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## Research Article

## Predictors of Psychological Distress Trajectories in the First Year After a Breast Cancer Diagnosis

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## ABSTRACT

**Purpose:** Psychological distress is a significant and ongoing problem for breast cancer. These mental health problems are often neglected as they are not always properly understood. This study was performed to explore the trajectory of psychological distress over 1 year since breast cancer surgery and to identify the associated factors for the trajectory.

**Methods:** One hundred seventeen women who underwent surgery for breast cancer completed the psychological distress thermometer and problem lists from after surgery to 12 months after surgery. Information on their sociodemographic and clinical characteristics was also obtained. Group-based trajectory modeling was performed to identify the distinct trajectories of psychological distress. Chi-square test and logistic regression analysis were performed to determine predictors of psychological distress trajectories.

**Results:** A two-group linear trajectory model was optimal for modeling psychological distress (Bayesian information criterion = -777.41). Group-based trajectory modeling identified consistently high-distress (19.4%) and low-decreasing distress (80.6%) trajectories. Old age, depression, nervousness, and pain were significant predictors of consistently high-distress trajectory.

**Conclusion:** Our results indicate that distinct trajectory groups can be used as a screening tool to identify patients who may be at an increased risk of psychological distress over time. Screening for psychological distress during disease diagnosis is important and necessary to identify patients who are at an increased risk of elevated distress or at risk of experiencing psychological distress over time.

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## Introduction

Breast cancer is the most common type of cancer among women in Korea. The incidence of breast cancer in 2013 was approximately 17,000 [1]. Although the probability of survival has risen in Korea in recent years because of screening and new treatment modalities, being diagnosed with cancer and receiving treatment, including in the months following primary therapy, are stressful times for many breast cancer patients [2,3]. Breast cancer diagnosis and treatment also has significant long-term impact on a person's life as well as with their psychological adjustments [3]. Many people affected by cancer

suffer from psychological distress (i.e., depressive and anxiety symptoms) as a direct result of a cancer diagnosis and treatment.

Distress has been defined by the National Comprehensive Cancer Network (NCCN) as “an unpleasant experience of an emotional, psychological, social, or spiritual nature that interferes with the ability to cope with cancer treatment” [4]. The NCCN proposed the use of the term distress, which was chosen as nonstigmatizing word, to encapsulate a broad range of psychological problems. Psychological distress has been included as the sixth vital sign to monitor cancer patients and is a broader concept than depression [2,5]. It includes a wide continuum of psychological feelings relating to worry, anxiety, depression, fear, and sadness and extends on a continuum from common normal feelings of vulnerability to problems that are disabling, such as true depression [2,5].

Previous studies have shown that 20–50% of women with breast cancer suffer from psychological distress since the time of diagnosis, during their treatment, and most commonly in the first year

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after diagnosis [6–9]. There are interpersonal differences in the degree of psychological distress that cancer patients experience [10]. Some longitudinal studies examined the changes in psychological distress and reported that its levels may decrease over time [7–9,11,12]. Others, however, reported that the levels of psychological distress may be maintained [7] or even increase over time [9,13]. Given that psychological distress negatively affects survival rate, quality of life, social skills, and a patient's ability to cope with cancer [14–17], understanding these different patterns of psychological distress is important to guide clinicians and oncology nurses to design interventions that best support a breast cancer patient's condition [12].

Trajectory analysis, or group-based trajectory modeling, is used to describe different developmental trajectories of an outcome over time and identifies unobserved subgroups of individuals with similar trajectories [18]. Group-based trajectory modeling is based on the finite mixture modeling of unobserved subpopulations, and hypotheses regarding trajectory shape and the number of trajectory groups can be tested using maximum likelihood method. Although group-based trajectory modeling is widely used and more studies are needed to better understand variations in the experiences of psychological distress among breast cancer patients, few studies have investigated the distinctive trajectories of psychological distress within this disease group.

In the literature on psychological distress among breast cancer patients, various factors increased psychological distress. These include demographic characteristics such as age [5,9,19], gender [19], financial problems [17], marital status [12,15], employment status [2,20], psychiatric history [2], and level of social support [3,12]. Some studies report an association between psychological distress and cancer-related variables, such as cancer stage and type of treatment [5,19,20], while other studies found no such associations [9,16]. It is important to investigate the trajectories of psychological distress and its influencing factors for providing insight for the guidance and development of optimal interventions. Thus, the purposes of this study were to: (1) identify distinct trajectories of psychological distress and (2) determine predictors of trajectories of psychological distress among breast cancer patients.

## Methods

### *Study design and participants*

This study used a descriptive longitudinal research design. Women who underwent surgery for breast cancer in a university hospital in the Korea were recruited in this study when they visited breast cancer center after discharge. To identify the patterns of psychological distress in women with breast cancer during the months following primary therapy, a research assistant screened eligible women according to the following criteria. Eligibility criteria included age  $\geq 19$  years, first diagnosis of breast cancer, and planned for adjuvant treatment by chemotherapy and/or radiotherapy. Patients should be able to read and write in Korean to complete the questionnaires and did not have recurrence or metastases, and did not have a serious psychiatric disorder. We recruited 130 women, among whom 13 patients were lost to follow-up, resulting in 117 total patients included in the final analysis.

### *Ethical considerations*

The study has been reviewed and approved by the Institutional Review Board of the participating medical center (Approval no. AJIRB-MED-SUR-13-118). All patients with first diagnosed breast cancer between October 2013 and March 2014 were screened for

inclusion. A research assistant identified and approached eligible participants using the medical records and then explained the purpose of the study and obtained written informed consent.

### *Instruments*

#### *Distress and problem list*

The distress thermometer (DT) and problem list (PL) were developed by the NCCN distress management panel and are presently well known for the initial screening of psychological distress [4]. The DT is a simple, self-report, pencil and paper measure consisting of a line with a 0–10 scale anchored at the zero point with “No distress” and at scale point 10 with “Extreme distress”. Patients are given the instruction, “How distressed have you been during the past week on a scale of 0–10?” Patients indicated their level of distress with a mark on the scale. The DT includes a problem checklist. The patient is asked to identify those problems from the checklist which are contributing to their score. The PL comprises of a total of 39 items grouped as: practical (six items), family (four items), emotional (six items), spiritual/religious (one item) and 22 physical items. The validation of the NCCN PL has been verified in many countries, with a cutoff score of 4 being the most sensitive and specific [2,6,9,11,12], which is also recommended by NCCN distress management guidelines. This implies that cancer patients whose score is 4 or higher should receive evaluation and treatment by professional psychologists and psychiatrists [21]. In addition, the DT has been validated with the hospital anxiety and depression scale, showing good sensitivity and specificity [4].

### *Procedures*

Self-reported questionnaires were used to obtain information on patients' sociodemographic characteristics at baseline interview as well as on the DT and the PL. Sociodemographic characteristics included age, educational level, spouse, religion, household income, employment status, and menopause. To assess for changes in the psychological distress levels, patients were measured three times using DT. The three times occurred at baseline (after surgery/before chemotherapy or T1), within a week of completing adjuvant chemotherapy or T2, and 6 months after adjuvant chemotherapy (T3). Clinical characteristics were extracted from the patients' medical record. These included pathology type, stage of cancer, and type of treatments received (e.g., surgery, chemotherapy, radiotherapy, and hormone therapy).

### *Data analysis*

The PROC TRAJ in SAS 9.4 (SAS Institute Inc., Cary, NC, USA) was used to identify distinct subgroups of women who followed similar trajectories over time of their psychological distress score. The PROC TRAJ was specially designed to identify cases with similar trajectory or patterns of change over time; more specifically, the number of distinctive patterns of change can be identified [22]. Trajectory analysis identifies latent patterns of longitudinal data by using a semiparametric, group-based modeling strategy, in which each group represents individuals with similar trajectories. A series of models from one to five groups was systematically examined and compared; each group contained linear, quadratic, and cubic change coefficients. Because there is no gold standard for defining the correct number of trajectories, we made use of several criteria simultaneously. We utilized the Bayesian information criterion (BIC). This criterion considers the improvement in model fit when one adds more parameters (e.g., groups) but also rewards parsimony by penalizing the model for additional parameters. The higher the BIC (i.e., the value closest to 0), the better the model fit.

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