Intolerance of Uncertainty and Anxiety and Depression Symptomatology in Breast Cancer Survivors: Mediating Role of Fear of Cancer Recurrence and Moderating Role of Social Support

By

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This is to certify that I have examined this copy of a master's thesis by

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and have found that it is complete and satisfactory in all respects, and that any and all revisions required by the final examining committee have been made.

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Special thanks to my beloved father Hasan Solmaz, my protector, teacher and encourager in life. You are no longer by my side, but forever in my heart.

Abstract

Breast cancer is one of the most common cancer types and despite that, it has an increasing survival rate. Therefore, the number of cancer survivors is increasing throughout the world. The post-treatment process of breast cancer can be challenging, and it involves a lot of uncertainty. Intolerance of uncertainty (IU) is as a dispositional characteristic which is caused by negative cognitive, emotional, and behavioral reactions that people have against uncertain events. Although robust evidence exists regarding the association between IU and depression/anxiety symptoms, the underlying mechanism through which IU is related to depression/anxiety in breast cancer survivors have received little empirical attention. The uncertainty in the post-treatment process related to recurrence creates a fear of cancer recurrence (FCR). Several studies indicate that FCR is related with increased risk of depression while perceived social support has a positive impact on mental health. However, the mechanism of action by which perceived social support affects FCR is not clear in the literature. Overall, most of the studies done on these topics comes from Western countries, and the ones from Turkey are not sufficient to understand the specific pathways between these factors. Therefore, the aim of this study is to explore the mediating role of FCR and the moderating role of perceived social support on the association between IU and anxiety and depression. In this study, data were collected cross-sectionally through convenience sampling. A total of 269 participants were recruited for the study. Participants completed a sociodemographic questioner, Intolerance of Uncertainty Scale, Fear of Cancer Recurrence Scale, Multidimensional Scale of Perceived Social Support and Depression Anxiety Stress Scale. According to the results, there was a positive relationship between IU, FCR and depression and anxiety levels. Additionally, FCR fully mediated the association between IU and depression and anxiety. In other words, among breast cancer survivors, those with higher IU had higher FCR and consequently this led to higher anxiety and depression levels. There was no significant moderating effect of perceived social support in the association between FCR and depression and anxiety. Overall, these findings illustrate that individuals with high IU are more likely to have greater fear against cancer recurrence, which in turn is linked with increased symptoms of depression and anxiety. As a clinical implication, the findings of the current study are helpful for extending the current knowledge on the factors that are associated with anxiety/depression symptomology in breast cancer survivors. Furthermore, based on these findings, future studies can further investigate the effect of IU and FCR on cancer survivors' well-being and explore effective interventions for preventing psychopathology among breast cancer survivors.

Key words: intolerance of uncertainty, fear of cancer recurrence, perceived social support, depression and anxiety

Özet

Meme kanseri ülkemizde yaygın kanser tiplerinden bir tanesidir. Kanser ile mücadele ve tedavi süreci başlı başına zor bir süreçtir ancak kanseri yendikten ve gerekli tedavileri tamamladıktan sonraki belirsiz sürecin de kendine özgü bazı zorlukları vardır. Bu nedenle, kanseri atlatmış bireylerin duygudurumunu etkileyen faktörleri araştırmak kritik bir önem taşır. Literatürde, belirsizliğe tahammülsüzlük ve anksiyete arasındaki ilişkinin incelendiği çalışmalar olmasına karşın, kanser nüks korkusunun ve sosyal desteğin bu ilişkiyi nasıl etkilediği net olarak oraya konmamıştır. Bu nedenle bu araştırmada meme kanseri sonrası sağ kalımlı kadınlarda belirsizliğe tahammülsüzlük, kanser nüks korkusu, algılanan sosyal destek, depresyon ve anksiyete arasındaki ilişkilerin incelenmesi hedeflenmiştir. Bahsi geçen faktörlerin arasındaki dolaylı ilişkilerin incelenmesi adına durumsal aracılık analizleri yapılmıştır. Araştırmadaki veriler, elverişlilik örnekleme yoluyla kesitsel olarak toplanmış ve araştırmaya meme kanseri sonrası sağ kalımlı 269 kadın dahil edilmiştir. Veriler, Belirsizliğe Tahammülsüzlük Ölçeği, Kanser Nüks Korkusu Envanteri, Çok Boyutlu Algılanan Sosyal Destek Ölçeği ve Depresyon, Anksiyete Stres Ölçeği kullanılarak toplanmıştır. Analizler, SPSS PROCESS Macro kullanılarak gerçekleştirilmiştir. Araştırma sonuçlarına göre; meme kanseri sonrası sağ kalımlı kadınlarda belirsizliğe tahammülsüzlük, kanser nüks korkusu ve depresyon ve anksiyete belirtileri arasında pozitif yönde anlamlı ilişki bulunmuştur. Ayrıca sonuçlar, kanser nüks korkusunun belirsizliğe tahammülsüzlük ve depresyon anksiyete belirtileri arasındaki ilişkiye aracılık ettiğini göstermiştir. Algılanan sosyal desteğin, kanser nüks korkusu ve depresyon anksiyete arasındaki ilişkide önemli bir düzenleyici rolü olmadığı gözlemlenmiştir. Bu araştırma sonucunda elde edilen bulgular, ilgili literatür çerçevesinde değerlendirilip tartışılmıştır.

Anahtar Sözcükler: belirsizliğe tahammülsüzlük, kanser nüks korkusu, algılanan sosyal destek, depresyon ve anksiyete

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TABLE OF CONTENTS

List of Tables

List of Figures

ABBREVIATIONS

IU	Intolerance of Uncertainty
IUM	Intolerance of Uncertainty Model
FCR	Fear of Cancer Recurrence
PSS	Perceived Social Support

Chapter 1:

Introduction

1.1 Breast Cancer

Cancer is one of the major public health concerns globally, and it is the second leading cause of death, following heart diseases (World Health Organization, 2020). Among all cancer types, breast cancer and lung cancer are the most common ones worldwide, contributing 12.5% and 12.2% of the total number of new cases diagnosed in 2020, respectively (World Health Organization, 2020). Breast cancer can be defined as a kind of cancer that begins as a growth of cells in the breast tissue, and these cells then changes/divides rapidly over time creating lumps or masses. Typically, breast cancer begins in the milk glands called lobules, or in the ducts and has a tendency to spread to other tissues nearby the breast (American Cancer Society, 2022). For women, breast cancer is the most common type of cancer (in 157 countries out of 185) (Breastcancer.org, 2024). According to the World Health Organization, there were 2.3 million people diagnosed with breast cancer in the year of 2020, and at the end of that year there were 7.8 million women alive who were diagnosed with it in the past 5 years. It is estimated that in the year of 2040, there will be approximately 3.19 million people diagnosed with breast cancer and mortality will reach to 1.04 million (World Health Organization, 2022).

Incidence of breast cancer and its survival rate differs among countries. For example, incidence rates are highest in the developed countries and lowest in the developing countries such as countries from Middle East, Asia, and Africa (Bray et al., 2004). The age-standardized incidence is highest in North America, 99.4 per 100,000, and lowest in central Africa, 16.5 per 100,000 (Parkin et al., 2005). On the other hand, the incidence rates of breast cancer are increasing more rapidly in low and middle-income countries compared to places where the rates are already high (Parkin et al., 2005).

In Turkey, incidence rate of breast cancer has been increasing and the age of receiving a diagnosis has been decreasing (Özmen, 2014; Özmen et al.,2015). Furthermore, a quarter of women who received a cancer diagnosis seems to have breast cancer (Türkiye Kanser İstatistikleri, 2017). According to studies, breast cancer incidence rates had been previously calculated as 24.1/100,000 in 1993 (Özmen, 2008). By 2017, the rates increased to 50/100,000 (Özmen et al., 2019). Therefore, it seems that breast cancer rates in Turkey increased more than twice in twenty years (Özmen, 2014; Özmen et al., 2019). This increase can be related to lifestyle changes (adopting a westernized lifestyle), reproductive factors or aging of the population, especially in the western part of Turkey (Özmen, 2008; Yılmaz et al., 2010).

1.2 Survival and Mortality

In today's world, getting a breast cancer diagnosis is not a death sentence. It has become a treatable disease, especially with early detection (Memon et al., 2015; Mordang et al., 2017). According to several studies, prognosis of breast cancer tends to be related with the stage of the cancer, and with early detection and screening, chances of survival tend to increase (Saadatmand et al., 2016; National Cancer Institute, 2023). In the United States, the 5-year survival rate has found to be 97% for women with early stages of breast cancer, 86% for women with breast cancer that has spread regionally (e.g., lymph nodes), and 30% for women who had breast cancer that metastasized to other tissues and/or organs (American Cancer Society, 2023). Therefore, early detection by screening (mammography, ultrasounds) is crucial for the prognosis of this disease and chances of survival is relatively high for the patients who caught the cancer early before it starts to spread to other tissues or organs (Weir et al., 2003).

As stated earlier, breast cancer rates are higher in developed countries, however, it was observed that higher rates of deaths that are related with cancer occur in developing countries (Ferlay et al., 2010). In Turkey, deaths related to cancer increased by 28.6% between 2009 and 2018, and breast cancer was the most common mortality-causing cancer type for women (while

it was lung cancer for man) (Şahin et al., 2020). One reason for the increase in mortality rate have been thought to be related with “age”. In Turkey, population is getting older since 1935 (TURKSTAT, 2023), and old age has found to be an important risk factor for many different cancer types (American Cancer Society, 2022). While the life expectancy was 50 years in the year of 1970, it was 78 years in 2018 (TURKSTAT, 2023), and therefore, it is predicted that in the future, as the number of people who are over 70 years old increase, cancer incidence and mortality rates will increase. In line with this knowledge, Şahin and colleagues (2020) have found lower cancer related mortality rates in regions of Turkey where population is young, and higher cancer related mortality rates in regions where elderly population was high. Another study evaluating breast cancer mortality rates in Turkey has found that there is a significant increase in breast cancer related deaths between 2009-2019, and the highest increase was in the Eastern Anatolia region of the country (9.84%) (Doğan et al., 2023). In contrast with Anatolian region, mortality rates in İstanbul have found to be decreasing between 2009-2019. This may be due to the fact that the oncological workforce in İstanbul is higher compared to other regions in Turkey, and accessing to healthcare services is easier and quicker (Doğan et al., 2023).

1.3 Risk Factors

There are several risk factors that are associated with breast cancer and while some of them are controllable (related to lifestyle and the environment) by the individual, some of them are heritable and genetic. According to the literature, relatively controllable risk factors include:

Body mass index: The largest study looking at the relationship between BMI and breast cancer found that BMI is not a risk factor for breast cancer development for premenopausal women. However, for postmenopausal women, the risk of breast cancer development in the highest versus the lowest BMI quintile was 1.18 in women aged 60 to 64 and 1.22 in age 65 to 69 (Tretli, 1989).

Physical activity: Women who engage in regular physical exercise have a 10-20% lower risk of developing breast cancer than women who does not engage in regular exercise. This relationship is stronger in postmenopausal women (Eliasen et al., 2010).

Cigarette consumption: Women who have been smoking cigarettes for more than 10 years (also current smokers) have a 10% higher chance of developing breast cancer than women who have never smoked in their lives (Macacu et al; 2015)

Alcohol consumption: Excessive alcohol consumption can increase the risk of developing breast cancer by increasing the level of estrogen-related hormones in women's body and activating the estrogen receptor pathways (Jung et al; 2015)

Consumption of processed food: Diet that contain too much fat (and consumption of saturated fat) can affect mortality of breast cancer and cause a poorer prognosis in breast cancer patients (Uhumoibhi et al.,2022).

Insufficient vitamin supplementation: Although there is controversy in the literature, some studies have found a relationship between low levels of vitamin D and breast cancer incidence. In a study done in Pakistan, researchers have found that vitamin D deficiency was present in 95.6% of breast cancer patients and in 77% of control group (healthy individuals) (Imtiaz et al; 2012). Similarly, another study done by Shaukat and colleagues (2017) reported that there were a relationship between vitamin D deficiency and risk of breast cancer.

Risk factors that the individual cannot modify, or control are:

Female gender: Being a woman is the main risk factor for developing breast cancer. Men can also develop breast cancer; however their chances are much lower than women. Reason behind this is that women's breast cells are constantly exposed to estrogen and progesterone hormones, which tend to promote cell growth.

Age: Risk of developing breast cancer increases as with age. According to studies, breast cancer rates are lower for women under the age of 40 (only 4% of women diagnosed with breast

cancer in the U.S. are younger than 40) and they are highest in women over age 70 (American Cancer Society, 2022).

Genetic mutations: Breast cancer is highly associated with genes *BRCA1* and *BRCA* (Paluch-Shimon et al; 2016).

Family history of cancer: Women who have a mother or a sister (a first degree relative) with a breast cancer history are more prone to this disease than others. Overall, risks are 1.75-fold higher for women with one first-degree relative with breast cancer. This is related with the mutations of two genes, *BRCA1* and *BRCA2* (Brewer et al., 2017).

Exposure to radiation (for therapeutic reasons): According to the literature, people who were exposed to large amounts of radiation early in life their lives (radiation therapy for different health problems including childhood cancer or lymphoma) have a higher risk of developing breast cancer than those who were not exposed to such treatments (Ibrahim et al., 2012; Moskowitz et al., 2014).

Pregnancy and breastfeeding: Having first pregnancy at an early age tends to decrease breast cancer risk in women. However, this relationship only occurs for cancer that is hormone receptor–positive, therefore, it does not affect the risk of cancer that is hormone receptor-negative (Lord et al., 2008; Ma et al., 2006).

Menopause (reproductive milestones): Reproductive factors including early menarche, late menopause, and low parity can increase the risk of breast cancer development in women (Washbrook, 2006; Dall & Britt, 2017).

Density of the beast tissue (or other breast related diseases): Women can have different breast tissues, some having a denser tissue and some having a more fatty tissue. When a woman has high breast density, it means that she has more connective tissues compared to fat. Therefore, risk of developing breast cancer is higher (4-5 times) for women who have denser

breast tissues (Boyd et al., 2007). However, studies have found that breast density only affects the risk of developing breast cancer, but it is not related to cancer survival (Gierach et al., 2012).

1.4 Breast Cancer Treatment

When doctors want to classify a patient's cancer, they use "staging" which describes how much cancer there is in the body and where the tumor is when it is first diagnosed. There are 5 stages of breast cancer (0 to 4) and higher stage numbers indicate larger tumor size or they mean that the cancer has spread. The lowest stage, stage 0, is called "In situ breast cancer" and it means that the cancer cells are only in the duct or lobule where they started and have not spread into nearby breast tissue (non-invasive) (American Cancer Society, 2022). When breast cancer has spread from its original location into other surrounding tissues (other breast tissue or lymph nodes), or when the tumor is 20 to50 mm, it is called early-stage invasive breast cancer, involving stages 1 and 2. In stage 3, the tumor becomes larger than 50 mm and/or it may spread to the skin, the muscles of the chest wall or more than 3 lymph nodes (American Cancer Society, 2022). This stage is called locally advanced breast cancer. Finally, in the last stage, stage 4, cancer spreads to other organs and other parts of the body. This is called metastatic breast cancer.

Treatment for breast cancers includes surgery (mastectomy or partial removal of the breast tissue), chemotherapy (medication that is used to shrink or kill the cancer cells. It can either be given orally, intravenously, or both), radiation therapy (involves receiving high-energy rays to kill the cancer cells in a specific area), hormone therapy (typically given to lower the levels of estrogen or progesterone hormones in the body), and immunotherapy (treatment that helps the body's immune system to kill cancer cells). Treatment of each case can be different based on the tumor type, stage and general health state of the patient and it can vary greatly from person to person. The length of the targeted treatment is approximately 1-1.5 years

if there are not treatment delays (side effects, pregnancy, insurance problems, surgery recovery).

Breast cancer can be affected by hormones including estrogen and progesterone. The receptors in breast cancer cells tend to attach to estrogen and progesterone, and this helps them to grow. Hormonal therapy is a treatment for breast cancer that is intended to stop these hormones from attaching to these receptors. It is usually given after surgery, chemotherapy, and radiotherapy, and used for preventing cancer recurrence and improving survival. It can only be used for breast cancer that is hormone-receptor positive (estrogen or progesterone). According to research, 67–80% of breast cancers in women are estrogen positive, therefore use of hormonal therapy is not uncommon (Kohler et al., 2015). Patients are offered with this therapy to destroy cancer cells that were left after surgery and radiation, to treat locally advanced cancer (stage 2 and 3) or to control the symptoms of metastatic breast cancer. Hormonal therapy tends to continue for a long time after the completion of other treatments (5 or more years) including chemotherapy, surgery, and radiation (Davies et al., 2011).

1.5 Breast Cancer Survivorship

The word "cancer survivor" can mean different things to different individuals. There are several different definitions of survivorship in the cancer literature, but none is universally accepted. Originally, cancer survivorship was defined in 1985 by Fitzhugh Mullan, who was a physician and a cancer survivor. He published an article called "Seasons of Survival: Reflections of a Physician with Cancer" in the New England Journal of Medicine and identified three phases of survivorship: acute, extended, and permanent survival. Acute survivorship involved cancer diagnosis and initial treatment. Extended survivorship involved a time of uncertainty and watchful waiting, and permanent survivorship involved confidence of being free of cancer (Mullan, 1985). More recently, National Coalition for Cancer Survivorship came

up with another definition of cancer survivorship and claimed that we can consider someone as cancer survivor starting from the time of diagnosis through the balance of life (National Coalition of Cancer Survivorship, 2025). A person can be referred as cancer survivor if he/she is free of cancer or if they are living with cancer. Considering various definitions of cancer survivorship in the literature, this paper will take cancer survivorship as something that starts at the end of treatment process (chemotherapy, radiation, surgery) and assume that survivors are people who have no signs of cancer after finishing their treatment. This is similar with Mullan's explanation of permanent survivorship involving confidence of being cancer free.

Breast cancer patients who complete chemotherapy, radiotherapy and surgery can be prescribed with hormonal therapy medicines, depending on the type of cancer they had. Hormone therapy for breast cancer is used to treat cancers that are hormone sensitive, and people with hormone sensitive cancer is required to take these pills (e.g., Tamoxifen) for at least 5-10 years. Overall, since this type of a treatment takes many years, in this study, women are considered breast cancer survivors even if they are still going through their follow-up care process (doctor appointments, hormonal therapy).

1.6 Treatment Side Effects

Treatments that are used for breast cancer, and all cancer types in general, have some side effects. Side effects related with chemotherapy can be divided into two: short-term and long-term effects. Short-term side effects include fatigue, nausea, emesis (act of vomiting), stomatitis (inflammation of the oral mucosa), alopecia (hair loss), loss of energy, neuropathy (nerve damage), myalgias (muscle pain), and thromboembolism (obstruction of a blood vessel by a blood clot) (Altun & Sonkaya, 2018; American Cancer Society, 2020). These typically occur during the course of chemotherapy sessions and resolve 3-5 days after the treatment. It is important to distinguish between anxiety and depressive symptoms and side effects of

chemotherapy since they might resemble each other. It is hard to detect depressive symptoms in cancer survivors because there can be an overlap between the somatic symptoms of the depression (e.g. decrease in appetite, weight loss, loss of energy, fatigue) and the cancer treatment. Chemotherapy is designed to damage and destroy cancer cells so that they cannot divide and further develop. While doing that, it can also affect healthy body tissues where the cells are constantly growing and dividing. The damage to these healthy cells can cause side effects, however, those cells can repair the damage they took during chemotherapy, meaning that the damage to does not usually last very long after treatment. Therefore, since some of the short-term side effects of chemotherapy resemble symptoms of depression (even though the short-term side effect of chemotherapy resolves days after completing the treatment), participants in this study will be breast cancer survivors who completed their medical treatments at least a year ago.

Overall, most chemotherapy related side effects tend to be temporary and disappear once the treatment is over. However, for some people, chemotherapy can cause long-term difficulties and changes in the body. These include infertility, cardiac problems, peripheral neuropathy, cognitive disfunction and early menopause. Some of these long-term side effects may happen months or years after the treatment has finished and some of them tend to be permeant. Doctors and the other members of a patient's healthcare team usually talk to their patient about the risk of late side effects with the chemotherapy drugs and they take precautions if possible. Dietary programs can be given in advance, cardiology appointments can be arranged, and fertility preservation options can be explained to the patient.

Like chemotherapy, radiation and hormonal therapy can also have side effects. For hormonal therapy, side effects depend on the specific drug (or drug combinations) that was prescribed to the patient. Night sweats, vaginal dryness, hot flashes are common side effects of

all hormonal therapy drugs (Breastcancer.org, 2024). Tamoxifen, a well-known drug used as a hormonal therapy, has some other side effects including risk of blood cloths, stroke, cataracts, bone loss, mood swings, depression, loss of libido (National Cancer Institute, 2024). Side effects tend to last as long as the therapy continues. For radiation therapy, side effects tend to start at the beginning of the treatment and continue throughout the treatment process. Once the radiation treatment is over, side effects usually continue for about 2-4 weeks and then begin to improve. Short-term side effects of breast radiotherapy include skin problems, swelling of the breast, tiredness and weakness, loss of hair in the treatment area, problems moving the arm and shoulder (Breastcancer.org, 2024). Even though most side effects gradually go away in the weeks or months after treatment, there are some long-term side effects that can continue for months or years. These side effects include swelling in the arm (lymphoedema), skin changes (tanned skin area, telangiectasia), changes in the shape of the breast, nerve damage in the area (Breastcancer.org, 2024). These long-term side effects are rare, but they can have a negative effect on individuals' lives.

1.7 Anxiety and Depression in Breast Cancer Patients and Survivors

Depression is a psychiatric condition and a mental disorder which affects how a person thinks, feels, and acts. There are several different symptoms of depression which tend to vary from mild to severe, depending on the person. Symptoms of depression include loss of pleasure or interest in activities for long periods of time, feeling sad/hopeless/empty, feeling tired (decreased energy), fatigue, changes in sleep (too much or too little sleeping), changes in appetite (weight gain or loss), feeling worthless or excessively guilty, and in severe cases, thoughts of death, suicidal ideation, or suicide attempts (American Psychiatric Association, 2013). Depression can happen to anyone, it can affect people of all ages, races, ethnicities, and genders. The exact cause of depression is not known, but there are some factors that may have a role in the development of depression. Some of these factors involve: genetics, brain

chemistry, medical conditions (e.g. chronic pain), medication and stressful life events. Stressful life events can involve things like difficult life experiences including trauma, death of a loved one, divorce, lack of support or in some cases, diagnoses of a life-threatening/chronic disease like cancer (Derogatis, 1983).

Anxiety is characterized by feelings of tension, worried thoughts, and bodily changes. Unlike fear, which is a present-oriented feeling and an appropriate response to specific and an identifiable threat, anxiety is a future-oriented, long-acting response broadly focused on a diffuse threat. Symptoms of anxiety involve feeling tense/restless/nervous, increased heart rate, sweating, rapid breathing, muscle and stomachaches, chills, nausea, trouble concentrating, problems with sleeping (American Psychiatric Association, 2013). Everyone can feel anxious at some point in their life. For instance, an upcoming exam, medical appointment, job interview can be anxiety provoking. During these times, feeling anxious is a perfectly normal response. However, when the anxiety is difficult to control, persistent and out of proportion to the actual danger, it can interfere with daily life. While the exact causes of anxiety disorders are not fully understood, negative life experiences, stressful and traumatic events seem to trigger anxiety in people who are prone to it.

As previously mentioned, cancer patients/survivors go through treatment and recovery process that can be hard and mentally consuming. Throughout this process, the problems experienced by breast cancer patients may include physical symptoms and/or pain, psychological distress and existential concerns. These can all affect a person's life quality in a negative way. Anxiety and depression are two psychiatric disorders that are commonly seen in breast cancer patients (Baqutayan, 2012; Javan Biparva et al., 2023). Symptoms of anxiety and depression in breast cancer patients may arise during the treatment process, or even after

completion of medical treatments. Therefore, development of the symptoms can occur at any stage of the illness from pre-diagnosis to the survival period.

Studies have shown that cancer patients are likely to experience depression and anxiety (Massie, 2004), and prevalence of anxiety disorder in breast cancer patients ranges from 1 to 49% (Morasso et al., 2001), while it ranges from 1.5 to 46% for depression (Morasso et al., 2001; Massie, 2004). In meta-analytic research done with 47,424 studies, they looked at the global prevalence of depression among breast cancer patients and found the prevalence of depression to be 32.2% (the rate was highest in the Eastern Mediterranean region) (Pilevarzadeh et al., 2019). Similarly, another meta-analytic study has found the prevalence of anxiety among breast cancer patients to be 41.9% (the rate was higher in Mediterranean countries compared to others) (Hashemi et al., 2019). Overall, the variation between prevalence rates can be explained by time of evaluation, measurement tools or characteristics of the sample. For instance, in a systematic review study, researchers have looked at the risk of depression after mastectomy or breast reconstruction among women with breast cancer 1 year after surgery and they found that cases of mastectomy had a 22.2% risk of depression, while cases of breast reconstruction had 15.7% risk (Padmalatha et al., 2021).

There are many improvements in cancer detection and treatment, and because of this reason, two-thirds of people diagnosed with an invasive cancer today live more than five years (Miller, 2016). This results in rising population of long-term cancer survivors. Depression and anxiety symptomology can still be seen after a person survives cancer. While some people adjust to the posttreatment process of cancer, some continue to struggle with emotional adjustment during survivorship period. Therefore, it is important to understand cancer survivors' concerns after the treatment process because their mood disturbances can affect their quality of life in a negative way in the long run. A study providing data on depression and anxiety in long-term

cancer survivors have reported that 17% of breast cancer survivors experienced moderate to severe depression 5-10 years after treatment, and 9% of them experienced moderate to severe anxiety 5-10 years after completing their treatment. Therefore, it seems that the negative effects of cancer tend to remain within individuals even after many years (Götze et al., 2020).

It is important to keep in mind that depression and anxiety often occur as comorbid illnesses (when someone experiences two or more illnesses together at the same time) and share many common symptoms. Therefore, someone can report having symptoms of both psychiatric disorders at the same time. For this reason, both anxiety and depression symptoms were included as dependent variable in this study.

1.8 Intolerance of Uncertainty

People may not always be 100% sure and certain about what will happen next in their lives, and this can cause "uncertainty". In general, feeling a little uncomfortable with uncertainty is normal and expected. For example, a person might prefer to know what the weather will be like when he/she travels to another country, or they might want to know whether they will be promoted next month, or whether their thesis will be approved, or whether they will find the love of their lives and get married. This kind of knowledge can make people to feel more comfortable about the future and it will make them less worried about their upcoming travel plan, or about their job position, academic status, or love life. However, knowing things exactly is not possible for most of the time. The world is full of events which do not always end up with certain and absolute outcomes. These events happen because we either do not have enough information about them to contribute or we do not have control on the process or on the outcome of the event. When people do not have enough information or control on an event, their ability to effectively prepare for the future outcome becomes hindered, and this can increase their vulnerability to anxiety and its symptomology (Grupe & Nitschke, 2013).

1.8.1 Theoretical Background of Intolerance of Uncertainty

Previous studies on the concept of uncertainty have demonstrated that uncertainty is related with threat perception, fear, and anxiety. Especially for anxiety, the fear of the unknown is a core concept. The idea of intolerance of uncertainty (IU) emerged from anxiety related research, specifically from studies that were examining anxiety as a result of the fear of unknown. In the literature, fear of the unknown is defined as a fear that is caused by the perceived absence of information at any level of consciousness or processing (Carleton, 2016). Therefore, the cognitive process underlying the anxiety related disorders is considered to be this fear; 'fear of the unknown'. It is important to know that the concept of fear is present-oriented (focusing on the immediate, sensory present) and relatively more certain while anxiety is more future oriented (focusing on future consequences of alternative courses of action) and involves more uncertainty (Ankrom, 2023). Therefore, uncertainty seems to be an essentially important feature in the conceptual model of fear, which then leads to worry and anxiety (Gu et al., 2020).

A person's ability to effectively plan for the future can be disrupted by experiencing uncertainty resulting from a perceived lack of information, and this increases vulnerability to anxiety-related symptoms (Grupe & Nitschke., 2013; Carleton., 2016). People who cannot tolerate uncertainty may find uncertain event and situations stressful and unbearable, causing them to avoid these situations or experience difficulties while facing them. We would expect that an individual who cannot tolerate uncertainty would feel greater distress when exposed to an uncertain event than an individual with higher tolerance to uncertainty, hence, the one with lower tolerance to uncertainty may find his intuitive aversive response to perceived uncertainty more unbearable than the individual with higher tolerance to uncertainty and therefore, this can cause him to become more vulnerable to psychological distress (Koerner & Dugas, 2007). By definition, intolerance of uncertainty (IU) can be explained as a dispositional characteristic

which is caused by negative cognitive, emotional and behavioral reactions that people have against uncertain events and situations and their implications (Dugas & Robichaud, 2007; Dugas, Buhr & Ladouceur, 2004). Initially, studies on intolerance of uncertainty were looking at the relationship between IU and generalized anxiety disorder (GAD) (and its symptoms). According to several studies, increased IU is related with increased worry, and this makes IU a key component of generalized anxiety disorder (Dugas et al., 1998; Dugas et al., 2005; Ladouceur et al., 2000). IU is accepted as a cognitive schema that allows people to perceive their environment and worry (repetitive and uncontrollable thoughts about a potential future threat) is considered to be a reaction to uncertain things and events (Dugas et al., 2004). Worry tends to act as a cognitive response for individuals who have low tolerance of uncertainty (finds uncertain events upsetting), and it helps them to cope with distress related with uncertainty. If worrying about uncertain future events is helpful for an individual (e.g., if bad things are prevented from occurring because of "worrying"), then he/she will be motivated to continue worrying, and eventually, this leads to anxiety.

The whole process is explained by a simple model called "The Intolerance of Uncertainty Model (IUM)". According to the IUM, by increasing repetitive negative thinking (e.g. worrying about something bad is going to happen), IU can develop and maintain anxiety symptoms and people who have higher levels of IU are more likely to perceive and treat uncertainty as unacceptable and threatening, which may lead to a negative problem orientation and an avoidance response style. These are the two feedback loops of intolerance of uncertainty model (Dugas et al., 1998). Negative problem orientation loop states that people are drawn to engage in negative problem orientation because of anxiety. Negative problem orientation is related with having a low problem-solving confidence and thinking of problems as threats (McEvoy & Mahoney, 2011). This type of understanding tends to increase the intensity of worry and distress. The second loop, avoidance response, indicates that anxiety leads people to engage in

cognitive avoidance, and they do this by thought replacement, suppression, and distraction. Overall, a decrease in anxiety and worry can negatively reinforce the use of these strategies in the short term, but they also prevent the modification of underlying threat appraisals, which feeds back into the loop and results in even more worrisome thoughts. Therefore, the more they face uncertainty, more they will worry and attempt to avoid it. At the end, this vicious cycle leads to the formation of anxiety symptoms. For this reason, several psychological treatments for GAD aim to increase a person's tolerance and acceptance of uncertainty so that he/she elicits less distress and worry when face with everyday uncertainness.

Overall, IU is caused by negative cognitive, emotional, and behavioral reactions that people have against uncertain events and situations and their implications (Dugas, Buhr & Ladouceur, 2004), and it can be divided into two components: inhibitory and prospective IU. Inhibitory IU is related with the inability to take action due to uncertainty and the unknown, and prospective IU reflects the desire for predictability and seeking of certainty in the face of uncertainty, and it involves concerns and worries about the future. While inhibitory IU is associated with avoidance-oriented responses and disengagement, prospective IU is associated with more approach-oriented and information seeking behavior (Shihata et al., 2018).

While initial research on intolerance of uncertainty focused on its relationship with GAD, more recent studies indicate that IU is related with other anxiety related disorders and symptoms. These disorders include obsessive-compulsive disorder (OCD) (Lind & Boschen, 2009) and social anxiety (Carleton et al., 2010). Intolerance of uncertainty has also been suggested to be a transdiagnostic risk factor of emotional disorders (Shihata et al., 2017), meaning that IU can contribute to the maintenance of symptoms across depression and anxiety disorders (McEvoy & Mahoney, 2011).

1.8.2 Intolerance of Uncertainty and Cancer

Dealing with uncertainty is a part of cancer survivorship. After the long medical treatments including chemotherapy, radiotherapy, and surgery a person goes through a process in which she is required to come back to the hospital for her monthly controls. These control appointments take place every three months at first, then once in six months, and then once in a year, and they take place to keep a track of the patient and check whether the cancer has returned. Therefore, the period after treatment can also be stressful and involves uncertainty related to the patients' situation. As previously mentioned, high intolerance of uncertainty is identified as a vulnerability factor for several anxiety disorders and depression, therefore, it plays an important and a significant role in mental health and overall well-being. In the process of breast cancer diagnosis, treatment and recovery, having lower levels of IU (being able to tolerate uncertainty related to the disease) may be important for maintaining psychological well-being. Throughout the process, people who cannot tolerate uncertainty may find their situation stressful, unbearable and threatening.

Based on the literature and the theory of IU, we can say that intolerance of uncertainty is a construct relevant for individuals who are diagnosed with cancer. There are several studies in the literature that examined the relationship between intolerance of uncertainty and psychological distress (e.g. depressive symptoms, anxiety). For example, in one study done with 49 participants who had lung cancer, researchers examined the relationship between uncertainty and psychological adjustment in patients and they found an association between high stress, low emotional well-being and high levels of IU (Kurita et al., 2012). Additionally, IU was associated with increased perceived illness-related ambiguity (Kurita et al., 2012). The results of this study also indicated an association between non-somatic depressive symptoms and higher levels of intolerance of uncertainty. Additionally, they found out that avoidance was mediating the relationship between of IU with non-somatic depressive symptoms and emotional

well-being (Kurita et al., 2012). Overall, based on the findings of this study, researchers have suggested that interventions to address avoidance and IU in lung cancer patients can be helpful for improving psychological adjustment throughout the process of treatment.

Another study looking at the associations between cancer related uncertainty, fatigue, insomnia, and affect in 313 female breast cancer survivors have found that higher cancer-related uncertainty was significantly associated with more self-reported fatigue insomnia, negative affect, as well as less positive affect. Therefore, they concluded that breast cancer survivors who are 2– 4 years posttreatment experience cancer-related uncertainty, with higher levels associated with more self-reported psycho-physiological disruptions (Hall et al., 2014).

Related to the topic of intolerance of uncertainty, one study done in Turkey have looked at the relationship between psychological distress, social support, coping strategies and intolerance of uncertainty in female breast cancer survivors during the time of COVID-19 pandemic. They specifically wanted to examine the effect of having a former breast cancer diagnosis during a stressful and an uncertain time like a pandemic, and therefore they designed a study where they could compare the responses coming from breast cancer survivors to heathy individuals. According to their results, there were no difference between these two groups in terms of depression and anxiety scores, but the diagnosis of breast cancer was a significant predictor for stress levels (Taş et al., 2023). Breast cancer patients actually turned out to be less stressful during the time of COVID-19 compared to the healthy individuals. Therefore, authors of the article have concluded that being diagnosed with cancer (specifically breast cancer in this case) during pandemic is not a vulnerability factor and perhaps even has an empowering effect in terms of coping with stress. Because breast cancer survivors have already gone through a process that involves uncertainty and distress prior the pandemic, they are less vulnerable to uncertainty during the time of a pandemic. Additionally, this study also showed that low levels of social support, high IU and high emotion-focused coping have found to be the predictors of

depression and anxiety for both healthy individuals and breast cancer survivors (Taş et al., 2023).

Lastly, a study including 150 breast cancer patients examined the relationship between depression, worry, anxiety, and post-traumatic stress symptoms, and looked how the trait worry and IU affects people with breast cancer. As a result, they found that all participants showed a significant and continuous increase in intolerance of uncertainty, from time since diagnosis to the end of their study. Also, there were a significant relationship between intolerance of uncertainty and high levels of worry contents, anxiety, and depressive symptoms (Shams et al., 2023). Based on their findings, they concluded that it is important to assess the trait of worry and IU early, so that we can identify patients with higher risk of psychopathology (Shams et al., 2023).

1.9 Fear of Cancer Recurrence

Fortunately, with early detection and proper treatments, breast cancer is a survivable disease (Giordano et al., 2003). However, post-treatment process can be as hard as the treatment process since it has its own hassles. The process after medical treatments is an uncertain one. Whether the cancer is completely gone or not is unknown, therefore this tends to create a fear for individuals. This is called fear of cancer recurrence, and it is a common concept among cancer survivors (Tran et al., 2022). By definition, fear of cancer recurrence (FCR) is the fear and concern that people have against the possibility of cancer recurrence or cancer progress (e.g., metastases) (Lebel et at., 2016). In some cases, cancer recurrence is probable and possible, therefore, some level of fear of cancer recurrence is natural and understandable. It can even promote positive health care behaviors and make people seek surveillance after completing their treatment. However, excessive amounts of FCR can cause psychological distress and can interrupt daily life (Koch et al., 2013). Previous studies have argued that FCR is associated with negative feelings, including anxiety and depression, which, if not addressed promptly, can

impact the psychological well-being of cancer survivors. This may lead to a decreased quality of life and potentially it can even elevate the risk of suicide (Zhang et al., 2021).

According to studies, FCR is a common concept to experience in all cancer types, and it can persist long after the termination of cancer treatments involving chemotherapy, radiation and surgery (Armes et al., 2009). Approximately, 42%-70% of breast cancer survivors experience a high level of fear of cancer recurrence (Thewes et al., 2012), and 21%-40% of them need help dealing with it (Harrison et al., 2011). It is important to keep in mind that most studies collect data from people who are in early years of their cancer survivorship. During early survivorship period, 1-5 years post-treatment process, concern and fear about cancer recurrence may be more intense. Therefore, long-term cancer survivors, 5 years and more, may experience FCR in different levels and intensity. Unfortunately, the prevalence of FCR and other related psychological disorders/symptoms in long-term cancer survivors has been much less extensively investigated in the literature (Tran et al., 2022). In order to understand the effects of FCR on the well-being of breast cancer survivors, more research is needed (both for short- and long-term survivors).

The mechanisms behind the development of FCR remain unclear, but terror management theory (TMT) offers a useful framework for investigating FCR (Simonelli et al., 2017). According to this theory, humans have advanced cognitive abilities and for that reason, they are aware of the fact that everyone is going to die someday and that death is inevitable. This knowledge creates an existential dilemma, triggering anxiety and fear when confronted with reminders of mortality. As a life-threatening condition, cancer has a potential for recurrence even after intensive treatment, therefore this possibility further amplifies the fear that people experience because it reminds them of their own mortality. At the end, the fear they experience for their own mortality leads them to develop FCR. Because of FCR, people engage in behaviors such as excessive monitoring and focusing on physical symptoms, which can be

interpreted as potential signs of recurrence (Savard and Ivers, 2013). The reason for this heightened concern against physical symptoms is that, unlike many other illnesses, cancer's growth and progression can be subtle and difficult to detect or control, leading to a strong sense of illness uncertainty among survivors. Therefore, illness uncertainty together with FCR creates a tendency for the development of psychological distress, which can then lead to the formation of anxiety and depression in cancer survivors.

Overall, there has been considerable research interest in understanding FCR and how it affects patients'/ survivors' well-being (Liu et al., 2018; Tran et al., 2022; Waroquier et al., 2022). However, although there is significant interest, research on FCR is still in the early stages. Recent research on fear of cancer recurrence suggests that cognitive mechanisms play a role as transdiagnostic factors in the development of pathological FCR. Since FCR is considered to be a multidimensional construct that involves cognitions about cancer recurrence, affect related to recurrence and behavior resulting from this fear, researchers suggest that the cognitive behavioral model seems to be the suitable framework for understanding the impact of FCR (Butow et al., 2014; Fardel et al., 2016; Liu et al., 2018). Because of this reason, studies have started to investigate the moderating roles of positive and negative cognitive styles on FCR, but results are mixed. For example, one study with 238 cancer survivors were looking at the moderating effects of positive reappraisal and avoidance on the association between fear of cancer recurrence and decreasing life quality levels, and they did not find any significant moderation effect (Cho & Lü, 2017). However, another cross-sectional study found a statistically significant association between negative metacognitions (worry and rumination about uncontrollability of a perceived danger) and increased fear of cancer recurrence levels among cancer survivors (Butow et al., 2014). Overall, the research on FCR and related concepts are growing in the field, however, how FCR and/or rumination and their interaction affect

people's psychological well-being (including depression and anxiety symptoms) has not been thoroughly and deeply investigated up to this point.

There are some studies in the field of psychology which involves rumination, and these studies have found rumination to be related with high levels of depression and anxiety, for individuals with or without a diagnosis of cancer (Chan et al., 2011; Lo et al., 2008). The effect of rumination on depression and anxiety psychopathology can be explained by a theory called "Response Styles Theory", which states that rumination can be considered as a maladaptive cognitive style that happens when a person is preoccupied with thinking about an emotional distress (Soo et al., 2009). More specifically, the theory states that rumination creates a vicious cycle between negative thoughts, emotional distress and biased processing of negative cognitive content, and this leads a person to have catastrophic thoughts. Overall, rumination disrupts information processing, increases distress, and impairs problem solving which then leads to an increase in anxiety and depression levels (Liu et al., 2018). It seems that fear of cancer recurrence and rumination are both related with depression and anxiety symptomology, but it is important to make a distinction between these two concepts because they tend to be perceived as the same thing. Both of these concepts include negative thinking, but while FCR is more about future worries/threats related with cancer, rumination is more about recalling past negative memories and interpreting the present in a negative way which then leads to pessimistic thoughts about the future. Also, FCR has a higher tendency to provoke problem solving behavior than rumination, and this kind of a behavior can be useful for the individual. Overall, it is important to examine the role of FCR and rumination (together or separately) on psychopathological outcomes such as depression and anxiety symptomology in cancer survivors.

In one study, researchers have examined the interaction between fear of cancer recurrence and rumination in relation to anxiety and depression among 388 cancer survivors. They argued

that high levels of fear of cancer recurrence are related with higher anxiety and depression scores, and also the interaction between FCR and rumination is associated with more self-reported anxiety and depression symptoms. The results of their study supported their hypothesis and showed a significant association between FCR and depression and anxiety scores. Additionally, there was a significant positive relationship between rumination and depression symptoms in participants with high fear of cancer recurrence. For participants with low fear of cancer recurrence, there were no significant association between rumination and depression. Based on the study findings, researchers concluded that habitual rumination may be a maladaptive cognitive style to cope with high fear of cancer recurrence (Liu et al., 2018). Similarly, another study with 259 cancer patients looked at the role of rumination on the relationship between fear of cancer recurrence and depression. The hypothesized that in cancer patients, rumination plays a mediating role between the FCR and depression. According to their findings, cancer patients had a moderate level of FCR, and the level of depression was significantly higher in cancer patients than that in the normal population. Additionally, they found a significantly positive correlation with rumination and depression scores, and lastly, they found out that FCR was a significant positive predictor of the level of depression in cancer patients, and rumination played a partial mediating role between FCR and depression (Quan et al., 2022). In another recent study, researchers wanted to examine the relationship between FCR and health-related quality of life in long-term breast cancer survivors and found out that FCR was related with increased risk of depression, and it negatively impacted emotional functioning of individuals. Therefore, they concluded that higher FCR levels was impairing overall health-related quality of life in long-term breast cancer survivors (Tran et al., 2022).

Taking everything together, previous research has shown that there seems to be a relationship between FCR and psychological distress and/or quality of live. Therefore, this study aims to be an extension of current knowledge on fear of cancer recurrence and associated

psychopathological factors. More research on this area is needed, so that researchers can come up with psychological techniques and treatments to reduce the risk of depression and anxiety symptoms in cancer survivors.

1.10 Perceived Social Support

Like intolerance of uncertainty and fear of cancer recurrence, there is another factor that seems to be inextricably linked to breast cancer survivors' well-being, and it is called social support. Breast cancer survivors tend to make some adjustments in their lives in order to deal with the physical and psychological side effects of cancer treatment (e.g. bodily changes, pain, irritability). Unfortunately, throughout this process, they may feel disconnected from their loved ones and their social connections (with friends, family and significant other) may get challenged. Not being able to maintain their social connections, feeling unsupported, lonely, or drifted away from their loved ones may have a negative effect on their well-being. Therefore, social support appears to be a key factor in maintaining psychological integrity of breast cancer survivors.

Social support is a multidimensional construct that is hard to define, and there are different types of social support in the literature, including perceived and received social support. "Perceived" social support can be described as "a person's perception (subjective evaluation) of the availability of assistance coming from other people during times of need (friends, family, significant other)" (Sarason et al., 1983), and it includes the perception of being loved, cared and valued (Cobb, 1976). On the other hand, received social support focuses more on the quality and quantity of the actual provided help coming from friends, family and significant other. Compared to received social support, perceived social support can be identified in subjective qualitative perspectives, is easier to measure, and it is more determinative on mental health (Stokes, 1985). Individual differences may influence one's

perception of a situation. Since people can sometimes differ in the degree to which they feel supported, cared for, and loved in response to a given social state, I will be using perceived social support measures in this study to see how supported breast cancer survivors feel in their lives.

Getting a cancer diagnosis, going through treatment (potentially losing a breast(s)), surviving the disease, going through regular check-ups are all challenging, and social support seems like an important factor in maintaining psychological well-being of the individuals who have to go through this process. Previous research has argued that social support directly affects individuals' well-being in a positive way. Thus, instead of being a temporary buffering factor following a stressful event/situation, it is positioned as an existing social resource in a person's perception through which he/she is able to utilize to fulfill his/her on-going support needs, no matter how high the current stress level is (Thoits, 1982; Cohen, 2004). Consequently, social support was thought to have a more continuous role in preserving the overall well-being and quality of life of individuals. Overall, social support comes in different forms (e.g. helping an individual with various tasks, giving advice, providing care, empathy, concern), and it can help individuals to cope with stress. In the psychology literature, social support has been recognized as a key contributor of social, functional, and emotional well-being of individuals, and the positive and beneficial effects of social support on mental health have been indicated in several different studies. For example, social support has found to be related with reduced anxiety, depression, emotional disturbances, and increased adaptation to and coping with stress (Brusilovskiy et al., 2009). Furthermore, social support has found to be an important factor in dealing with stressful situations (e.g. cancer diagnosis) and a predictor of depressive symptoms among breast cancer survivors (Lee et al., 2008). Based the literature, we can say that social support helps reduce anxiety, stress, and depression (Brusilovskiy et al., 2009), while also enhancing psychological adjustment, improving coping skills to manage with stress, and

ultimately helping individuals in the cancer recovery process. (Epplein et al., 2011; Lee et al., 2011). In the context of breast cancer, more recent studies have further indicated that there is a negative correlation between social support and mental disturbances, therefore low levels of social support indicate high levels of anxiety and depression (Ng et al., 2015; Wondimagegnehu et al., 2019).

Both cancer patients and survivors face a variety of stressors throughout their medical treatment and follow-up care process. They experience psychological threats such as reduced bodily function, uncertainty related to their disease and about future and body image concerns (Carver & Antoni., 2004). Taking everything together, it hardly comes as surprise that high levels of psychological morbidity have been reported in breast cancer patients and survivors. In this case, not having sufficient social support can lead to an increase in psychological distress, depressive symptoms, mood disturbances and poor overall health related quality of life (Schou et al., 2005). In one cross-sectional study done with Turkish breast cancer patients, researchers looked at the effect of social support on health-related quality of life and found a positive relationship between these two concepts. Based on their analysis, they indicated that time since diagnosis and operation, stage of cancer, and social support were significant predictors of health-related quality of life (Filazoğlu & Griva., 2007). In another study done in Turkey, researchers looked at the relationship between social support and the level of anxiety, depression, and quality of life of women with cancer, and they found statistically significant correlations among type of perceived social support, quality of life, anxiety, and depression. According to the results, high social support was associated with increased quality of life, and reduced anxiety and depression levels (Pınar et al., 2012).

Considering the literature findings, we can say that social support plays an important role in increasing quality of life and health outcomes after breast cancer diagnosis and treatment. This makes me think about how social support would relate with fear of cancer

recurrence. When we consider social support in relation with fear of cancer recurrence, there seems to be a negative correlation among social support and FCR (Zheng et al., 2022). In one study done with 342 breast cancer patients, researchers have found a positive effect of social support on decreasing fear of cancer recurrence. According to their results, social support was an independent predictor of FCR (Niu et al., 2019). Another study examining FCR and its relationship with distress, contextual factors, illness representation, and psychological adjustment have found direct and indirect effects of social support on psychological adjustment, and they concluded that successful psychological adjustment of cancer patients receiving chemotherapy may be facilitated by improving social support (Hong et al., 2020).

While there is evidence showing a negative relationship between FCR and social support, the mechanism of action through which perceived social support affects fear of cancer recurrence is not clear in the literature. Mishel (1990), introduced uncertainty in illness theory that was designed to describe the antecedents of intolerance of uncertainty formation. According to this theory, social support is a key factor that contributes to the formation of illness uncertainty. Essentially, it shapes the patient's interpretation of disease-related stimuli and plays a significant role in reducing illness-related uncertainty and improving psychological and emotional well-being of the individual. When a patient considers uncertainty as a danger, he/she tries to create a strategy to eliminate this uncertainty by either seeking more information or taking direct action. Additionally, they will try to engage in affect-control strategies, including seeking emotional support, to minimize the distress that they feel because of uncertainty. Hence, social support becomes a critical component since it affects the patient's interpretation of disease-related stimuli and plays a vital role in managing with illness uncertainty (Mishel., 1990). To summarize, we can say that in cancer care, uncertainty often fuels FCR, a common and distressing outcome for cancer survivors. Social support can alleviate the distressing effects of FCR by providing emotional reassurance and coping resources necessary to manage FCR.

When social support is high, patients/survivors feel better equipped to manage the uncertainty surrounding their prognosis and potential cancer recurrence, and this leads them to experience less fear and have better psychological well-being. Therefore, based on this theory and previous literature findings, it seems like there is a negative relationship between social support and FCR, and taking everything together, this study argues that social support may be moderating the impact of fear of cancer recurrence on depression and anxiety, and decrease the psychological distress caused by FCR.

1.11 The Current Study

The diagnosis and treatment process of cancer has its own challenges, but the period after that can also be stressful. According to several studies, breast cancer survivors tend to face uncertainty (Hall et al., 2014; Thewes et al., 2012) after completing their treatment process and this uncertainty that they experience tend to create worrisome thoughts about their future (e.g., causing fears about cancer recurrence, long-term health concerns). Fear of cancer recurrence is an important cause of suffering for cancer survivors. Therefore, considering the lengthy disease and treatment process that people go through, the uncertainty they face after completing their treatment, and the fear they have for recurrence, examining factors that might affect cancer survivors' psychological well-being becomes an important consideration. Extending the current knowledge on the factors that are associated with anxiety and depression symptomology for breast cancer survivors can be vital for the prevention of psychopathology among cancer survivors and may help to guide intervention development in the future. Thus, a study that examines fear of cancer recurrence as a mediator and perceived social support as a moderator might potentially shed new insight in the relationship between intolerance of uncertainty and anxiety and depression symptoms among female breast cancer survivors in Turkey.

Although there are studies in the field examining the role of uncertainty in the adjustment process of cancer patients, the impact of intolerance of uncertainty and other

predictive constructs on common psychological problems such as anxiety and depression have not been deeply studied with Turkish breast cancer survivors, and considering cancer survivorship in females, the significance of social support to survivors is not adequately understood. Additionally, the impact of perceived social support on the well-being of cancer survivors can vary according to their culture. Most of the studies done on this topic tend to come from Western countries, which has implications on conclusions drawn on a wider level, and the ones from Turkey are not sufficient to understand the specific pathways and the moderating effects of social support on fear of cancer recurrence and anxiety/depression symptomology in breast cancer survivors. Overall, little is known about the effect of perceived social support on the positive association between having a fear against cancer recurrence and experiencing depression and anxiety symptoms among Turkish women who survived breast cancer.

Furthermore, it is important to keep in mind that post-treatment cancer survivors tend to have different social support needs and coping strategies related to their situation compared to cancer patients who still go through treatment and recovery. Unlike newly diagnosed patients who are undergoing treatment, cancer survivors' needs may involve strategies to cope with fear of cancer recurrence and gain normalcy in their lives (Cheng et al., 2012). There is not enough information in the literature that shows whether post-treatment cancer survivors' social needs are met by their social network or not. Therefore, it seems to be important to conduct studies to understand survivors' distinctive social support needs and the significance of these needs in their lives.

In summary, considering the lengthy disease process, treatment challenges and the uncertainty after treatment, examining factors that affect cancer survivors' psychological well-being seems to be an important consideration. Based on the theories indicating a link between intolerance of uncertainty and anxiety, and research findings in the same area, this study will

involve intolerance of uncertainty as an independent variable that is assumed to be related with anxiety and depression levels of participants who are breast cancer survivors. Therefore, the study is done to examine a possible mechanism for an association between intolerance of uncertainty and depression/anxiety symptomology. To advance our understanding of breast cancer survivorship, this study will look at whether the relationship between IU and depression and anxiety symptomatology is mediated through the fear that people have for cancer recurrence. Considering empirical evidence in the literature, this study aims to examine potential interactions between intolerance of uncertainty, fear of cancer recurrence, and perceived social support in relation to self-reported anxiety and depression symptoms among female breast cancer survivors. Hence, this study findings can be valuable in developing future interventions for cancer survivors in their follow-up care period.

1.12 Hypotheses

Based on the literature reviewed, these are the hypothesis that will be tested in this study:

Hypothesis 1: Intolerance of uncertainty will be positively associated with depression and anxiety levels.

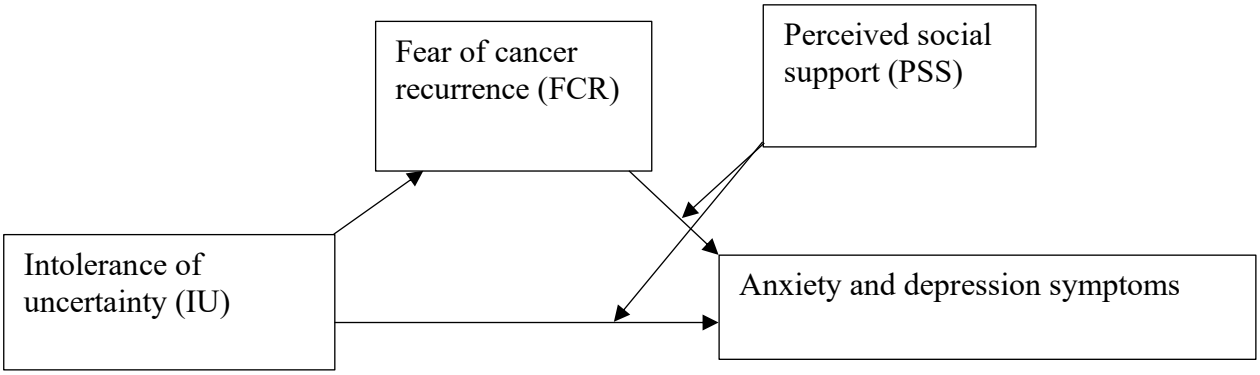
Hypothesis 2: FCR will mediate the relationship between IU and depression and anxiety levels, therefore higher IU will indicate higher FCR, which will lead to higher depression and anxiety levels.

Hypothesis 3: The effect of FCR on depression and anxiety depends on perceived social support. Therefore, PSS plays a significant moderating role in the relationship between FCR and depression and anxiety scores in female breast cancer survivors. The positive relationship between FCR and depression and anxiety scores are weaker when PSS is high and stronger when perceived social support is low.

Hypothesis 4: The indirect effect of IU on depression and anxiety via FCR depends on PSS.

Figure 1

Hypothesized path model



Note. Figure displays the hypothesized path model used in this study.

Chapter 2:

Method

2.1 Study Design

This is a cross-sectional correlational study investigating associations between intolerance of uncertainty (independent variable), fear of cancer recurrence (mediator variable), perceived social support (moderator variable) and anxiety and depression symptoms (dependent variable) in female breast cancer survivors at a single point in time.

2.2 Participants

269 female breast cancer survivors with complete were enrolled in the study. Prior to the data collection, G*Power program was used to determine the sample size. Sample size for this study is considered for correlation and regression analysis to achieve a medium effect size of .15, an alpha level of .05 and a power of .95 (Cohen, 1988). Medium effect size was used because when the effect size is small, the study may lack the power to detect it even if it exists.

If the effect size is too large, we might need a very large sample to detect it, which may take much more time to collect data. Therefore, choosing a medium effect size provides us a practical target that we can realistically detect with an adequate sample size.

Participants were recruited through social media platforms (Instagram, Twitter (X), Facebook, WhatsApp, LinkedIn). Participants were considered eligible for his study if they met the following inclusion criteria: (1) Female with a (former) breast cancer diagnosis (at any stage); (2) 18 years or older; (3) has completed necessary treatments such as chemotherapy, radiotherapy, surgery (at least 1 year prior to this study); (4) able to read, understand and respond to questionnaires in Turkish. Exclusion criteria will include: (1) sign of active disease; (2) unable to complete questionnaires due to psychological or cognitive impairment (3) previous psychiatric diagnoses. The aim of the study, standard principles of protection of human subjects, participants' right to withdraw, confidentiality of data and anonymity was explained to participants in writing. Participants who gave their written informed consent to participate were asked to complete a series of self-report measures.

Overall, all the participants in this study were female (N= 269). Among 269 individuals, 7.8% of the participants were at the age group of 20-30, 33.1% of them were at the age group of 31-50, 30.1 % of them were at the age group of 51-70 and 29% of them were aged 71 and above. When we look at the marital status of the participants, we see that 60.6% of them were married, 17.8% of them were singe and 21.6% of them were widowed. 39.1% of participants reported their education level as high school and below, 46.8% were at undergraduate level, 10.4% were at master's degree level and 3.7% were at doctorate (PhD) level. As for the stage of cancer they had, 26.5% of participants had cancer at stage 2 and lower, 30.4% had cancer at stage 3, 2.6% had cancer at stage 4, and 40.5% of participants did not know the stage of their disease. While 50.6% of participants reported taking hormonal therapy, 49.4% of them reported

otherwise. Majority of participants, 59.2%, reported having cancer 2-5 years ago while 15.6% reported to have it the last year and 25.2% of them reported to have it more than 6 years ago. Finally, as for cancer relapse, 98.5% of the participants did not have relapse until the time of the survey while 1.5% of them reported experiencing relapse before. The further demographic characteristics of the sample are presented in Table 1.

Table 1

Demographic Characteristics of the Sample

Demographic characteristic	N	%
Gender		
Female	269	100
Age		
20-30	21	7.8
31-50	89	33.1
51-70	81	30.1
71+	78	29
Marital status		
Married	163	60.6
Single	48	17.8
Widowed	58	21.6
Level of education		
Elementary school	5	1.9
Secondary school	17	6.3
Highschool	83	30.9
Undergraduate	126	46.8
Masters	28	10.4
Doctorate	10	3.7
Stage of cancer		
0	6	2.2
1	14	5.3
2	51	19
3	82	30.4
4	7	2.6

Do not know	109	40.5
Hormonal therapy		
Yes	136	50.6
No	133	49.4
Time since diagnosis (years)		
1	42	15.6
2-5	159	59.2
6+	68	25.2
Relapse		
Yes	4	1.5
No	265	98.5

Note. N=269

2.3 Measures

2.3.1 Demographic Information Form

A self-designed questionnaire was used to collect sociodemographic characteristics of participants including their age, marital status, education level. Additionally, information about participant's previous psychiatric history, former breast cancer stage (disease severity), whether they take adjuvant therapy (e.g. hormonal therapy), whether they had cancer recurrence, the time passed since diagnosis were collected as well. (See Appendix B)

2.3.2 Intolerance of Uncertainty Scale

Intolerance of uncertainty levels were measured by Intolerance of Uncertainty Scale (Sarıçam et al., 2014) which is an adapted version of the Intolerance of Uncertainty Scale-short form (IUS-12) (Carleton, Norton, & Asmundson, 2007) into Turkish. The scale includes a 12-item questionnaire to investigate overall intolerance of uncertainty of the participants. (Sample item: When it is time to act, uncertainty paralyses me). Participants responded to each item on

a 5-point Likert scale with responses ranging from 1 “Not at all characteristic of me” to 5 “Very characteristic of me.” The scores of each item were summed to compute overall intolerance of uncertainty. There were no negatively coded items in the scale. The range of possible scores were from 12 to 60. Higher scores indicate a higher level of intolerance to uncertainty. Cronbach alpha internal consistency coefficient for overall scale was .88, for prospective anxiety subscale it was .84, and for inhibitory anxiety subscale it was .77 (Sarıçam et al., 2014). The test-retest reliability coefficient was found to be .74 (Sarıçam et al., 2014). In the current study, the scale demonstrated excellent internal consistency where Cronbach’s alpha coefficient and McDonald’s omega coefficient was both .96 for the total scale. (See Appendix C)

2.3.3 Fear of Cancer Recurrence Inventory

This scale was used to measure fear of cancer recurrence, and it is an adapted version of the Fear of Cancer Recurrence Inventory (FCRI) (Simard & Savard, 2008) into Turkish. Both the original and Turkish adaption version of the scale contains 42-items and seven subscales, which include severity, triggers, psychological distress, coping strategies, insight, reassurance behaviors, and overall functioning. However, in the research that was done to adapt FCRI into Turkish, it was stated that only 24 out of 42 questions should be scored to come up with a total score (Eyrenci & Berk, 2018). These questions involve: Triggers Subscale (questions 1, 2, 3, 5,6,7,10) (Sample item: The situations listed below make me think about the possibility of cancer recurrence: TV programs or newspaper articles about cancer or illness); Functioning Impairments Subscale (questions 22, 23) (Sample item: My thoughts or fears about the possibility of cancer recurrence interfere with/ disrupt…My social or leisure activities); Recurrence Related Meta-Cognitions Subscale (questions 15, 16, 17, 28) (Sample item: How often do you think about the possibility of cancer recurrence?); Emotion-Focused Coping Strategies (questions 19, 20, 18, 21, 34) (Sample item: "When I think about the possibility of

cancer recurrence I feel….Worry, fear, or anxiety.") and Quality of Life Subscale (questions 26, 27, 25, 24, 30, 29) (Sample item: My thoughts or fears about the possibility of cancer recurrence interfere with/ disrupt…My relationships with my spouse/partner, family, or people close to me.". Participants respond to each item on a 5-point Likert scale ranging from 0 (never) to 4 (always). A total score is calculated for each subscale and the total questionnaire by summing the responses. Higher scores indicate higher fear of cancer recurrence levels. Cronbach's alpha coefficient of this scale was found to be .94, and the item-total correlations were between .37- .75. Overall, this Turkish version of the original FCRI scale has satisfactory psychometric properties and it was found to be eligible for use in Turkish studies (Eyrenci & Berk, 2018). In the current study, this scale demonstrated excellent internal consistency where Cronbach's alpha coefficient was .96 and McDonald's omega coefficient was .97 for the total scale. (See Appendix D)

2.3.4 Multidimensional Scale of Perceived Social Support

Çok Boyutlu Algılanan Sosyal Destek Ölçeği (Eker et al., 2001) is an adapted version of Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al., 1988) into Turkish and it measures individual's perception of support from three sources: friends, family, a significant other. The scale contains 12-item questionnaire, and each item is scored on a scale from 1(very strongly disagree) to 7 (very strongly agree). (Sample item: There is a person outside of my family and friends who is there for me when I need them (for example, a partner, fiancé, spouse, relative, neighbor, doctor)). Higher scores indicate higher levels of perceived social support. The scores of each item will be summed to compute overall perceived social support, and three subscales separately: family, friends and a significant other. Cronbach's alpha coefficient of this scale was found to be .89 for overall scale, .85 for support from family, .88 for support from friends and .92 for support from significant other (Eker et al., 2001). In the

current study, Cronbach's alpha coefficient of the scale was found to be .96 for overall scale. Similarly, McDonald's omega coefficient was found to be .96 and this indicates excellent internal consistency. (See Appendix E)

2.3.5 Depresyon Anksiyete Stress Scale (DAS-21)

Anxiety and depression levels of our participants will be measured by using Depresyon Anksiyete Stres Ölçeği-21 (Sarıçam, 2018), which is the Turkish version of the original Depression Anxiety Stress Scale-21 (DASS-21) (Lovibond & Lovibond, 1995). The original DASS-21 is a shortened version of DASS-42 (Lovibond & Lovibond, 1995) and due to application time concerns, the shorter version of DASS will be used in this study. DASS-21 has three scales (depression, anxiety and stress) and each of them contains 7 items. Participants will respond to each item by selecting numbers ranging from 0 (never) to 3 (always), which indicates how much the statement applied to them over the past week. (Sample item: I had difficulty relaxing). Total score is calculated for each subscale by summing the relevant responses. Higher scores indicate higher depression, anxiety and stress levels. Cronbach's alpha coefficient was found to be .87 for depression subscale, .85 for anxiety subscale and .81 for stress subscale. The test-retest reliability coefficient for depression, anxiety and stress subscales were r= .68, r= .66, r= .61 respectively (Sarıçam, 2018). In the current study, this scale demonstrated excellent internal consistency where Cronbach's alpha coefficient was .95 and McDonald's omega coefficient was .96 for the total scale. (See Appendix F)

2.4 Procedure

Ethical approval for this study was obtained from the Ethics Committee of Koç University. All participants were informed about the procedure and purpose of the study before they start filling the survey. (See Appendix A). They were informed about the confidentiality, and their right to withdrawn from the study was also indicated before they start filling the questions. Only participants who gave their written informed consent were considered eligible for the study.

The survey for this study was created using Qualtrics program. A link and a QR code that includes the information about the study, informed consent form, demographic form, and related scales were distributed to various social media sites (Instagram, Twitter (X), Facebook, WhatsApp, LinkedIn) as part of the online data collection process. The first thing that was presented in the link was the informed consent form. After signing the consent form, participants were given demographic questions, Intolerance of Uncertainty Scale, Fear of Cancer Recurrence Inventory, Multidimensional Scale of Perceived Social Support and Depression Anxiety Stress Scale-21 respectively. In this study, participants were not given any incentives to participate. In order to minimize risks and harms and protect subjects' welfare I highlighted the fact that they can withdraw from the study anytime they want (if they feel uncomfortable at any point). Also, they had the right to skip questions they did not want to answer. The survey took about 15-20 minutes to complete. The whole online data collection process took 11 months, between February 2024 to January 2025.

2.5 Statistical Analysis

In this study, IBM SPSS Statistics 28.0 (IBM Corp, 2021) was used to analyze the data. Initially, descriptive and correlation analyses between study variables were conducted (intolerance of uncertainty, fear of cancer recurrence, anxiety and depression symptoms and

perceived social support). Following the descriptive statistics, the main hypotheses of the study were tested using the PROCESS Macro for SPSS. For mediation analysis (the mediating role of FCR on IU and depression and anxiety levels) Model 4 (simple mediation model) was used. For moderated mediation, where IU was the predictor variable, perceived social support was the moderator, FCR was the mediator, and depression and anxiety levels were the outcome variable, Model 15 was used (Hayes, 2022). Furthermore, 5000 bootstrapping sample technique was executed in this study and bootstrapped confidence intervals that did not contain zero were considered to show a significance (Hayes, 2022).

Chapter 3:

Results

A total number of 284 individuals have responded to the study survey. Amon these individuals, 269 of them completed the survey questions and 15 of them did not provide necessary information for this study. Therefore, study analysis was performed on data from 269 subjects who completed the survey fully. Additionally, the examination of outliers and normality was performed with data from 269 subjects. Univariate outliers were examined by conducting boxplots and no items were detected as extending up to 1.5 times the interquartile range from the upper boundary of the middle 50% of the data, therefore no removal was made. In order to detect Multivariate outliers, Mahalanobis distance was calculated in SPSS and values that were significant at $p < .001$ were supposed to be accepted as outliers (Kline, 2015). Since there were no outliers detected, no deletion was made from the data, and further analyses were conducted with the 269 subjects. Furthermore, the skewness and kurtosis of the study variables were tested using SPSS and both were within the acceptable range to infer the normality of the data (George & Mallery, 2010).

The assumption of multicollinearity was evaluated by examining the Variance Inflation Factors (VIFs) for each predictor. Results indicated that multicollinearity was not a concern

(IU, Tolerance = .34, VIF = 2.8; FCR, Tolerance = .37, VIF = 2.6; PSS, Tolerance = .87, VIF = 1.15). Additionally, the scatterplot of standardized residuals showed that the data met the assumptions of homogeneity of variance (no specific pattern was detected) and linearity (scatterplots of IU, FCR and PSS revealed linear trends), and the histogram of standardized residuals showed that the data contained normally distributed errors, as did the normal P-P plot of standardized residuals. As for independence, the data met the assumption of independent errors (Durbin-Watson value = 2.02).

3.1 Descriptive Statistics and Bivariate Correlations

Participants' socio-demographic and medical information (stage of the cancer, presence of hormonal therapy, time since diagnosis and whether they had a relapse) are summarized in Table 1. Before testing the main hypotheses of the study to see mediation and moderation effects of our variable, the bivariate correlations of the study variables were investigated. Their results are displayed in Table 2.

According to the analysis, all of the main variables of this study were significantly correlated with one another. Intolerance of uncertainty was positively correlated with fear of cancer recurrence (r = .79, $p < .01$), and depression and anxiety symptoms (r =.52, $p < .01$), and negatively correlated with perceived social support (r = -.22, $p < .01$). Fear of cancer recurrence was negatively correlated with perceived social support (r = -.34, $p < .01$) and positively correlated with depression and anxiety symptoms (r =.70, $p < .01$). Perceived social support was negatively correlated with depression and anxiety symptoms (r = -.71, $p < .01$).

Additionally, age was negatively correlated with IU (r = -.34, $p < .01$), FCR (r = -.25, $p< .01$), PSS (r = -.05, $p = .44$) and DAS (r = -.05, $p = .46$). Time since diagnosis was negatively correlated with IU (r = -.28, $p < .01$), FCR (r = -.27, $p < .01$) and DAS (r = -.16, $p < .01$), and was positively correlated with PSS (r= .005, $p= .93$). Stage of the cancer had a negative correlation with IU (r = -.29, $p < .01$), FCR (r = -.13, $p < .05$) and PSS (r = -.07, $p = .26$), and it

was positively correlated with DAS (r=. .012, *p*= .84). Having of hormonal therapy was negatively correlated with IU (r= -.12, $p < .05$), positively correlated with FCR (r= -.03 p=.64), negatively correlated with PSS (r=-13 $p < .05$) and positively correlated with DAS (r= .07, p=26). Finally, going through a relapse was positively correlated with IU (r= .04, *p*= .53), FCR (r= .04, *p*= .57) and DAS (r= .09, *p*= .15) and was negatively correlated with PSS (r= -.07, *p*= .29).

Table 2

Descriptive Statistics and Bivariate Correlations Among Study Variables

Variables	Age	Time since diagnosis	Cancer stage	Relapse	Hormonal therapy	IU	FCR	PSS	DAS	M	SD	Min	Max	Skew	Kurtosis
Age	.	.55	.46	-.06		-.34**	-.25**	-.05	-.05						
Time since diagnosis	.55	.	.40	-.13		-.28**	-.27**	.005	-.16**						
Cancer stage	.46	.40	.	-.09		-.29**	-.13*	-.07	.012						
Relapse	-.06	-.13	-.09	.		.04	.04	-.07	.09						
Hormonal therapy	.31**	.10	.21**	-.08	.	-.12*	-.03	-.13*	.07						
IU	-.34**	-.28**	-.29**	.04	-.12*	.	.79**	-.22**	.52**	36.02	11.45	17	58	.08	-1.4
FCR	-.25**	-.27**	-.13*	.04	-.03	.79**	.	-.34**	.70**	51.20	20.17	10	90	-.07	-1.17
PSS	-.05	.005	-.07	-.07	-.13*	-.22**	-.34**	.	-.71**	63.59	13.81	30	83	-.40	-1.13
DAS	-.05	-.16**	.012	.09	.07	.52**	.70**	-.71**	.	24.43	12.36	4	51	.09	-1.26

Note. N= 269. IU= Intolerance of Uncertainty Scale, FCR = Fear of Cancer Recurrence Inventory, PSS = Multidimensional Scale of Perceived Social Support, DAS = Depression Anxiety Stress Sacle-21.
** $p < .01$, * $p < .05$

3.2 Testing the Main Hypotheses

3.2.1 The Mediating Role of Fear of Cancer Recurrence in the Association Between Intolerance of Uncertainty and Depression and Anxiety Symptoms

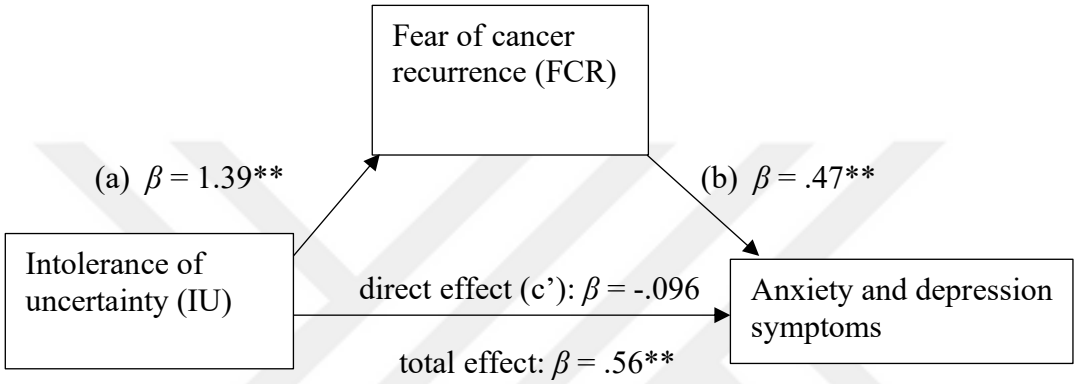
The current study aimed to investigate a potential mediating effect of fear of cancer recurrence on the relationship between intolerance of uncertainty and depression and anxiety symptomatology in female breast cancer survivors. Simple mediation (PROCESS Model 4) analysis was conducted to test the hypothesized model (Hayes, 2022).

According to the hypothesis, intolerance of uncertainty was expected to be positively associated with fear of cancer recurrence, which in turn, was expected to be positively associated with depression and anxiety symptoms. The analysis showed that the direct effect of intolerance of uncertainty on fear of cancer recurrence was significant, $\beta = 1.39$, $SE = .06$, $t = 21.02$, $p < .001$, therefore IU was positively associated with FCR as expected. This indicates that individuals scoring higher on IU scale are more likely to experience higher fear of cancer recurrence than those scoring lower on IU measure. Additionally, the direct effect of FCR on depression and anxiety symptoms was also and statistically significant, $\beta = .47$, $SE = .04$, $t = 10.8$, $p < .001$, indicating that FCR is positively associated with depression and anxiety. Therefore, it seems that individuals with higher levels of FCR tend to experience depression and anxiety at a higher level than those who have lower FCR. Since both path a and b are significant, we can say that the indirect effect of IU on depression and anxiety levels through FCR is significant, supporting the idea that FCR mediates the relationship. Therefore, the second hypothesis is supported. Furthermore, there was no significant direct effect of IU on depression and anxiety, $\beta = -.096$, $SE = .08$, $t = -1.2$, $p = .22$. As for the indirect effect of IU on depression and anxiety, results showed a significance, $\beta = .66$, $SE = .07$, 95% CI = [.5285, .7974]. This indicates that FCR fully mediated the relationship between IU and depression and anxiety symptoms, such that the relationship between IU and depression and anxiety is

explained entirely through FCR. Once FCR is accounted for, the direct effect of IU on depression and anxiety levels becomes non-significant. Finally, the total effect (c) of IU on depression and anxiety is significant, $\beta = .56$, $SE = .06$, $t = 9.91$, $p < .001$. IU is positively related with depression and anxiety levels (see Figure 2).

Figure 2

The mediation model



Note. This figure demonstrates the mediating role of fear of cancer recurrence in the association between intolerance of uncertainty and depression and anxiety levels.
** p <.001

3.2.2 The Moderating Role of Perceived Social Support in the Association Between Intolerance of Uncertainty, Fear of Cancer Recurrence and Depression and Anxiety

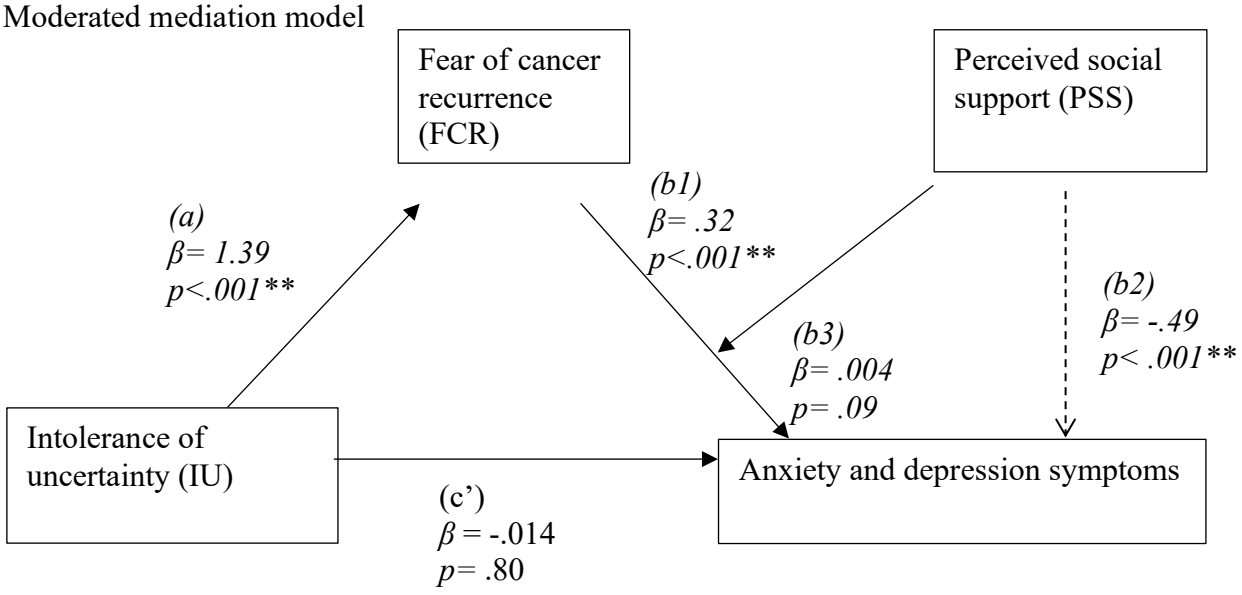
In this study, it was proposed that perceived social support would significantly moderate the association between fear of cancer recurrence and depression and anxiety levels. Therefore, we expected that the positive relationship between fear of cancer recurrence and depression and anxiety scores would be weaker when perceived social support is high and stronger when perceived social support is low. Additionally, a moderated mediation analysis was conducted using PROCESS Macro Model 15 (Hayes, 2022) to examine whether the indirect effect of IU on depression and anxiety through FCR was moderated by PSS

The results demonstrated that there is a significant effect of IU on FCR (path a), b = 1.39, SE = .06, t = 21.02, p<.001, therefore IU was a significant predictor of FCR. FCR and PSS were both significantly associated with depression and anxiety symptoms, (path b1) b = .32, SE = .03, t = 9.76, p<.001; (path b2) b= -.49, SE = .03, t = -15.9, p < .001, respectively. However, the interaction between FCR and PSS did not have a significant effect on depression and anxiety levels (path b3), b = .004, SE = .002, t = 1.66, p = .09, indicating that there is no significant moderating effect of PSS on the association between FCR and depression and anxiety. This result fails to support the third hypothesis in the study. Additionally, the direct effect of IU on depression and anxiety also seems to be non-significant (b= -.014, SE= .06, t= -.25, p= .80). (See figure 3)

Moderated mediation is the effect of IU on depression and anxiety via mediator FCR, which differs depending on the levels of moderator PSS. According to the results, the index of moderated mediation was b= .006, 95% CI [-.002, .014], indicating that the conditional indirect effect of IU on depression and anxiety through FCR did not significantly vary as a function of PSS.

Figure 3

Moderated mediation model



Note. The moderator role of PSS and the mediator role of FCR in the association between IU and depression and anxiety symptoms.

Table 3

The Results of the Moderation Analysis

	B	SE	t	p	LLCI	ULCI	F	R2
Outcome: DAS							441.9	.62
IU	-.014	.055	-.24	.80	-.12	.095		
FCR	.32	.033	9.76	.000***	.25	.38		
PSS	-.49	.031	-15.92	.000***	-.55	-.43		
IU x PSS	-.004	.004	-.98	.33	-.012	.004		
FCR x PSS	.004	.002	1.66	.09	-.001	.009		

Note: N = 269. IU = Intolerance of Uncertainty, FCR = Fear of Cancer Recurrence, PSS = Perceived Social Support, DAS = Depression Anxiety Stress. ** $p < .001$

Chapter 4:

Discussion

This study aimed to investigate factors contributing to depression and anxiety symptoms in females who had breast cancer earlier in their lives and now in their survivorship period. More specifically, the main goal was to investigate the relationship between intolerance of uncertainty and depression and anxiety symptoms experienced by female breast cancer survivors while exploring the mediating role of fear of cancer recurrence and the moderating role of perceived social support.

To understand the relationship between intolerance of uncertainty, fear of cancer recurrence and depression and anxiety levels, correlational and mediation analysis was performed in this study. Bivariate correlations among study variables revealed a significant correlation among IU and FCR; IU and depression and anxiety levels; FCR and depression and anxiety levels. Even though IU was positively correlated with depression and anxiety levels, mediation analysis revealed no significant direct effect of IU on depression and anxiety. Since the direct effect of IU on the dependent variable was not significant, it could indicate that after accounting for other factors (the mediator FCR), the direct relationship between IU and depression and anxiety levels was not strong enough to be detected statistically. In other words, the effect of IU on depression and anxiety levels is not significant, even though these two variables are correlated.

Based on the Intolerance of Uncertainty Model (IUM), which suggests that IU can develop anxiety symptoms and stress by increasing repetitive negative thinking (Dugas et al., 1998), we expected to see a positive relationship between IU and depression, anxiety and stress levels. In this case, FCR was expected to work as a ruminative factor in the context of psychological distress in cancer survivors, and it was expected to lead individuals to negative thinking. Consistent with previous studies that found positive relationship between FCR and

intrusive thoughts (Curran et al., 2020), intolerance of uncertainty (Waroquier et al., 2022), worry (Simonelli et al., 2017), depression, anxiety and rumination (Liu et al., 2018), we predicted to see a relationship between high levels of IU and high levels of FCR, leading to an increase in depression and anxiety levels. Since the IUM suggest that IU can develop and maintain anxiety symptoms and people who have higher levels of IU are more likely to perceive and treat uncertainty as unacceptable and threatening, it was predicted that high IU would be related with high FCR, because a person who considers uncertainty unacceptable would have greater fear against cancer recurrence (which is an uncertain concept). In line with this idea, the study results showed a significant effect of IU on FCR, meaning that IU was positively associated with FCR as expected. This indicates that female breast cancer survivors in this study who had high levels of intolerance against uncertainty experienced higher levels of fear against cancer recurrence. Additionally, the direct effect of FCR on depression and anxiety levels was also statistically significant, indicating that people who experienced higher levels of fear against cancer recurrence had increased depression and anxiety symptoms compared to the ones who had lower levels of fear against cancer recurrence. Overall, since there was no significant direct effect and a significant indirect effect of IU on depression and anxiety, it was concluded that FCR fully mediated the relationship between IU and depression and anxiety symptoms as expected. Therefore, as stated in the hypothesis, the effect of intolerance of uncertainty on depression and anxiety symptoms exist when fear of cancer recurrence mediates this relationship. Consistent with these results, several studies in the literature have demonstrated that there is a significant relationship between intolerance of uncertainty and high levels of worry contents, anxiety, and depressive symptoms (Shams et al., 2023), and high stress levels (Kurita et al., 2012). Similarly, previous studies on fear of cancer recurrence and how it affects cancer survivors have found a significant association between FCR and depression and anxiety scores (Liu et al., 2018), and they indicate that excessive amounts of FCR causes psychological

distress and interrupts daily life (Koch et al., 2013). Therefore, previous research has shown a potential relationship between FCR and psychological distress and/or quality of live, and the results of the current study provided an extension of the existing knowledge on FCR and how it is related with depression and anxiety symptoms.

Another variable that seemed important to consider in this study with female breast cancer survivors was perceived social support. There are many different studies in the field that underline and show the importance of social support on people's well-being (Schou et al., 2005; Ng et al., 2015; Wondimagegnehu et al., 2019). Based on the current knowledge, this study examined the moderator role of perceived social support of the relationship between fear of cancer recurrence and depression and anxiety symptoms and hypothesized that perceived social support would play a significant moderating role in the relationship between FCR and depression and anxiety scores in female breast cancer survivors. Therefore, we expected to see a weaker relationship between FCR and depression and anxiety scores when perceived social support is high and a stronger relationship when perceived social support is low. However, study results did not support moderated mediation hypothesis and showed no significant moderation effect of PSS on the relationship between the mediator, FCR, and the dependent variable, depression and anxiety symptoms. More specifically, the association of FCR and depression and anxiety levels did not change across the levels of perceived social support. Also, there were no significant moderated mediation effect, therefore, the effect of IU on depression and anxiety via mediator FCR, did not change across the levels of PSS.

In the literature, there are some findings supporting an existence of a negative relationship between PSS and FCR. For example, according to studies, social support has an ameliorating effect on FCR (Yu et al., 2022), it often serves as a buffer against psychosocial distress (Applebaum et al., 2014) and it can help cancer survivors to cope with uncertainty

(Sammarco, 2003). Additionally, social support was indicated to be an independent predictor of FCR (Niu et al., 2019) and it was found that increased social support may lead to a successful psychological adjustment of cancer patients (Hong et al., 2020). In spite of these findings, we still do not know how and why PSS affects FCR, therefore, the mechanism of action by which perceived social support affects fear of cancer recurrence is not clear in the literature (Yu et al., 2022). According to Mishel (1990), when a person (female breast cancer survivor in this case) perceives uncertainty as a danger, she will seek emotional support from her loved ones to lower the stress that she experiences because of the uncertainty. Therefore, social support becomes important component because it affects people's understanding of their condition and plays an important role in dealing with illness uncertainty (Mishel., 1990). Based on this theory, it was hypothesized that perceived social support would weaken the effects of fear of cancer recurrence on depression and anxiety levels because it would help individuals to cope better with uncertainty and the possibility of a cancer relapse. Because only a few studies have investigated perceived social support in the realm of FCR, this study aimed to advance our understanding of PSS and how it is related with FCR and psychological well-being. More studies on the effect of perceived social support on the well-being of cancer survivors is needed to better understand the importance of PSS in people's lives.

4.1 Strengths, Limitations and Recommendations for Future Research

This study has several strengths. Overall, the purpose of this study was to investigate the effect of IU on depression and anxiety through FCR across the moderation of PSS. The results showed that there was a positive association between IU and FCR, and a positive association between FCR and depression and anxiety levels. Therefore, these findings further emphasize the negative impact of intolerance of uncertainty and fear of cancer recurrence on the psychological wellbeing of breast cancer survivors. Similar results have been found in previous studies in the literature (Kurita et al., 2012; Hall et al., 2014; Liu et al., 2018; Shams

et al., 2023). Even though we failed to detect a significant moderating effect of PSS on the relationship between FCR and depression and anxiety levels, to our knowledge, this study was the first theoretically based and empirical study to examine both the mediating role of FCR on IU and depression and anxiety levels, and the moderating role PSS on FCR and depression and anxiety levels. Furthermore, there were some studies in the Western countries examining the role of uncertainty in the adjustment process of cancer patients (current patients, not survivors), however, the impact of intolerance of uncertainty and other predictive constructs on common psychological problems such as anxiety and depression was not deeply studied with Turkish breast cancer survivors. Thus, unlike other studies working with current cancer patients, this study simultaneously investigated the role of IU, FCR and PSS on psychological well-being of the individuals after being diagnosed with breast cancer and after completing all the treatments (survivors).

Despite of some significant findings of this study and its' contributions to the literature and clinical practice, there are some limitations of the current study.

First, this is a cross-sectional study which can be used to understand the prevalence of a phenomenon at a particular point in time, however, causality cannot be established by this study. Hence, future studies can use a longitudinal design to strengthen the causal relationship between intolerance of uncertainty, fear of cancer recurrence and depression and anxiety symptoms in breast cancer survivors.

Second, all of our sample in this study were consisted of female breast cancer survivors, however, though it is rare compared to women, men can also have breast cancer. Although breast cancer predominantly affects women, mainly because they have higher amount of breast tissue and hormones like estrogen and progesterone, men also have breast tissue where cancer can develop. According to statistics, male breast cancer accounts for about 1% of all breast

cancer cases (American Cancer Society, 2022). In order to have a broader understanding on how IU and FCR affects breast cancer survivors' psychological well-being, future studies can include both female and male cancer patients and/or survivors in their sample.

Next, the present study failed to establish perceived social support as a significant moderator in the association between fear of cancer recurrence and depression and anxiety levels. This may have several explanations. For example, the data was collected using self-report measures that may lead to potential biases. These biases occur because participants may not always provide accurate or truthful responses. For example, this study included a survey which had questions about social support coming from friends, family and others (boyfriend/girlfriend, fiancé, neighbor, friend, doctor), therefore respondents could have provided answers they believe are more socially acceptable or desirable, rather than their true feelings. They might have wanted to appear more socially supported and intact than they actually are. Another explanation is cultural differences. Previous studies on the relationship between PSS and FCR was reviewed before conducting this one, but those studies were done in countries other than Türkiye. Therefore, since the concept of social support can vary across countries and cultures, there might be a difference in the understanding of "social support" in Turkish culture compared to others. For example, an important source of social support in Türkiye is "family" (including parents, siblings, and members of the extended family) because Turkish culture places high importance on family bonds (Evason, 2019). In Türkiye, it is common for family members to provide emotional and financial support. Unlikely, in many Western countries, social support systems rely more on friends, neighbors, or professional networks (e.g., therapists, doctors). Family support, though still present, might not play as central a role as in Turkey (Akbulut et al., 2025). Considering this difference, the scale used to measure perceived social support in this study might not be the most appropriate social support scale to use in the current context. Most of the questions in the scale (8/12) included

social support coming from people outside the family and only four questions directly involved social support coming from family members (mother, father, spouse, children, siblings). Therefore, in Turkish culture, social support coming from people outside of the family (boyfriend/girlfriend, fiancé, neighbor, friend, doctor) might not be that much effective in reducing the negative impact of fear of cancer recurrence on depression and anxiety. This might be the reason for failing to detect the moderation effect in this study. Additionally, differences in cancer stage might also have an effect on the relationship between PSS, FCR and depression and anxiety. Out of 269 participants in this study, only 6 of them were diagnosed with stage 4 breast cancer, meaning that most participants were (when they were diagnosed) in a stage where 5- year survival rates are above 86% (American Cancer Society, 2023). Therefore, the stage of the disease may influence how perceived social support interacts with FCR and depression and anxiety. Individuals with different cancer stages might experience fear of recurrence in very different ways, and this could influence how perceived social support functions as a moderator. Future studies may try to include an equal number of participants (cancer survivors) from each cancer stage (0, 1, 2, 3, 4) in their study.

Another potential limitation of this study is that it was a single-center study that used convenience sampling to recruit participants, which may cause a generalization issue. Originally, the data was planned to be recruited through social media, hospitals and breast cancer organizations, but due to some difficulties obtaining permission/consent from the related institutions or from doctors, and due to time restriction, the data was collected only through social media. Because of this reason, convenience-sampling method had to be used where we selected participants based on their ease of access. More specifically, rather than randomly selecting individuals from the entire population, we included participants who were easiest to reach and available for the study (e.g. WhatsApp and Facebook groups, Instagram connections). Although it is low cost and convenient to use convenience sampling, it may cause several biases

that can affect the validity and generalizability of the results. For example, selection bias may occur because the sample is not representative of the broader population, thus some groups may be overrepresented or underrepresented. Therefore, it becomes difficult to generalize the findings to the larger population. Additionally, another bias that can occur because of convenience sampling is “non-response bias”. In convenience sampling, we include people who are willing and available to participate, and these individuals may have certain characteristics that differ from those who are not willing and/or available to participate in the study. Again, this creates a generalizability issue because the responses may not reflect the broader population's views or experiences. Future research should design a multi-center study and engage in random sampling in order to ensure that their sample represents the population as accurately as possible.

Overall, future research that involves data collection from different sites, longitudinal approach and larger sample size is recommended the better understand the relationship between IU, FCR, PSS and depression and anxiety symptoms in breast cancer survivors.

4.2 Clinical Implications and Conclusion

The results of this study show that there is a positive relationship between high IU, high FCR and depression and anxiety levels. Since higher IU and FCR is related with higher levels of depression and anxiety, addressing these factors in psychotherapy can be effective for reducing depression and anxiety. According to the literature, techniques related to Cognitive Behavioral Therapy (CBT) can be used to manage IU to treat several psychological disturbances, especially anxiety disorders. There is a specific treatment called Cognitive-Behavior Therapy Targeting IU which aims to treat anxiety resulting from intolerance of uncertainty. This therapy addresses four components: (1) intolerance of uncertainty, (2) positive beliefs about the function of worry, (3) negative problem orientation, and (4) cognitive avoidance. According to CBT-IU model, people tend to have a fear against uncertainty and this

fear leads them to experience excessive worry and engage in dysfunctional coping behaviors. Therefore, the aim of the treatment is to help individuals develop more functional responses when they face uncertainty, reduce the excessive worry that they experience during facing uncertainty, and to break the cycle of avoidance/safety behaviors that are used to manage uncertainty. Several studies looking at the effect of CBT-IU on reducing intolerance of uncertainty and anxiety have found CBT-IU to be more effective than control groups at reducing IU and worry in adults (Dugas et al., 2003) and older adults (Hui & Zhihui, 2017) with GAD. Furthermore, when compared with pharmacological treatments, CBT-IU was found to be significantly more effective at reducing intolerance of uncertainty and worry (Zemestani et al., 2021).

Therapeutic interventions including CBT, mindfulness-based approach (either as mindfulness-based stress reduction or mindfulness-based cognitive therapy), and acceptance and commitment therapy can all be used to address FCR related uncertainty (Dawson et al., 2016), anxiety and depression (Cramer et al., 2012; Modica & Hoenig., 2013; Murphy et al., 2019), overall well-being (Manne et al., 2016; Park et al., 2020; Zhao et al., 2021), and distress (Compen et al., 2018). Although all these techniques are effective, CBT was found to be the most effective one, especially in a blended form (e.g. standard CBT combined with other self-help activities) (Paperak et al., 2022).

In conclusion, the present study investigated the relationship between factors that are linked with depression and anxiety in female breast cancer survivors, and our results stressed the importance of targeting IU and FCR for managing anxiety, depression and stress. It appears that having a high intolerance against uncertainty and high fear against cancer recurrence play an interactive role in the formation of depression and anxiety symptoms in cancer survivors and targeting these factors might be key for the prevention and intervention of psychological

disturbances in this population. Unfortunately, our results failed to show a significant moderator role of PSS in the association between FCR and depression and anxiety symptoms. Future studies are needed in order to better understand the effects of PSS on the association between FCR and depression and anxiety symptomatology in cancer survivors.

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Appendices

Appendix A

Informed Consent Form

Sayın katılımcı, sizi Prof. Dr. Mehmet Eskin danışmanlığında Nilsu Solmaz tarafından Koç Üniversitesi Klinik Psikoloji Yüksek Lisans programı kapsamında yürütülen, Koç Üniversitesi Etik Kurulları'nın 2023.434.IRB3.187 sayılı onayı ile izin verilen "Meme Kanseri Sonrası Sağkalımlarda Belirsizliğe Tahammülsüzlüğün, Kanser Nüks Korkusunun ve Algılanan Sosyal Desteğin Depresyon ve Anksiyete Semptomlarına Etkisi" başlıklı araştırmaya katılımınız rica olunmaktadır. Bu araştırmaya tamamen kendi iradenizle, herhangi bir zorlama veya mecburiyet olmadan gönüllü olarak katılımınız esastır. Lütfen aşağıdaki bilgileri okuyunuz ve katılmaya karar vermeden önce anlamadığınız herhangi bir husus varsa çekinmeden sorunuz.
Bu çalışmaya gönüllü katılmak istemeniz halinde yürütülecek çalışmalar şöyledir: Sizlere verilen anket sorularını dikkatle okumanız ve sizin için en uygun olan cevabı vermeniz beklenmektedir. Bu soruların doğru veya yanlış bir yanıtı yoktur, size en yakın gelen cevabı vermeniz araştırma için önemli olacaktır. Bu araştırma için doldurulacak soruların yaklaşık olarak 15-20 dakikanızı alması beklenmektedir. Araştırmaya katılım gönüllülük esasına dayanmaktadır. Bu araştırmaya katılarak topluma ve bilim dünyasına vermiş olduğunuz katkı için şimdiden teşekkür ederiz.
Bu araştırmada verdiğiniz cevaplar ve edinen bilgiler yalnızca araştırma amacı ile kullanılacaktır. Bu çalışmayla bağlantılı olarak elde edilen ve sizinle özdeşleşmiş her bilgi gizli kalacak, 3. kişilerle paylaşılmayacaktır.
Katılmaya karar verdikten sonra, herhangi bir anda sahip olduğunuz herhangi bir hakkı kaybetmeden veya herhangi bir yaptırıma maruz kalmadan istediğiniz zaman ayrılabilirsiniz.

☐ Okudum, anladım çalışmaya katılmayı kabul ediyorum.

Appendix B

Demographic Information Form

1- Kaç Yaşındasınız?
- 18-30
- 31-50
- 51-70
- 71 ve üzeri

2- Medeni durumunuz nedir?
- Evil
- Bekar
- Dul

3- Eğitim durumunuz nedir?
- Ilköğretim
- Ortaöğretim
- Lise
- Üniversite- Lisans
- Yüksek lisans
- Doktora

4- Meme kanseri tehşisi aldığınızda kanser kaçıncı evredeydi?
- 0
- 1
- 2
- 3
- 4
- Bilmiyorum

5- Hormon tedavisi görüyor musunuz? (örneğin Tamoksifen vb)
- Evet
- Hayır

6- Tanı alali kaç sene oldu?
- 1
- 2-5
- 6 ve üzeri

7- Meme kanseri sürecini geçirdikten sonra nüks (kanserin tekrarlanması) yaşadınız mı?
- Evet
- Hayır

8- Daha önce hiç bir psikiyatrik tanı aldınız mı?
- Evet
- Hayır

Appendix C

Belirsizliğe Tahammülsüzlük Ölçeği (BTÖ-12)

Lütfen aşağıdaki maddelerin karşısında bulunan ve maddelere ne kadar katıldığınızı gösteren sayılardan size en uygun olanını işaretleyiniz. **(1) Bana hiç uygun değil, (2) Bana çok az uygun, (3) Bana biraz uygun, (4) Bana çok uygun ve (5) Bana tamamen uygun** anlamına gelmektedi.

	Bana hiç uygun değil (1)	Bana çok az uygun (2)	Bana biraz uygun (3)	Bana çok uygun (4)	Ban tamamen uygun (5)
Beklenmedik olaylar canımı çok sıkar					
Bir durumda ihtiyacım olan tüm bilgilere sahip değilsem sinirlerim bozulur.					
Insanlar beklenmedik olaylardan kaçınmak için daima ileriye bakmalıdır.					
En iyi planlamayı yapsam bile beklenmedik küçük bir olay her şeyi mahvedebilir.					
Geleceğin bana ne getireceğini her zaman bilmek isterim.					
Bir duruma hazırlıksız yakalanmaya katlanamam.					
Her şeyi önceden ayrıntılı bir şekilde organize edebilmeliyim.					
Belirsizlik beni hayatı dolu dolu yaşamaktan alıkoyar.					
Harekete geçme zamanı geldiğinde belirsizlik elimi kolumu bağlar.					
Belirsizlik yaşadığımda pekiyi çalışamam.					
En küçük bir şüphe bile hareket etmemi engeller.					
Tüm belirsiz durumlardan uzak durmak zorundayım.					

Appendix D

Kanser Nüks Korkusu Envanteri

Kanser teşhisi konmuş kişilerin çoğu, kanserin nüksedebilecek olmasından çeşitli düzeylerde endişe duyar. Nüksetmekten kastımız, kanserin yeniden baş göstereceği, ya da vücudun aynı veya farklı bir bölgesinde yayılmaya devam edeceği olasılığıdır. Bu anketin amacı kanserin nüksetmesinden duyulan endişe yaşantısını daha iyi anlamaktır. Lütfen her bir ifadeyi okuyunuz ve her bir ifadenin **GEÇTİĞİMİZ AY BOYUNCA** size ne düzeyde uyduğunu uygun rakamı daire içine alarak belirtiniz.

- Aşağıda belirtilen durumlar, kanserin nüksetme olasılığı hakkında beni düşünmeye sevk eder:

	Hiçbir Zaman (0)	Nadiren (1)	Bazen (2)	Çoğu Zaman (3)	Her zaman (4)
1-Kanser veya hastalık hakkındaki televizyon programları veya gazete yazıları					
2-Doktorumla veya başka bir sağlık profesyoneli ile bir randevu					
3-Tıbbi tetkikler (örneğin; yıllık check-up, kan tahlilleri, röntgenler)					
4-Hasta birini görmek ya da hasta biri hakkında haber almak					
5-Bir cenazeye gitmek ya da gazetenin ölüm ilanları bölümünü okumak					
6-Fiziksel olarak kendimi iyi hissetmediğimde ya da hasta olduğumda					

Lütfen aşağıdaki ifadeyi okuyunuz ve bu ifadenin GEÇTİĞİMİZ AY BOYUNCA size ne düzeyde uyduğunu uygun şıkkı işaretleyerek belirtiniz.

"Kanserin nüks etmesinden korkuyorum":

- Hiç
- Az
- Biraz
- Çok
- Büyük ölçüde

Kanser nüks ihtimalini ne kadar sık düşünüyorsunuz?

- Asla
- Ayda birkaç kere
- Haftada birkaç kere
- Günde birkaç kere
- Günde pek çok kere

Kanser nüks ihtimali hakkında düşünmeye günde ne kadar vakit harcıyorsunuz?

- Düşünmüyorum
- Birkaç saniye
- Birkaç dakika
- 1-2 saat
- Pek çok saat

Ne kadar zamandır nüks ihtimali hakkında düşünmektesiniz?

- Düşünmüyorum
- Birkaç haftadır
- Birkaç aydır
- 1-2 yıldır
- Birçok yıldır

Kanser nüks ihtimalini düşündüğümde.....hissederim:

	Hiç (0)	Az (1)	Biraz (2)	Epey (3)	Büyük ölçüde (4)
Endişe, korku veya kaygı					
Üzüntü, cesaret kırılması ya da hayal kırıklığı					
Hüsran/engellenmişlik, kızgınlık veya öfke					
Çaresizlik veya teslimiyet					

Kanser nüks ihtimali hakkındaki düşünce ya da korkularım..... engelliyor/ bozuyor:

	Hiç (0)	Az (1)	Biraz (2)	Epey (3)	Büyük ölçüde (4)
Sosyal ya da boş zaman faaliyetlerimi (Örneğin; geziler, spor ve seyahat)					
İş ya da günlük faaliyetlerimi					
Eşim/sevgilim, ailem ya da yakın olduğum insanlarla olan ilişkilerimi					
Gelecek ile ilgili planlar yapma ya da yaşam hedefleri koyma becerimi					
Ruh halim ya da duygu durumumu					
Genel olarak yaşam kalitemi					
Kanser nüks ihtimali hakkında aşırı endişelendiğimi hissediyorum					
Diğer insanlar benim kanser nüks ihtimali hakkında aşırı endişelendiğimi düşünüyorlar					
Sanırım kanser nüks ihtimali hakkında kanser teşhisi konmuş diğer insanlardan daha fazla endişeleniyorum					

Kanser nüks ihtimalini düşündüğümde şüphelerimi gidermek için aşağıdaki yöntemi uygularım:

- Dikkatimi dağıtmaya çalışırım (Örn. çeşitli aktiviteler yaparım, televizyon izlerim, okurum, çalışırım)
    - Hiçbir zaman
    - Nadiren
    - Bazen
    - Çoğu zaman
    - Her zaman

Appendix E

Çok Boyutlu Algılanan Sosyal Destek Ölçeği

Aşağıda 12 cümle ve her bir cümlenin yanında da cevaplarınızı işaretlemeniz için 1'den 7'ye kadar rakamlar verilmiştir. Her cümlede söylenenin sizin için ne kadar çok doğru olduğunu veya olmadığını belirtmek için o cümlenin yanındaki rakamlardan yalnızca bir tanesini işaretleyiniz. Bu şekilde 12 cümlenin her birine bir işaret koyarak cevaplarınızı veriniz. Sizce doğruya en yakın olan rakamı işaretleyiniz.

	Kesinlikle uygunsuz (1)	Uygunsuz (2)	Biraz uygunsuz (3)	Tarafsızım (4)	Biraz uygun (5)	Uygun (6)	Tamamen uygun (7)
Ailem ve arkadaşlarım dışında olan ve ihtiyacım olduğunda yanımda olan bir insan (örneğin, flört, nişanlı, sözlü, akraba, komşu, doktor) var.							
Ailem ve arkadaşlarım dışında olan ve sevinç ve kederlerimi paylaşabileceğim bir insan (örneğin, flört, nişanlı, sözlü, akraba, komşu, doktor) var.							
Ailem bana gerçekten yardımcı olmaya çalışır.							
İhtiyacım olan duygusal yardımı ve desteği ailemden (örneğin, annemden, babamdan, eşimden, çocuklarımdan, kardeşlerimden) alırım.							
Ailem ve arkadaşlarım dışında olan ve beni gerçekten rahatlatan bir insan (örneğin, flört, nişanlı, sözlü, akraba, komşu, doktor) var.							
Arkadaşlarım bana gerçekten yardımcı olmaya çalışırlar.							
İşler kötü gittiğinde arkadaşlarıma güvenebilirim.							
Sorunlarımı ailemle (örneğin, annemle, babamla, eşimle, çocuklarımla,							

kardeşlerimle) konuşabilirim.							
Sevinç ve kederlerimi paylaşabileceğim arkadaşlarım var.							
Ailem ve arkadaşlarım dışında olan ve duygularıma önem veren bir insan (örneğin, flört, nişanlı, sözlü, akraba, komşu, doktor) var.							
Kararlarımı vermede ailem bana yardımcı olmaya isteklidir.							
Sorunlarımı arkadaşlarımla konuşabilirim.							

Appendix F

Depresyon-Anksiyete-Stres Ölçeği -21

Son 1 haftadaki durumunuz:

	Hiçbir zaman (0)	Bazen ve Ara sıra (1)	Oldukça sık (2)	Her zaman (3)
Gevşeyip rahatlamakta zorluk çektim.				
Ağzımda kuruluk olduğunu fark ettim.				
Hiç olumlu duygu yaşayamadığımı fark ettim.				
Soluk almada zorluk çektim (örneğin fiziksel egzersiz yapmadığım halde aşırı hızlı nefes alma, nefessiz kalma gibi).				
Bir iş yapmak için gerekli olan ilk adımı atmada zorlandım.				
Olaylara aşırı tepki vermeye meyilliyim.				
Vücudumda (örneğin ellerimde) titremeler oldu.				
Sinirsel enerjimi çok fazla kullandığımı hissettim.				
Panikleyip kendimi aptal durumuna düşüreceğim durumlar nedeniyle endişelendim.				
Hiçbir beklentimin olmadığı hissine kapıldım				
Kışkırtılmakta olduğumu hissettim				
Kendimi gevşetip salıvermek zor geldi				
Kendimi perişan ve hüzünlü hissettim				
Beni yaptığım işten alıkoyan şeylere dayanamıyordum				
Panik haline yakın olduğumu hissettim				
Hiçbir şey bende heyecan uyandırmıyordu				
Birey olarak değersiz olduğumu hissettim				

Alıngan olduğumu hissettim				
Fizik egzersiz söz konusu olmadığı halde kalbimin hareketlerini hissettim (kalp atışlarımın hızlandığını veya düzensizleştiğini hissettim)				
Geçerli bir neden olmadığı halde korktuğumu hissettim				
Hayatın anlamsız olduğu hissine kapıldım				