Changes in the Quality of Life After Women's Menopause

[1]Myoung-Hee Kim

Abstract: Background/Objectives: The purpose of this study was to identify changes in quality of life after women's menopause and the factors affecting the quality of life of premenopausal women and postmenopausal women. Methods/Statistical analysis: This is a secondary analysis study that integrates raw data from the KNHANES. Of the 22,948 participants who participated in the KNHANES between 2013 and 2015, ultimately 4,378 individuals who were suitable for the purpose of this study were analyzed. Using the SPSS program, the changes in quality of life after menopause and the factors affecting the quality of life of premenopausal and postmenopausal women were analyzed using the CSGLM.

Findings: The quality of life by the postmenopausal period was significantly different both in the EQ-5D index and within the sub-categories of quality of life, including mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Subject's age, perceived usual stress and perceived health status of premenopausal women were covariates, and the factors affecting the quality of life (EQ-5D index) of premenopausal women were education level and basic living conditions. Subject's age, menopausal age, postmenopausal period, perceived usual stress, and perceived health status were covariates in postmenopausal women, and factors affecting the quality of life (EQ-5D index) of postmenopausal women were household income, education level, and occupation. Improvements/Applications: The results of this study can be used as useful data for the development of programs to improve the health-related quality of life of women in the postmenopausal period.

Keywords: Quality of life, Premenopausal, Postmenopausal, women, KNHANES.

I. INTRODUCTION

Quality of life is multifaceted and multidimensional. Wherefore, each individual is defined as a perceived subjective well-being in the physical, mental, and socioeconomic domains [1]. Thus, it has also become a major concern to ensure optimal wellbeing in human life by pursuing health and happiness.

With advances in medical technology, economic growth and improved living standards, life expectancy has continuously been extended. The average life expectancy of men and women is 81.44 years, and one-third of people are living beyond middle age[2].In recent years, middle-aged women have an increased desire to prepare for a healthier and happier post-menopausal life. Middle-aged health affects the quality of life of the elderly for the rest of the life, so it is necessary to be proactive in exploring various changes among middle-aged women. Women are vocal about the quality of life and changes in their health status in relation to menopause [3, 4].Understanding factors affecting menopausal quality of life or changes in health status are considered to be essential for postmenopausal women's health care.

Menopause is a period corresponding to the middle age of women. It is a transition period in which the reproductive function deteriorates with physical aging and is accompanied by numerous psychological and social changes along with the change of estrogen. Menopausal symptoms vary from person to person due to hormonal changes associated with ovarian function degeneration before and after menopause, in addition to the physical, social, and psychological factors necessary to adapt to the aging process [5].

In Korea, 38-98% of middle-aged women experience menopausal symptoms [6]. Age, occupation, economic status, and educational status are discussed as factors affecting menopausal symptoms. There is a difference in the degree of perceived menopausal symptoms according to socio-cultural background [7].In recent years, health care has begun to recognize the quality of life of individuals as the ultimate management objective. Medical diagnosis puts an emphasis on reducing the physical and mental discomfort that affects the quality of an individual life. Therefore, the recent study sought to measure the level of self-perceived health regardless of disease status[8-10].One of these efforts was to measure the subjective health status of a patient using a health-related quality of life (HRQoL) measurement tool [9, 11]. EQ-5D is HRQoL metric developed by the EuroQol Group to measure overall health status [12]. In Korea's National Health and Nutrition Survey, EQ-5D is used to measure health-related quality of life.

The purpose of this study was to investigate the changes in quality of life after menopause in married women over 40 years of age and to identify the factors affecting the quality of life of premenopausal women and postmenopausal women.

II. MATERIALS AND METHODS

2.1. *Study design*

This study is a secondary analysis examining raw data from the Korean National Health and Nutrition Examination Survey VI (KNHANES VI) conducted between 2013 and 2015.

2.2. *Study population*

Among the 22,948 women who participated in the National Health and Nutrition Examination Survey between 2013 and 2015,4,378 respondents who were married and at least 40 years of age currently

Revised Manuscript Received on January 03, 2019.

Myoung-Hee Kim, Professor, Department of Nursing, Semyung University, 65 Semyung-ro, Chechon, Chungbuk, 27136, Republic of KOREA,

living together and not suffering from chronic diseases were included in the study for the final analysis.

2.3. *Study variables*

In this study, we used health questionnaire data found in the National Health Nutrition Survey. Health Survey Data including demographic, socioeconomic, disease related data, menopause age, oral contraceptive use, usual stress perception, subjective health status, and quality of life in the health questionnaire were used in this study.

The postmenopausal period was determined by calculating the current age minus the menopausal age. It's divided before menopause, within five years after menopause, between six and ten years after menopause, between 11 and 15 years after menopause, between 16 and 20 years after menopause, and over 21 years after menopause.

1 point for "don't feel that I am usually stressed", 2 points to "feel a little bit", "Feeling a lot" 3 points, and "feeling very much" 4 points were inversely converted. It showed that the higher the score, the higher the stress level. Subjective health status was inversely converted to 1 point for "very poor", 2 points for "poor", 3 points for "normal", 4 points for "good", and 5 points for "very good". It showed that the higher the score, the better the subjective health status.

Quality of life was measured using EQ-5D data.EQ-5D is a standardized tool for measuring quality of life in health. It is composed of five areas (mobility, self-care, daily activities, pain/ discomfort, and anxiety/ depression). The items in each area are configured of 1 point for no problem, 2 points for some problems, and 3 points for serious problems to respond. Subject's quality of life was determined by converting each question into weight values ranging between 1 (excellent) and -1 (worst; worse than dying).

2.4. *Statistical analysis*

The statistical program used SPSS win 19 and the significance level was less than 0.05.Statistical analysis was performed by applying the weight of composite sample design. The frequency and percentage of the general characteristics of the subjects were calculated. The factors affecting the quality of life of the premenopausal women and the postmenopausal women after the menopause were determined by using the complex sample general linear model (CSGLM) respectively.

2.5. *Ethical considerations*

The Korea National Health and Nutrition Examination Survey was conducted with the approval of the institutional review board (IRB No= 2013-07CON-03-4C, 2013-12EXP-03-5C, 2015-01-02-6C) of the Korea Center for Disease Control and Prevention and the raw data can be downloaded from the website of the KNHANES (https://knhanes.cdc.go.kr/knhanes/sub03/sub03_02_02.do) for academic research use.

III. RESULTS AND DISCUSSION

3.1. The socioeconomic related characteristics of subjects

Table 1 presents the socioeconomic related characteristics of subjects.

41.80% of the subjects were aged between 40 and 50, 33.80% in 51 ~ 60 years, 16.50% in 61 ~ 70 years, 7.90% in 71 ~ 80 years, 13.20% in 60 ~ 69 years, 6.90% in 70 years or older. Residents were 19.90% in metropolitan areas, 27.00% in large cities, and 53.10% in provinces. Personal income was 19.80% in the lower class, 24.50% in the middle class, 27.10% in the middle class, and 28.60% in the upper class. Household income was 14.10% in the lower class, 24.00% in the middle class, 28.00% in the middle class, and 33.90% in the upper class. The education level was 25.20% lower than elementary school graduation, 14.40% graduated from junior high school, 38.20% graduated from high school, and 22.20% higher than university. The occupation was 8.90% of professional occupation, 42.20% of other occupation, and 48.90% of unemployed (housewife, student etc.). Basic living recipients were 4.50%, and home ownership was 24.60% were homeless, 59.90% owned by one, and 15.50% owned by two or more. The perceived stress level of the subjects was 95% CI of 2.09~2.13, which indicated that subjects did not usually feel stressed. Perceived health status showed 95% CI in the range of 3.01~3.07.Of the subjects, 41.10% were premenopausal status and 58.90% were menopausal status. The postmenopausal period for menopausal women was 11.04 years (95% CI= 10.65~11.43).33.90% of subjects were within 5 years after menopause, 22.90% were 6-10 years after menopause, 15.50% after 11-15 years, 11.50% after 16-20 years of menopause and 16.20% after 21 years of menopause.

Table 1: Socioeconomic related characteristics of study participants (N=4378)

Characteristics	Categories	N[a]	Estimated value (%) [b]	SE (%)[b]
Age (years)	40~50	1503	41.80	1.00
	51~60	1432	33.80	0.90
	61~70	972	16.50	0.60
	71~80	471	7.90	0.40
Residential area	Capital (Seoul)	842	19.90	0.70
	Urban, Metropolitan area	1175	27.00	1.20
	Province	2361	53.10	1.20
Personal income level	Lower class (1st quartile)	866	19.80	0.80

Characteristics	Categories	N[a]	Estimated value (%) [b]	SE (%)[b]
	Lower-middle class (2nd quartile)	1061	24.50	0.80
	Upper-middle class (3rd quartile)	1221	27.10	0.80
	Upper class (4th quartile)	1230	28.60	1.10
Household income level	Lower class (1st quartile)	749	14.10	0.70
	Lower-middle class (2nd quartile)	1086	24.00	0.80
	Upper-middle class (3rd quartile)	1161	28.00	0.90
	Upper class (4th quartile)	1382	33.90	1.20
Education	≤Elementary school	1333	25.20	0.90
	Middle school	637	14.40	0.70
	High school	1510	38.20	0.90
	≥College	898	22.20	1.00
Occupation	Professional	356	8.90	0.50
	Other occupation	1813	42.20	1.00
	Unemployed (housewife, students etc.)	2209	48.90	1.00
Basic living allowance	Yes, received	211	4.50	0.40
	No, never received	4167	95.50	0.40
Home ownership	No home ownership	1002	24.60	1.00
	1 household	2660	59.90	1.00
	2 or more household	716	15.50	0.70
Perceived usual stress	95% CI: : 2.09~2.13 Min.~ Max.: 1~4	5656	2.11	0.01
	Almost don't feel	723	16.00	0.60
	Feel a little	2670	61.00	0.90
	Feel a lot	799	18.60	0.70
	Feel significantly	186	4.40	0.40
Perceived health status	95% CI: 3.01~3.07 Min.~ Max.: 1~5	5696	3.04	0.01
	Very Bad	206	3.90	0.30
	Bad	757	17.10	0.70
	Normal	2306	53.10	0.90
	Good	951	22.30	0.80
	Very Good/Excellent	158	3.50	0.30
Menopausal status	Premenopause	1508	41.10	1.00
	Postmenopause	2870	58.90	1.00
Duration after menopause (years)	95% CI: 10.65 ~11.43 Min.~ Max.: 0~44		11.04	0.19
	≤ 5	811	33.90	1.10
	6~10	626	22.90	0.90
	11~15	481	15.50	0.70
	16~20	397	11.50	0.60
	≥ 21	555	16.20	0.80

a: Unweighted value, b: Weighted value

3.2. Quality of life by the postmenopausal period

The quality of life by the postmenopausal period in Korean women is shown in Table 2.

The quality of life according to the postmenopausal period was significantly different both in the EQ-5D index(Wald F = 57.47, p <0.001) and within the sub-categories of quality of life, including mobility, self-care, usual activities, pain/discomfort, and anxiety/depression (Wald F = 77.29, p <0.001; Wald F=13.96, p<0.001; Wald F= 39.26, p <0.001; Wald F= 23.14, p <0.001; Wald F=12.74, p<0.001, respectively).

The EQ-5D index, a measure of quality of life, was significantly lower in women after menopause than in premenopausal women. The quality of life of women within 5 years after menopause (Mean = 0.94), women 6~10 yearsafter menopause (Mean = 0.93), women 11~15 years after menopause (Mean = 0.91), women 16~20 years after menopause (Mean = 0.89), and women over 21 yearsafter menopause (Mean = 0.84)were significantly lower than in premenopausal women (Mean = 0.96)andthe quality of life deteriorated with time after menopause.

Among the quality of life domains, mobility was significantly higher in women after menopause than in premenopausal women. The mobility of women within 5 years after menopause (Mean=1.12), women 6~10 years after menopause (Mean= 1.16), women 11~15 years after menopause (Mean= 1.26), women 16~20 years after menopause (Mean= 1.32), and women over 21 years after menopause (Mean= 1.51) were significantly higher than in premenopausal women (Mean = 1.05). That is, mobility capacity decreased as time passed after menopause.

Among the quality of life domains, self-care was not significantly different between premenopausal women (Mean = 1.01) and women within 5 years after menopause (Mean = 1.02). However, self-care was significantly higher in women after menopause than in premenopausal women. The self-care of women 6~10 years after menopause (Mean= 1.04), women 11~15 years after menopause (Mean= 1.04), women 16~20 years after menopause (Mean= 1.06), and women over 21 years after menopause (Mean= 1.14) were significantly higher than in premenopausal women (Mean = 1.01). Self-care was significantly more of an ongoing problem from 6 years after menopause compared to before menopause.

Among the quality of life domains, usual activities were significantly higher in women after menopause than in premenopausal women. The usual activities of women within 5 years after menopause (Mean=1.07), women 6~10 years after menopause (Mean= 1.10), women 11~15 years after menopause (Mean= 1.15), women 16~20 years after menopause (Mean= 1.18), and women over 21 years after menopause (Mean= 1.34) were significantly higher than in premenopausal women (Mean = 1.04).As the time passed after menopause, problems with usual activities appeared.

Among the quality of life domains, pain/ discomfort was significantly higher in women after menopause than in premenopausal women. The pain/ discomfort of women within 5 years after menopause (Mean=1.30), women 6~10 years after menopause (Mean= 1.28), women 11~15 years after menopause (Mean= 1.35), women 16~20 years after menopause (Mean= 1.47), and women over 21 years after menopause (Mean= 1.53) were significantly higher than in premenopausal women (Mean = 1.21). As time passed after menopause, pain/ discomfort appeared to be a problem.

Among the quality of life domains, anxiety/ depression was not significantly different between premenopausal women (Mean = 1.10) and women within 5 years after menopause (Mean = 1.11) or women 6~10 years after menopause (Mean= 1.13). However, the anxiety/ depression of women 11~15 years after menopause (Mean= 1.20), women 16~20 years after menopause (Mean= 1.23), and women over 21 years after menopause (Mean= 1.24) were significantly higher than in premenopausal women (Mean = 1.10).Anxiety/ depression was shown to be significant problems from 11 years after menopause compared to before menopause.

Perceived usual stress was not different between premenopausal and postmenopausal women.

Perceived health status was significantly higher in premenopausal woman (Mean = 3.22) compared to women within 5 years after menopause (Mean= 3.04), women 6~10 years after menopause (Mean= 2.98), women 11~15 years after menopause (Mean= 2.87), women 16~20 years after menopause (Mean= 2.86), and women over 21 years after menopause (Mean= 2.65). Perceived health status grew worse over time after menopause.

Table 2: EQ-5Daccording to period after menopause in Korean women(N=4378)

Categories	Postmenopausal duration (years)	% [a]	Mean	SE	Estimated value	SE	Wald F	p
5 EQ-Total							57.45	<0.001
	Premenopausal status	41.10	0.96	0.20	Ref.			
	≤ 5	20.00	0.94	0.36	-1.90	0.01	21.47	<0.001
	6~10	13.50	0.93	0.48	-2.80	0.01	27.85	<0.001
	11~15	9.20	0.91	0.63	-5.10	0.01	61.00	<0.001
	16~20	6.70	0.89	0.86	-7.50	0.01	72.61	<0.001

Categories	Postmenopausal duration (years)	% [a]	Mean	SE	Estimated value	SE	Wald F	p
	≥21	9.60	0.84	0.82	-12.40	0.01	209.72	<0.001
5 EQ: mobility							77.29	<0.001
	Premenopausal status	41.10	1.05	0.01	Ref.			
	≤ 5	20.00	1.12	0.01	0.07	0.01	23.42	<0.001
	6~10	13.50	1.16	0.01	0.11	0.01	36.94	<0.001
	11~15	9.20	1.26	0.02	0.21	0.02	70.36	<0.001
	16~20	6.70	1.32	0.02	0.27	0.03	81.79	<0.001
	≥21	9.60	1.51	0.02	0.45	0.02	303.38	<0.001
5 EQ: self-care							13.96	<0.001
	Premenopausal status	41.10	1.01	0.01	Ref.			
	≤ 5	20.00	1.02	0.0	0.01	0.01	3.62	0.058
	6~10	13.50	1.04	0.01	0.03	0.01	9.10	0.003
	11~15	9.20	1.04	0.01	0.02	0.01	8.36	0.004
	16~20	6.70	1.06	0.01	0.04	0.01	12.65	<0.001
	≥21	9.60	1.14	0.01	0.12	0.01	52.38	<0.001
5 EQ: usual activities							39.26	<0.001
	Premenopausal status	41.10	1.04	0.01	Ref.			
	≤ 5	20.00	1.07	0.01	0.03	0.01	8.74	0.003
	6~10	13.50	1.10	0.01	0.06	0.01	18.79	<0.001
	11~15	9.20	1.15	0.01	0.11	0.01	32.82	<0.001
	16~20	6.70	1.18	0.022	0.14	0.02	44.49	<0.001
	≥21	9.60	1.34	0.025	0.30	0.02	141.96	<0.001
5 EQ: pain/ discomfort							23.14	<0.001
	Premenopausal status	41.10	1.21	0.01	Ref.			
	≤ 5	20.00	1.30	0.01	0.09	0.02	17.69	0
	6~10	13.50	1.28	0.02	0.07	0.02	7.70	0.006
	11~15	9.20	1.35	0.02	0.14	0.03	22.02	<0.001
	16~20	6.70	1.47	0.03	0.25	0.03	46.12	<0.001
	≥21	9.60	1.53	0.03	0.32	0.03	84.58	<0.001
5 EQ: anxiety/ depression							12.74	<0.001
	Premenopausal status	41.10	1.10	0.01	Ref.			
	≤ 5	20.00	1.11	0.01	0.01	0.01	0.25	0.612
	6~10	13.50	1.13	0.01	0.03	0.01	2.47	0.117
	11~15	9.20	1.20	0.02	0.09	0.02	14.04	<0.001
	16~20	6.70	1.23	0.02	0.12	0.02	22.58	<0.001
	≥21	9.60	1.24	0.02	0.13	0.02	32.33	<0.001
Perceived usual stress							0.88	0.488
	Premenopausal status	41.10	2.12	0.01	Ref.			
	≤ 5	20.00	2.09	0.02	-0.03	0.03	0.84	0.358

Categories	Postmenopausal duration (years)	% [a]	Mean	SE	Estimated value	SE	Wald F	p
	6~10	13.50	2.11	0.03	-0.01	0.03	0.13	0.717
	11~15	9.20	2.16	0.04	0.03	0.04	0.65	0.419
	16~20	6.70	2.14	0.04	0.01	0.01	0.09	0.755
	≥21	9.60	2.05	0.04	-0.06	0.04	2.22	0.137
Perceived health status							33.54	<0.001
	Premenopausal status	41.10	3.22	0.02	Ref.			
	≤ 5	20.00	3.04	0.03	-0.17	0.03	22.71	<0.001
	6~10	13.50	2.98	0.03	-0.23	0.04	35.21	<0.001
	11~15	9.20	2.87	0.04	-0.34	0.04	48.94	<0.001
	16~20	6.70	2.86	0.05	-0.35	0.05	43.00	<0.001
	≥21	9.60	2.65	0.04	-0.56	0.05	114.85	<0.001

3.3.Factors affecting quality of life in premenopausal women

The factors affecting the quality of life of premenopausal women are shown in Table 3.

As subject's age, perceived usual stress and perceived health status were covariates in premenopausal women, the factors affecting the quality of life (EQ-5D index) of premenopausal women were education level and basic livelihood recipients.

Compared to women whose education level is below elementary school(Mean= 0.97), the quality of life of women graduated from middle school (Mean= 0.99), high school (Mean= 0.99), and university or more (Mean= 1.00) were consecutively higher(Wald F=5.45, p=0.020; Wald F=7.84, p=0.005, Wald F=8.82, p=0.003, respectively).

The quality of life of the non-basic livelihood recipient (Mean = 0.99) was higher than that of the basic livelihood recipient (Mean = 0.97) (Wald F = 7.42, p = 0.007).

The perceived usual stress (Wald F = 32.50, p <0.001) and perceived health status (Wald F = 67.75, p <0.001) of covariance variables were significant variables affecting the quality of life of premenopausal women.

The subject's age, perceived usual stress, and subjective health status were covariates. Since the demographic variables were used as explanatory variables, the explanatory power of these variables on the quality of life of premenopausal women was 19.2% (Wald F = 7.50, p <0.001).

Table 3: Factors affecting the EQ-5Din the premenopausal women (N=1508)

			Model effect verification		Parameter Estimation		
Characteristics	Mean	SE	Wald F	p	Estimated value (%)	SE	p
(constant)			929.95	<0.001	1.10	0.04	<0.001
Dummy_Region1	0.97	0.01	.	.	0.00[a]	.	.
Dummy_Region 2	0.98	0.01	0.22	0.638	-0.01	0.01	0.638
Dummy_Region 3	0.98	0.01	0.24	0.623	-0.01	0.01	0.623
Dummy_Personal income level 1	0.97	0.01	.	.	0.00[a]	.	.
Dummy_Personalincome level 2	0.97	0.01	2.91	0.088	0.01	0.01	0.088
Dummy_Personal income level 3	0.97	0.01	0.41	0.520	0.01	0.01	0.520
Dummy_Personal income level 4	0.97	0.01	0.10	0.745	0.01	0.01	0.745
Dummy_Householdincome level 1	0.97	0.01	.	.	0.00[a]	.	.
Dummy_Household income level 2	0.98	0.01	3.88	0.049	-0.02	0.01	0.049
Dummy_Household income level 3	0.99	0.01	3.54	0.060	-0.02	0.01	0.060
Dummy_Household income level 4	0.98	0.01	1.63	0.202	-0.02	0.01	0.202

			Model effect verification		Parameter Estimation		
Characteristics	Mean	SE	Wald F	p	Estimated value (%)	SE	p
Dummy_Education 1	0.97	0.01	.	.	0.00[a]	.	.
Dummy_Education 2	0.99	0.01	5.45	0.020	-0.03	0.01	0.020
Dummy_Education 3	0.99	0.01	7.84	0.005	-0.03	0.01	0.005
Dummy_Education 4	1.00	0.01	8.82	0.003	-0.04	0.01	0.003
Dummy_Occupation 1	0.97	0.01	.	.	0.00[a]	.	.
Dummy_Occupation 2	0.98	0.01	0.77	0.381	-0.01	0.01	0.381
Dummy_Occupation 3	0.97	0.01	0.32	0.566	0.01	0.01	0.566
Dummy_Basicliving allowance 1	0.97	0.01	.	.	0.00a	.	.
Dummy_Basic living allowance 2	0.99	0.01	7.42	0.007	-0.03	0.01	0.007
Dummy_Home ownership 1	0.97	0.01	.	.	0.00[a]	.	.
Dummy_Home ownership 2	0.98	0.01	0.35	0.552	-0.01	0.01	0.552
Dummy_Home ownership 3	0.98	0.01	2.83	0.093	-0.01	0.01	0.093

a: reference category

Mean and SE (standard error) are results from the weighted analysis.

Model a: EQ-5D index = (constant) + Dummy_Region 1 + Dummy_Region 2 + Dummy_Region 3 + Dummy_ Personal income level 1 + Dummy_Personal income level 2 + Dummy_ Personal income level 3 + Dummy_ Personal income level 4 + Dummy_ Household income level 1 + Dummy_ Household income level 2 + Dummy_ Household income level 3 + Dummy_ Household income level 4+ Dummy_ Education 1 + Dummy_ Education 2 + Dummy_ Education 3+ Dummy_ Education 4 + Dummy_ Occupation 1 + Dummy_ Occupation 2 + Dummy_ Occupation 3 + Dummy_Basic living allowance 1+ Dummy_Basic living allowance 2 + Dummy_ Home ownership 1 + Dummy_ Home ownership 2 + Dummy_ Home ownership 3 + age + Perceived usual stress + Perceived health status

b. Covariate variable: age=45.55, Perceived usual stress=2.12, Perceived health status=3.22

Model testing : R2=19.2%, Wald F=7.50, p<0.001

3.4. Factors affecting quality of life in postmenopausal women

The factors affecting the quality of life of postmenopausal women are shown in Table 4.

When the subject's age, menopausal age, postmenopausal period, perceived usual stress, and perceived health status were covariates in postmenopausal women, factors affecting the quality of life (EQ-5D index) of postmenopausal women were household income, education level, and occupation.

Compared to women whose household income is lower class(Mean= 0.95), the quality of life of lower-middle class women (Mean= 0.96), upper-middle class (Mean= 0.97), and upper class (Mean= 0.97) were consecutively higher(Wald F=11.12, p=0.001; Wald F=7.50, p=0.006, Wald F=6.17, p=0.013, respectively).

Compared to women whose education level is below elementary school(Mean= 0.95), the quality of life of women graduated from middle school (Mean= 0.97), high school (Mean= 0.97), and university or more (Mean= 0.97) were consecutively higher(Wald F=21.12, p<0.001; Wald F=21.71, p<0.001, Wald F=18.58, p<0.001, respectively).

There was no significant difference in other occupation(Mean = 0.95) compared to professional occupation (Mean = 0.95). However, the quality of life of the unemployed (housewife, students, etc.) women (Mean= 0.94) was lower than that of the women with occupations (Mean = 0.95) (Wald F = 4.12, p = 0.043).

The subject's age, menopausal age, postmenopausal period, perceived usual stress, and perceived health statuswere covariates. As demographic variables were used as explanatory variables, the explanatory power of these variables on the quality of life of postmenopausal women was 28.1% (Wald F = 26.75, p <0.001).

These results were supported the previous studies [13] that factors affecting the quality of life of menopausal women were gender, age, education, occupation, income, marital status, religion, social participation, race, and health. Previous studies suggest that social psychological factors such as fatigue, depression, personality traits, stress, mood, social support, social activities, attitudes toward life, and health perceptions, in addition to changes in cognitive function affect the quality of life [14], which was also supported by this study.

Table 4: Factors affecting the EQ-5D in the postmenopausal women (N=2870)

			Model effect verification		Parameter Estimation		
Characteristics	Mean	SE	Wald F	p	Estimated value (%)	SE	p
(constant)			697.42	<0.001	1.07	0.04	<0.001
Dummy_Region 1	0.95	0.01	.	.	0.00[a]	.	.
Dummy_Region 2	0.95	0.01	0.60	0.439	-0.01	0.01	0.439
Dummy_Region 3	0.95	0.01	0.79	0.374	0.01	0.01	0.374
Dummy_Personal income level 1	0.95	0.01	.	.	0.00[a]	.	.
Dummy_Personal income level 2	0.95	0.01	1.23	0.267	0.01	0.01	0.267
Dummy_Personal income level 3	0.94	0.01	3.48	0.063	0.01	0.01	0.063
Dummy_Personal income level 4	0.94	0.01	1.47	0.226	0.01	0.01	0.226
Dummy_Household income level 1	0.95	0.01	.	.	0.00[a]	.	.
Dummy_Household income level 2	0.96	0.01	11.12	0.001	-0.02	0.01	0.001
Dummy_Household income level 3	0.97	0.01	7.50	0.006	-0.03	0.01	0.006
Dummy_Household income level 4	0.97	0.01	6.17	0.013	-0.03	0.01	0.013
Dummy_Education 1	0.95	0.01	.	.	0.00[a]	.	.
Dummy_Education 2	0.97	0.01	21.12	<0.001	-0.03	0.01	<0.001
Dummy_Education 3	0.97	0.01	21.71	<0.001	-0.03	0.01	<0.001
Dummy_Education 4	0.97	0.01	18.58	<0.001	-0.03	0.01	<0.001
Dummy_Occupation 1	0.95	0.01	.	.	0.00[a]	.	.
Dummy_Occupation 2	0.95	0.01	0.41	0.522	-0.01	0.01	0.522
Dummy_Occupation 3	0.94	0.01	4.12	0.043	0.01	0.01	0.043
Dummy_Basic living allowance 1	0.95	0.01	.	.	0.00[a]	.	.
Dummy_Basic living allowance 2	0.96	0.01	3.31	0.069	-0.02	0.01	0.069
Dummy_Home ownership 1	0.95	0.01	.	.	0.00[a]	.	.
Dummy_Home ownership 2	0.96	0.01	3.33	0.068	-0.01	0.01	0.068
Dummy_Home ownership 3	0.96	0.01	3.69	0.055	-0.01	0.01	0.055
Dummy_Oral pill taking 1	0.95	0.01	.	.	0.00[a]	.	.
Dummy_Oral pill taking 2	0.95	0.01	0.06	0.801	0.01	0.01	0.801

a: reference category

Mean and SE (standard error) are results from the weighted analysis.

Model a: EQ-5D index = (constant) + Dummy_Region 1 + Dummy_Region 2 + Dummy_Region 3 + Dummy_ Personal income level 1 + Dummy_Personal income level 2 + Dummy_ Personal income level 3 + Dummy_ Personal income level 4 + Dummy_ Household income level 1 + Dummy_ Household income level 2 + Dummy_ Household income level 3 + Dummy_ Household income level 4+ Dummy_ Education 1 + Dummy_ Education 2 + Dummy_ Education 3+ Dummy_ Education 4 + Dummy_ Occupation 1 + Dummy_ Occupation 2 + Dummy_ Occupation 3 + Dummy_Basic living allowance 1+ Dummy_Basic living allowance 2 + Dummy_ Home ownership 1 + Dummy_ Home ownership 2 + Dummy_ Home ownership 3 + Dummy_Oral pill taking 1+

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

Dummy_Oral pill taking 2 + Age + Menopausal Age + Duration after menopause + Perceived usual stress + Perceived health status

b. Covariate variable: age=60.05, menopausal age=49.01, Duration after menopause=11.04, Perceived usual stress=2.10, Perceived health status=2.92

Model testing :R2=28.1%, Wald F=26.75, p<0.001

IV. CONCLUSION

Menopausal women are at a time when they appear to many health problems and may show many changes in their quality of life. As the average lifespan of the population increases due to socioeconomic development and improved medical standards, women have to live an average of more than 30 years postmenopausal life.

The results of this study showed that women had lower quality of life after menopause, and the level of education and economy are the main factors influencing quality of life among premenopausal and postmenopausal women. The understanding of factors affecting the quality of life of premenopausal women and postmenopausal women identified in this study is interpreted as a related factor that should be considered important in terms of health management for improvement of health related quality of life in postmenopausal women. Also, understanding the changes in quality of life after menopause can be used as useful data for the development of programs to improve the health-related quality of life of women in the postmenopausal period.

ACKNOWLEDGMENT

This paper was supported by the Semyung University Research Grant of 2019.

REFERENCES

1. Kaasa S, Loge JH. Quality of life in palliative care: principles and practice.Palliat Med. 2003;17(1):11-20. DOI: 10.1191/0269216303pm662ra
2. Statistics Korea. KOSIS National statistical portal [Internet]. KOreanStatistical Information Servis: Statistics Korea [cited 2018 Jan 8]. Available from: http://kostat.go.kr.
3. Karmakar S, Majumdar A, DasguptaS. Das. Quality of life among menopausal women: A community-based study in a rural area of West Bengal.Journalof mid-life health. 2017;8(1): 21-27. DOI: 10.4103/jmh.JMH_78_16.
4. Liu, Kuo et al. Relationship between menopause and health-related quality of life in middle-aged Chinese women: a cross-sectional study. BMC women's health. 2014;14: 7. DOI:10.1186/1472-6874-14-7
5. G K P, Arounassalame B. The quality of life during and after menopause among rural women. J ClinDiagn Res. 2013 Jan;7(1):135-9. doi: 10.7860/JCDR/2012/4910.2688
6. Kim SA. Impact of attitude to developmental phenomena and menopausal symptoms to the meaning of life among climacteric women. The Korean gerontological society.2012;32(2):631-664.
7. Woods NF, Cray L, Mitchell ES, HertingJR. Endocrine biomarkers and symptom clusters during the menopausal transition and early postmenopause: observations from the Seattle Midlife Women's Health Study. Menopause. 2014;21(6):646-652. DOI: 10.1097/GME.0000000000000122
8. Hunt SM, McKenna SP, McEwen J, Backett EM, Williams J, Papp E. A quantitative approach to perceived health status: a validation study. J Epidemiol Community Health. 1980;34:281-286.
9. Locker D, Allen F. What do measures of "oral health-related quality of life" measure? Community Dent Oral Epidemiol. 2007;35:401-411.
10. Allen PF. Assessment of oral health related quality of life. Health Qual Life Outcomes. 2003;1:40.
11. Dolan P. Modeling valuations for EuroQol health states. Med Care. 1997;35: 1095-1108.
12. Brooks R, Rabin R, De CharroF.The measurement and valuation of health status using EQ-5D: a European perspective: evidence from the EuroQol BIOMED Research Programme(1st ed.). Berlin: Springer Science & Business Media; 2013. 2-299 pp.
13. Reich M, Lesur A, Perdrizet-Chevallier C. Depression, quality of life and breast cancer: a review of the literature. Breast Cancer Res Treat. 2008;110(1):9-17. DOI: 10.1007/s10549-007-9706-5
14. Berent-Spillson A, Persad CC, Love T, Sowers M, Randolph JF, Zubieta JK,Smith YR. Hormonal environment affects cognition independent of age during the menopause transition. JClinEndocrinolMetab. 2012;97(9):1686-1694.