

ASSOCIATION BETWEEN RHEUMATOID ARTHRITIS AND HEALTH-RELATED QUALITY OF LIFE IN KOREAN WOMEN AGED 50 YEARS AND OVER

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ABSTRACT

Objective: The purpose of this study is to evaluate the association between rheumatoid arthritis (RA) and health-related quality of life (HRQoL) in Korean women.

Methods: Participants (n=2068) aged 50 years or older were selected from Korea National Health and Nutrition Examination Survey (KNHANES) 2005-2008. Sociodemographic characteristics, medical history of RA, and EuroQol-5 dimension were obtained from the KNHANES dataset.

Results: The results revealed that demographic variables, including age, education level, income, exercise, smoking, and alcohol drinking, were important factors associated with HRQoL. In this study, RA was an important factor affecting HRQoL in Korean women. The adjusted odds ratio for HRQoL in participants with RA was 2.15 (95% confidence interval [CI]: 1.46-3.18, p=0.001) in mobility, 2.30 (95% CI: 1.60-3.32, p<0.001) in usual activities, and 3.41 (95% CI: 2.20-5.28, p<0.001) in pain/discomfort.

Conclusion: These findings suggest that there is a strong association between RA and HRQoL and preventing and controlling RA may significantly improve the quality of life for elderly Korean women.

Keywords: Demographic factor, EuroQol-5 dimension, Health-related quality of life, Rheumatoid arthritis.

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INTRODUCTION

Arthritis is among the most common joint disorder in the world and is among the leading conditions causing limitation of physical activity for the elderly [1,2]. Rheumatoid arthritis (RA) is a chronic inflammatory autoimmune disease that leads to progressive joint destruction and disability [3]. RA is estimated to be about 0.5-1.0% worldwide and is known to affect about 2% of the Korean population [4,5]. The incidence of RA is 4-5 times higher in women than men under the age of 50 and is 2 times higher in women aged 60-70 seconds group [6]. It is known that the onset of RA has various effects on health-related quality of life (HRQoL) in terms of the physical and mental aspects of patients [7]. Especially, joint disease, including RA is known to be a major cause of lowering HRQoL in the elderly [8].

In patients with RA, aggravation of pain or symptoms of illness or a limitation in physical function has been reported to be closely associated with lowering HRQoL [9,10]. Studies of other chronic diseases have reported that a variety of demographic characteristics, including sex, body mass index (BMI), severity of illness, and age, will affect HRQoL [11-13]. In addition, pain, age, and functional limitations have been reported to lower HRQoL in the elderly people with RA [14].

As a tool to evaluate HRQoL in the target population, medical outcome study short form-36, EuroQol-5 dimension (EQ-5D), and health utility index mark-3 are widely used [15]. Among these instruments, EQ-5D is a self-reported questionnaire that consists of five domains of HRQoL and one of standardized research tools developed in Europe to measure and describe HRQoL [16]. Because of high validity and reliability, EQ-5D has recently been widely used in the measurement of HRQoL for patients with RA in many studies.

It is known that factors affecting HRQoL are not only demographic factors such as gender, age, education level, and income but also chronic

diseases such as RA and chronic obstructive pulmonary disease [17,18]. Therefore, it is important to analyze the relationship between RA and HRQoL in women to improve HRQoL of women through prevention and management of RA.

The purpose of this study is to investigate the association between RA and HRQoL in women over 50 years of age using the Korea National Health and Nutrition Examination Survey (KNHANES). For this purpose, this study was undertaken to analyze the prevalence of RA and HRQoL according to the sociodemographic characteristics of the participants and to clarify the relationship between prevalence of RA and HRQoL in each of the five dimensions of EuroQoL.

METHODS

This study was based on data from the KNHANES 2005 to 2008, which included a health and nutrition survey and a medical examination. The KNHANES sample was selected using a stratified multistage cluster sampling design with proportional allocation based on the National Census Registry. Trained interviewers conducted face-to-face interviews using a structured questionnaire. From this sample, elderly women (≥ 50 years of age) were selected for this study. Individual subjects from selected census blocks were asked their age, education level, income, physical exercise level, cigarette smoking status, alcohol drinking status, and medical history of RA. Height and weight were measured with the subjects wearing light clothing and no shoes. BMI was then calculated as weight (kg) divided by the square of height (m^2). The study protocol was approved by the Korean Ministry of Health and Welfare and was conducted in accordance with the Ethical Principles for Medical Research involving human subjects, as defined by the Helsinki Declaration. The study participants provided written informed consent. Of the selected subjects in the census blocks, 2068 individuals provided data without values missing for any of the variables analyzed in this study.

Table 1: Prevalence of RA by demographic characteristics in Korean women 50 years of age or older

Variable	n	RA (%)	p value ^a
Age (years)			
50-59	604	38 (6.3)	0.125
60-69	742	42 (5.7)	
≥70	722	60 (8.3)	
BMI (kg/m ²)			
<18.5	58	3 (5.2)	0.426
18.5-22.9	636	50 (7.9)	
23.0-24.9	499	31 (6.2)	
≥25.0	875	56 (6.4)	
Education			
< Elementary school	631	49 (7.8)	0.255
Elementary school	1074	69 (6.4)	
≥ Middle school	363	22 (6.1)	
Income			
Quartile 1 (lowest)	572	38 (6.6)	0.624
Quartile 2	568	39 (6.9)	
Quartile 3	503	29 (5.8)	
Quartile 4 (highest)	425	34 (8.0)	
Regular exercise			
No	944	64 (6.8)	0.987
Yes	1124	76 (6.8)	
Cigarette smoking status			
Never	1833	124 (6.8)	0.980
Ever	235	16 (6.8)	
Alcohol drinking status			
Never	1209	88 (7.3)	0.178
Light	393	27 (6.9)	
Heavy	466	25 (5.4)	

^ap determined by Mantel-Haenszel Chi-square test, RA: Rheumatoid arthritis, BMI: Body mass index

The subjects were categorized as underweight (BMI <18.5), normal (18.5 ≤ BMI <22.9), overweight (23.0 ≤ BMI <24.9), and obese (BMI ≥25.0) according to the World Health Organization definitions for Asian populations. The RA criterion was a self-reported history of doctor-diagnosed RA. As a covariate, education was categorized as less than an elementary school graduate, elementary school graduate, and middle school or higher. Income was calculated by dividing the square root of the household size by the monthly household income according to the Organization for Economic Cooperation and Development method. Then, income was categorized by quartiles based on the income of the participant's age group. Cigarette smoking status was defined as never smoked or ever smoked, and alcohol-consumption status was defined as never, light, or heavy drinking. The light- and heavy-drinking categories included participants whose average frequency of alcohol consumption was less than once a month and more than once a month, respectively.

HRQoL was assessed using EQ-5D questionnaire. EQ-5D is a self-reported descriptive system instrument with five health dimensions (mobility, self-care, pain/discomfort, usual activities, and anxiety/depression) each divided into three different levels, namely, no problems, some or moderate problems, and severe or extreme problems [19]. For the purpose of this study, the level scores were used to describe an overall measure of perceived HRQoL.

The differences in the categorical variables between groups were evaluated using the Mantel-Haenszel Chi-square test. The presence of a linear trend was evaluated by defining a linear contrast in the linear regression models. Logistic regression models were used to estimate the odds ratio (OR) and 95% confidence intervals (CIs) for abnormal (disability) versus normal (no problem) in the categories of EuroQol among participants who reported to have RA compared with the reference group (those who reported to not have RA). All statistical analyses were conducted using SAS version 9.4 (SAS Institute, Cary, NC, USA).

Table 2: Mean EQ-5D by demographic characteristics in Korean women 50 years of age or older

Variable	n	EQ-5D	p value
Age (years)			
50-59	604	0.89±0.13	<0.001
60-69	742	0.83±0.16	
≥70	722	0.76±0.21	
BMI (kg/m ²)			
<18.5	58	0.86±0.15	0.102
18.5-22.9	636	0.83±0.18	
23.0-24.9	499	0.84±0.16	
≥25.0	875	0.81±0.18	
Education			
< Elementary school	631	0.78±0.20	<0.001
Elementary school	1074	0.83±0.17	
> Middle school	363	0.88±0.15	
Income			
Quartile 1 (lowest)	572	0.80±0.19	0.013
Quartile 2	568	0.83±0.17	
Quartile 3	503	0.83±0.17	
Quartile 4 (highest)	425	0.83±0.17	
Regular exercise			
No	944	0.80±0.20	<0.001
Yes	1124	0.84±0.16	
Cigarette smoking status			
Never	1833	0.83±0.17	<0.001
Ever	235	0.77±0.22	
Alcohol drinking status			
Never	1209	0.80±0.18	<0.001
Light	393	0.84±0.17	
Heavy	466	0.86±0.16	

EQ-5D: EuroQol-5 dimension, BMI: Body mass index

Table 3: Descriptive characteristics of study population by category of RA

Variables	Total	RA	Non-RA
n	2068	140	1928
Age (years)	65.7±9.2	67.5±9.9	65.6±9.2
BMI (kg/m ²)	24.4±3.3	24.1±3.3	24.4±3.3
EQ-5D	0.82±0.18	0.75±0.19	0.83±0.18

Data are presented as mean±standard deviation, BMI: Body mass index, EQ-5D: EuroQol-5 dimension, RA: Rheumatoid arthritis

RESULTS

Table 1 represents the prevalence of RA according to demographic characteristics such as age, BMI, education level, income level, regular exercise, smoking, and drinking status. The prevalence of RA in the categories for all demographic variables was in the range of 5.2-8.3 and there was no statistically significant difference.

The mean EQ-5Ds by demographic characteristics are presented in Table 2. EQ-5D was decreased with the increase of age ($p<0.001$). The EQ-5D of participants with the lowest BMI was the highest at 0.86, and the EQ-5D of the normal body weight, overweight, and obesity women was 0.83, 0.84, and 0.81, respectively. As the education level or income increased, participants were more likely to have higher EQ-5D ($p<0.001$ or 0.013). In addition, regular exercise, nonsmoking, or consumption of alcohol were significantly associated with increased EQ-5D ($p<0.001$).

Table 3 shows the age, BMI, and EQ-5D of study population by categories of RA. The mean age, BMI, and EQ-5D of participants with RA were 67.5, 24.1, and 0.75, respectively. In contrast, the mean age, BMI, and EQ-5D were 65.6, 24.4, and 0.83, respectively, in the subjects without RA. BMI and EQ-5D were lower in women with RA than women without RA.

Table 4 shows ORs for disability associated with the prevalence of RA. Compared with non-RA participants, the adjusted ORs of mobility, usual

Table 4: Adjusted ORs (95% CI) for disability in the categories of EuroQoL by the prevalence of RA in Korean women 50 years of age or older

EuroQoL domain	Non-RA (n=1928)	RA (n=140)	p value
EuroQoL-mobility			
Model 1	1.00 (reference)	2.19 (1.48-3.22)	<0.001
Model 2	1.00 (reference)	2.15 (1.46-3.18)	0.001
EuroQoL-self-care			
Model 1	1.00 (reference)	1.21 (0.75-1.96)	0.432
Model 2	1.00 (reference)	1.24 (0.77-2.01)	0.382
EuroQoL-usual activities			
Model 1	1.00 (reference)	2.28 (1.58-3.28)	<0.001
Model 2	1.00 (reference)	2.30 (1.60-3.32)	<0.001
EuroQoL-pain/discomfort			
Model 1	1.00 (reference)	3.40 (2.20-5.26)	<0.001
Model 2	1.00 (reference)	3.41 (2.20-5.28)	<0.001
EuroQoL-anxiety/depression			
Model 1	1.00 (reference)	1.32 (0.92-1.90)	0.136
Model 2	1.00 (reference)	1.34 (0.93-1.93)	0.119

RA: Rheumatoid arthritis, CI: Confidence interval, OR: Odds ratio

activity, and pain/discomfort were 2.15 (95% CI: 1.46-3.18), 2.30 (95% CI: 1.60-3.32), and 3.41 (95% CI: 2.20-5.28), respectively, among those with RA ($p < 0.01$) (Model 2). However, adjusted ORs for disability in self-care and anxiety/depression were not significantly related with the prevalence of RA after adjusting for age and BMI (Model 1) or all other potential covariates, such as education, income, physical exercise, cigarette smoking, and alcohol drinking (Model 2).

Model 1 was adjusted for age and BMI. Model 2 was adjusted for age, BMI, education, income, exercise, cigarette smoking, and alcohol drinking.

DISCUSSION

The purpose of this study was to investigate the association between HRQoL and RA using EQ-5D, one of the reliable HRQoL measures. The prevalence of RA is closely related to aging and RA has a high morbidity rate in women. RA has been known to have an adverse effect on the quality of life as well as the physical health of women [20]. The results of this study showed that there was no significant difference between demographic factors such as age, BMI, and education level, and prevalence of RA. Obesity is known to be a major risk factor for osteoarthritis, one of the major joint diseases [21]. However, in this study, unlike osteoarthritis, the prevalence of RA was not directly associated with obesity.

The result of this study showed that the sociodemographic characteristics and individual's health behavior such as education level, income, regular exercise, smoking status, and drinking status, had an effect on HRQoL. These results are consistent with several previous studies. Borzecki *et al.* [22] suggested that the frequency and intensity of physical exercise were related to the quality of life and Jiang and Hesser [17] reported that current smokers had a lower quality of life compared with ex-smokers or nonsmokers. In addition, alcohol drinking was associated with an increase in HRQoL compared with never drinking alcohol. This finding is consistent with the results of a study conducted with middle-aged and elderly people, in which the continuous light drinking group had a higher HRQoL than the non-alcoholic group [23].

In this study, RA in Korean women was significantly related to HRQoL. Multiple logistic regression analysis showed ORs for disability in the dimension of mobility, usual activity, and pain/discomfort were significantly increased among Korean women with RA. In particular, it was found that pain/discomfort was the most influential factor in HRQoL of RA subjects. These results suggest that the prevention and management of pain/discomfort is important for the improvement of HRQoL in patients with RA.

This study has several limitations. Because this study used a cross-sectional design, the results only indicate associations and cannot be used to determine causality. In addition, self-reports of current RA state may lead to misclassification and informational bias. There may also be limitations related to the reliability and objectivity of using EQ-5D as a tool for assessing the quality of life.

CONCLUSION

In this population-based study of elderly women, the HRQoL was associated with several demographic characteristics, including age, education level, income, physical exercise, cigarette smoking, and alcohol drinking. In addition, the elderly women with RA were found to have a significantly lower level of HRQoL. In the analysis of five dimensions of EQ-5D, the prevalence of RA significantly increased ORs of disability in mobility, usual activity, and pain/discomfort. The results of this study suggest a significant association between RA and HRQoL in Korean women aged 50 years and over. Therefore, prevention and management of RA will be needed to improve the quality of life of elderly women.

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