

# Research on the Relationship Between Self-Management Efficacy and Quality of Life for Breast Cancer Patients Receiving Endocrine Therapy

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## Research Article

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# Abstract

## Purpose

To investigate the status quo and relationship between self-management efficacy and quality of life (QOL) of patients with breast cancer undergoing endocrine therapy, and to explore the influencing factors of QOL.

## Methods

The convenience sampling method was used to select 240 patients who received endocrine therapy after breast cancer surgery in the First Hospital of China Medical University, the self-designed general data questionnaire, self-management efficacy questionnaire for breast cancer patients with endocrine therapy and quality of life scale for breast cancer patients were used to investigate. The frequency, percentage, mean  $\pm$  standard deviation were used to describe patients' self-management efficacy and quality of life. Pearson correlation analysis was used to analyze the relationship between self-management efficacy and quality of life, and univariate analysis and multiple stepwise regression were used to analyze the influencing factors of QOL.

## Results

The scores of self-management efficacy and QOL of patients with breast cancer endocrine therapy were  $125.21 \pm 25.57$  and  $153.33 \pm 19.31$  respectively, which were at the middle level; self-management efficacy was significantly positively correlated with quality of life ( $p < 0.01$ ); multiple stepwise regression results showed that self-management efficacy, the number of physical symptoms, monthly family income and recurrence and metastasis were the influencing factors of QOL.

## Conclusion

The self-management efficacy of endocrine therapy was positively correlated with QOL in breast cancer patients. The higher the self-management efficacy of endocrine therapy, the better QOL in breast cancer patients. Self-management efficacy is the main factor affecting the quality of life of breast cancer patients undergoing endocrine therapy. Improving the level of self-management efficacy can improve their quality of life.

## Introduction

Breast Cancer (BC) is the most common malignant tumor in women worldwide [1] and also causes the largest number of deaths among women worldwide [2]. The latest global cancer burden data released by THE World Health Organization/International Agency for Research on Cancer (WHO/IARC) in December 2020 [3] showed that the number of new cases of breast cancer in 2020 was as high as 2.26 million (11.7% of the newly diagnosed cancer), and the number of deaths was more than 680,000 (6.9%). In China, the number of new cases of breast cancer reached 426,000, with 117,000 deaths. The incidence and mortality rate of breast cancer are still rising[3, 4].

Endocrine therapy for breast cancer mainly reduces or clears estrogen levels in the body through some drugs or treatments, thereby inhibiting the growth of breast cancer and reducing the risk of recurrence and metastasis [5, 6], which plays an important role in the comprehensive treatment of breast cancer [7]. Studies [8–12] show that most

patients with endocrine therapy for breast cancer have experienced hot flashes, night sweats, insomnia, joint stiffness, weight gain, anxiety, depression and other symptoms, and the long treatment cycle will make patients become depressed and indifferent. Therefore, in the process of treatment and rehabilitation of patients with breast cancer endocrine therapy, it is particularly important for patients to actively participate in the management of the disease and establish an effective self-management model. Self-efficacy is a core concept in self-management theory, and studies have confirmed that the self-management behavior of breast cancer patients is affected by self-efficacy, and the higher the level of self-efficacy, the better the self-management behavior [13]. Based on the endocrine therapy of breast cancer patients quality of life of the related research is less involved in self-management efficacy problems, this study aims to investigate the status quo of self-management efficacy and quality of life of breast cancer patients undergoing endocrine therapy, clarify the relationship between self-management efficacy and QOL, and provide reference for the formulation of nursing intervention programs to improve patients' self-management efficacy and improve patients' QOL.

## Methods

### Participants

From May 2016 to September 2016, convenience sampling method was used to select patients who received endocrine therapy after breast cancer surgery in the Department of Breast Surgery of the First Affiliated Hospital of China Medical University as the research subjects. Inclusion criteria: pathological diagnosis of breast cancer and postoperative endocrine therapy for more than 1 month; above 18 years old; complete cognitive and behavioral abilities; patients were willing to participate in the study with informed consent. Exclusion criteria: combined with more serious cognitive and mental disorders; combined with complicated diseases that seriously affect the quality of life.

### Sample size

In multi-factor analysis, 10 times of the independent variable is considered appropriate. There were 20 independent variables in this study, and 20% invalid questionnaires should be considered. The final sample size was 240 cases. Invalid questionnaire criteria: more than 20% of the items in the whole questionnaire are not answered; the whole questionnaire was wavy or monosyllabic.

### Data collection and measurements

#### General Data Questionnaire

It was designed by researchers themselves, including demographic data (age, height, weight, race, level of education, employment status, lifestyle, marital status, monthly family income, medical payment method, *etc.*) and disease related information questionnaire (postoperative time, start time of endocrine therapy, menstrual status, physical symptoms, complications, recurrence, metastasis, *etc.*).

#### Self-management efficacy questionnaire for breast cancer patients undergoing endocrine therapy [14]

The questionnaire consisted of 33 items from 4 dimensions, including 9 items of life/emotion, 7 items of disease coping, 9 items of society/family and 8 items of compliance behavior. Likert 5-level scoring method was used in the questionnaire, ranging from "no confidence" to "very confidence", and the higher the score, the higher the level of self-management efficacy. The Cronbach's  $\alpha$  coefficients of the total questionnaire were 0.972, and the Cronbach's  $\alpha$

coefficients of the four dimensions ranged from 0.895 to 0.949. The I-CVI of the questionnaire ranged from 0.80 to 1.00 and the S-CVI was 0.966. The retest reliability was 0.913.

### **Quality of Life Instruments for Patients with Breast Cancer[QLICP-BR][15,16]**

The scale developed by the Chinese scholars Chong-hua Wan, combined with China's economic and cultural background and value system, specially for measuring the breast cancer patient health related quality of life, a total of 39 items, consisted of the common module QLICP - GM and breast cancer specific entry form; using Likert 5 grade evaluation method, from "no" to "very" count 1-5 points, respectively. There are both positive and negative scoring items in the scale. The higher the score of the positive item, the better the quality of life; the higher the score of the negative item, the worse the quality of life. The Cronbach's  $\alpha$  coefficient of internal consistency of social dimension was 0.58, and the other dimensions were greater than 0.65. The retest reliability of the scale was 0.88. In addition, some studies have proved that the internal consistency Cronbach's  $\alpha$  coefficient of this scale is 0.81[17].

### **Survey methods**

Questionnaire was distributed by the researcher himself. Before the investigation, researcher explained the purpose and significance of the study to the patients, promised to keep their information strictly confidential, and the patients signed the informed consent form. In the process of filling in the questionnaire, patients' questions were answered in time. For those patients who were not convenient to fill in the questionnaire by themselves or had poor eyesight, the researcher read the questions for the patients one by one, and then the patients answered by themselves or the researcher recorded their answers. The questionnaire was filled in anonymously, and was taken back on the spot after filling in, and checked whether there was any missing content. If there was any missing or unclear content, the questionnaire was returned to the patient in time for checking and filling to ensure the integrity of the results.

### **Statistical analysis**

SPSS 20.0 software was used for statistical analysis. Descriptive statistics included frequency, percentage, mean and standard difference, *etc.* and inferential statistics included T test, Pearson correlation analysis, one-way ANOVA and multiple step-up regression analysis, *etc.*  $P < 0.05$  was statistically significant.

## **Results**

A total of 300 questionnaires were sent out and 240 were effectively received with effective recovery rate of 80%. All subjects were female, aged between 30 and 78 years old, with an average age of  $52.89 \pm 9.67$  years old.

### **Status quo of self-management efficacy of patients undergoing endocrine therapy for breast cancer**

The average score of self-management efficacy of patients undergoing endocrine therapy for breast cancer was  $125.21 \pm 25.57$ , among which 48.3% of patients with total score higher than the average were in the middle level (Table 1).

**Table 1** Scores of self-management efficacy and dimensions (n=240)

	Minimum	Maximum	Mean ± SD
Self-management efficacy	57	165	125.21 ± 25.57
Life/emotion	18	45	35.36 ± 7.75
Disease coping	11	35	26.30 ± 6.23
Society/family	11	45	32.26 ± 7.74
Compliance behavior	15	40	31.28 ± 6.53

### Status quo of QOL of patients undergoing endocrine therapy for breast cancer

The average score of QOL of breast cancer patients treated with endocrine therapy was  $153.33 \pm 19.31$ , and 54.2% of them were higher than the average score, which was generally in the middle level( Table 2).

**Table 2** QOL and score of each dimension (n=240)

	Minimum	Maximum	Mean ± SD	Standardized score
QOL	93	193	$153.33 \pm 19.31$	73.29
Physical function	15	35	$27.90 \pm 4.07$	74.64
Mental function	24	60	$44.31 \pm 8.09$	67.33
Social function	14	30	$23.77 \pm 4.03$	74.05
Common symptoms and side effects	7	35	$28.96 \pm 5.64$	78.42
Specific modules	9	35	$28.38 \pm 4.65$	76.35

### Correlation between self-management efficacy and quality of life in breast cancer patients undergoing endocrine therapy

The total score of self-management efficacy and all dimensions were significantly positively correlated with the total score of quality of life ( $p < 0.01$ ), self-management efficacy was significantly positively correlated with physical function, physiological function, social function and breast cancer specific modules of quality of life ( $p < 0.01$ )(Table 3).

**Table 3** Correlation between self-management efficacy and QOL(n=240)

	Self-management efficacy	Life/emotion	Disease coping	Social/family	Compliance behavior
QOL	0.404**	0.425**	0.403**	0.303**	0.320**
Physical function	0.423**	0.452**	0.436**	0.329**	0.336**
Physiological function	0.335**	0.341**	0.323**	0.256**	0.270**
Social function	0.317**	0.317**	0.306**	0.245**	0.266**
Common Symptoms and side effects	0.040	0.087	0.072	-0.014	0.010
Specific modules	0.520**	0.510**	0.509**	0.427**	0.442**

Note: \* \*  $p < 0.01$ .

### Univariate analysis of quality of life patients treated with endocrine therapy of breast cancer

According to the results of independent sample T test and one-way ANOVA, age, BMI, marital status, monthly family income, number of physical symptoms, fatigue, nausea, insomnia, recurrence and metastasis, and self-management efficacy had statistically significant effects on QOL ( $p < 0.05$ ) (Table 4).

**Table 4** One-way ANOVA of influencing factors of QOL(n=240)

Item	n	QOL			Item	n	QOL		
		S	F/t	P			S	F/t	P
<b>Age[year]</b>			2.942	<b>0.021</b>	<b>Endocrine therapy time (month)</b>		1.22	0.301	
≤39	26	75.27±12.44			1~12	105	72.24±11.43		
40~49	55	75.05±9.97			13~24	55	74.96±13.63		
50~59	92	70.14±13.36			25~36	40	75.29±11.17		
60~69	60	65.16±12.12			37~48	25	73.59±13.61		
≥70	7	69.41±11.10			49~60	7	64.93±14.45		
<b>BMI</b>			2.883	<b>0.023</b>	~60	8	72.20±14.95		
≤18.50	6	62.50±15.20			<b>Number of physical symptoms</b>		4.17	<b>0.003</b>	
18.51~24.99	151	74.89±12.27			0	136	75.39±12.16		
25.00~29.99	71	70.39±11.80			1	66	72.13±10.71		
30.00~34.99	7	75.55±14.53			2	26	69.85±13.94		
35.00~39.99	5	74.74±8.61			3	9	65.60±15.01		
<b>Marital status</b>			4.254	<b>0.002</b>	4	3	55.98±8.01		
Married/cohabit	208	73.43±12.23			<b>Ethnic group</b>		0.41	0.682	
Unmarried	7	79.76±8.92			Han	221	73.38±12.26		
Divorced	12	71.00±9.91			Minority	19	72.17±14.00		
Separated	4	50.16±11.78			<b>Whether to live alone</b>		0.42	0.675	
Widowed	9	70.93±12.35			Yes	27	72.34±11.57		
<b>Degree of education</b>			1.892	0.113	No	213	73.41±12.50		
Primary school or below	1	55.13±0.00			<b>Whether to have any occupation</b>		-1.34	0.181	
Unior high school	79	73.33±12.68			Yes	77	74.84±12.96		
High school/technical secondary	70	70.90±11.80			No	163	72.55±12.07		
Junior college	56	74.75±12.54			<b>Whether to have children</b>		0.368	0.713	
Bachelor's degree or above	34	76.23±11.92			Yes	218	73.19±12.22		
<b>Monthly family income[yuan]</b>			2.555	<b>0.040</b>	No	22	74.21±14.16		
≤3000	107	70.79±12.89			<b>Whether to have children in the future</b>		-1.38	0.168	
3001~6000	96	75.23±12.39			Yes	11	78.32±11.07		

6001-10000	27	73.62±9.10			No	229	73.04±12.41		
10001-12000	3	80.13±14.43			<b>Other diseases</b>			1.365	0.173
≥12000	7	80.40±7.48			Yes	76	71.69±10.69		
<b>Medical payment method</b>			1.184	0.308	No	164	74.03±13.05		
Public expense	10	67.69±15.66			<b>Physical symptom</b>				
Medical insurance	220	73.44±12.25			<b>fatigue</b>			3.211	<b>0.002</b>
Self-pay	10	75.38±11.55			Yes	67	69.24±12.82		
					No	173	74.85±12.82		
<b>Smoke</b>			0.014	0.986	<b>Nausea</b>			2.948	<b>0.004</b>
No smoking	231	73.27±12.48			Yes	9	61.54±15.90		
Used to smoke and quit Smoking.	8	73.80±10.87			No	231	73.74±12.04		
Still smoking	1	71.79±0.00							
<b>Drink</b>			2.542	0.081	<b>Emesia</b>			0.948	0.344
No drinking	210	73.30±12.51			Yes	4	67.47±17.00		
Used to drink and quit drinking.	26	75.15±9.47			No	236	73.38±12.31		
Still drinking	4	60.26±17.30							
<b>Self-management efficacy</b>			15.123	<b>0.000</b>	<b>Pain</b>			1.178	0.24
High group	67	79.32±12.79			Yes	31	70.84±12.83		
Medium group	113	73.29±12.36			No	209	73.65±12.30		
Low group	60	67.87±9.31			<b>Insomnia</b>			2.66	<b>0.008</b>
<b>Current menstrual status</b>			0.873	0.419	Yes	35	68.21±12.31		
Regular	14	77.38±12.10			No	205	74.15±12.21		
Not yet menopause, but beginning	59	73.51±11.64			<b>Others</b>			0.071	0.944
Postmenopausal	167	72.86±12.66			Yes	10	73.01±12.50		
<b>Postoperative time[month]</b>			1.795	0.115	No	230	73.30±12.40		
1-12	76	71.30±11.84			<b>Recurrence or transfer</b>			2.035	<b>0.043</b>
13-24	63	75.69±10.94			Yes	9	65.10±16.61		
25-36	42	75.70±13.71			No	231	73.60±12.12		
37-48	30	73.53±11.49							

49	20	70.19±12.54
60	9	68.02±18.78

### Multivariate analysis of quality of life of breast cancer patients treated with endocrine therapy

QOL as a dependent variable, the single factor meaningful variables of age, BMI, marital status, family income, the number of somatic symptoms and types, fatigue, nausea, insomnia, whether metastasis and recurrence self-management effectiveness as independent variables, multiple stepwise regression analysis, the results showed that there were four significant variables included in the regression equation, namely, self-management efficacy, number of physical symptoms, monthly family income, and recurrence and metastasis, which jointly predicted 46.2% of the variance in quality of life, in which self-management efficacy alone explained 33.6% of the variance (Table 5).

#### Regression equation:

$$Y_{\text{QOL}} = 5.445X_{\text{Self-management efficacy}} - 3.337X_{\text{number of physical symptoms}} + 2.144X_{\text{monthly family income}} - 8.660X_{\text{recurrence and metastasis}} + 61.255$$

**Table 5** Multiple stepwise regression analysis of influencing factors of QOL (n=240)

Item	Multivariate correlation coefficient (R)	Determinant coefficient (R <sup>2</sup> )	Partial regression coefficient (β)	t	p
Constant term			61.255	24.055	0.000
Self-management efficiency	0.336	0.113	5.445	5.516	0.000
Number of physical symptoms	0.032	0.055	-3.337	-4.199	0.000
Monthly family income	0.074	0.024	2.144	2.705	0.007
Recurrence or metastasis	0.020	0.015	-8.660	-2.288	0.023

## Discussion

### Status quo of self-management efficacy in patients with endocrine therapy of breast cancer

The total score of the questionnaire on self-management efficacy of endocrine therapy for breast cancer patients was 165.00 points. In this study, the average score of the self-management efficacy of breast cancer endocrine therapy patients was 125.21 points, which was at a medium level and consistent with previous research results [18–19]. Studies have shown that the course of disease will affect the level of self-management efficacy of patients, and the level of self-management efficacy of patients will decrease with the passage of time [20]. Therefore, in this study, patients were divided into 1 year, 2 years, 3 years, 4 years, 5 years and more than 5 years according to the length of endocrine therapy for comparison. However, the results showed that there was no significant difference in the scores of self-management efficacy among patients with different periods of endocrine therapy ( $p > 0.05$ ), which may be due to the good physiological and psychological status of most patients with endocrine therapy in this study, and the adequate family and social support system, which made patients confident to adhere to long-term treatment.

## **QOL status quo in patients with endocrine therapy of breast cancer of breast cancer**

The average score of QOL of breast cancer patients treated with endocrine therapy was 73.29, which was at a medium level, consistent with the results of Montagnese et al. [21]. Among all the dimensions, the score of psychological function was the lowest, which may be related to breast cancer patients' inferiority about the change of their own image, the worry about the disease and treatment, and the symptom confusion caused by endocrine therapy.

## **Correlation between self-management efficacy and QOL in patients with endocrine therapy of breast cancer**

The results of this study showed that there was a positive correlation between self-management efficacy and quality of life ( $p < 0.01$ ), which indicated that the higher the level of self-management efficacy, the better the QOL, which was consistent with previous research results [18, 22–24]. At the same time, the results of this study showed that the self-management efficacy of patients with breast cancer endocrine therapy was positively correlated with the physical function dimension, physiological function dimension, social function dimension and breast cancer-specific module of QOL ( $p < 0.01$ ), which indicated that improving the self-management efficacy of patients with breast cancer endocrine therapy can improve their physical, physiological and social function and other aspects of life quality. However, in the results of this study, the common symptoms and side effects of self-management efficacy and QOL were not related, which may be due to the difference between the symptoms and side effects contained in the dimension of QOL scale for breast cancer patients and the physical symptoms and side effects experienced by breast cancer patients during endocrine therapy. In addition, the life/emotion dimension, disease coping dimension, social/family dimension and compliance behavior dimension of self-management efficacy were positively correlated with the quality of life ( $p < 0.01$ ), which indicated that when the self-management efficacy level of daily life and emotions is high, positive emotions can be improved while negative emotions can be reduced to broaden the patient's thinking-behavior system and establish an effective coping mode [23, 25], so as to better cope with diseases and achieve social and family functions. In addition, breast cancer patients with a strong sense of self-efficacy can face the stress caused by the disease with a more optimistic and positive attitude, actively seek the help of medical staff and the support of family and society, build up confidence in fighting the disease, actively participate in the management of the disease, and reduce the influence of disease and treatment on the overall health and QOL [26–27].

## **Analysis of influencing factors of QOL in patients with endocrine therapy of breast cancer**

In this study, the factors influencing the QOL of patients with breast cancer undergoing endocrine therapy were analyzed by one-way ANOVA, and it found that age, BMI, marital status, monthly family income, the number and types of physical symptoms, fatigue, nausea, insomnia, recurrence and metastasis and self-management efficacy had significant influence on the QOL ( $p < 0.05$ ).

Because single factor analysis can't control the influence of confounding factors and the information obtained from comprehensive analysis, the comparability of data is slightly poor and the results are relatively limited. Multi-factor analysis has the characteristics of high efficiency and reliable results, and through comprehensive analysis, it can eliminate atypical and unrepresentative factors and find out the real factors. Therefore, in order to eliminate the possible interaction among various factors, this study took the QOL as the dependent variable, and meaningful variables in single factor analysis as the independent variable, and carried out multiple stepwise regression analysis to screen the most important influencing factors of the QOL of breast cancer patients undergoing endocrine therapy.

The results showed that the variables entered the regression equation were self-management efficacy, number of physical symptoms, monthly family income, recurrence or metastasis, which jointly predicted the variation of 46.2% of the QOL of patients with breast cancer undergoing endocrine therapy. It was suggested that the higher the self-management efficacy level of breast cancer endocrine therapy patients, the better the QOL, which was consistent with the previous research results [18, 22–24, 28]. Bandura[29] thought self-efficacy can affect human health by influencing individual's physical and mental regulation system, such as influencing individual's health habits and directly controlling individual's physiological aging. Therefore, self-efficacy can make breast cancer patients reach the physiological, psychological and social health state by regulating the physical and mental system, thus affecting their quality of life. Patients with high self-efficacy, when faced with difficulties and challenges, often don't fear difficulties, often can make their ability to solve problems outstandingly, show better self-management ability, better grasp the relevant knowledge and skills of self-management healthy behaviors, adhere to daily life and emotional management, adhere to self-condition monitoring, adhere to correct self-management behaviors and improve their quality of life; on the contrary, patients with low self-efficacy often question their abilities and tend to adopt negative or evasive coping styles when facing diseases, which easily leads to the generation of bad emotions such as anxiety, depression, pessimism, disappointment, *etc.*, which is not conducive to the formation of correct self-management behaviors and new healthy behaviors, and leads to the decline of quality of life [22, 26, 28, 30–31]. Secondly, the number of physical symptoms, family monthly income and whether recurrence or metastasis also enter the regression equation. The fewer physical symptoms, the higher monthly income of family, and the better QOL if there is no recurrence or metastasis [26, 32–35].

To sum up, the self-management efficacy of breast cancer patients undergoing endocrine therapy is the most important factor affecting their QOL. The higher the self-management efficacy level of breast cancer patients, the better their QOL.

## Conclusion

Self-management efficacy and QOL of patients with breast cancer undergoing endocrine therapy are in the middle level, and self-management efficacy is positively correlated with QOL. Self-management efficacy of breast cancer patients undergoing endocrine therapy is an important factor affecting their QOL. In nursing work, we should pay attention to the status of self-management efficacy of breast cancer patients, and take corresponding nursing measures to help patients improve their self-management efficacy, self-management behavior and treatment compliance, so as to prolong their lives and improve their QOL.

## Declarations

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**Conflicts of interest:** The researchers declare no conflict of interests.

**Availability of data and material:** Data and material are available upon request.

**Code availability:** The IBM SPSS statistics 20.0 was utilized to analyze the data.

**Authors' contributions:** All authors contributed to the study conception and design. Material preparation, data collection, analysis were performed and the first draft of the manuscript was written by Hongjie Yi. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

**Ethics approval:** The study project was approved by The First Affiliated Hospital of China Medical University Medical Science Research Ethics Committee (No. [2016] 2016-5-2)

**Consent to participate:** Informed consent was sought and gained from all study participants.

**Consent for publication:** All the authors agreed to publish this article.

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