

# Factors Affecting Health-related Quality of Life for Subjects with Breast Cancer

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## Abstract

**Background/Objectives:** The purpose of this study was to compare the health-related quality of life between subjects in good health and subjects with breast cancer.

**Method/Statistical Analysis:** A secondary analysis was performed with data from 255 adults using raw data from the Korean National Examination Survey (KNHANES) conducted from 2010 to 2017.

**Findings:** Subjects with breast cancer displayed a poor level of health awareness and high activity confinement. The EQ-5D index scores between subjects in good health and subjects with breast cancer did not show any significant differences. However, factors affecting health related quality of life for subjects with breast cancer and subjects in good health were different. Household income, perceived health status and activity confinement were the strongest factors affecting the health related quality of life among subjects with breast cancer while residential area, level of education, household composition, perceived health status, activity confinement and BMI were significant for subjects in good health.

**Improvements/Applications:** The results of the study will be instrumental in giving insights on health-related quality of life for patients with breast cancer and establishing nursing strategies to promote their HR-QoL.

**Keywords:** *Breast cancer, Quality of life, HR-QoL, EQ-5D, KNHANE*

## Introduction

As the frequency of breast cancer occurrences and patients' survival rate have been increasing recently, people are more interested in the quality of life of the patients with breast cancer. It has been necessary to promote the patients' quality of life during their medical treatments in order to receive the best outcomes [1-3].

Most breast cancer patients finish their medical treatments, including chemo therapy and radiation therapy, one year after first being diagnosed [4]. Of particular interest was that 58% of the breast cancer patients were diagnosed before age 49, thus indicating

that Korean breast cancer patients are generally younger than their European counterparts [5]. The growth of young breast cancer patients was primarily related to their family history, but because they are young, they are often better able to survive treatment and thus their life is prolonged. Accordingly, it is important to pay attention to their quality of life. After medical treatments, the majority of breast cancer survivors were still struggling with activities of daily living and their quality of life continued to be decreased [6]. Breast cancer survivors who survived 5 years or more were still afraid of cancer recurrence and continued to experience side effects long after treatments which negatively impacted their quality of life in addition to experiencing long-term psychological barriers and physical discomfort [7].

This study noted that the subjects with breast cancer were in need of not only medical treatments, but also of enhancing their quality of life and for that reason, the quality of life was included as an important index that

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can be used to evaluate the effectiveness of the cancer treatments [8].

This study examined factors that affect health-related quality of life (below HR-QOL) of the subjects with breast cancer by comparing them with the healthy subjects and aims to provide basic materials that can guide the promotion of HR-QoL among breast cancer patients.

**Method**

This study was a secondary analysis of data collected by the KNHANES from 2010 and 2017. Subjects were selected two groups (subjects with breast cancer and healthy subjects) according to study criteria.

The total number of female participants in the KNHANES from 2010 to 2017 was 35,301. Among them, 113 participants were breast cancer patients with an age range from 31 to 80. An additional 142 healthy subjects aged over 30 were used as a comparison group. Participants who were receiving treatments for other types of cancer were excluded for this study.

This study used the health-related survey questionnaire from the KNHANES. Socio-demographic characteristics included age, residential area, education level, marital status, household composition, household income level and occupation.

Variables associated with physical and mental health included perceived health condition, activity confinement, perceived usual stress level and body mass index (BMI).

The EQ-5D was used to measure HR-QoL. The EQ-5D is a standardized instrument that measures HR-QoL and it is composed of 5 items/areas. The EQ-5D index was obtained by applying a weighted value to the measured score of each question. The score variation was 0 through 1 and higher scores indicated a better quality of life [9].

The study analysis was conducted by following usage guidelines of the Korea Centers for Disease Control and Prevention suggested by the KNHANES. The raw materials of KNHANES were used for complex sample design. Complex sample Chi-square test was to compare the differences of EQ-5D on socio-demographic variables and health related variables between the health subjects and the subjects with breast cancer. The complex sample general linear model (CSGLM) was

used to examine the factors that affect health-related quality of life (HR-QOL) of health participants and participants with breast cancer.

SPSS version 19.0 (SPSS Inc. Chicago, IL, USA) was used to measure the data and significance level was below 0.05.

**Result and Discussion**

**1. Socio-demographic characteristics comparison between healthy female subjects and subjects with breast cancer**

Among demographic characteristics [Table 1], significant differences were noted between the healthy subjects and the subjects with breast cancer according to their age ( $\chi^2=4.06$ ,  $p=0.003$ ) and occupation ( $\chi^2=5.50$ ,  $p<0.001$ ). The results show a spike in the percentage of subjects with breast cancer in their 40s (compared to those in their 30s) and a drop in the percentage of breast cancer patients in their 60s and 70s. The occupation of the subjects with breast cancer was also significant as it showed that those with breast cancer were more likely to be in clerical positions or be unemployed compared to healthy subjects.

**Table 1. Socio-demographic factors of study participants (N=255)**

Categories	Healthy Subjects (n=142)		Subjects with breast cancer (n=113)		$\chi^2$	p
	Value	SE	Value	SE		
	(%) <sup>a</sup>	(%) <sup>a</sup>	(%) <sup>a</sup>	(%) <sup>a</sup>		
Age (years)						
30~39	6.4	2.60	10.1	3.30	4.06	0.003
40~49	15.9	3.50	32.0	4.90		
50~59	32.8	4.50	35.8	5.20		
60~69	27.4	4.20	11.1	3.00		
≥70	17.5	2.90	11.0	2.70		
Occupation*					5.50	<0.001
A	12.3	3.10	2.7	1.60		
B	3.6	1.60	11.4	4.20		
C	14.3	3.50	3.5	1.60		
D	5.4	2.10	0.7	0.60		
E	2.4	1.40	1.4	1.10		
F	10.2	3.10	3.9	2.00		
G	51.8	4.60	76.4	4.70		

Value= Estimated value, SE= Standard error, a= Weighted value

Occupation\*: A=Managers, B=Clerical workers, C=Service and sales workers, D=Farm and fishery skilled workers, E=Technicians, machine operations and assembly line workers, F=Simple labor workers, G=Unemployed

### 2. Comparison of health-related characteristics between the healthy subjects and the subjects with breast cancer

In health-related characteristics [Table 2], perceived health status ( $\chi^2=4.34$ ,  $p=0.015$ ), activity confinement ( $\chi^2=5.99$ ,  $p=0.016$ ) and BMI ( $\chi^2=4.31$ ,  $p=0.015$ ) showed significant differences between the healthy subjects and the subjects with breast cancer, but not perceived usual stress level.

Beaulac et al. [10] discovered that a year after surgery, breast cancer survivors who had lymphedema and confined shoulder movement had significantly low HR-QOL in physical and functional areas. Accordingly, it is very important for breast cancer patients to make an effort to manage their physical and functional health so their quality of life is not adversely affected.

**Table 2. Health related factors of study participants (N=255)**

Categories	Healthy subjects (n=142)		Subjects with breast cancer (n=113)		$\chi^2$	p
	Value (%) <sup>a</sup>	SE (%) <sup>a</sup>	Value (%) <sup>a</sup>	SE (%) <sup>a</sup>		
Perceived health status						
Good	23.3	4.00	9.4	2.40	4.34	0.015
Moderate	44.5	4.40	53.4	5.20		
Poor	32.2	4.30	37.2	5.20		
Activity confinement						
Yes	13.1	2.80	26.0	4.80	5.99	0.016
No	86.9	2.80	74.0	4.80		

BMI						
<18.5	4.6	2.30	1.3	1.00	4.31	0.015
18.5 ~<25	58.2	4.60	76.6	4.50		
≥25	37.2	4.70	22.1	4.50		

Value= Estimated value, SE= Standard error, a= Weighted value

### 3. Comparison in HR-QOL between the healthy subjects and the subjects with breast cancer

As shown [Table 3], the EQ-5D index score for the HR-QOL between healthy subjects and the subjects with breast cancer did not show any significant differences (Wald F=0.18,  $p=0.672$ ). The EQ-5D index score for the healthy subjects was 0.92 and the EQ-5D index score for the subjects with breast cancer was 0.91.

In the research done by Matalqah et al. [11] and Wallwiener et al. [12], the EQ-5D index score of breast cancer patients was lower compared to healthy people, which is different from the results of this paper. According to Matalqah et al. [11], the EQ-5D index scores for breast cancer patients and healthy people in Malaysia were 0.71 and 0.87 respectively, which were lower than our EQ-5D index scores, which indicated that Korean breast cancer patients had higher health-related quality of life.

**Table 3. EQ-5D index score of healthy women and women with breast cancer**

Categories	Healthy women (n=142)	Women with breast cancer (n=113)	Wald F	p
	Mean±SE	Mean±SE		
EQ-5D index	0.92±0.011	0.91±0.017	0.18	0.672

EQ-5D: European quality of life-5 dimensions used as a measure of health-related quality of life (HR-QOL)

### 4. Factors affecting HR-QOL of women with breast cancer

[Table 4] presents the factors affecting HR-QOL of women with breast cancer.

As a result of examining the socio-economic and health-related factors that affect health-related quality of life of breast cancer patients by controlling age, the factors found to affect the HR-QOL of breast cancer patients were household income (Wald F=3.16, p=0.027), perceived health status (Wald F=4.35, p=0.015) and activity confinement (Wald F=4.81, p=0.030).

When controlling for age, the factors affecting health-related quality of life of healthy women were residential area (Wald F=11.00, p<0.001), education (Wald F=2.67, p=0.050), household composition (Wald F=5.10, p=0.002), perceived health status (Wald F=6.47, p=0.002), activity confinement (Wald F=7.09, p=0.009) and BMI (Wald F=8.08, p<0.001).

Among the subjects with breast cancer receiving medical treatments, those who perceived their health condition positively and those who had less activity confinement had higher health-related quality of life.

According to studies [13, 14], physical activity played an essential role as it reduces the side effects of treatments and disease prognosis. Consequently, it is necessary to examine the factors that affect activity confinement and to develop and apply guidelines to manage overall health. In addition, the breast cancer patients' financial situation is an important indicator of quality of life and this study noted that among subjects with breast cancer, those who had high household incomes had better health-related quality of life. Other research including Edib et al. [15] and Huang et al. [16] had similar findings which support the findings of this study. Economical allowance provides more opportunities for cancer patients to join in social activities and hobbies and minimizes stress levels created by financial struggles such as medical bills or lack of cost of living and accordingly, economical allowance

is closely related to the quality of life of participants. Thus, it is very important to eventually improve public health policies focusing on reducing the medical costs for cancer patients.

Other criteria such as residential area, education, marital status, household composition, occupation, perceived usual stress and BMI did not affect the health-related quality of life of breast cancer patients.

Social support plays a positive role in HR-QOL of cancer patients [17]. Family support is the most primary support in social supports, since as the more family members a person has, the more social support they can receive. However, it did not show any significant difference for cancer patients in this study.

In the studies of Leung et al. [18], social supports including positive and emotional cares, informational consultation and emotional support from spouses or significant others was found to be an important factor in promoting health-related quality of life. Family support is a very important element for breast cancer patients for their health-related quality of life. However, it explained that the emotional support offered by the family unit is the meaningful element rather than the number of people in the household.

Factors influencing HR-QOL of patients with breast cancer in this study were household income, perceived overall health condition and activity confinement and the explanatory power of socioeconomic and health related factors was 41.9%.

It is necessary to develop nursing management plans by considering the each patients' socio-economic and health-related characteristics to maximize their health-related quality of life instead of providing generalized treatment.

**Table 4. Factors affecting health-related quality of life of breast cancer patients (N=113)**

Categories	95% CI Lower limit	95% CI Upper limit	p	Wald F	p
(constant)	0.634	1.096	<0.001	263.97	<0.001
Residential area					
Seoul	-0.031	0.104	0.283	1.16	0.314
Urban area	-0.018	0.103	0.168		
Provincial area <sup>a</sup>	.	.	.		
Education					
≤Elementary	-0.135	0.043	0.305	1.13	0.336
Middle	-0.136	0.083	0.630		
High	-0.121	0.013	0.112		
≥University <sup>a</sup>	.	.	.		
Marital status					
Married	-0.091	0.125	0.760	0.09	0.760
Others <sup>a</sup>	.	.	.		
Household composition					
1	-0.103	0.252	0.410	1.44	0.234
2~3	-0.066	0.166	0.397		
4~5	-0.032	0.222	0.141		
≥6 <sup>a</sup>	.	.	.		
Household income level					
Lower class	-0.169	0.057	0.327	3.16	0.027
Lower-Middle	-0.018	0.142	0.129		
Upper-Middle	-0.117	0.040	0.330		
Upper class <sup>a</sup>	.	.	.		
Occupation <sup>*</sup>					
A	-0.140	0.077	0.565	1.75	0.114
B	-0.006	0.123	0.076		
C	-0.017	0.175	0.104		
D	-0.013	0.302	0.072		
E	-0.042	0.336	0.127		
F	-0.025	0.265	0.103		
G <sup>a</sup>	.	.	.		
Perceived health status					
Good	0.043	0.218	0.004	4.35	0.015
Moderate	-0.050	0.081	0.640		
Poor <sup>a</sup>	.	.	.		
Activity confinement					
Yes	-0.180	-0.009	0.030	4.81	0.030
No <sup>a</sup>	.	.	.		

**Cont... Table 4. Factors affecting health-related quality of life of breast cancer patients (N=113)**

Perceived usual stress					
Often	-0.199	0.048	0.230	1.53	0.209
Frequently	-0.166	0.049	0.286		
Somewhat	-0.090	0.114	0.815		
Hardly any <sup>a</sup>	.	.	.		
BMI					
<18.5	-0.070	0.229	0.296	0.59	0.551
18.5 ~<25	-0.061	0.081	0.782		
≥25 <sup>a</sup>	.	.	.		
Age (years)	-0.003	0.002	0.688	0.16	0.688

Model summary: R<sup>2</sup>=0.419, Wald F=377.83, p<0.001

95% CI=95% Confidence Interval, a =Reference category

Occupation\*: A=Managers, B=Clerical workers, C=Service and sales workers, D=Farm and fishery skilled workers, E=Technicians, machine operations and assembly line workers, F=Simple laborworkers, G=Unemployed

**Conclusion**

Breast cancer patients’ treatment and nursing care are not just survival strategies. The direction of nursing care after the treatment should be aimed at improving the patients’ health-related quality of life.

While there were no significant differences in health-related quality of life between the healthy subjects and the subjects with breast cancer, the factors affecting health-related quality of life were different. It is important to explore alternatives in receiving cancer treatment and promoting health-related quality of life for breast cancer patients since it primarily affects those females aged below 50 in Korea.

Therefore, this study focused on providing fundamental data that can be used to manage the health-related quality of life for subjects with breast cancer by comparing factors that affect the health--related quality of life between the healthy subjects and the subjects with breast cancer.

**Ethical Clearance:** Not required

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**Conflict of Interest:** Nil

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