

Quality of life as a mediator of leisure activity and perceived health among older women

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Abstract:

Despite consistent evidence to suggest that participating in leisure is associated with perceived health status among older adults, there have been few attempts to determine the possible underlying mechanisms in this relationship, including the role of quality of life (QoL). This study examined the role of perceived quality of life in the relationship between leisure and perceived health in older women. Correlations, regression, and mediation analysis were conducted on data from the Woman's College Alumnae Women's Health Study. Results indicate that QoL partially mediates the relationship between leisure and perceived health in older women. Findings further establish the link between leisure and perceived health with QoL playing an important role in the relationship.

Keywords: Leisure | older women | perceived health status | quality of life

Article:

Introduction

The role of leisure in productive or healthy aging has historically been of considerable interest to both researchers and practitioners (Brown, McGuire, & Voelkl, 2008; Hicks & Siedlecki, 2016; Hutchinson & Nimrod, 2012; Menec, 2003; Rowe & Kahn, 1997). It has been argued that leisure activities are antecedents of productive aging and may enable older adults to remain physically, socially, and mentally active by capitalizing on remaining strengths and interests (Bryant, Corbett, & Kutner, 2001; Warr, Butcher, & Robertson, 2004). However, aspects of aging such as chronic disease development may also limit leisure or the enjoyment of leisure (Kleiber, McGuire, Aybar-Damali, & Norman, 2008; Strain, Grabusic, Searle, & Dunn, 2002). This

investigation sought to explore the relationship between leisure and health among older females. Of particular interest was the role of quality of life in mediating this relationship. Numerous studies have indicated a relationship between leisure and quality of life (Balboa-Castillo, León-Muñoz, Graciani, Rodríguez-Artalejo, & Guallar-Castillón, 2011; Karinkanta, Heinonen, Sievanen, Uusi-Rasi, & Kannus, 2005; J. H. Lee, Lee, & Park, 2014; Silverstein & Parker, 2002; Tessier et al., 2007; Wendel-Vos, Schuit, Tjihuis, & Kromhout, 2004; Wilhelmson, Andersson, Waern, & Allebeck, 2005). There is also a demonstrated relationship between quality of life and health (Bevil, O'Connor, & Mattoon, 2008; Machon, Vergara, Dorronsoro, Vrotsou, & Larrnaga, 2016). Leisure can make a significant contribution to overall life satisfaction (Hawkins, Foose, & Binkley, 2004) and contentment (Lawton, 1994). Although there is a clear relationship between leisure and health, leisure and quality of life, and health and quality of life, no studies have examined how these three variables interact together in older adults, especially women. Considering that women greatly outnumber men in the older population, understanding the role of leisure and quality of life in the healthy aging of older women is important.

Literature review

Leisure

Leisure can be described as the “pleasurable activities that individuals engage in voluntarily when they are free from the demands of work or other responsibilities” (Pressman et al., 2009, p. 726). Examples of leisure activities include hobbies, sports, travel, church attendance, socializing, or spending time in nature. Leisure activities offer physical, psychological, and social benefits that can enhance an older person’s life. Specifically, leisure activities are beneficial for older adults since they give a sense of purpose and strengthen social ties (Chang, Wray, & Lin, 2014; Rejeski & Mihalko, 2001) while enhancing physical health (Kim, Yamada, Heo, & Han, 2014). However, studies show that satisfaction of the leisure experience provides more benefits than the frequency of leisure activities (Hawkins et al., 2004; Russell, 1990). This may be particularly significant for older adults since they often face barriers to frequent leisure, such as tiredness and finances (Reichert, Barros, Domingues, & Hallal, 2011). Satisfaction with leisure also represents an important factor contributing to perceived health status of older adults (Chang et al., 2014; Heo & Lee, 2010; Machon et al., 2016; Paggi, Jopp, & Hertzog, 2016).

Perceived health status

Perceived health status is the subjective rating by an individual of his or her personal health and well-being. A number of studies have demonstrated that a person’s own appraisal of his or her health is as essential as traditional indicators of health (Wu et al., 2013). Most people experience their health on a global level and consider a number of factors such as “medical status; functional status; psychological function and emotional state; social factors, role demands, and life events and age” (Bryant, Beck, & Fairclough, 2000, p. 171). Perceived health status is considered easy to assess (Bryant et al., 2000) and a valid (Ferraro & Farmer, 1999) measure of actual health. Perceived health status is a widely used measure in research as it is a strong predictor of future morbidity and mortality, even after controlling for other factors such as comorbidity or functional status (DeSalvo, Bloser, Reynolds, He, & Muntner, 2006; Idler & Angel, 1990).

Limitations in understanding the relationship between leisure and health in females

Although the correlation between leisure and health has been established, there are limitations to the understanding of this relationship. First, there are inadequate data related to the potential role of sex in the relationship between leisure and perceived health status despite disparities between men and women in (a) amounts of leisure activities (Drake, 2013; Y. S. Lee, 2005), (b) perception of leisure activities (De Fontenelle & Zinkhan, 1993), (c) satisfaction with leisure (Jaumot-Pascual, Monteagudo, Kleiber, & Cuenca, 2016), and (d) perceptions of health status (Benyamini, Blumstein, Lusky, & Modan, 2003; Denton & Walters, 1999). Furthermore, some of the most substantial data related to leisure and health in older adults is specific to males. Studies that examine leisure and health in all female samples are needed to fill this gap but also to elucidate life expectancy differences between males and females in the United States and other industrialized countries.

Second, there seems to be a number of factors other than leisure that conceivably contribute to health to varying extents. In particular, perceived health status in older adults has been found to be associated with sociodemographic characteristics such as sex, education, and income (Bryant et al., 2000; Machon et al., 2016; Schulz, Mittelmark, & Kronmal, 1994), chronic diseases (Eifert, Wideman, Oberlin, & Labban, 2014; Mavaddat, Vladeras, van der Linde, Khaw, & Kinmonth, 2014; Molarius & Janson, 2002), and functional status (Hoeymans, Feskens, van den Bos, & Kromhout, 1997; Latham & Peek, 2013). Additional factors linked to perceived health status are social relationships (White, Philogene, Fine, & Sinha, 2009; An, 2015), neighborhood environment (Mathis, Rooks, & Kruger, 2015; Subramanian, Kubzansky, Berkman, Fay, & Kawachi, 2006), alcohol consumption (Moriconi & Nadeau, 2015), and spiritual satisfaction (Daaleman, Perera, & Studenski, 2004; George, Larson, Koenig, & McCullough, 2000). However, the magnitude of influence of these factors on perceived health status varies depending on the study design, cultural context (Iwasaki, 2007), and inclusion of all previously mentioned variables (Schulz et al., 1994).

Quality of life

One influential factor of interest in the relationship between leisure and health is quality of life (QoL). The World Health Organization (WHO, 1993) defines QoL as an “individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns” (p. 1). However, Baernholdt, Hinton, Yan, Rose, and Mattos (2012) claim QoL can be conceptualized differently depending on the “discipline, paradigm, and time frame of research” (p. 529). QoL has been shown to be independently related to both leisure activities and perceived health status in older adults, but its role in the relationship between leisure activities and perceived health status is still unclear.

Russell (1990) reports that satisfactory leisure is the only significant, direct predictor of QoL in old age. Other variables such as sex, education, religiosity, marital status, age, income, health, and frequency of leisure have a relationship to each other, but none is significantly related to quality of life. Moreover, QoL is intrinsically related to health. Under the umbrella of QoL is the concept of health-related quality of life (HRQoL). According to Torrance (1987), “quality of life is an all-inclusive concept incorporating all factors that impact upon an individual’s life” (p.

594), while HRQoL includes the subset of the important or most common ways in which health or health care impact well-being. To understand the proposed relationship between leisure, QoL, and health, a conceptual framework was created (Figure 1).

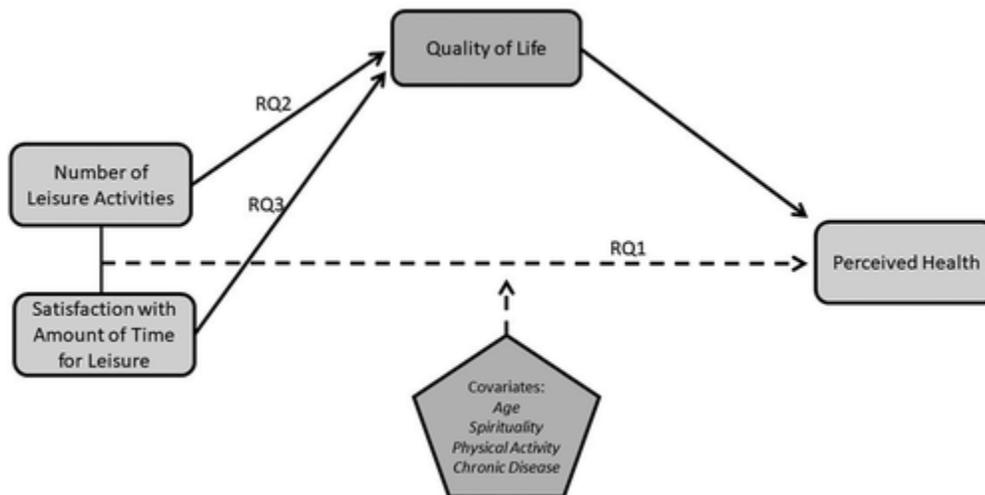


Figure 1. Conceptual framework.

Previous studies have widely investigated the relationships between leisure and health, as well as between leisure and QoL and QoL and health. However, researchers typically only study the direct associations between two variables with limited comprehensive exploration. Studies on the relationship between leisure and health should consider both the direct and indirect variables that potentially influence this relationship, including QoL. Therefore, it is necessary to use a mediation analysis to provide insights into health and its determinants because mediating factors shown to be important could potentially alter how professionals develop interventions aimed at improving older women's health.

Aim and hypothesis

The purpose of this study was to evaluate the relationship between the number of and time for leisure activities and satisfaction with time for leisure activities with perceived health status among participants in the Woman's College Alumnae study. The following research questions were explored:

RQ1: When controlling for age, level of spiritual satisfaction, weekly physical activity, and number of chronic conditions, what is the relationship between the number of leisure activities and satisfaction with time for leisure activities with perceived health status among older women?

RQ2: Does Quality of Life mediate the relationship between the number of leisure activities and perceived health status among older women?

RQ3: Does Quality of Life mediate the relationship between satisfaction with time for leisure activities and perceived health status among older women?

Method

Design

A cross-sectional study was conducted on data collected for the Women's College (WC) Alumnae Women's Health Study with alumnae of the Woman's College of the University of North Carolina (1932–1962), now known as the University of North Carolina at Greensboro (UNCG). The WC Alumnae Women's Health Study was conducted in 2008 to identify the factors that affect the QoL and health of women as they age by the Center for Women's Health and Wellness (CWHW), which is part of the School of Health and Human Services at UNCG. The study included a survey and was the primary source of data for this particular study. Approval to use deidentified data for a secondary data analysis was sought and obtained from CWHW in 2015.

Sample

The majority of WC alumnae were from lower- to middle-class families who came from rural areas of North Carolina. Many were the first in their families to attend college. Most students or their families made financial sacrifices to attend the college (Trelease, 2004). Furthermore, most WC students pursued degrees in teaching, particularly physical education. The curriculum included a three credit-hour health course and four semester activity courses in physical education in addition to a daily, mandatory walking or recreation period before dinner (Trelease, 2004). WC students were extremely involved in extracurricular athletics and competitive sports. The combination of economically disadvantaged and intentionally active is unlike other student bodies from female institutions of higher education of the time that mainly consisted of the social elite or privileged who led less physically strenuous lives (Kinzie, Thomas, Palmer, Umbach, & Kuh, 2007; Langdon, 2001).

As outlined previously (Eifert et al., 2014), a total of 8,969 graduates with active addresses were initially identified as potential participants for the WC Alumnae Women's Health Study. A random sample of 1,818 alumnae were drawn from this list. To increase valid mailing, the Accurint database was used to remove anyone in the sample who was deceased but not listed as such in the alumni listings. Of the 1,818 original chosen, 72 were identified by Accurint as deceased and removed from the listing. Additionally, 49 surveys were returned undeliverable; hence, approximately 1,697 women received the survey. Of these, 1,024 returned a completed questionnaire for a response rate of 60.34%.

Measures

The CWHW contracted with the Odum Institute for Research on Social Science at the University of North Carolina at Chapel Hill to manage the logistics of the survey. Working with Odum staff, the CWHW revised and finalized the survey, conducted a cognitive test of the instrument, and conducted a pilot study with 100 randomly selected WC alumnae. The content of the final survey was informed by the results from the pilot study and from input solicited and received from faculty around UNCG's campus. The 44-page survey included separate sections on: (a) their experiences at WC; (b) volunteer service; (c) employment/paid work; (d) spouse/partner; (e) children; (f) family; (g) friends, neighbors, and community; (h) thoughts about their life; (i)

physical activity; (j) leisure activity; (k) health; and (l) miscellaneous background information. For this particular project, data regarding leisure and health were of interest. Additionally, we examined age, chronic disease diagnosis, spiritual satisfaction, and physical activity levels because of their potential to influence perceived health status. The measures are described as follows:

Leisure. Two questions were examined regarding leisure. The first question asked WC alumnae to report how frequently they participated in leisure activities. WC alumnae were provided with a list of seven leisure activities, and they could indicate their frequency of performing the activity on a 5-point scale from *daily* to *never*. The second question assessed how satisfied WC alumnae were with the amount of time they had to spend participating in the same seven leisure activities. They could indicate their level of satisfaction on a 4-point scale from *very satisfied* to *very dissatisfied*. The Cronbach’s alpha for Leisure Participation and Leisure Satisfaction were $\alpha = .86$ and $\alpha = .67$ respectively. Means, standard deviations, and reliabilities for the two leisure scales are reported in Table 1.

Table 1. Means, standard deviations, and reliability scores for leisure participation, leisure satisfaction, and quality of life.

Scale	<i>M^a</i>	<i>SD</i>	Reliability Score
Leisure Participation	2.57	.63	.86
Leisure Satisfaction	2.50	.56	.67
Quality of Life	2.99	.42	.83

^aAll scales used reverse-coded Likert-response scales with higher scores indicating a greater amount of participation, satisfaction, or quality of life. Leisure Satisfaction and Quality of Life used 4-point Likert scales, and Leisure participation used a 5-point scale.

Perceived health status. Perceived health status was measured using a single question in which WC alumnae could rate the current status of their own health on a 5-point scale from excellent to poor.

Quality of life. QoL was determined by seeking WC alumnae’s level of agreement related to thoughts about their life. They could indicate agreement on a 4-point scale from *strongly agree* to *strongly disagree* on 11 statements, such as “In most ways my life is close to my ideal” and “I am satisfied with my life.” Scores for each statement were combined for a single QoL indicator. Reliability for the QoL scale was $\alpha = .83$. Mean, standard deviation, and reliability for the QoL scale are reported in Table 1.

Control variables. Variables with the potential to influence perceived health ratings, as evidenced in previous studies and cited in the background, were examined in exploratory analysis prior to final analyses being completed. Four variables—age, level of spiritual satisfaction, weekly physical activity, and number of chronic conditions—indicated significant influence and were included in this study as control variables. These control variables were obtained through various questions. Age was determined by a single question: “In what year were you born?” Spiritual satisfaction was determined with the question, “In general, how satisfied are you with your spiritual life?” Response options included *very important*, *somewhat important*, *not very important*, or *not at all important*. Chronic disease diagnosis was obtained through the question, “Has your doctor ever told you that you had any of the following health

problems? Please check all that apply.” Response options included diabetes; hypertension; heart disease; fibromyalgia; osteoporosis; arthritis; obesity; anxiety, depression, or some other emotional disorder; alcohol or drug problems; cancer; or other. Physical activity was determined by calculating metabolic equivalents (METs) for multiple activities, which was done in a previous study using the WC data (Eifert et al., 2014).

Analysis

The main study variables were examined for bivariate relationships using Pearson correlation. Linear regression analysis was used to establish the predictor and covariate relationship among the selected variables. Hierarchical regression was used to evaluate the conceptual model illustrating the effect of the number of leisure activities and satisfaction with leisure activities on perceived health, after controlling for a number of additional variables (age, spirituality, physical activity, and number of chronic diseases). Next, mediation analysis was completed using the macro PROCESS to determine the indirect effect of the proposed mediators. We proposed that Perceived Quality of Life (QoL) would mediate the relationship between the number of Leisure Activities (LeisAct) and Satisfaction with time for Leisure Activities (LeisSat) with the dependent variable Perceived Health Status (PerHealth). A mediation analysis is an estimated measure of the effect of an independent variable on a mediator (path a) and the effect of the mediator on the dependent variable (path b), known as the indirect effect (path ab). The direct effect of the independent variable on the dependent variable in the mediation analysis is known as path c', while the nonmediated effect of the IV on the DV is known as the total effect (path c) (Figure 2). Further estimates include the measure of effect of the independent variable on the dependent variable while accounting for the mediator (path c'). A difference in value between c and c' indicates either a partial or complete mediation of the independent/dependent relationship. To facilitate the mediation analysis, the PROCESS macro was added to the SPSS software. PROCESS allows for “bootstrapping” the sample, and based on 1,000 bootstraps, the point estimates and 95% bias-corrected and accelerated confidence intervals for indirect path (a x b) were calculated. Mediated effect was verified when the 95% confidence intervals did not include zero.

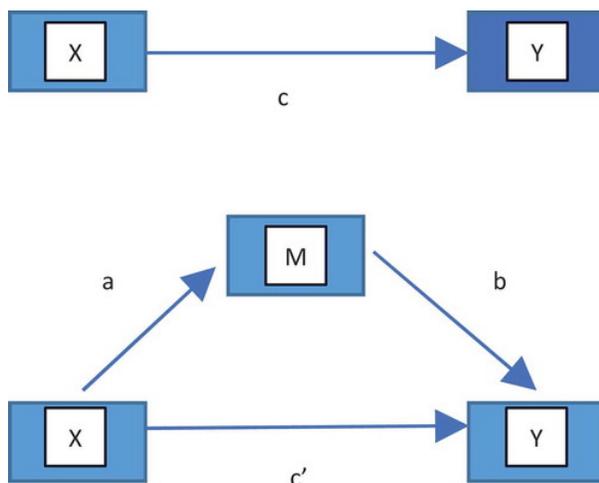


Figure 2. Illustration of direct effect (path c) and indirect effect (path a*b, path c').

Results

Sample characteristics

The total sample for the current study consisted of 1,024 predominately Caucasian adult females between the ages of 60 and 99 (Table 2). The majority of the sample attended the WC between 1951–1960 (48%) and 1941–1950 (30.6%). Almost 60% continued their education beyond the WC. Approximately one-third (33.1%) of participants had a current annual household income greater than \$85,000.

Table 2. Sample characteristics ($N = 1,024$).

		<i>N</i> (%)
Year Enrollment at WC Ended	1911–1920	1
	1921–1930	0
	1931–1940	60
	1941–1950	313
	1951–1960	492
	1961–1970	132
	Missing	26
Age	60–69	147 (14.7%)
	70–79	492 (49.3%)
	80–89	323 (32.4%)
	90–99	35 (3.5%)
	Missing	27 (3%)
Race/Ethnicity	Caucasian/White	1003 (97.9%)
	Black/African American	1 (<1%)
	Native American	7 (<1%)
	Missing	13 (1.2%)
Household Income	Less than \$24,999	79 (7.7%)
	\$25,000 to \$44,999	177 (8.4%)
	\$45,000 to \$64,999	183 (17.8%)
	\$65,000 to \$84,999	149 (14.5%)
	\$85,000 or greater	345 (33.6%)
	Missing	91 (8.8%)
Marital Status	Married	512
	Divorced	60
	Widowed	331
	Single	19
	Missing	84

Overall, the individuals sampled were frequently involved in and satisfied with leisure activities (Table 3). The mean leisure participation score was 2.57 ($SD = 0.63$), and the mean satisfaction with leisure was 2.50 ($SD = 0.56$). The WC alumnae also reported a high QoL ($M = 2.99$, $SD = 0.42$). The bulk of the sample perceived themselves to be in excellent (16.3%) or very good (39.6%) health despite a number of chronic disease diagnoses like arthritis (54%) or hypertension (46.2%) (Table 4). The sample indicated that participants were overwhelmingly satisfied (70.2%) or very satisfied (24.7%) with their spiritual life.

Table 3. Sample characteristics of key variables used in regression model ($N = 1,024$).

		<i>N</i> (%)
Perceived Health Status	Excellent	161 (16.3%)
	Very Good	390 (39.6%)
	Good	293 (29.7%)
	Fair	115 (11.6%)
	Poor	27 (2.7%)
	Missing	38
Spiritual Satisfaction	Extremely Satisfied	254 (25.7%)
	Satisfied	693 (70.2%)
	Dissatisfied	40 (4.1%)
	Extremely Dissatisfied	0 (0%)
	Missing	37
Diagnosed with Chronic Disease	Diabetes	76 (7.4%)
	Hypertension	473 (46.2%)
	Heart Disease	153 (14.9%)
	Fibromyalgia	32 (0.3.1%)
	Osteoporosis	336 (32.8%)
	Arthritis	553 (54.0%)
	Obesity	103 (10.0%)
	Anxiety, depression, or some other emotional disorder	132 (12.9%)
	Alcohol or drug problems	4 (<1.0%)
	Cancer	270 (26.4%)
	Other	551 (53.8%)
	None of the above	61 (0.6%)

Table 4. Relationships among the main study variables.

Variable	1	2	3	4	5	6	7	8
(1) Age	1.00	-.053	-.169**	.093**	-.222**	-.126**	-.299**	-.137**
(2) Spiritual Satisfaction	-.053	1.00	.075*	-.044	.157**	.214**	.170**	.309**
(3) Weekly PA	-.169**	.075*	1.00	-.092**	.232**	.048	.317**	.139**
(4) Number of Chronic Conditions	.093**	-.044	-.092**	1.00	-.437**	-.084**	-.155**	-.131**
(5) Perceived Health Status	-.222**	.157**	.232**	-.437**	1.00	.231**	.411**	.318**
(6) QOL	-.126**	.214**	.048	-.084**	.231**	1.00	.282**	.359**
(7) Leisure Participation	-.299**	.170**	.317**	-.155**	.411**	.282**	1.00	.484**
(8) Leisure Satisfaction	-.137**	.309**	.139**	-.131**	.318**	.359**	.484**	1.00

* $p < 0.05$; ** $p < 0.01$.

Correlation among study variables

Pearson correlation was used to examine the bivariate relationships among the study variables (Table 4). Significant ($p < .001$) correlations were found between the independent variables Leisure Activities and Satisfaction with Time for Leisure Activities with the dependent variable of Perceived Health Status. Furthermore, the mediator QoL was significantly correlated ($p < .001$) with both independent variables and the outcome variable. Additional correlations

with other study variables were noted, and the effect of these variables was controlled for in later analyses.

Linear regression

Hierarchical multiple regression was used to assess the ability of leisure activities and satisfaction with time for leisure activities to predict perceived health status after controlling for the influence of: age of participant, level of spiritual satisfaction, weekly physical activity (calculated METS), and total number of chronic diseases (Table 5). Age, spiritual satisfaction, weekly PA, and number of diseases were entered at Step 1, explaining 26.3% of the variance in perceived health status. After entry of number of leisure activities and satisfaction with time for leisure activities at Step 2, the total variance explained by the model as a whole was 31.1%, $F(6,946) = 72.70, p < .001$. The two measures of leisure explained an additional 5.0% of the variance in perceived health, R^2 change = .050, F Change (2,946) = 34.27, $p < .001$. In the final model all control variables were significant ($p < .05$), with the four largest contributors being total number of chronic diseases (beta = $-.283$), spiritual satisfaction (beta = $.137$), number of leisure activities (beta = $.046$), and satisfaction with time for leisure activities (beta = $.026$).

Table 5. Hierarchical regression: Leisure and control factors associated with quality of life.

	Model 1			Model 2			Tolerance	VIF
	B	SE	β	B	SE	β		
(Constant)	4.96***	.378		3.17***	.424			
Age	-.02***	.004	-.15	-.01***	.004	-.09	.899	1.11
Spirituality	.24***	.055	.12	.14*	.055	.07	.915	1.09
Weekly PA (METs)	.003***	.001	.16	.002***	.001	.11	.920	1.09
# Chronic Disease	-.30***	.021	-.40	-.28***	.020	-.39	.978	1.02
Freq of Leisure Activity				.05***	.008	.18	.680	1.47
Satisfaction with Leisure Activity				.03**	.008	.10	.691	1.45
R^2		.263			.311			
F		85.89***			72.70***			
ΔR^2					.050***			

Mediation analysis

First, the mediated role of QoL in the association between number of leisure activities (LeisAct) and Perceived Health (PerHealth) was tested (Table 6). The total effect of LeisAct on perceived health (represented by path c) was $B = .088, SE = .008, p < .001$, and the direct effect (path c') on perceived health after controlling for QoL was $B = .079, SE = .008, p < .001$. The accelerated bootstrapping confidence interval did not cross zero (95% CI; .073, .104), indicating that QoL partially mediated the relationship between LeisAct and PerHealth.

Another mediation model was analyzed in the same manner as the first, except the independent variable was changed to satisfaction with time for leisure activities (LeisSat) and perceived health status (PerHealth). The total effect of LeisSat on PerHealth (represented by path c) was $B = .073, SE = .008, p < .001$, and the direct effect (path c') on perceived health after controlling for QoL was $B = .061, SE = .009, p < .001$. The accelerated bootstrapping confidence interval

did not cross zero (95% CI; .058, .089) indicating QoL also partially mediated the relationship between LeisSat and PerHealth.

Table 6. Mediation analysis results.

Outcome Variable	Path/Effect	B	SE	B	95% CI
PerHealth	c	.088	.008	.338**	[.073, .104]
	a(LeisAct → QoL)	.179	.021	.260**	
	b(QoL → PerHealth)	.055	.012	.154**	
	c'(LeisAct → PerHealth)	.079	.008	.298**	
	a x b	.010	.003	.040**	
	c	.073	.008	.288**	[.058, .089]
	a(LeisSat → QoL)	.256	.020	.380**	
	b(QoL → PerHealth)	.048	.013	.142**	
	c'(LeisSat → PerHealth)	.061	.009	.234**	
	a x b	.012	.003	.054**	

Note. CI = Confidence Interval; PerHealth = Perceived Health; QoL = Quality of Life; LeisAct = Frequency of Leisure Activities; LeisSat = Satisfaction with Leisure Activities. For paths, c = Total Effect of independent variables on dependent variable; a = independent variable to mediators; b = direct effect of mediator on dependent variable; c' = direct effect of independent variable on dependent variable; a x b = indirect effect of independent variable on dependent variable through mediator.

** $p < .001$.

Preacher and Kelley (2011) suggest reporting the proportion of the maximum possible indirect effect (k^2), to be interpreted similarly to J. Cohen's (1988) guidelines for squared correlation coefficients (e.g., .01 small effect size, .09 medium effect size, .25 large effect size). The k^2 for the first indirect size with LeisAct, $k^2 = .019$, 95% CI (.0052, .0407), suggests a small but significant effect size.

A similar effect was noted when examining the indirect effect of QoL on LeisSat as the independent variable, $k^2 = .024$, 95% CI (.0039, .0429), indicating a small but significant effect of the mediator.

Discussion

This study examined the mechanism of QoL-mediated leisure on the perceived health status of older women. The research highlights the relationship between leisure activities and self-reported health status while emphasizing the role of QoL in that relationship. Results of mediation analysis indicate that number of leisure activities and satisfaction with time for leisure activities affected perceived health via QoL.

Research question 1

Our study supports the link between leisure activities and perceived health in older women. First, the relationship between leisure and health was examined in our group of WC alumni, while controlling for variables known to influence perceived health (age, spirituality, physical activity, and chronic disease). As expected, our results indicated that all four variables remained significant when examining the relationship between leisure and health in these women.

While leisure and health are clearly related, age may significantly influence the relationship simply because older adults, on average, spend more time engaged in leisure activities (i.e., they are usually retired from full-time work). According to the U.S. Bureau of Labor Statistics (2015), adults age 75 and over, on average, spend 8 hours per day engaged in leisure activities—more than any other age group. Arem et al. (2015) found a dose-response relationship between leisure and mortality, while Agahi and Parker (2008) suggest that the relationship is stronger in women than in men. WC participants reported participating in leisure activities on a weekly basis and align with findings from these previous studies, suggesting that the relationship between leisure and health is influenced by age in this group of older females.

Spirituality (and a closely related concept, religion) has been shown to impact the leisure realm of older adults by shaping leisure preferences and participation (Cohen, 2008). Attending religious services and other religious activities are often listed as specific types of leisure favored by older adults (Szanton et al., 2015). Additionally, leisure has been shown to have spiritual benefits and to contribute to spiritual well-being (Heintzman, 2002). Spiritual well-being has also been positively related to perceived health (Yoon, 2006). Since spirituality is important for many older adults, particularly older women (Gillum, 2006), it seems logical that spirituality would have a role in the relationship between leisure and health in this sample. Similar findings were reported by Groff et al. (2010) in their study on the role of recreation therapy in facilitating spirituality and well-being among women with breast cancer.

As outlined previously (Eifert et al., 2014), the WC alumnae significantly exceed the recommended amounts of physical activity needed by adults by the American College of Sports Medicine (Haskell et al., 2007), reporting an average of 53.5 metabolic equivalent (MET) per week. Among the types of physical activity reported were common activities considered to be leisure time physical activities, such as golf, gardening, walking, bicycling, and swimming. Physically demanding leisure activities have been associated with better physical function (Spiriduso & Cronin, 2001) as well as reduced mortality (Arem et al., 2015; Moore et al., 2012) among people 65 and over. It is possible that the propensity of our study participants to participate in physical activity in addition to leisure has contributed to overall health.

Ponde and Santana (2002) found that leisure activities act as a protective factor for women's health, and the current study suggests this is the case. Despite reporting a number of chronic diseases, the WC alumnae have a high perceived health status. Leisure also offers a number of psychological and mental health benefits such as happiness, fulfillment or purpose, and stress management (Buettner & Fitzsimmons, 2002; Kleiber, Hutchinson, & Williams, 2002). Leisure is therapeutic (Caldwell, 2005) and may ameliorate the effects of chronic disease and may help an older woman escape the paradigm of being labeled "sick" based on the diagnosis of chronic disease(s). The actual diagnosis of a disease may not be nearly as important as the perception of the impact of that disease on personal health. Leisure activity may be one important behavioral factor with the potential to help optimize the health and well-being of older women with chronic illness. Hutchinson and Nimrod (2012) explored "ways in which older adults with chronic health conditions use leisure participation to enhance their well-being and manage their health conditions and to identify the strategies they use to remain engaged in leisure despite health-related constraints" (p. 42). They found that older adults with chronic conditions draw on

existing resources for continued leisure involvement, set leisure-based goals, use strategies to get more out of life, and strive for more than managing their chronic conditions but instead aim to live a life with meaning.

Research questions 2 and 3

Second, we examined the relationship between leisure and health mediated by QoL. As mentioned previously, prior studies have demonstrated a relationship between leisure and health as well as between leisure and QoL and QoL and health. Unfortunately, these studies typically only examined the direct association between any two variables, and the vast majority of studies use QoL as the primary outcome variable. The current study is unique since it explores the impact of QoL as a mediator of the relationship between leisure and perceived health in older women. If QoL is used as a mediator, it is specifically health-related QoL. Chin, Choi, Wan, and Lam (2016) found that health-related QoL mediates associations between morbidity (i.e., prevalence of chronic disease) and depression in middle-aged Chinese. Walker (2014) found that health-related QoL mediates the relationship between social problem solving and suicidal behavior in a sample of primary care patients ages 19–79. To fully articulate the potential role of QoL in the relationship between leisure and perceived health status, QoL must be recognized as separate from but augmentative to perceived health status. Health is a significant aspect of QoL, and it is frequently assumed that a healthy life is necessary for a high QoL (Moons, 2004). It is important to note that this current study examined both leisure activities and also satisfaction with the amount of time for leisure activities. It is possible that QoL partially mediates the relationship between leisure and perceived health in older women because the leisure activities are satisfying. QoL is an overarching concept that reflects the physical, mental, and social aspects of an individual's life, many of which may be achieved through their leisure activities. This suggests that leisure activities should not be done just to occupy one's time but should be fulfilling if the individual wants to maximize benefits from participating in the activity.

Findings from the present study make a strong argument for continuing to test the relationships between QoL, leisure, leisure satisfaction, and perceived health in older women. Potential models should be created to provide a framework for examining and understanding the relationship between leisure and health using a fine-grained approach. Findings also suggest the potential power of intervening on modifiable factors such as leisure in an effort to enhance either QoL, perceived health status, or both. Leisure interventions should be structured to emphasize QoL, not just chronic disease prevention or management.

Limitations

When interpreting the results of the present study, some strengths and limitation should be taken into account. Strengths include the uniqueness of the sample when compared to data from samples that include other all-female college students from that time period, such as the WC women often being first-generation college students and or that many were from lower-income households. Additionally, the large sample size and data set that included a variety of explanatory factors, ranging from sociodemographic factors to health behavior, is a definite strength of the WC health study. Our study had some limitations. First, we performed a cross-sectional study; therefore, we could not determine any causal effect between leisure and

perceived health. Significant indirect effects from the mediation analysis does not prove causation; rather the results can disprove or lend support to the hypothesis. Second, data were obtained using self-reported questionnaires that are subject to personal bias. Third, it is possible that additional factors not explored in this study could mediate the relationship between leisure and health. Finally, the graduates of the WC who were included in this sample were White and college educated, which limits the generalizability of our findings.

Conclusion

In closing, this study finds that leisure and perceived health relationship in older women are partially mediated by QoL. Additionally, leisure should be thought of as the combination of time for activities and the satisfaction derived from those activities. Although the data were a cross-sectional sample, we believe that it provides an important perspective on the health perceptions of older women. We further believe that this is an important starting point in attempts to address the challenges of understanding and addressing issues affecting aging and female health, especially for those focused on the role of leisure.

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