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Original Article

Effects of Middle-Aged Women's Demographics, Health Behavior, And Health Status on Health-Related Quality of Life by Economic Activity Participation: Panel Evidence from Korea

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Abstract

Background: Middle-aged women have lower health-related quality of life (HRQoL) than men, and women's participation in economic activities is an important issue. In this study, the middle-aged female population was classified by economic activity participation to explore HRQoL and to identify related factors.

Methods: We obtained data from the 2017 Korea Health Panel Survey (N = 1857 women aged 50–64 years), analyzed with chi-squared tests, t-tests, analyses of variance, and multiple regression analyses. HRQoL was measured with the Euro QoL-5 Dimensions index, and four demographic factors, four health behavior factors, and ten health status factors were entered.

Results: HRQoL was lower in the economically inactive group compared to the active group. Education, physical activity, chronic disease, vision problem, dental problem, activity restriction, frustration, and anxiety were associated with HRQoL in both groups. Spouse and household income were additional predictors identified only in the economically inactive group, and the 10 factors explained 36.0% of the variance. In the economically active group, drinking, sleeping time, hearing problem, stress, and depression were additional predictors identified, and the 13 factors explained 23.0% of the variance.

Conclusion: Healthcare providers should consider both common predictors between economically active and inactive middle-aged women as well as predictors that were unique to each group to improve their HRQoL.

Keywords: Middle-aged; Women; Health; Quality of life

Introduction

"Health-related quality of life (HRQoL) is an individual's or group's perceived physical and mental health over time" (1) and is an important index for healthcare and clinical trials (2). The Euro QoL-5 Dimensions (EQ-5D) was developed by the EuroQol Group as a standardized instrument for non-disease-specific health status (3). The EQ-5D has been standardized and cross-culturally validated (4). Many studies that used this instrument showed that HRQoL varies according to age and gender and that HRQoL is generally lower in women and middle-aged or older individuals as compared to their counterparts (5, 6).

In South Korea, the HRQoL of the population is surveyed annually through the Korea Health Panel

Survey (KHPS) and Korea National Health and Nutrition Examination Survey (KNHANES), which includes EQ-5D (7). A study that analyzed KHPS data (8) reported that HRQoL was lower among working adults than non-working adults and lower among the older group, and the gender differential effect was greater in the middle-aged group than the young and older groups. A study that analyzed the KNHANES data reported that HRQoL of women aged 19–64 years was lower among those aged 50–64 years and varied according to job characteristics, where HRQoL was the lowest among the unemployed (compared to non-physical and physical workers) (9).

Middle-aged people undergo physical changes and strive to prepare for retirement; thus, economic activity is critical among this population (10). Women's economic involvement is a central issue of gender regimes in post-industrial societies (11). HRQoL was lower among middle-aged women who were economically inactive than those who are active (12); however, HRQoL did not differ according to economic activity among older women (13). A study that investigated HRQoL among the general population of Iran using the 36-item Short Form Health Survey (14) showed that women and older and less educated people were at a higher risk for poorer HRQoL than their counterparts; gender, age, education years, and employment status were predictors of the mental and physical components of HRQoL (15).

Healthcare providers must identify factors associated with HRQoL to pinpoint the characteristics of populations with poor HRQoL and improve their HRQoL. The major reason for discrepancies in health outcomes, including life expectancy, is the gap in health behaviors (16), and health behaviors can be modified through education (17,18). Age, subjective health status, and present health status are all predictors of HRQoL in non-physical workers, physical workers, and unemployed individuals (9). Both health behavior and health status should be considered when examining the factors associated with HRQoL.

In the context of the rising average age at retirement and the growing need for new policies specific to employment status and gender for individuals aged 50 years or older (8), this study identifies the factors associated with HRQoL among economically active and economically inactive middle-aged women to present foundational data for developing healthcare policies and programs to enhance HRQoL in this population.

This is the first study to identify HRQoL factors by classifying the middle-aged female population by economic activity. As the definition of middle-aged adulthood varied across previous studies, we defined middle age to be 50–64 years based on the age classification used for the chronic disease indicator by the US Centers for Disease Control and Prevention (CDC) (19) and recently published EQ-5D Brazilian population norms (5).

The study examined 1) the difference in HRQoL according to economic activity among middle-aged women; 2) the differences in HRQoL according to demographic factors, health behavior, and health status in the economically active and economically inactive groups; and 3) the identification of the demographic, health behavior, and health status factors that predict HRQoL.

Materials and Methods

Study design and databases

We employed a descriptive and cross-sectional design using secondary data. We used the 2017 KHPS data even though the 2018 data were the latest available at the time of the study. We excluded 2018 data as this year witnessed changes in the employment of wage and salary earners owing to a remarkable increase in minimum wage (20). The raw deidentified data were provided by the Korea Institute for Health and Social Affairs via email.

This study was exempted for review by the Institutional Review Board of the authors' affiliation (no. 1040117-202208-HR-023-01).

Out of 1867 women aged 50–64 years at the time of survey, we included 1857 who responded to all the study parameters were included in this study. Those who answered "yes" to the question, "Have you worked for income? This includes currently

being on a temporary leave from your work for income" were considered economically active (Group 1), and those who answered "no" were considered economically inactive (Group 2).

Variables

HRQoL

HRQoL was assessed using the three-level version of the EQ-5D—a self-report questionnaire comprising five dimensions: mobility, self-care, usual activities, pain/discomfort, anxiety/depression. Each dimension is indicated using three levels: "no problem," "some or moderate problems," and "extreme problems." The EQ-5D index score was calculated using the EQ-5D preference weights developed for the South Korean population (21). A score closer to 1 indicates higher HRQoL.

Demographic factors

Demographic factors included age, spouse, education, and household income were detrmined.

Health behavior

Health behavior comprised smoking, drinking, sleeping time, and physical activity. Drinking was assessed as drinking in the past year. Sleeping time was divided into normal (7–8 hours of average daily sleep duration in the past week) and abnormal (not 7–8 hours). The cutoff was set based on the statements of the American Academy of Sleep Medicine and Sleep Research Society (22) and since the median sleep duration of our participants was seven hours. Physical activity was assessed by first calculating the metabolic equivalent task-minutes based on the number of days and duration of three types of physical activity (vigorous, moderate, walking) in the past week and classifying it into high, moderate, and low in accordance with the International Physical Activity Questionnaire group (23).

Health status

Health status included physical and mental health (Table 2).

Chronic disease was defined as "yes" if the disease persisted for three months or longer. Vision and hearing problems were defined as "yes" if there were even minor problems. Dental problem was classified into "yes" for "occasionally" and "frequently." Activity restriction ("yes"/"no") indicated whether the individual faces restrictions in routine activities, social life, leisure life, or family life owing to disease, accident, or disability.

Stress, frustration, and anxiety were assessed based on any of the following experiences in the past month: "unbearable experience," "any experiences of frustrated attempts to live in adherence to one's belief," and "being uncertain or anxious about the future," respectively. Each question was rated on a five-point scale (1 "never" to 5 "always"). Depression was assessed based on the yes-or-no question, "Have you felt extremely sad or miserable to the point of being unable to carry on with your daily life for two consecutive weeks or more in the past year?" Suicidal ideation was assessed based on the yes-or-no question "Have you ever wanted to kill yourself in the past year?"

Statistical analysis

Data were analyzed using IBM SPSS Statistics 25 (Armonk, NY, USA). Descriptive statistics on participants' characteristics were compiled, and HRQoL differences according to economic activity were analyzed with *t*-tests. The differences in HRQoL related to characteristics in each group were analyzed with *t*-tests and analyses of variance, followed by Scheffé's test. Correlations between stress, frustration, and anxiety and HRQoL were analyzed with Pearson correlation coefficients.

Stress, frustration, and anxiety were analyzed as continuous variables, and the rest were dummy-coded. The Durbin-Watson statistic was close to 2, confirming the absence of autocorrelation among error terms. Tolerance was all above 0.1, and variance inflation factor was below 10. The absolute correlation coefficients among the independent variables were below 0.8, confirming the absence of multicollinearity among independent variables in both groups and thus satisfying the basic assumptions for multiple regression analysis. Significance was set at $P < .05$.

Results

Table 1 reports participants' demographic factors, health behavior, and health status. The mean EQ-5D scores were 0.96 ± 0.07 in Group 1 and 0.95 ± 0.10 in Group 2 (t = 3.36, P = .001).

In both groups, HRQoL was significantly higher in the 50–59 years group, those with more than high school education, with a spouse, and those with a moderate or higher household income as compared to their counterparts (Table 2).

Table 1: Descriptive statistics of variables

Variables	*Characteristics*	*Categories*	*Economically active (Group 1)*		*Economically inactive (Group 2)*	
Demo-graphic factors	Total		1,173	(63.2)	684	(36.8)
	Age (yr)	50–59	809	(69.0)	418	(61.1)
		60–64	364	(31.0)	266	(38.9)
	Spouse	Yes	975	(83.1)	594	(86.8)
	Education	≤ Elementary school	226	(19.3)	110	(16.1)
		Middle school	252	(21.5)	136	(19.9)
		High school	497	(42.4)	301	(44.0)
		≥ College	198	(16.9)	137	(20.0)
	Household income	Low	76	(6.5)	79	(11.5)
		Moderate	799	(68.1)	429	(62.7)
		High	298	(25.4)	176	(25.7)
Health behavior	Smoking	Nonsmoker	1,130	(96.3)	648	(94.7)
		Ex-smoker	16	(1.4)	14	(2.0)
		Current smoker	27	(2.3)	22	(3.2)
	Drinking	Yes	676	(57.6)	357	(52.2)
	Sleeping time	Abnormal	693	(59.1)	409	(59.8)
	Physical activity	High	67	(5.7)	41	(6.0)
		Moderate	575	(49.0)	336	(49.1)
		Low	531	(45.3)	307	(44.9)
Health status (physical)	Chronic disease	Yes	940	(80.1)	563	(82.3)
	Vision problem	Yes	364	(31.0)	241	(35.2)
	Hearing problem	Yes	59	(5.0)	49	(7.2)
	Dental problem	Yes	212	(18.1)	154	(22.5)
	Activity restriction	Yes	19	(1.6)	42	(6.1)
Health status (mental)	Stress		1.71 ± 0.90		1.73 ± 0.97	
	Frustration		1.29 ± 0.60		1.34 ± 0.70	
	Anxiety		1.64 ± 0.84		1.66 ± 0.87	
	Depression	Yes	58	(4.9)	73	(10.7)
	Suicidal ideation	Yes	32	(2.7)	32	(4.7)

Regarding health behavior, HRQoL differed according to sleeping time and physical activity in both groups. HRQoL differed in relation to smoking and drinking only in Group 2. Regarding health status, HRQoL differed by category in seven characteristics, and stress, frustration, and anxiety were negatively correlated with HRQoL in both groups (Table 3).

Table 2: HRQoL according to demographic characteristics and economic activity

Characteristics	*Categories*	*Economically active (Group 1)*		*Economically inactive (Group 2)*	
		M ± SD	F/t (*P*)	M ± SD	F/t (*P*)
Age (yr)	50–59	0.97 ± 0.06	3.86 (< .001)	0.95 ± 0.09	2.05 (.041)
	60–64	0.95 ± 0.08		0.94 ± 0.11	
Spouse	Yes	0.96 ± 0.07	2.19 (.029)	0.95 ± 0.08	3.84 (< .001)
	No	0.95 ± 0.07		0.89 ± 0.16	
Education	≤ Elementary school	0.94 ± 0.08[a]	14.89 (< .001)	0.90 ± 0.15[a]	13.72 (< .001)
	Middle school	0.95 ± 0.07[a]		0.93 ± 0.09[b]	
	High school	0.97 ± 0.06[b]		0.96 ± 0.08[c]	
	≥ College	0.98 ± 0.04[b]		0.96 ± 0.07[c]	
Household income	Low	0.94 ± 0.08[a]	7.56 (.001)	0.90 ± 0.14[a]	10.41 (< .001)
	Moderate	0.96 ± 0.07[b]		0.95 ± 0.10[b]	
	High	0.97 ± 0.06[b]		0.96 ± 0.08[b]	

a, b, c = Scheffé test

Table 3: HRQoL according to health behavior and health status and economic activity

Variables	*Characteristics*	*Categories*	*Economically active (Group 1)*		*Economically inactive (Group 2)*	
			M ± SD	F/t (*P*) or r (*P*)	M ± SD	F/t (*P*) or r (*P*)
Health behavior	Smoking	Nonsmoker	0.96 ± 0.07	2.00 (.136)	0.95 ± 0.10[a]	7.97 (< .001)
		Ex-smoker	0.93 ± 0.11		0.89 ± 0.17[b]	
		Current smoker	0.96 ± 0.05		0.88 ± 0.12[b]	
	Drinking	No	0.96 ± 0.07	-1.40 (.161)	0.93 ± 0.12	-3.72 (< .001)
		Yes	0.96 ± 0.06		0.96 ± 0.07	
	Sleeping time	Normal	0.97 ± 0.06	4.06 (< .001)	0.95 ± 0.09	2.12 (.035)
		Abnormal	0.95 ± 0.07		0.94 ± 0.10	
	Physical activity	High	0.95 ± 0.07[a]	4.02 (.018)	0.98 ± 0.05[a]	17.74 (< .001)
		Moderate	0.96 ± 0.06[b]		0.96 ± 0.06[a]	
		Low	0.96 ± 0.07[b]		0.92 ± 0.13[b]	
Health status (physical)	Chronic disease	Yes	0.95 ± 0.07	-6.99 (< .001)	0.94 ± 0.11	-8.85 (< .001)
		No	0.98 ± 0.05		0.99 ± 0.04	
	Vision problem	Yes	0.94 ± 0.08	-6.44 (< .001)	0.92 ± 0.12	-4.59 (< .001)
		No	0.97 ± 0.06		0.96 ± 0.08	
	Hearing problem	Yes	0.93 ± 0.10	-2.78 (.007)	0.90 ± 0.11	-2.76 (.008)
		No	0.96 ± 0.06		0.95 ± 0.10	
	Dental problem	Yes	0.93 ± 0.08	-5.16 (< .001)	0.90 ± 0.14	-5.36 (< .001)
		No	0.97 ± 0.06		0.96 ± 0.08	
	Activity restriction	Yes	0.82 ± 0.13	-4.85 (< .001)	0.77 ± 0.21	-5.49 (< .001)
		No	0.96 ± 0.06		0.96 ± 0.07	
Health status (mental)	Stress			-.19 (< .001)		-.37 (< .001)
	Frustration			-.21 (< .001)		-.32 (< .001)
	Anxiety			-.17 (< .001)		-.25 (< .001)
	Depression	No	0.96 ± 0.06	4.59 (< .001)	0.95 ± 0.09	4.96 (< .001)
		Yes	0.91 ± 0.09		0.87 ± 0.14	
	Suicidal ideation	No	0.96 ± 0.06	5.46 (< .001)	0.95 ± 0.08	3.89 (< .001)
		Yes	0.87 ± 0.09		0.80 ± 0.22	

a, b, c = Scheffé test

Predictors of HRQoL in economically active and inactive groups

Table 4 shows the predictors of HRQoL. There were 13 predictors of HRQoL in Group 1. The model explained 23.0% of the total variance (F = 16.04, *P* < .001). The most potent predictor was activity restriction (β = .23). In Group 2, there were 10 predictors of HRQoL. The model explained 36.0% of the total variance (F = 17.44, *P* < .001). The most potent predictor was activity restriction (β = .29).

Table 4: Factors associated with HRQoL by economic activity

Variables		***Economically active (Group 1)***				***Economically inactive (Group 2)***			
		B	S.E	*β*	t (*P*)	B	S.E	*β*	t (*P*)
Demographic characteristics	Spouse	.01	0.01	-.01	0.45 (.651)	-.03	0.01	-.11	3.24 (.001)
	High school	.01	0.01	.11	2.88 (.004)	.03	0.01	.16	3.25 (.001)
	≥College	.02	0.01	.13	3.63 (< .001)	.02	0.01	.09	1.94 (.053)
	Household income _moderate	.01	0.01	.01	0.09 (.931)	-.02	0.01	-.11	2.02 (.043)
	Household income _high	.01	0.01	-.03	0.50 (.616)	-.03	0.01	-.12	2.11 (.036)
Health behavior	Drinking	.01	0.01	.06	2.18 (.030)	.01	0.01	.06	1.95 (.052)
	Sleeping time	-.01	0.01	-.08	3.06 (.002)	.01	0.01	.01	0.05 (.960)
	Physical activity _moderate	.02	0.01	.16	2.86 (.004)	-.02	0.01	-.08	1.22 (.223)
	Physical activity _low	.01	0.01	.09	1.63 (.104)	-.03	0.01	-.17	2.44 (.015)
Health status (physical)	Chronic disease	.01	0.01	.08	3.17 (.002)	.02	0.01	.09	2.81 (.005)
	Vision problem	.02	0.01	.13	5.01 (< .001)	.01	0.01	.07	2.17 (.030)
	Hearing problem	.02	0.01	.06	2.20 (.028)	.01	0.01	.02	0.54 (.590)
	Dental problem	.02	0.01	.11	4.20 (< .001)	.02	0.01	.09	2.70 (.007)
	Activity restriction	.12	0.01	.23	8.67 (< .001)	.12	0.01	.29	8.69 (< .001)
Health status (mental)	Stress	-.02	0.01	-.06	2.26 (.024)	-.02	0.01	-.05	1.42 (.157)
	Frustration	-.05	0.01	-.13	4.54 (< .001)	-.04	0.02	-.09	2.54 (.011)
	Anxiety	-.01	0.01	-.07	2.09 (.037)	-.02	0.01	-.17	4.23 (< .001)
	Depression	-.01	0.01	-.08	2.33 (.020)	-.01	0.01	-.04	1.04 (.300)
R^2				.24				.38	
Adjusted R^2				.23				.36	
F(*P*)				16.04 (< .001)				17.44 (< .001)	

Dummy variables: Spouse: Yes = 0, Education: ≤ Elementary school = 0, Household income: Low = 0, Drinking: No = 0, Sleeping time: Normal = 0, Physical activity: High = 0, Chronic disease: Yes = 0, Vision problem: Yes = 0, Hearing problem: Yes = 0, Dental problem: Yes = 0, Activity restriction: Yes = 0, Depression: No = 0

Discussion

The EQ-5D index, a proxy for HRQoL, was higher in Group 1 than 2. This mirrors the results of a previous study that analyzed the 2016 KHPS data of women aged 40–64 years, where the economically active group had higher HRQoL (12). A study that measured HRQoL in women aged 14 years and over in Iran (24) showed that housewives had lower vitality compared to employed women. HRQoL in women aged 35–59 years differed according to their jobs, classified into housewife, employee, and self-employed (25). While the age range slightly differs across studies, findings consistently show that HRQoL is lower among the economically inactive middle-aged women, and

these women tend to have poorer personal resources for economic activity, calling for societal support (e.g., job opportunities) for those who wish to engage in economic activity. Concerning the difference in physical activity, the results suggest that physical activity among economically active women is work-related, while that among economically inactive women is leisure-related. Studies should further analyze the physical activity patterns among middle-aged women.

In both groups, education, physical activity, chronic disease, vision problem, dental problem, activity restriction, frustration, and anxiety influenced HRQoL, with activity restriction being the most powerful predictor. In this study, activity restriction was defined as having restrictions in routine activities, social life, leisure life, and family life owing to a disease, accident, or disability. Thus, HRQoL in middle-aged women is thought to involve not only health and disease but also wide-ranging aspects of life, including, job, leisure, and family. It is necessary to adopt a multidimensional approach using the concept of activity restriction used in this study to explore the specific factors involved. The results pertaining to physical activity, vision problem, dental problem, and activity restriction were consistent with those found among older adults (13); thus, these factors should be considered for HRQoL management in middle-aged or older women.

In contrast to previous results (13), chronic disease was a predictor of HRQoL in both groups. In a previous study (13), 95.1% of older women had a chronic disease; however, only 80.1% of Group 1 and 82.3% of Group 2 had a chronic disease. Low education level and presence of chronic disease were predictors of HRQoL in middle-aged women in low-resource settings in India, as well (26). As the US CDC treats people aged 50–64 years as a relevant category in their chronic disease indicators (19), healthcare providers should strive to prevent chronic diseases in these women and consider those who have chronic diseases a high-risk group for poor HRQoL. Contrasting the results for older adults (13), frustration and anxiety predicted HRQoL in both groups among middle-aged women. Hence, healthcare providers should manage frustration of beliefs and anxiety about the future in middle-aged women as health issues.

The predictors of HRQoL differed between groups. Drinking, sleep time, hearing problem, stress, and depression were the predictors of HRQoL only in Group 1. HRQoL decreased with abnormal sleeping time, presence of hearing problems, and depression. HRQoL was higher among drinkers. This partially coincides with previous findings that middle-aged Taiwanese women who drink at least once a week are more strongly associated with the physical component summary of HRQoL than women who drink fewer than once a week (27). However, other findings indicated that low-risk drinkers demonstrate a higher HRQoL than never drinkers in the female population (28); thus, future research must consider economic activity and drinking patterns. HRQoL decreased with increasing stress. Considering that HRQoL decreased with increasing perceived stress among German employees (29) and that workers under stress showed poorer general health and HRQoL than workers not under stress regardless of type of employment (30), it seems that stress has an adverse impact on HRQoL in adults who work for an income.

In contrast to Group 1, spouse and household income were identified as predictors of HRQoL in Group 2. Group 2 may primarily include housewives and unemployed women. Previous findings that individuals with a higher economic status have higher HRQoL and unemployed individuals have a higher degree of inequality in HRQoL than employed people (31) partially support our results that women with a high or moderate income had better HRQoL than those with low income in Group 2. Furthermore, women without a spouse have lower HRQoL, presumably because they cannot share the burden of economic activity and house chores with their spouse or receive social support from their spouse. Therefore, healthcare providers should consider demographic factors that serve as individuals' support system when managing HRQoL in economically inactive individuals.

We used data from the pre-COVID-19 period, which were collected via structured interviews;

hence, the accuracy of the data is not guaranteed. Despite these limitations, this study is significant as it explored the factors associated with HRQoL related to economic activity in middle-aged women (50–64 years), using nationally representative sample data. The results serve as useful foundational data to promote an understanding of HRQoL in middle-aged women and to develop measures and policies for improving their HRQoL. We recommend that researchers specifically identify the relationships among these factors in different cultural contexts. Consequently, public health policy can be prepared to consider the cultural universality and specificity of HRQoL.

Conclusion

Economically inactive middle-aged women in South Korea showed poorer HRQoL than economically active middle-aged women. Spouse and household income predicted HRQoL only in the economically inactive group. Drinking, sleep time, hearing problem, stress, and depression predicted HRQoL only in the economically active group. The factors that influenced HRQoL in both groups were education (demographic), physical activity (health behavior), and chronic disease, vision problem, dental problem, activity restriction, frustration, and anxiety (health status); activity restriction was the most potent predictor. As we identified predictors of HRQoL that were unique to each group and shared in both groups, these findings are useful as foundational data for promoting HRQoL in middle-aged women in the public health sector.

Journalism Ethics considerations

Ethical issues (including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Conflict of Interest

The authors received no financial support for the research, authorship, and publication of this study. The authors declare that there are no conflicts of interests.

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