

Perceived New Normal and Inner Strength on Quality of Life in Breast Cancer Patients Receiving Adjuvant Endocrine Therapy

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ABSTRACT

Objective: This study aimed to investigate the differences in symptom experience, inner strength, adherence, and quality of life (QOL) according to the perception of the new normal, and identify the factors related to the QOL of breast cancer patients undergoing adjuvant hormonal therapy based on the theory of inner strength in women. **Methods:** This cross-sectional study recruited patients with breast cancer receiving adjuvant hormonal therapy in the National Cancer Center. Demographic and clinical characteristics were recorded, and patients were assessed using the M. D. Anderson Symptom Inventory, Connor-Davidson Resilience Scale 2, Morisky Medication Adherence Scale 8, and Functional Assessment of Cancer Therapy-General Scale. **Results:** After the breast cancer diagnosis, the perception of the new normal showed a significant dependence on pill count and emotional and functional well-being. The hierarchical

regression analysis indicated that the new normal, symptom interference, and inner strength after adjusting for age, time since diagnosis, and receiving chemotherapy were significant predictors of QOL in breast cancer patients receiving adjuvant endocrine therapy. The model accounted for 47.8% of the variance in QOL. **Conclusions:** The theory of inner strength might be a potential pathway in health care to improve patients' QOL during long-term medication. The results of this study have both theoretical and applied implications. The findings can be utilized as evidence for developing an effective intervention that improves the QOL and adherence to adjuvant hormonal therapy of breast cancer patients.

Key words: Breast neoplasms, drug therapy, quality of life, survivors

Introduction

Regardless of age, lymph node metastasis, and menopause, estrogen receptor (ER)-positive early-stage breast cancer is frequently treated with over 5 years of adjuvant hormonal therapy which may include the use of tamoxifen or an aromatase inhibitor (AI) alone or in conjunction.^[1] The intake of selective ER modulators or AIs as adjuvant hormonal therapy in hormone receptor-positive

breast cancer, is an essential method of treatment and corresponds to an evidence level of category 1 in the guidelines.^[2] Five years of adjuvant tamoxifen decreases cancer recurrence by half in the first 5 years, by one-third in years 5–9, and it also decreases breast cancer mortality by approximately a third for a 15-year duration.^[3,4]

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The use of long-term adjuvant hormonal treatment is increasingly changing the perception of breast cancer toward that of a chronic disease, which further affects concerns about patient compliance with prescribed treatment regimens.^[5] For instance, the long-term oral intake of selective ER modulators may result in side effects of hot flashes, mood disorders, and menopause.^[6] On the other hand, the most common side effects of AIs are osteopenia and bone fracture, with the risk of spinal fracture increased by five times.^[7] The AI has a lower incidence of hot flashes than the selective ER modulator, but the incidence rates of vaginal dryness and low sex drive are similar.^[8] Therefore, these symptoms interfere with daily life and decrease quality of life (QOL).^[6,9] The experience of side effects of the adjuvant hormonal therapy is the main reason for the suspension or discontinuation of treatment. In a series of interviews with patients with breast cancer, the majority cited a preference for oral therapy over injections; however, approximately half admitted to forgetting or choosing not to take their medications.^[10]

As inner characteristics of individuals are influential factors for adherence, it is necessary to consider how symptom experience, fear, inner strength, adherence, and QOL of breast cancer patients relate to adjuvant hormonal therapy.^[11,12] The way people successfully cope with the difficulties such as prolonged illness, functional decline, and loss, depends on their life circumstances and individual capacities. In the trajectory of breast cancer patients, a transition is observed at a particular point where there is stress (i.e., waiting time for treatment, treatment period, end of treatment, and point for follow-up care), which influences QOL.^[13] Although the physical and psychological symptoms during the treatment process are related to low QOL, this usually improves within 6–12 months after the end of treatment.^[14] However, breast cancer patients who receive adjuvant hormonal therapy have to take the medication for 5 years; thus, it is anticipated that they experience continued distress and low QOL.

The theory of inner strength in women explains the psychosocial adaptation process of women who successfully adapt to these difficulties. There have been studies on symptom experience and adherence of breast cancer patients to adjuvant hormonal therapy, but we did not find studies that analyzed the relationships between symptom experience, inner strength, adherence, and QOL. The theory of inner strength in women was refined into a gender-sensitive theory regarding the unique development process of women experiencing a chronic health problem such as breast cancer, heart disease, multiple sclerosis, or organ transplantation.^[15] Therefore, this cross-sectional study was conducted to examine the relationships

between symptom experience, inner strength, adherence to treatment, and QOL of breast cancer patients on adjuvant hormonal therapy based on the theory of inner strength in women.

Methods

Patients

Participants were breast cancer patients on adjuvant hormonal therapy who visited the breast cancer center of the National Cancer Center in Korea. The inclusion criteria involved patients who underwent breast cancer surgery (breast-conserving surgery or mastectomy), were currently on adjuvant hormonal therapy, understood our study objectives, and gave consent to participate. The exclusion criteria were the recurrence or metastasis of breast cancer or patients who were currently receiving treatment for cancer other than breast cancer. For the selection process, potential participants were first selected among the patients visiting the center during the data collection period who matched the inclusion criteria. Second, the researcher and a research assistant explained the purpose and process of the study in a face-to-face interview. Third, the participants filled out the questionnaire upon their voluntary consent to participation. A total of 185 copies were distributed, but only 180 copies (96%) were used for data analysis due to the refusal of five participants to complete the questionnaire in the middle of the answering process. *A priori* calculation of the minimum required sample size for multiple regression with nine predictor variables was $n = 114$ for a medium effect size of 0.15, $\alpha = 0.05$, and 80% power.^[16]

Patients with hormone receptor-positive primary breast cancer scheduled to undergo first-line endocrine treatment with tamoxifen (and additional gonadotropin-releasing hormone analogs depending on menopausal status) or a third-generation AI (i.e., anastrozole, letrozole, or exemestane) were eligible to participate.

Measures

Sociodemographic and clinical backgrounds

Data for patient clinical characteristics were extracted from nurse documentations in the electronic medical record. The demographic questionnaire was designed by the researchers based on a literature review. The new normal was measured with the level of agreement to the statement, "I have been living a new life since the breast cancer diagnosis." If the patients answered "yes," this meant that a new normal was achieved.

M. D. Anderson Symptom Inventory

The symptoms of the breast cancer patients were assessed using the M. D. Anderson Symptom Inventory-Korean

version.^[17] This self-reported questionnaire includes 19 items consisting of two domains: symptoms and symptom interference with daily life. This tool uses an 11-point scale to rate each of the symptoms that the patients have experienced for the last 24 h. The item scores range from 0 for “none” to 10 for “unimaginably severe,” with higher scores indicating a more severe symptom experience. The Cronbach’s alpha (α) was 0.94 for core symptoms and 0.928 for the degree of interference with daily life.

Connor-Davidson Resilience Scale 2

Inner strength was measured using the Connor-Davidson Resilience Scale 2.^[18] This tool consists of two questions in total. Each question can be answered on a Likert-type scale ranging from 0 for “not at all” to 4 for “strongly agree.” The total score can range from 0 to 8, with higher scores indicating a stronger level of inner strength.^[18,19] The Cronbach’s alpha (α) for this scale was 0.826.

Morisky Medication Adherence Scale 8

The Morisky Medication Adherence Scale 8 (MMAS-8) was used to assess pill counts and patient adherence.^[20] We defined adherence to drug therapy as the extent to which a patient adheres to the recommended dosage and intake interval. Medication adherence, as one aspect of adherence, was defined as the percentage of the prescribed dose that was actually taken within a certain time frame. The pill count was converted into percentiles by subtracting the number of remaining medications from the number prescribed and dividing it by the number of medications that should have been taken during a certain period according to physician instructions. A pill count value that was lower than 100 meant that the patient took less medication than prescribed. Therefore, a pill count value higher than 100 meant higher adherence. The MMAS-8 consists of 8 questions with a total score ranging from 0 to 8. A score lower than 6 means “low adherence,” 6 to lower than 8 means “intermediate adherence,” and 8 means “high adherence.” The Cronbach’s alpha (α) of the MMAS-8 was 0.641.

Functional assessment of cancer therapy

The health-related QOL was measured with the Functional Assessment of Cancer Therapy-General (FACT-G).^[21] The FACT-G consists of 27 questions divided into 4 domains (i.e., physical well-being, social well-being, emotional well-being, and functional well-being) of the individual’s physical state and side effects from the treatment. The items inquired about one’s physical well-being (seven questions), interpersonal relationship and degree of support from others for social well-being (seven questions), emotional difficulties in the fight against cancer for emotional well-being (six

questions), and occupation, house chores, or leisure activity for functional well-being (seven questions). All questions were answered on a five-point rating scale (0–4 points). Based on the instructions of the fourth version provided by the Functional Assessment of Chronic Illness Therapy Measurement System (www.facit.org), the total score ranged from 0 to 108, with a higher total score indicating a higher general QOL. The Cronbach’s alpha (α) for this scale in this study was 0.812.

Statistical analysis

The data analysis included frequency, percentage, means, and standard deviation (SD) for demographic characteristics. In addition, the descriptive statistics were computed for study variables. Tests of normality were performed with the Kolmogorov–Smirnov test. We also used a Mann–Whitney *U*-test to examine differences between perceptions of the new normal. A hierarchical logistic regression analysis was also performed to identify the factors affecting QOL. The significance level of all the statistical tests was set at $P < 0.05$. Statistical analyses were performed with SPSS version 25 for Windows (IBM, Armonk, NY, USA).

Ethical approval

This study was approved by the Institutional Ethics Review Committee of the hospital (Approval No. NCC2014-0162). During data collection, potential participants were informed of the study’s purpose as well as the potential benefits and dangers. The participants also gave their informed consent prior to being asked a series of questions. It is only when the participants voluntarily put their signature on the consent form were the data collected. After collection, the questionnaires were sealed in an envelope to maintain confidentiality.

Results

Demographic characteristics of the sample

Participants were the median of 54 years old (interquartile range [IQR] = 14) and mostly married [72.8%; Table 1]. A total of 83.9% had undergone breast conserving surgery. Tamoxifen was the most prescribed drug, and the median months of oral hormonal therapy was 22.0 (IQR = 33).

Symptom experience, inner strength, quality of life, and adherence

As shown in Table 2, the mean score of symptom experience was 2.21 points (SD = 2.02), with a minimum value of 0 and a maximum of 8.8. The mean score of inner strength was 5.32 (SD = 2.23, range: 0–8). In terms of adherence, the average pill count value was

Table 1: Demographic and clinical characteristics of the sample (n = 180)

Variables	n (%)
Age (year) (median, IQR)	54.0 (14.0)
Education	
Middle school	37 (20.6)
High school	75 (41.7)
Above university	68 (37.8)
Marital status	
Single	11 (6.1)
Married	131 (72.8)
Divorced/widowed	38 (21.1)
Religion	
Christian	69 (38.3)
Catholic	27 (15.0)
Buddhist	37 (20.6)
None	43 (23.9)
Others	4 (2.2)
Stage of cancer	
Stage I	73 (40.6)
Stage II	78 (43.3)
Stage III	29 (16.1)
Types of surgery	
Conserving surgery	151 (83.9)
Mastectomy	20 (11.1)
Mastectomy and reconstruction	6 (3.3)
Bilateral surgery	3 (1.7)
Chemotherapy	
AC	15 (8.3)
FAC	31 (17.2)
AC → taxane	50 (27.8)
AC → taxane/Herceptin	15 (8.3)
None	69 (38.3)
Hormone therapy agents	
Nolvadex (tamoxifen)	96 (53.3)
Arimidex (anastrozole)	30 (16.7)
Femara (letrozole)	54 (30.0)
Number of pills per day	
1-3	138 (76.7)
4-5	28 (15.6)
≥6	14 (7.8)
Duration of hormone therapy (month) (median, IQR)	22.0 (33.0)
AC: Adriamycin and cyclophosphamide, FAC: 5-fluorouracil, adriamycin, and cyclophosphamide, IQR: Interquartile range	

91.48% (SD = 11.94), and the self-reported MMAS-8 had mean of 5.83 points (SD = 1.41), showing a low level of adherence (lower than 6) with scores ranging from 0.8 to 7.50. The mean score of QOL was 73.86 points (SD = 15.80, range: 15–108).

Difference in study variables according to the perception of the new normal

There was no significant difference in symptom experience, inner strength, and QOL according to the new normal group distinction. However, there were significant differences in pill count ($P = 0.037$), in emotional

well-being ($P = 0.015$), and functional well-being ($P = 0.044$) aspects of QOL [Table 3].

Factors influencing quality of life

A hierarchical multiple regression analysis was employed to explore the predictors of QOL [Table 4]. The statistical assumptions for the model (i.e., ratio of cases to independent variables, normality, independence of errors, homoscedasticity, linearity, and absence of multicollinearity) were all met.

In Model 1 of the hierarchical analysis, age, which influenced QOL, was applied as an independent variable and no significant difference was found. In Model 2, wherein the age was adjusted, the treatment period of adjuvant therapy and application of chemotherapy were applied and resulted in the treatment period of adjuvant therapy after diagnosis being statistically significant ($\beta = 0.13$; $P = 0.015$). In Model 3, age and treatment period of adjuvant therapy and chemotherapy were adjusted, and concepts from the theory of inner strength in women (i.e., perception of new normal, core symptom, symptom interference, inner strength, and medication adherence) were applied. In this model, the perception of the new normal, symptom interference, and inner strength had a significant influence on the QOL ($\beta = 5.57$, $P = 0.008$; $\beta = -2.35$, $P < 0.001$; $\beta = 3.47$, $P < 0.001$, respectively). In this final model, the variables accounted for 47.8% (adjusted R^2) of the variance in the QOL of breast cancer patients on adjuvant hormonal therapy.

Discussion

Inner strength consists of the process of growth and transition, deepening one's own knowledge, connection with others, realization of resources for needs satisfaction, and concentrating on interactions with surroundings.^[22] The concepts related to inner strength consist of a sense of coherence, resilience, hardiness, and fighting spirit.^[23] The inner strength of the participants was measured with a resilience tool, and its mean was 5.51 points, which is close to the mean of 5.6 of trauma survivors,^[24] but was lower than the mean score of 6.8 of patients with chronic obstructive pulmonary disease.^[25]

A previously reported standard of adherence was 80% or higher;^[26] thus, adherence measured by the participants' pill count values was high at 91.25% compared to a study on the adherence of elderly participants in home care (88.3%).^[27] Age is an influential factor for adherence,^[8] and the participants of this study with a mean age of 50.52 years were younger than those elderly participants. On the other hand, the adherence score measured by self-report (MMAS-8) had a mean of 5.89, indicating a low level of adherence, and was lower than the mean of 7.38 (intermediate adherence) for oral chemotherapy

adherence demonstrated in colorectal cancer patients.^[28] Since there can be differences depending on the type of cancer, medication, method of intake, and side effects of

Table 2: Descriptive statistics for theory of inner strength variables (n=180)

Variables	Mean	SD	Minimum	Maximum	Range (Max - Min)
Symptom experiences	2.21	2.02	0.0	8.8	8.8
Symptom severity	2.27	2.05	0.0	8.5	8.5
Symptom interference	2.07	2.29	0.0	9.5	9.5
Inner strength	5.32	2.23	0.0	8.0	8.0
Adherence					
Pill count	91.48	11.94	0.0	100.0	100.0
MMAS-8	5.83	1.41	0.8	7.5	6.7
Quality of life					
Physical well-being	22.20	5.55	1.0	28.0	27.0
Social well-being	15.61	6.88	0.0	28.0	28.0
Emotional well-being	17.85	4.05	3.0	24.0	21.0
Functional well-being	18.18	6.40	0.0	28.0	28.0

SD: Standard deviation, MMAS-8: Morisky Medication Adherence Scale 8

Table 3: Comparison of study variables between the group perceiving a new normal and the group not perceiving a new normal (n=180)

Variables	New normal (n=138)		No change (n=42)		Z*	P
	Median	IQR	Median	IQR		
Symptom experiences	1.45	3.4	1.50	2.1	-0.13	0.450
Symptom severity	1.54	3.4	1.57	1.6	-0.18	0.427
Symptom interference	1.33	3.1	1.16	2.5	-0.19	0.342
Inner strength	6.00	3.0	6.00	1.0	-0.40	0.342
Adherence						
Pill count	95.5	9.0	94.4	8.0	-1.80	0.037
MMAS-8	6.25	1.8	6.00	1.3	-1.43	0.075
Quality of life						
Physical well-being	24.00	5.0	23.50	7.0	-1.29	0.097
Social well-being	17.00	10.0	16.00	6.0	-0.89	0.186
Emotional well-being	19.00	5.0	17.00	5.0	-2.17	0.015
Functional well-being	19.00	8.0	16.50	8.0	-1.70	0.044

*Mann-Whitney U-test (one-tailed). IQR: Interquartile range

medication, certain restrictions may follow in comparison.

This study suggests that the discrepancy between pill count and MMAS-8 score can be explained by a number of reasons. For instance, pill count measures adherence in a relatively objective manner. It is useful due to its easy application; however, simply counting the number of pills does not reveal whether the patient has overdosed, and more specific information such as the time and amount of intake is not provided.^[29] In other words, it cannot be known if the patient takes their medication daily or if they do not due to reasons such as forgetting, being careless, or being lazy, and then, they simply compensate for it by taking the dose on another day. In this case, pill count cannot provide an accurate measurement. Therefore, pill count can reveal high medication adherence, while the MMAS-8 reveals low adherence. Nonadherence to adjuvant endocrine therapy for early breast cancer is often underrecognized partly because of the unavailability of a gold standard method for its detection.^[30] Pistilli *et al.* reported that nonadherence by serum assessment measured as early as 1 year after treatment prescription emerged as a marker of poorer outcomes regardless of other main prognostic factors, suggesting that the risk of recurrence increases as soon as the patients start to be nonadherent.^[30] Therefore, since patients are more likely to underestimate the rate of their nonadherence, health providers need to identify the adherence to medication using an objective method such as drug serum assessment.

The participants' mean score of QOL was 74.38, which was higher than that of gynecologic cancer patients on chemotherapy.^[31] Chemotherapy has a negative influence on QOL,^[32] and the fact that the proportion of breast cancer patients not undergoing chemotherapy was 38.3% in this study, likely had an influence on the result. Moreover, the QOL of 56% of the breast cancer patients was higher compared to the study by Byun and Kim,^[33] which considered a period of 6–12 months after the diagnosis.

Table 4: Hierarchical regression analysis for quality of life in breast cancer patients

Variables	Model 1					Model 2					Model 3				
	Beta	SE	β	t	P	Beta	SE	β	t	P	Beta	SE	β	t	P
Age	-0.12	0.11	-0.08	-1.12	0.262	-0.17	0.11	-0.11	-1.46	0.145	-0.07	0.08	-0.05	-0.88	0.374
Time since diagnosis						0.13	0.05	0.18	2.45	0.015	0.12	0.04	0.16	2.90	0.004
Chemotherapy (yes=1)						-0.41	2.44	-0.01	-0.16	0.867	-0.34	1.83	-0.01	-0.18	0.852
New normal (yes=1)											5.57	2.06	0.15	2.70	0.008
Symptom severity											-0.61	0.69	-0.08	-0.88	0.379
Symptom interference											-2.35	0.62	-0.34	-3.74	0.000
Inner strength											3.46	0.40	0.49	8.65	0.000
Pill count											-0.03	0.08	-0.02	-0.37	0.711
Adherence											0.06	0.66	0.01	0.01	0.921
F (P)	1.26 (0.262)					2.440 (0.065)					19.21 (<0.001)				
Adjusted R ²	0.01					0.02					0.47				

SE: Standard error

The participants of this study took the adjuvant hormonal agents for a mean of 26.29 months postsurgery, indicating that more than 2 years had passed since the surgery. This supports the notion that the time since the surgery is a factor that influences the QOL.^[32]

This study aimed to confirm the perception of a new normal in breast cancer patients. Three-quarters of the participants perceived a new normal, and there was a significant difference between emotional and functional well-being – the subcategories related to pill count and QOL – in these participants. This study also investigated the factors influencing the QOL of breast cancer patients on adjuvant hormonal therapy using a hierarchical multiple regression analysis. After adjusting for age, duration of hormonal therapy after diagnosis, and decision to comply with hormonal therapy, the factors influencing QOL were found to be the perception of a new normal, symptom interference, and inner strength.

Higher inner strength was associated with an increased QOL. Inner strength is a kind of strength in which the individual renders the changes in life that are experienced during the course of a disease towards the positive. It does not simply focus on the present status of the cancer patient but comprehends the entire process that the patient has to go through with the disease as a factor that can influence the QOL.^[34] The concept of inner strength was measured in this study by resilience, and future studies should apply additional measurement of inner strength to investigate its relationship with QOL.

The perception of the present situation as the new normal was a significant predictor of QOL. In most breast cancer patients, the psychological struggle is amplified when the physical battle comes to an end.^[35] It is tremendously important that breast cancer patients feel that they are supported in this situation, and that they understand that their feelings are normal and appropriate. Finding people to share the experience with, can offer an enormous degree of relief and encouragement; however, not all women are interested in the healing process of other breast cancer patients. Some breast cancer patients accept their illness as the new normal and find ways to reorganize and restore their lives.^[35] As described above, the group which perceived the new normal showed a significant difference in the emotional and functional well-being aspects of QOL and medication adherence, but they did not show a difference in aspects of physical and social well-being and symptom experience compared to the group who did not report experiencing a new normal. This implies that the perception of a new normal may be indicative of better control of emotional and psychological problems.

Among the symptom experiences, symptom interference with daily life also turned out to be an influential factor for QOL. The tamoxifen-induced menopause symptoms in breast cancer patients on adjuvant hormonal therapy reflected the results of previous studies which stated that this reduced one's QOL.^[9,36] This study confirmed that the effects of the new normal and inner strength are factors which influence the QOL of breast cancer patients on adjuvant hormonal therapy. In previous studies, when women with chronic health problems including breast cancer, heart disease, or organ transplantation were faced with a difficult and challenging situation, the ability to adapt to and reorganize their lives in lieu of the new normal as promoted by inner strength resulted in enhanced QOL and effective self-management.^[15,37]

According to the theory of inner strength in women, self-esteem and self-efficacy should be strengthened first in order to achieve ultimate growth of inner strength. Since our study measured inner strength through resilience, it is important to note that the enhancement of resilience does not imply avoiding risk, but rather, having confidence in oneself regarding dealing with a problem by means of his or her own actions.^[38] Gaining such faith that can have a positive influence on one's own life plays a fundamental role in resilience development.

Limitations

Several limitations of this study should be considered. First, inner strength is often hidden behind both the suffering of the patient and the caregivers.^[23] Therefore, an analysis using dyadic data on the patient and spouse or the patient and caregiver should be conducted to help gauge inner strength more accurately. Second, our work is a cross-sectional study that investigated variables and factors influencing the QOL related to the inner strength theory. As the data were measured through self-report by the breast cancer patients, they lack objectivity and make it difficult to identify the long-term influence of single factors. Inner strength or resilience is a characteristic that is changeable across situations and time; thus, in future studies, it will be necessary to continuously monitor a variety of factors in the trajectory of breast cancer survivors by means of a longitudinal study. In addition, since we assessed "living with the new normal" by a dichotomous question, we were not able to identify the degree of acceptance or adaptation of the new normal in breast cancer survivors. This could be solved by developing a scale for measuring normality (i.e., the new normal) in patients with breast cancer and exploring methods on how to attain a positive attitude regarding their situation through a longitudinal study.

Conclusions

This study investigated a model to improve the QOL by enhancing women's inner strength in a clinical setting based on the theory of inner strength in women. These findings support the theory that women who have higher levels of inner strength have an enhanced QOL. Therefore, in relation to nursing care, there is need for further research on inner strength, particularly focusing on understanding the relevance of reorganization with the onset of a new normal, when developing a nursing intervention to improve adherence to long-term medication.

Nurses are involved throughout the patient's cancer trajectory, and their role can affect patients physically, emotionally, and socially. Therefore, targeted interventions that facilitate patient adherence are needed since they can improve short-term breast cancer outcomes in terms of women surviving cancer.

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Conflicts of interest

There are no conflicts of interest.

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