

## **Factors Affecting Health Related Quality of Life in Korean Perimenopausal Women Using Hierarchical Regression Analysis**

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### **ABSTRACT**

*Women's menopause is a natural process that every woman must eventually experience, but changes in hormones before and after menopause can serve to produce life-threatening crises in some situations, with individual differences. Data for the study was elicited from 22,610 Korean women ranging in age from 45 to 55 years in the 2013 Korean Community Health Survey. Statistical analyses was performed using descriptive, t-test, ANOVA, and hierarchical regression analysis using SPSS IBM 20.0 version. Individual characteristics, lifestyle, history of chronic disease(s), psychological and environmental factors were included as independent and EQ5D weights of Koreans were used as dependent variables. The survey subjects consisted of a total 15,505(58.3%) in their 50s, 1,765 (66.5%) in middle and high school dropouts or graduates, 22,174 (83.3%) living in spouses and 10,534(39.6%) in wages. There was a significant difference in HRQOL among all independent variables except drinking and residential areas. Hierarchical regression analysis showed that age, smoking, obesity and other incidental disease factors (fall, angina, asthma, arthritis, osteoporosis, stroke) had a negative effect on HRQOL. The selected independent variables accounted for 22.7% of HRQOL. It is necessary to find a way to improve HRQOL of Korean perimenopausal women, focusing on the significant variables revealed by the study results.*

**Key words:** *Community Health Survey, Health-related Quality of Life, Perimenopausal Women, EQ5D.*

### **1. INTRODUCTION**

Quality of life (QOL) is seen as the ultimate value of human life to pursue. The QOL is a very comprehensive concept such as social, economic, cultural, and health, but the health-related quality of life (HRQOL) is critical interest in public health area. Personal health is subject to physical, mental and social impact. EQ-5D of Euro QOL Group as a general tool for measuring HRQOL has five dimensions such as mobility, self-care, usual activity, pain/discomfort, and anxiety depression. EQ5D has been validated reliability and, it is widely used to measure the QOL in patients, general population and in menopausal women [1]-[8].

HRQOL is influenced by various factors such as lifestyle, diseases, psychological and environmental factors, and individual characteristics [7], [8]. Lifestyle refers to the cultural and psychological differences in all aspects of life, including various lifestyles, behavior patterns, and thinking styles that arise from individual and family values. As the disease pattern changes due to the chronic disease structure, the lifestyle is understood as a concept that includes a wide range of social network from health behaviors such as smoking, drinking, exercise, nutrition, etc. and has a significant effect on HRQOL

[7]-[9]. In particular, obesity and drinking are associated with lower HRQOL, and proper weight maintenance and physical activity are known to enhance HRQOL [8], [9].

The experience of diseases such as diabetes, arthritis, cancer, asthma, and discs is related to low HRQOL [11]. Psychological factors such as physical satisfaction, subjective assessment of health, stress, suicidal ideation, and social life factors were found to be significant variables in HRQOL [12]. Among these, the symptoms of depression and anxiety in menopausal women were associated with sleep quality and quantity, and it was reported to be a factor to lower HRQOL [13], [14].

Environment such as residential environment, affection for the area, traffic environment, safety environment, social environment, educational environment, pleasant environment, basic living conditions have an important health determinant factor and also affect the HRQOL [15]. In Korea, the family environment, such as caring for the demented family, has an effect on the QOL for women because of the duty of parental care or family care tends to be biased toward women [16], [17]. Menopause is a turning point in life that all women should go through. It is a period of 2 to 8 years before and after menopause as a process of extinction of reproductive ability due to the loss of estrogen secretion [18], [19]. At this time there are diverse social and cultural changes as well as biological changes [20]. Menopausal symptoms are various from mild symptoms such as facial flushing and night sweats to

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osteoporosis, cardiovascular disease, and other serious health problems such as depression, suicide, depression, and loss [21]-[24]. These symptoms are particularly evident in people with mild physical and mental health problems [11].

Menopause affects the HRQOL in various aspects of physical, mental and social aspects, various studies have recently been carried out to alleviate menopausal symptoms and improve HRQOL in menopausal women. Lifestyle such as smoking cessation, healthy eating, and regular physical activity improve the health status of women in menopausal status [25]-[28]. In addition, various sports activities are known to improve HRQOL through reducing menopausal symptoms such as depression and the risk of chronic diseases [29]-[33]. In a study of Turkish menopausal women, menopausal symptoms were associated with physical health, mental well-being, and social relationships. The level of education, postmenopausal knowledge, participation in family decision making, and economic level have positive effects on QOL, while marital status and BMI have negative effects [34]. In China, the effects of menopause on EQ5D index and QOL in 40-59 year - old women are as follows: menopause itself deteriorates HRQOL, it has been reported that the chronic illness is related to the HRQOL of middle-aged women who are in the middle of the menopause. Among them, physical activity improves the HRQOL, smoking and the history of chronic diseases decrease the HRQOL [35], [36]. In addition, many studies have shown that menopause itself has no significant difference in QOL, high education level enhances quality of life, and sociodemographic characteristics such as occupation, age, etc. have a significant impact on QOL are reported [29], [31], [37], [38].

Many women are seeking hormone therapy to relieve menopausal discomfort, but actual hormone therapy is ineffective or rather exposed to many side effects such as the risk of coronary artery disease, stroke, thromboembolism, breast cancer, and cholecystitis [39]-[46]. Therefore, it is necessary to actively mediate the HRQOL.

It is difficult to find a systematic analysis of the HRQOL to perimenopausal women in Korea. The purpose of this study was to investigate the factors affecting the HRQOL by using the EQ5D Index, and to provide basic data for policy development to improve the HRQOL of Korean perimenopausal women.

## 2. METHOD

### 2.1 Data Source

Data for the analysis of HRQOL in Korean perimenopausal women utilized 2013 Community Health Survey in Korea. The 2013 Community Health Survey was conducted from 2013.10.16~10.31 (for 3 months) collaborated with 16 Provinces, 253 public health centers, 35 universities of Korea and the Korea Centers for Disease Control and Prevention. Of the total 228,781 respondents, 26,610 women aged 45 to 55 (11.6% of all respondents, 18.0% of all female respondents) were included in the analysis. The reason for this limitation is that the menopause occurs at the age of 50 and the

menopause appears at the age of 45 to 55 years before and after menopause. Other countries in Asia, such as China and Taiwan, also tend to limit ages from 45 to 55 years in menopausal studies [35], [36].

### 2.2 Research Model

The research model is based on variables that have a significant effect on QOL or HRQOL through extensive literature review. Independent variables are classified into five factors: individual factors (age, education level, marital status, and employment), lifestyle (smoking, drinking, obesity, physical activity and social network) disease-related factors (injury and nine chronic diseases; hypertension, diabetes, myocardial infarction, angina, asthma, arthritis, osteoporosis, stroke, and atopic disease), psychological factors (depression, subjective stress, suicidal ideation, happiness index, and sleeping time), and environmental factors (community environment and household environment).

The social network is considered to be an important factor in recent lifestyle research [50]. The community environment included the score of the community environmental satisfaction, the household environment (the household type, the basic living status, and living with a family with dementia). This is because the burden of caring for a sick family in Korea is mainly attributed to women, which can affect women's QOL [51], [52].

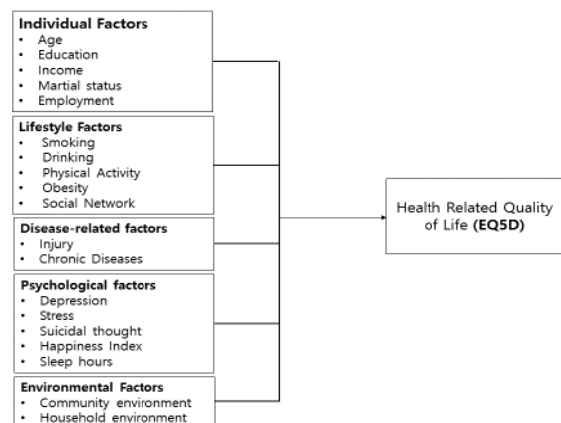


Fig. 1. Research Model

### 2.3 Variable Definition

**2.3.1 Dependent variable (EQ-5D index):** EQ5D has five domains such as Mobility, Self-care, Pain / Discomfort, and Anxiety / Depression which are measured from 'you do not have any~' or 'not at all ~' in three levels. EQ-5D weight means by subtracting the disutility in complete health condition (value=1), the value has a range of -0.171~1, 1 means have no problem in the five domains, 0 means death, lower than 0 means the QOL lower than death. The prediction model of quality weight of Korean is as follows.

$$Y = 1 - (0.050 + 0.096 \times M2 + 0.418 \times M3 + 0.046 \times SC2 + 0.136 \times SC3 + 0.051 \times UA2 + 0.208 \times UA3 + 0.037 \times PD2 + 0.151 \times PD3 + 0.043 \times AD2 + 0.158 \times AD3 + 0.050 \times N3)$$

**2.3.2 Independent variables:** Individual factors include age (40s and 50s), education (below elementary school, secondary school, university, graduate school), marital status (unmarried, married, separation, divorce, bereavement), occupation (employer and self-employed, unpaid family workers, other full-time housewives, etc.). Lifestyle factors were smoking (non - smoking, daily smokers, occasional smokers, past smokers), problem drinking, physical activity, BMI, and social network (social participation activities and frequency of contact). Physical activity is defined as "more than 20 minutes of intense physical activity for one week" or "moderate to severe physical activity for more than 5 days of 30 minutes or more once for moderate physical activity". Problematic drinking was defined as 'drinking 5 or more' and 'drinks twice a week'. Social networking was used to score the participation of religious activities, social activities, leisure / leisure activities, and charity activities (0 ~ 4 points). The frequency of contact is 1 if the frequency of contact with a relative (family member), neighbor or friend is 'less than once a month', 2 points if it is 'once a month', 3 points for '2 times a month', 4 points for 'once a week', 5 points for '2 ~ 3 times a week', or 6 points for 'more than 4 times a week', ranging from 1 to 36 points. The factors related to the disease were selected as the presence of fall experience for the past one year and the presence of nine chronic diseases (hypertension, diabetes mellitus, myocardial infarction, angina pectoris, asthma, arthritis, osteoporosis, stroke and atopic disease). Psychological factors include depression, Suicidal thought, happiness index, and sleeping hours. Subjective stress is a measure of the degree of stress in everyday life, ranging from 'I rarely feel (1 point)' or 'I feel very much (4 points)', with depression and suicidal ideation in the last 1 year of experience, 'Very unsatisfied (1 point)' ~ 'Very satisfied (10 points)', and sleep time used the average sleep time per day.

Finally, the environmental factors included the household environment (household type, living with dementia, basic living status), satisfaction with the community environment, and the area (urban, rural). Satisfaction with community environment related to 'Neighborhood Trust', 'Neighborhood Congratulatory and Mutual Relief Tradition', 'Neighborhood Safety Level', 'Neighborhood Natural Environment', 'Neighborhood Living Environment', 'Public Transportation Satisfaction', and 'Health Care Service Satisfaction). A total of 7 items were given, and a score of 1 to 7 was given to each item when answered 'Yes'. The higher the score, the higher the satisfaction with the community environment.

**2.4 Data Analysis**

Statistical analysis was performed using IBM SPSS version 20. The differences in HRQOL (EQ5D) according to individual factors, lifestyle factors, disease-related factors, psychological factors, and environmental factors were analyzed by t-test and ANOVA. The effects of individual characteristics, lifestyle factors, disease related factors, psychological factors, and environmental factors on HRQOL (EQ5D) were analyzed by hierarchical regression analysis. It is useful for selecting independent variables that explain the dependent variables significantly when there are a large number of independent

variables in the multiple regression analysis and there is concern about the multi - collinearity among them.

**3. RESULTS**

**3.1 Socio-demographic Characteristics of the Study Subject**

As a result of analyzing the socio - demographic characteristics of the subjects, 15,505 (58.3%) were in their fifties by age, 1,655 (66.5%) were secondary education, 5,127 (19.3% 53.5 (2.0%) were trained at graduate level or above, while 12.2% were under elementary school education. By marital status, 22,174 (83.3%) were married, 1,563 (5.9%) divorced, 1,336 (4.1%) were bereaved and 461 (1.7%) were single. There were 10,534 workers (39.6%) in the occupation, 8,760 (33.0%) in the unemployed, and 4,497 (16.9%) in the self-employed.

**3.2 Differences in EQ5D according to Individual factors**

As a result of analyzing the HRQOL according to individual factors, the total EQ5D-Index was 0.917 (± .071). There was a significant difference in EQ5D among all variables included as individual factors. By age, the age group of 45 to 49 years (.925 ± .059) was higher than the age group of 50 to 55 years (.911 ± .078). Also, according to the level of education, the higher the education level, the higher the quality of life related to health. The married was the highest (.921 ± .06), while the bereavement (.895 ± .099) and divorce (.898 ± .097) had the lowest EQ5D. By employment status, EQ5D was lowest in the case of full-time housewife (.904 ± .095), while it was the highest with .924 (± .053) in employer and self-employed and wage salary.

Table 1. Differences in HRQOL by Individual Factors

Variables	Categories	EQ-5D index		t or F-Value
		N	Mean (Std.)	
Age	45-49 years	11103	.925(.059)	16.088***
	50-55 years	15504	.911(.078)	
	Total	26607	.918(.068)	
Education	Elementary School or Less	3235	.892(.098)	174.511***
	Middle & High School	17650	.918(.070)	
	College & University	5126	.928(.051)	
	Graduate or Higher	535	.929(.046)	
	Total	26546	.917(.071)	
Marital-Status	Single	459	.902(.108)	76.162***
	Married	22173	.921(.065)	
	Separated	1054	.915(.076)	
	Bereavement	1336	.895(.099)	
	Divorce	1563	.898(.097)	
	Total	26585	.917(.071)	

Employment	Employers & Self-employed	4497	.924(.053)	140.134***
	Wage Workers	10543	.924(.054)	
	Unpaid Family Workers	2772	.920(.060)	
	Housewives, etc.	8757	.904(.095)	
	Total	26569	.917(.071)	

\*\*\* p&lt;.001

### 3.3 Lifestyle factors and EQ5D

Among lifestyle factors, smoking, body mass index, physical activity, social activities, and frequency of contact except drinking were significant differences in HRQOL. Non-smokers (.919 ± .069) had higher EQ5D than smokers (.867 ± .125), daily smokers (.897 ± .101), and past smokers (.888 ± .105). HRQOL was the highest in subjects with normal body mass index (BMI) (.922 ± .063), but lowest in subjects with high obesity (.884 ± .111). EQ5D was the highest in moderate to moderate physical activity, 2.1 to 6 hours per week (.925 ± .053 ~ .054), but lowest in moderate physical activity (.914 ± .078). On the other hand, in the case of exercising more than 8 hours per week, EQ5D was lower than that of exercising less than 2 hours per week. The higher the frequency of social participation activities and contact, the better the HRQOL.

Table 2. Differences in HRQOL by Lifestyle Factors

Variables	Categories	EQ-5D index		t or F-Value
		N	Mean (Std)	
Smoking	Non Smoker	25,356	.919(.069)	71.227***
	Past Smoker	387	.888(.105)	
	Occasional Smoker	180	.867(.125)	
	Daily Smoker	684	.897(.101)	
	Total	26,607	.917(.071)	
Drinking	Not Problematic Drinker	25,533	.917(.071)	1.601
	Problematic Drinker	1,074	.913(.068)	
	Total	26,607	.915(.069)	
BMI	Underweight (BMI <18.5)	790	.906(.095)	69.671***
	Normal (BMI 18.5-22.9)	13,023	.922(.063)	
	Overweight (BMI 23-24.9)	6,266	.919(.066)	
	Obesity (BMI ≥25-29.9)	5,113	.908(.081)	
	High Obesity (BMI ≥30)	499	.884(.111)	
	Total	25,691	.917(.070)	

Physical Activity	None	14,773	.914(.078)	14.494***
	Less equal 2 hours	3,311	.919(.062)	
	2.1-4 hours	1,908	.925(.053)	
	4.1-6 hours	1,479	.925(.054)	
	6.1-8 hours	867	.921(.061)	
	8.1 hours and over	4,268	.917(.064)	
	Total	26,606	.917(.071)	

Social Participation Activities	None	4,576	.902(.095)	87.918***
	One activity	10,018	.915(.074)	
	Two activities	7,564	.923(.058)	
	Three activities	3,261	.925(.053)	
	Four activities	1,188	.931(.040)	
	Total	26,607	.917(.071)	

Frequency of Contact	5 and less	1,873	.905(.092)	34.835***
	6-10 points	9,216	.914(.075)	
	11-15 points	11,771	.920(.064)	
	15 points and over	3,662	.921(.065)	
	Total	26,522	.917(.071)	

\*\*\* p&lt;.001

### 3.4 Disease-related factors and HRQOL

The HRQOL was lower in patients with falling experiences and nine chronic diseases (hypertension, diabetes, myocardial infarction, angina pectoris, asthma, arthritis, osteoporosis, stroke and atopic disease). Arthritis (.865 ± .112) and osteoporosis (.874 ± .119), which are common among perimenopausal women, were also significantly associated with low HRQOL.

Table 3. Differences in HRQOL by Disease-related Factors

Variables	Categories	EQ-5D index		T-Value
		N	Mean (Std.)	
Falling Experience	Yes	4421	.889(.101)	-21.007***
	No	22182	.922(.062)	
Hypertension	Yes	4199	.903(.088)	-11.726***
	No	22408	.920(.067)	
Diabetes	Yes	1304	.892(.100)	-9.343***
	No	25303	.918(.069)	
Myocardial Infarction	Yes	75	.856(.142)	-3.695***
	No	26532	.917(.071)	
Angina Pectoris	Yes	187	.865(.123)	-5.739***
	No	26420	.917(.070)	
Asthma	Yes	473	.878(.114)	-7.442***
	No	26134	.918(.070)	

Arthritis	Yes	2812	.865(.112)	-26.969***
	No	23795	.9235(.062)	
Osteoporosis	Yes	1291	.874(.119)	-13.418***
	No	25316	.9195(.067)	
Stroke	Yes	129	.786(.183)	-8.168***
	No	26478	.918(.069)	
Atopic Disease	Yes	455	.899(.088)	-4.278***
	No	26152	.9177(.071)	

\*\*\* p<.001

**3.5 Psychological factors and HRQOL**

Psychological factors showed significant differences in HRQOL due to depression, subjective stress, suicidal thought, and happiness index. Subjects with depression experienced (.845± .013) lower EQ5D than those without depression (.923± .060). The higher the degree of subjective stress and the suicidal thought, the lower the EQ5D.

Table 4. Differences in HRQOL by Psychological Factors

Variables	Categories	EQ-5D index		t or F-Value
		N	Mean (Std.)	
Depression	Yes	1904	.845(.013)	-24.900***
	No	24700	.923(.060)	
	Total	26604	.884(.036)	
Subjective Stress	Hardly feel	4556	.930(.055)	633.384***
	Tend to feel a bit	15495	.925(.055)	
	Tend to feel much	5739	.895(.091)	
	I feel very much	814	.843(.145)	
	Total	26604	.917(.071)	
Suicidal Thought	Yes	2828	.856(.122)	-29.135***
	No	23772	.924(.058)	
	Total	26600	.889(.090)	
Happiness Index	5 points and less	6790	.888(.103)	829.926***
	6-7 points	10308	.923(.056)	
	8 points and over	9509	.931(.048)	
	Total	26607	.917(.071)	
Sleeping Hours	5 hours and less	4446	.901(.091)	99.797***
	6 hours	8486	.919(.065)	
	7 hours	8626	.924(.059)	
	8 hours and over	5049	.915(.077)	
	Total	26607	.917(.071)	

\*\*\* p<.001

**3.6 Environmental factors and HRQOL**

Among the environmental factors, there were differences in HRQOL in all items including household type, basic living status, living with demented family, and environmental

satisfaction. According to household type, the first generation households had the lowest level of .913 (± .07) and the third generation households had the highest level of .920 (± .064). The higher the household size, the higher the HRQOL. HRQOL was lower when living with a family with dementia (.907 ± .072) than when not (.918 ± .071). The higher the satisfaction of community environment, the higher the HRQOL.

Table 5. Differences in HRQOL by Environmental Factors

Variables	Categories	EQ-5D index		t or F-Value
		N	Mean (Std.)	
Size of Family	1st generation	7585	.913(.079)	13.789***
	2nd generation	16712	.918(.068)	
	3rd generation and over	2233	.920(.064)	
	Total	26530	.917(.070)	
Basic Livelihood Security	Current Recipients	651	.826(.159)	1113.838***
	No	25954	.919(.066)	
	Total	26605	.887(.112)	
Living with Demented Family	Yes	301	.907(.072)	5.376***
	NO	26306	.918(.071)	
	Total	26607		
Environmental Satisfaction	3 points and less	5673	.904(.085)	143.647***
	4-5 points	10282	.917(.071)	
	6 points and over	10652	.924(.061)	
	Total	26607	.917(.071)	
Region	City	16417	.917(.070)	-.346
	Rural	10190	.917(.073)	
	Total	26605	.887(.112)	

\*\*\* p<.001

**3.7 Factors influencing HRQOL (EQ-5D): Hierarchical multiple regression analysis**

To analyze factors affecting HRQOL, hierarchical multiple regression analysis was performed on individual characteristics, lifestyle factors, disease - related factors, psychological factors, and environmental factors. Prior to the analysis, Variance Inflation Factor (VIF) was verified to diagnose multi - collinearity between independent variables. In the 1 to 5 stage model, the VIF value was 1.0 ~2.3 indicating that there is no problem of multicollinearity and F-values were statistically significant and regression models were considered to be appropriate.

The first step model analyzed the effects of personal characteristics on the HRQOL. The higher level of education, the lower age (40s), and living with their spouse, employment showed a positive impact on HRQOL. In the second- step model, the effects of individual factors and lifestyle factors on health - related quality of life were analyzed. The age and education level, which showed significant influence in the first stage model, still had a significant influence. In the marital

status, the influence of negative was maintained only in the case of bereavement and divorce. On the other hand, employers and self - employed, wage workers, and unemployed family volunteers remained positive in terms of employment status. Among the newly introduced lifestyle variables, all variables except drinking were significant variables related to the HRQOL. In comparison with non - smokers, past smokers, occasional smokers, daily smokers and obesity showed negative, and activity, social participation activity and contact frequency showed positive influence. The explanatory power of the whole model is 0.051%, which is slightly higher than 0.03% of the model 1.

Individual factors, lifestyle factors, and disease - related factors were included in the third- step model. As in the case of the second-stage model, the 50-year-old, bereavement, and divorce had negative influence on HRQOL, and the education level, employer and self-employed, wage worker and unpaid family volunteers still had significant positive influence. Except for drinking, past smokers, occasional smokers, daily smokers, and obesity had negative influence on HRQOL, physical activity and social participation still had a positive impact. Among the newly introduced disease - related factors, all nine variables except atopy disease showed negative effects on HRQOL. The explanatory power of the whole model rose to 12.5%.

In the fourth step model, individual factors, lifestyle factors, disease related factors, psychological factors were included in the analysis. Among the individual characteristics, age, education level, bereavement, divorce, employer and self-employed, wage worker and volunteers still had a significant influence. Among the lifestyle factors, past smokers, occasional smokers, daily smokers and obesity were negative, physical activity, social participation activities, and frequency of contact showed positive and still had significant influence. Among the disease-related factors, hypertension, diabetes, and myocardial infarction, which were noted in the third stage, showed no significant influence. Only the fall experience, angina, asthma, arthritis, osteoporosis and stroke showed significant negative influence. Depression, stress and suicidal thought showed significant negative impact on HRQOL and positive affect on happiness and sleeping hours among newly introduced psychological factors. The explanatory power of the entire model rose to 21.9%.

Lastly, the 5th step model included individual factors, lifestyle factors, disease related factors, psychological factors, and environmental factors. Among the individual factors, age was negative, education level, employer and self-employed, wage worker and unpaid family volunteer showed significant positive influence on HRQOL. Among the lifestyle factors, past smokers, occasional smokers, daily smokers and obesity had a negative influence on HRQOL, whereas physical activity, social activities and frequency of contact still showed positive influence on the HRQOL. Stress and suicidal thought had negative, and happiness index and sleeping hours had positive influence on HRQOL. On the other hand, among the newly introduced environmental factors, the satisfaction of the community environment was positive, and the beneficiaries of basic living and second generation households showed negative

influence. The explanatory power of the whole model was 22.7%. The results showed that the HRQOL of perimenopausal women was affected by individual factors, lifestyle factors, disease - related factors, psychological factors, and environmental factors.

Table 6. Hierarchical Regression Analysis on HRQOL (EQ-5D)

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5
	B(SE)	B(SE)	B(SE)	B(SE)	B(SE)
<b>Individual Factors</b>					
Age	-.001(.000)*	-.001(.000)**	-.001(.000)**	-.001(.000)**	-.001(.000)**
50s(40s=0)	-.001**	-.001*	-.001*	-.001*	-.001***
Education	.011(.001)*	.007(.001)**	.005(.001)**	.004(.001)**	.004(.001)**
Marital Status(Spouse Living Together=0)					
Single	-.007(.005)	-.001(.005)	-.001(.005)	.000(.004)	-.001(.004)
Separated	-.006(.003)*	-.004(.003)	-.003(.003)	.000(.003)	.001(.003)
Bereavement	-.014(.003)*	-.012(.003)**	-.009(.003)**	-.006(.003)*	-.003(.003)
Divorce	-.019(.003)*	-.014(.003)**	-.013(.002)**	-.006(.002)**	-.003(.002)
Employment(Housewives=0)					
Employer or Self-employed	.009(.002)*	.011(.002)**	.011(.002)**	.012(.002)**	.011(.002)**
Wage Workers	.006(.001)*	.008(.001)**	.007(.001)**	.008(.001)**	.008(.001)**
Unpaid Family Workers	.004(.002)*	.007(.002)**	.009(.002)**	.008(.002)**	.007(.002)**
<b>Life Style Factors</b>					
Smoking(Non Smoker=0)					
Past Smokers		-.031(.004)**	-.029(.004)**	-.022(.004)**	-.021(.004)**
Occasional Smokers		-.023(.008)**	-.022(.007)**	-.018(.007)**	-.017(.007)**
Daily Smokers		-.026(.004)**	-.023(.004)**	-.011(.004)**	-.011(.004)**
Problematic Drinking		-.002(.003)	-.001(.003)	.002(.003)	.002(.003)
Obesity		-.009(.001)**	-.006(.001)**	-.004(.001)**	-.004(.001)**
Physical Activity		.000(.000)**	.000(.000)**	.000(.000)**	.000(.000)**
Frequency of Contact		.001(.000)**	.001(.000)**	.001(.000)**	.000(.000)**
Social Participation Activities		.004(.001)**	.003(.001)**	.002(.001)**	.002(.001)**
<b>Disease Factors</b>					
Falling Experience			-.023(.002)**	-.018(.002)**	-.017(.002)**
Hypertension			-.003(.002)**	-.003(.001)	-.002(.001)
Diabetes			-.009(.003)**	-.005(.003)	-.005(.003)
Myocardial Infarction			-.014(.010)**	-.001(.009)	-.004(.009)
Angina Pectoris			-.024(.006)**	-.019(.006)**	-.019(.006)**
Asthma			-.019(.004)**	-.012(.004)**	-.013(.004)**

Arthritis					
Osteoporosis					
Stroke					
Atopic Disease					
<u>Psychological Factors</u>					
Depression					
Subjective Stress					
Suicidal Thought					
Happiness Index					
Sleeping Hours					
<u>Environmental Factors</u>					
Environmental Satisfaction					
Living with Dementia					
Basic Livelihood Security					
Household Type(First Generation=0)					
Second Generation					
Third Generation					
Region(Rural=0)					
Constant	.962***	.960***	.935***	.946***	.951***
Adjusted R2	.030	.051	.125	.219	.227
R2 change		.21	.074	.094	.008
F-value	39.832**	37.125*	61.066*	100.639	90.984
	**	**	**	***	***

\*\*\* p<.001

#### 4. DISCUSSION

Menopause is a natural process of life for all women. However, menopause itself will affect the HRQOL of middle-aged women across various fields, including physical, mental, and social. Through the studies, it was confirmed that a difference in the level of HRQOL of perimenopausal women according to the individual characteristics, lifestyle, chronic disease, psychological and environmental factors.

First, the individual factors showed significant differences in HRQOL by age, education level, marital status, employment. This results were consistent with the findings of previous studies conducted from Kim et.al. [29], [31], and Ümit et al [34]. In regression analysis, age, education level, and employment status appeared to have a significant impact on HRQOL. In particular, even housewives or unpaid family volunteers showed higher HRQOL than the unemployed and the social activity of perimenopausal women was an important factor enhancing the quality of life. There was a report that

psychological factors such as body image spouse support, meaning of life, attitudes to menopause have a positive impact on quality of life [52], [53]. Therefore, it is necessary to the development and dissemination of perimenopausal health education programs that are involved with your spouse and family.

Second, lifestyle factors such as smoking, physical activity, obesity, and social activities, except drinking, showed that all factors remain significant in HRQOL even under controlled conditions. This supports the findings of previous studies that obesity, proper weight maintenance, and lifestyle habits such as physical activity [29]-[33] and smoking [8], [9] are associated with HRQOL. Drinking, on the other hand, did not have a significant impact on HRQL. This result is the opposite of the study by Chitra et al [38]. This is because the questionnaire related to drinking in Korea can only be analyzed at the level of lifetime or problem drinking, so it is not possible to obtain sophisticated data or there may be a negative response from female respondents to questions about drinking. In the future, an in-depth analysis of drinking and quality of life will be needed. However, all lifestyle factors, except alcohol drinking, had an impact on HRQOL and statistically significant, even if all factors were controlled. Therefore, in order to increase the HRQOL of Korean perimenopausal women, it is necessary to develop and implement various health promotion programs to have healthy lifestyle.

Third, the experience of falling and the existence of nine chronic diseases affects HRQOL, and all factors were included in the final regression model. HRQOL was lower in patients with falls, angina, asthma, arthritis, arthritis and osteoporosis. This is consistent with previous studies [29]-[33], [35], [36] in which the experience of musculoskeletal disorders or chronic diseases lowers the quality of life. However, musculoskeletal disorders such as osteoporosis and arthritis require efforts to reduce weight burden and maintain joint flexibility and mobility by preventing obesity and ongoing physical activity. This can be achieved through lifestyle improvements such as balanced nutrition and regular physical activity.

Fourth, depression, stress, suicidal thought, happiness index, and sleeping time, which were selected as psychological factors, were found to be important factors in HRQOL of perimenopausal women. These results support the conclusion that stress [9], suicidal thought [10], depression [11], sleep quality [13] and quantity [48], [49] affect QOL, as revealed through previous studies. It is reported that depression in menopausal period can be reduced through physical activities [29]-[33], suggesting that perimenopausal women need various social activities and physical activities.

Lastly, satisfaction with local environment, basic living security, and second generation household type, which are included as environmental factors, were significant variables on HRQOL. This supports the preliminary study that the residential and household environment [15]-[17] and the economic level [34] are related to the QOL.

This study is meaningful in that it is the first study that comprehensively analyzes factors affecting the HRQOL of Korean perimenopausal women using national data. However, it also has the following limitations. First, because the

secondary data were used for the general population, actual menopause, menopausal symptoms, and anthropogenic menopause such as hysterectomy were not considered as limitations of the data. Therefore, we could not reflect the difference according to menopausal symptoms or actual menopause. However, previous studies have shown that menopause and its symptoms do not have a significant effect on quality of life, but rather have a significant effect on education level, occupation, BMI, race, age, postmenopausal period, and social variables [7], [8], [29], [31], [34], [37], [38]. Therefore, it is considered that there will be no difficulty in interpreting the results. Second, the sleeping time included as a psychological factor was a quantitative variable and could not include quality of sleep due to limit of data availability. Future research will need to develop tools to measure quality of life that fit the characteristics of Korean perimenopausal women.

In conclusion, the HRQOL of perimenopausal women varied according to individual factors, lifestyle factors, disease-related factors, psychological factors, and environmental factors, and these factors were considered to affect overall HRQOL. Many studies have shown that menopause itself has little or no effect on quality of life [37]. On the other hand, the quality of life variables is higher than other factors in perimenopausal women, and many parts of chronic diseases can be prevented by improvement of lifestyle, and also affect psychological factors. Therefore, in order to improve the HRQOL of perimenopausal women, various health promotion programs including social participation and smoking cessation and physical activity promotion need to be developed and implemented at the workplace or community level. It is also necessary to improve awareness and promote public relations so that couples or families can understand and cope with positive attitudes toward menopause

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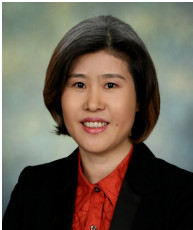
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