry at the University of California, San Diego. We included items to measure access to a partner, sexual activity with or without a partner in the last six months, satisfaction with overall sex life, and five sexual functioning questions (sexual desire, sexual arousal, vaginal tightness, use of vaginal lubricants, and ability to climax).

Measures related to successful aging—The primary dependent variables, Self-Rated Successful Aging (SRSA) and Self-Rated Quality of Life (SRQL) were obtained by asking participants to rate themselves on a 10-point Likert scale, with 1 being least and 10 most successful. The SRSA item asked subjects to rate their own level of successful aging, whereas the SRQL item asked subjects to rate their quality of life in the current decade of life. While we have not previously published results using the SRQL, our prior work

suggests that SRSA is related positively to physical and mental health-related quality of life¹¹ and less severe depressive symptoms¹³. Secondary measures of social, physical, and mental health-related functioning were obtained using the social functioning component and the physical and mental health composite scores of the MOS-RAND SF-36 scale¹⁸. Depression was assessed using the Center for Epidemiological Studies Scale for Depression (CES-D)²¹.

Statistical Analysis

We examined the data for outliers, missing values, and normality. We computed summary statistics for demographics; differences in demographics were compared across three age groups (ages 60 to 69, 70 to 79, and 80 to 89) using chi-square tests. We also checked for differences in demographics between the full sample of 3,653 women in the WHI San Diego cohort and 1,235 women who answered the SA and sexuality questionnaires.

We compared the three age groups on frequency of sexual activity with or without a partner in the last 6 months, satisfaction with overall sex life, five sexual functioning items, and six successful aging-related variables, using chi-square tests. Finally, each successful aging measure was entered as a dependent variable in multiple linear regression models with sexual function, activity, or satisfaction as independent variables of interest along with marital/relationship status and age group. Sexual variables were interacted with age cohort to determine if the association between sexual and SA variables varied across age cohorts.

All tests were Bonferroni adjusted to control for inflated Type I errors due to multiple testing. Analyses were conducted in R version 2.10.

Results

Demographics

The study sample consisted of 1,235 women aged 60 to 89 years (mean=73.6, SD =7.2). The participants were predominantly Caucasian (89%) and 53% were married or in an intimate relationship at the time of the SA survey. Eighty-eight percent had completed high school and 79% had attended at least some college. Sixty-seven percent of women aged 60-69, 53% of women aged 70-79, and 33% of women aged 80-89 were married or living in an intimate relationship at the time of the SA survey; these age cohort differences were highly significant ($p<0.001$). Older age cohorts were more predominantly Caucasian ($p<0.001$), but did not differ in years of education.

Of the 3,653 women in the San Diego WHI cohort, 1,979 (54%) returned the SA survey; no significant demographic differences existed between the subjects responding to the SA survey and the full San Diego WHI cohort. Additionally, no significant demographic differences existed between subjects in the full San Diego cohort and the 1,235 women who responded to the sexuality questionnaire.

Age Differences in Sexual and Successful Aging Variables

The responses for sexuality questionnaire items are presented in Table 1. Sexual activity decreased significantly in older age cohorts. Of the women who were married or in an

intimate relationship, 70% of women aged 60 to 69, 57% of women aged 70 to 79, and 31% of women aged 80 to 89 reported having had some sexual activity in the last six months. Thus, women married or living in an intimate relationship engaged in higher rates of sexual activity than women who were not living in such a relationship ($p < 0.001$), though sexual activity in women married or living in an intimate relationship still decreased across age cohorts ($p < 0.001$). No significant differences existed among age groups on reasons endorsed for not engaging in sexual activity. As seen in Table 1, women who had not engaged in recent sexual activity cited “lack of a partner” most often, followed by “partner is not able.” All five indicators of sexual functioning were negatively related to age. In contrast to sexual activity and functioning, satisfaction with overall sex life was not significantly different across age cohorts. Of the SA variables, three were significantly different across age cohorts: CES-D and the SF-36 Physical Health and Social Functioning Components (Table 2). SRQL, SRSA, and SF-36 Mental Health Component did not differ significantly across age cohorts.

Association between Sexual and Successful Aging Variables

Satisfaction with overall sex life was positively associated with SF-36 Mental Health Component ($t = 2.96$, $p = 0.003$) and SRQL ($t = 6.80$, $p < 0.001$), but negatively associated with and CES-D ($t = -2.88$, $p = 0.004$). Sexual activity was positively associated with SRSA ($t = 3.14$, $p = 0.002$) and SRQL ($t = 3.44$, $p < 0.001$).

With respect to the sexual functioning items, SRSA was positively associated with increased levels of sexual desire ($t = 2.88$, $p = 0.004$) and increased ability to climax ($t = 3.73$, $p < 0.001$), and significantly related to sexual arousal ($t = 2.56$, $p = 0.01$) before, but not after, the Bonferroni correction. SF-36 Social Functioning was positively associated with sexual arousal ($t = 3.01$, $p = 0.003$), but only in women who were married or otherwise in an intimate relationship. Likewise, SRQL was positively associated with sexual desire ($t = 2.89$, $p = 0.003$) and sexual arousal ($t = 3.27$, $p = 0.001$), but only in women who were married or in an intimate relationship.

Discussion

As predicted, sexual activity and functioning decreased with age, a result consonant with other reports^{3;5;23-25}. However, and contrary to our first hypothesis, sexual satisfaction was not significantly associated with age. In this regard, the literature has been inconsistent in describing the relationship between age and sexual satisfaction in older women, with some studies reporting a positive^{15;24} and others reporting a negative relationships^{5;26;27}. In our sample, levels of sexual activity and functioning vary significantly across age cohorts whereas sexual satisfaction does not. Similarly, most SA measures, including physical and mental health, declined with increasing age. Subjective assessments were exceptions to this trend. Levels of self-rated quality of life and successful aging remained substantially unchanged across age cohorts, mirroring the lack of change across age cohorts in self-rated sexual satisfaction.

That subjective appraisals of quality of life, successful aging, and sexual satisfaction did not decline in parallel with physical health, some cognitive abilities, and decreases in sexual

activity and functioning is consistent with observations that self-rated health changes little with age whereas objective health indicators do show age-associated decline²⁸. In other words, perceived quality of life, successful aging, and sexual satisfaction appear to be stable in the midst of age-associated changes in physical, mental, and sexual health. Interestingly, positive associations between successful aging and sexual variables were also strongest for subjective measures, in particular self-rated quality of life and sexual satisfaction. Self-rated quality of life and successful aging were also strongly associated with sexual desire and arousal in those women who were married or who had an intimate partner. These positive associations remained significant across all age cohorts, including women aged 80-89 years.

There are several limitations to this study. First, the data are cross-sectional and hence aging cannot be disentangled from age cohort effects; moreover, it requires longitudinal data to determine causal or directional relationships, if any, among successful aging and sexual variables. Second, the WHI San Diego cohort is largely Caucasian and highly educated and the results may not generalize to ethnic minorities or to other socioeconomic strata. Third, a minority of women in the San Diego cohort (34%) replied to the sexuality questionnaire and hence these results may reflect response biases. Fourth, obtaining valid sexual functioning measures from women who may have had variable lengths of time since last sexual activity can be problematic (e.g., they may be subject to recall bias). Finally, the current report uses self-report measures in post-hoc analyses, liable to be inferior to analyses of interviewer-administered data from studies *a priori* designed to address issues regarding successful aging and sexual variables. As such, future studies will be needed to address these limitations and also assess more subtle aspects of sexual function and successful aging.

Sexual activity, satisfaction, and functioning are positively associated with higher self-rated successful aging and quality of life across age groups in the sample. Moreover, self-rated quality of life and sexual satisfaction are strongly associated with each other and appear to be stable in the face of declines in physical health, certain cognitive abilities, and sexual activity and function.

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	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Employment or Affiliation		X		X		X		X		X		X
Grants/Funds		X		X		X		X		X		X
Honoraria		X		X		X		X		X		X
Speaker Forum		X		X		X		X		X		X
Consultant		X		X		X		X		X		X
Stocks		X		X		X		X		X		X
Royalties		X		X		X		X		X		X
Expert Testimony		X		X		X		X		X		X
Board Member		X		X		X		X		X		X
Patents		X		X		X		X		X		X
Personal Relationship		X		X		X		X		X		X

Table 1
Comparison of Age Groups on Sexuality Questionnaire responses

Variable	Age Cohort (years old)			χ^2 (DF)*	P
	60-69 (N=389)	70-79(N=565)	80-89(N=281)		
<u>SEXUAL ACTIVITY</u>					
Has sex been a part of your life in the last 6 months, either with or without a partner?					
Yes	201 (51.7%)	184 (32.6%)	38 (13.5%)	83.9 (2)	<0.001**
No	153 (39.3%)	286 (50.6%)	174 (61.9%)		
Missing	35 (9.0%)	95 (16.8%)	69 (24.6%)		
Reason for sex not being a part of your life in the last 6 months. (Only those women that answered "No" to "Has sex been a part of your life in the last 6 months.")					
Not interested	21 (13.8%)	33 (11.5%)	23 (13.2%)	12.7 (10)	0.239
Not able	2 (1.3%)	4 (1.4%)	0 (0.0%)		
Do not have a partner	60 (39.2%)	115 (40.1%)	91 (52.3%)		
Partner is not interested	6 (3.9%)	6 (2.1%)	4 (2.3%)		
Partner is not able	38 (24.8%)	81 (28.2%)	38 (21.8%)		
Other	13 (8.5%)	31 (10.8%)	11 (6.3%)		
Missing	13 (8.5%)	17 (5.9%)	7 (4.0%)		
<u>SEXUAL SATISFACTION</u>					
How satisfied have you been w/your overall sex life?					
Very dissatisfied	55 (14.1%)	55 (9.7%)	25 (8.9%)	9.1 (6)	0.167
Moderately dissatisfied	57 (14.7%)	79 (14.0%)	26 (9.3%)		
Equally to Moderately Satisfied	165 (42.4%)	199 (35.2%)	105 (37.4%)		
Very Satisfied	89 (22.9%)	143 (25.3%)	69 (24.6%)		
Missing	23 (5.9%)	89 (15.8%)	56 (19.9%)		
<u>SEXUAL DYSFUNCTION</u>					
Please rate how much, if at all, you have experienced the following in last 6 months:					
Sexual desire or interest					
Rarely or not at all	123 (31.6%)	214 (38.2%)	142 (51.0%)	72.0 (6)	<0.001***
Some or the time	188 (48.3%)	212 (37.5%)	66 (23.6%)		
A lot of the time	52 (13.4%)	56 (9.8%)	12 (4.2%)		

Variable	Age Cohort (years old)			χ^2 (DF)*	P
	60-69 (N=389)	70-79(N=565)	80-89(N=281)		
Missing/Do not want to answer	27 (6.9%)	85 (14.5%)	57 (19.4%)		
Feeling sexually aroused (turned on)					
Rarely or not at all	150 (38.6%)	239 (42.3%)	151 (53.7%)	59.9 (6)	<0.001**
Some of the time	175 (45.0%)	201 (35.6%)	58 (20.6%)		
A lot of the time	32 (8.2%)	35 (6.2%)	7 (2.5%)		
Missing/Do not want to answer	32 (8.3%)	90 (16.0%)	65 (23.1%)		
How often do you experience tightness of vagina?					
Rarely or not at all	215 (55.3%)	339 (60.0%)	176 (62.6%)	46.7 (6)	<0.001**
Some of the time	72 (18.5%)	74 (13.1%)	23 (8.2%)		
A lot of the time	45 (11.6%)	27 (4.8%)	8 (2.8%)		
Missing/Do not want to answer	57 (14.6%)	125 (22.2%)	74 (26.3%)		
How often do you require the use of vaginal lubricants?					
Rarely or Very Rarely	200 (51.4%)	294 (52.0%)	129 (45.9%)	31.6 (6)	<0.001**
Moderate	16 (4.1%)	33 (5.8%)	11 (3.9%)		
Often	40 (10.3%)	40 (7.1%)	12 (4.3%)		
Very Often	59 (15.2%)	37 (6.5%)	8 (2.8%)		
Missing	74 (19.0%)	161 (29.0%)	121 (43.1%)		
Ability to reach a climax (orgasm)					
Rarely or not at all	100 (25.7)	135 (23.9%)	90 (32.0%)	86.0 (6)	<0.001**
Some of the time	85 (21.9%)	85 (15.0%)	19 (6.8%)		
A lot of the time	123 (31.6%)	115 (20.4%)	25 (8.9%)		
Missing/Do not want to answer	81 (20.9)	230 (40.7%)	147 (52.3%)		

* Missing data category not included in χ^2 tests

** Significant after Bonferroni correction $p=0.05/7=0.007$

Table 2
Comparison of Age Groups on Successful Aging Variables

Variable (Range)	Age Cohort (years old) 60-69N=389Mean (SD)	70-79N=565Mean (SD)	80-89N=281Mean (SD)	F (df1,df2)	P
Primary Outcomes					
Self-Rated Successful Aging (1-10)	8.2 (1.4)	8.2 (1.4)	8.0 (1.6)	F=2.5 (2,1)	0.079
Self-Rated Quality of Life (1-10)	8.0 (1.8)	8.4 (1.8)	8.2 (1.8)	F=0.9 (2,1)	0.426
Secondary Outcomes					
MOS-RAND SF-36* social functioning component (1-100)	91.4 (17.1)	89.6 (18.1)	83.1 (21.4)	F=17.6 (2,1)	<0.001***
MOS-RAND SF-36* physical health component (1-100)	46.8 (10.1)	43.1 (11.3)	37.8 (12.0)	F=52.5 (2,1)	<0.001***
MOS-RAND SF-36* mental health component (1-100)	56.2 (6.6)	56.8 (7.1)	56.0 (9.0)	F=1.3 (2,1)	0.280
CES-D** (0-60)	5.8 (6.4)	6.3 (5.5)	8.7 (7.1)	F=15.9 (2,1)	<0.001***

* RAND Medical Outcomes Study, 36-Item Short Form Survey

** Center for Epidemiologic Studies Depression Scale

*** Significant after Bonferroni correction p=0.05/6=0.008