2021

Effectiveness of Cancer Survivorship Plans on the Emotional, Psychosocial, and Physical Well-Being of Breast Cancer Survivors

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Abstract

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MHEP, Walden University, 2017

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Doctoral Study Submitted in Partial Fulfillment

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Doctor of Public Health

Walden University

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Abstract

Cancer survivorship is essential for the longevity of all cancer survivors, and breast cancer survivorship has become the focus of public health organizations to help address the unmet needs of breast cancer survivors. This quantitative cross-sectional study explored the impact on the Quality of Life (QoL) and health outcomes of female breast cancer survivors in cancer survivorship programs or tertiary care. The ages of the survivors in the study sample ranged from 18 to 80, and all participants were at least 6 months into their cancer survivorship journey. Surveys used were the European Organization for Research and Treatment of Cancer's Quality-of-Life Questionnaire – Core 30 (QLQ-C30), along with the cancer-specific Quality of Life Questionnaire- Breast Cancer (QLQ-BR23). The QoL categories used in this study were emotional, psychosocial, and physical well-being (functionings). These analyses indicated that there are statistically significant associations between higher QoL scores, positive health outcomes, and female breast cancer survivors in cancer survivorship programs or tertiary care. This study also indicated that a multi-symptom approach is statistically significant, while single-symptom strategies are not. Positive social change implications include a comprehensive quality of care, increased QoL, and health outcomes, to which all cancer survivors can benefit. In addition, a change from the single-symptom approach to a multi-symptom system could facilitate a new health care model necessary for the future implementation of cancer survivorship programs in public health.

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Dedication

This is dedicated to every man, woman, and child who have journeyed or is journeying through cancer. As a survivor, this topic was very close to my heart. The cancer survivor population is a private group and although this research is on breast cancer survivors, this is dedicated to the many and different cancer journeys along the way. I also dedicate this to God, who brought me through my darkest years while dealing with cancer. To future cancer survivors and those who lost their battles, this is for you.

Acknowledgments

First, I give honor again to God who has brought me thus far. I would first like to acknowledge the woman who proved that Superwoman is real, my mother. To Marcia, you have shown me the true definition of being a great person, woman, and friend. If I could only be half as great of a person you are, then I will be an amazing person, and I just want to say that I wouldn't have made it this far in my life without you showing flawless execution of what tenaciousness and strength is.

To my best friend Nhyema, you are the foundation and pillar of excellence in everything I do. You have put into me so much unconditional love, love without explanation, love without alternate motives. You have been the perfect best friend any person could ask for. Words cannot describe my debt and love to you. Thank you for everything.

To my sisters, friends, family, and Sorors who have been with me since day one and new ones who came along the way, you didn't have too but you really looked out for me and from the bottom of my heart I thank you. I wish you all nothing but the best and I will always love and support you in whatever endeavors you set out on.

Lastly, Beta, I will never forget you. You stayed by my side all the way up until your end. To the world's greatest dog, I love you and thank you. Rest in Heaven.

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Section 1: Foundation of the Study and Literature Review

Introduction

As of January 2020, more than 3.5 million women in the U.S. had a history of breast cancer, including those being treated and those who had finished treatment (Hanna & Mayden, 2021. Breast cancer incidence has increased by 0.3% per year, and the estimate for 2020 was that there will be 276,480 new cases of breast cancer, with 42,170 estimated deaths. According to DeSantis et al. (2019), about 12% of women in the U.S. will develop invasive breast cancer during her lifetime. Nineteen percent of breast cancers are diagnosed in women between the ages of 30-49 years old, and 44% in women 65 years or older. In other countries, such as Saudi Arabia, breast cancer is the most common malignancy among women with a prevalence of 21.8% and is the ninth leading cause of death among Saudi women (Alotaibi et al., 2018). According to Saggu et al. (2015), there were 3,954 new cases in Saudi Arabia that counted for 29% of the new cases based on the World Health Organization Global Cancer Observatory.

There are different survival rates for each of the different breast cancer types. There are seven different types of breast cancer. The different breast cancers are: Triple Negative Breast Cancer Invasive Ductal Carcinoma (IDC), Metastatic Breast Cancer (MBC), Ductal Carcinoma In-Situ (DCIS), Inflammatory Breast Cancer (IBC), Invasive Lobular Cancer (ILC), and Lobular Carcinoma In-Situ (LCIS). TNBC is the most aggressive form of breast cancer; the most common form of breast cancer is IDC, which accounts for 70-80% of all breast cancer diagnosis (CDC, n.d.-a). According to DeSantis et al. (2019), breast cancer survival rates are 98% in Stage I, Stage II is 92%, Stage III is

75%, and Stage IV is 27%. Survival rates and breast cancer treatments are correlated. Breast cancer treatment options are chemotherapy, breast-conserving surgery (BCS), mastectomy, radiation therapy, and hormone therapy.

Breast-conserving surgeries are partial mastectomies or lumpectomies. A mastectomy is the full removal of the breast tissue or the breast. According to Figure 1, in Kim et al. (2017), 61% of women will opt for breast-conserving surgery in Stages I and II, while 36% will undergo a mastectomy. In Stage III, 21% will undergo breast-conserving surgery, while 72% will opt for mastectomy. In Stage IV, 48% will use chemotherapy and radiation alone.

Figure 1. *Breast Cancer Treatment Patterns by Diagnosis*

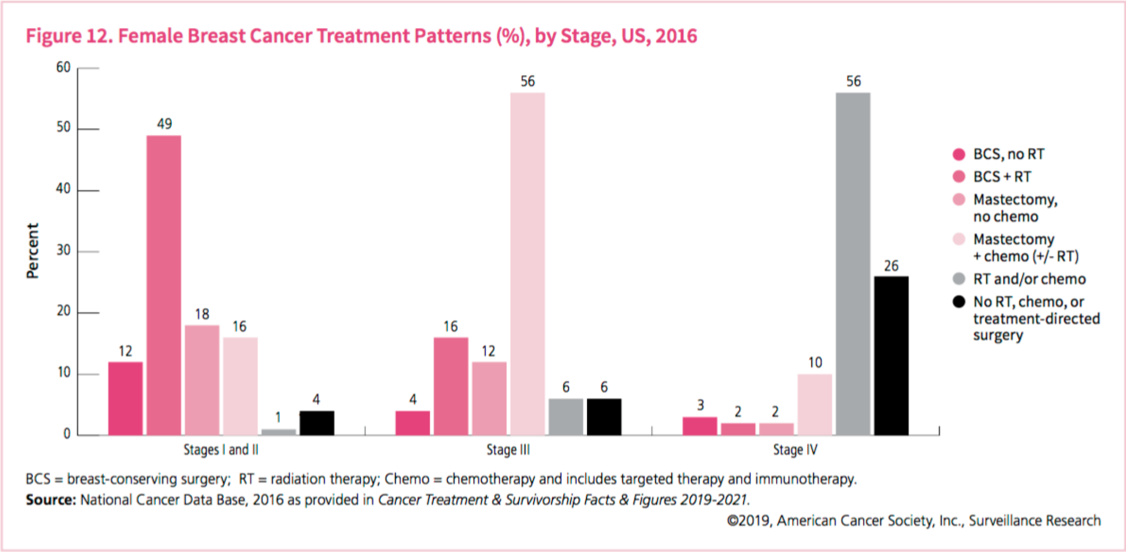


Figure 12. Female Breast Cancer Treatment Patterns (%), by Stage, US, 2016

BCS = breast-conserving surgery; RT = radiation therapy; Chemo = chemotherapy and includes targeted therapy and immunotherapy.
Source: National Cancer Data Base, 2016 as provided in *Cancer Treatment & Survivorship Facts & Figures 2019-2021.*
©2019, American Cancer Society, Inc., Surveillance Research

Exhibit A. American Cancer Society. Breast Cancer Facts and Figures 2019. Atlanta: American Cancer Society Inc.

Problem Statement

Cancer survivorship is essential to the longevity of cancer survivors by increasing their quality of life and health outcomes. Survivorship has become the focus and goals of many public health organizations to help address the unmet needs of cancer survivors in this country. For example, Healthy People 2020 created two objectives for cancer survivorship: to improve the physical, emotional, and mental health status of cancer survivors, and to increase the percentage of cancer survivors living 5 years or longer after treatment stage (Healthy People 2020, n.d.). Survivorship plans are an agreed plan of action between the patient and their healthcare team, that provide resources for the physical, mental, emotional, social, and financial issues that may appear posttreatment (Jacobsen et al., 2018). Public health has issued statements on the necessity of cancer survivorship plans to patients, providers, and in healthcare but has yet to provide literature on the variables that help determine the effectiveness of cancer survivorship plans on cancer patients (Lanigan et al., 2018).

Health organizations, physicians, providers, medical staff, cancer survivors, and their families have provided feedback the positive impact on the quality of life of cancer survivors who received cancer survivorship plans. However, literature providing evidence to the effectiveness of cancer survivorship plans is low in numbers and according to O’Malley et al. (2017), this is the largest barrier to the implementation of cancer survivorship programs in healthcare, which impacts the overall well-being of cancers survivors. To provide the best quality of life for cancer survivors and fill in the gap in this research area, this study sought to establish if the emotional, psychosocial, and physical well-being of the cancer survivor is positively impacted from cancer survivorship programs. According to Grassi et al. (2017), symptoms and health outcomes of cancer survivors should not be viewed in isolation but seen as part of an interrelated problem. That problem is the lack of cancer survivorship implementation for an increasing cancer survivor population.

Purpose of the Study

The purpose of this study was to examine the health outcomes of female breast cancer survivors who participated in a cancer survivorship program or tertiary care. Using secondary data, the emotional well-being, psychosocial well-being, and physical well-being of female breast cancer survivors was examined for the differences in their health outcomes.

Research Question(s) and Hypotheses

Research Question 1 (RQ1): What is the association between a female breast cancer survivor's emotional well-being and participation in a cancer survivorship program?

$H_0 1$: There is an association between female breast cancer survivor's emotional well-being and participation in a cancer survivorship program.

$H_a 1$: There is no association between female breast cancer survivor's emotional well-being and participation in a cancer survivorship program.

Research Question 2 (RQ2): What is the association between a female breast cancer survivor's psychosocial well-being and participation in a cancer survivorship program?

$H_0 1$: There is an association between female breast cancer survivor's psychosocial well-being and participation in a cancer survivorship program.

$H_a 2$: There is no association between female breast cancer survivor's psychosocial well-being and participation in a cancer survivorship program.

Research Question 3 (RQ3): What is the association between the physical well-being of a female breast cancer survivor and participation in a cancer survivorship program?

$H_0 3$: There is an association between female breast cancer survivor's physical well-being and participation in a cancer survivorship program.

$H_a 3$: There is no association between female breast cancer survivor's physical well-being and participation in a cancer survivorship program.

Research Question 4 (RQ4): What are the differences in female breast cancer survivor’s emotional, psychosocial, and physical health outcomes participating in a cancer survivorship program?

$H_0 4$: There are statistically significant findings on female breast cancer survivor’s emotional, psychosocial, and physical health outcomes participating in a cancer survivorship program.

$H_a 4$: There are no statistically significant findings on female breast cancer survivors' emotional, psychosocial, and physical health outcomes participating in a cancer survivorship program.

Theoretical Framework

The social-ecological model (SEM) is a theory that is based on a multilevel system that focuses on the linkages of several determinants or facts that affect the health of an individual on an individual level up to a large network level (Stokols, 1996). SEM has five levels of influence: individual, interpersonal, community, organization, and policy/society. According to Smith et al. (2017), the individual level of the SEM represents the physical well-being of the breast cancer survivor, which is seen in posttreatment symptoms (body image issues, fear of cancer reoccurrence, amputations, and health changes). The interpersonal level of the SEM represents the emotional well-being of the breast cancer survivor, which are the friends, family, partners, and other support systems that help integrate breast cancer survivor back into society. The organizational and community levels of the SEM concern the psychosocial well-being of the cancer survivor, which deals with monetary costs of treatment, feasibility of treatment, and directly connects to back to the physical well-being due to a decrease of physical activity due to illness (Smith et al., 2017).

This research focused on the policy/society level of the SEM in this study. The emotional, psychosocial, and physical well-being of female breast cancer survivors can positively be impacted on a significant level if the implementation (policy/society level) of cancer survivorship plan can be proven effective. The SEM provides alignment and understanding of the research question presented in this study

Nature of the Study

The nature of this study was quantitative using a cross-sectional study design that measured the health outcomes of the emotional, psychosocial, and physical well-being of female breast cancer survivors who participated in a cancer survivorship program. This study also measured health outcomes of breast cancer survivors participating in cancer survivorship programs. This quantitative analysis identified the health outcomes of breast cancer survivors and assessed the effectiveness of cancer survivorship programs by quantifying the emotional, psychosocial, and physical well-being of female breast cancer survivors. I used a secondary data set.

Literature Search Strategy

The articles selected relating to health outcomes and cancer survivorship programs of breast cancer survivors are described here. The keywords used to search for relevant materials were *breast cancer, breast neoplasm, breast carcinoma, breast tumor, quality of life, cancer survivor(s), breast cancer*, *cancer survivorship programs, cancer survivorship plans, well-being, and health outcomes.* I searched for articles and other materials in MEDLINE with Pub Med, CINAHL plus, the National Coalition for Cancer Survivorship website, the National Health Interview Survey, APA PsychInfo, paired with information from the Centers for Disease Control and Prevention Survivorship Survey.

Birken et al. (2019) provided information from a national survey from cancer care providers on the implementation of U.S. cancer survivorship programs. These providers and nurse navigators discussed the importance of implementing cancer survivorship programs for cancer patients and suggested possible methods to strengthen the evidence required for cancer survivorship programs. Foster et al. (2018) focused on the policy aspects of cancer survivorship programs and implementation. The researcher suggested that the growing number of broad-ranging strategies should focus on breast cancer survivors. These strategies included a focus on the emotional, psychosocial, and physical well-being of cancer survivors. The results highlight implications needed for policy and practice.

Nekhyludov et al. (2019) discussed the recommendations of healthcare to implement cancer survivorship programs to better assist the well-being of cancer survivors. These recommendations were directed towards the gaps in the progression of implementation of cancer survivorship programs. The authors agreed with public health officials that there needs to be an evidence-based cancer survivorship care framework and that this framework be used to systematically incorporate survivorship on a clinical, policy, and research basis. Zdenkowski et al. (2016) provided the link between the unmet supportive care needs of cancer patients and posttreatment health issues that affect the emotional, psychosocial, and physical well-being of breast cancer survivors. The emotional, psychosocial, and physical well-being of cancer survivors were the key concerns as well as the identification of practical solutions for cancer survivors.

Literature Review Related to Key Variables and/or Concepts

Cancer Survivorship

Cancer survivorship has become a worldwide health priority and objective in public health. Survivorship is the transition from diagnosis to posttreatment cancer care that includes follow-up care plans and treatment summaries involving health assessments, referrals, surveillance for reoccurrence or new cancer, evaluation and prevention of late effects, coordinated care, and health promotion (Jacobsen et al., 2018). For 2020, cancer survivorship was one of the main objectives and goals that Healthy People focused on regarding the quality of life of cancer survivors and the implementation of cancer survivorship plans into healthcare.

Healthy People is an initiative designed to help guide national health promotion and disease prevention efforts to improve its health. Every decade a new set of goals and objectives are created that health professionals actively attempt to reach and should reach by the end of the decade. The cancer objectives and goals of Healthy People 2030 are to "increase mental-physical health-related quality of life of cancer survivors, increase the proportion of cancer survivors who live five years or longer after their first diagnosis, increase the proportion of persons who are counseled, and to increase the proportion of people engaged in shared decision-making actions with their providers for clinical preventative services to prevent cancer" (Healthy People 2030, n.d., p.8).

A significant number of health organizations recommend that survivorship care plans be given to cancer patients to impact their health outcomes as cancer survivors. The National Cancer Survivorship Resource Center (The Survivorship Center) is a collaboration between George Washington University Cancer Institute and the American Cancer Society. According to American Cancer Society (2020-b), the Clinical Survivorship Care initiative, which focuses on health care opportunities and societal policy changes, recommends that guidelines are developed for survivors' psychosocial and clinical needs. The National Cancer Institutes' Office of Cancer Survivorship (OCS), conducts and supports cancer research on the physical, psychological, social, and economic effects of cancer. According to Nekhlyudov et al. (2019), cancer survivorship care plans should be implemented in clinical environments to help offer the resources that mirror the health effects of those cancer survivors. The OCS enhances the length and quality of survival, and the prevention, minimization, and management of all adverse health effects experienced to cancer survivors.

Cancer Survivorship Programs

Cancer survivorship programs are not fully defined, and due to no clear and accepted definition of this healthcare resource, services, or programs cannot be created or abandoned. According to Van de Poll-France et al. (2017), there are no consensus-based indicators to measure survivorship programs' success, which is needed to assess a survivor's needs and health outcomes. This results in the inability to demonstrate the effectiveness of the program’s impact on the quality of life of cancer survivors. Cancer survivorship plans should provide not only physical resources but also resources on the cancer patient's emotional, mental, psychosocial, and spirituality. Providing resources may help address cancer survivors during survivorship is directly associated with improving cancer survivors' quality of life. Due to diverse cancer survivor populations, a one-size-fits-all approach for cancer survivorship is not ideal. For example, breast cancer survivors need their own breast cancer survivorship programs to positively enhance their quality of life (Coughlin et al., 2019).

While survivorship programs are not defined, there are a few similar programs and guidelines available on breast cancer survivorship. A similar program is tertiary care.

Tertiary care is a way to categorize a specialist center or a university hospital that provides complex and symptom-specific care (Flegel, 2015). Tertiary care is typically for inpatients and on a referral from a either a primary or secondary health agency. An example of a guideline is The American Cancer Society/American Society of Clinical Oncology Breast Cancer Survivorship Care Guideline, which was developed to provide recommendations on enhancing the quality of life of female breast cancer survivors. According to Runowicz et al. (2016), breast cancer survivorship's overarching goals are to improve the individual-level, system-level, and policy-level posttreatment survivorship clinical care and develop resources to help survivors achieve optimal health and quality of life. This is significant to help disseminate survivorship as a public health issue. A different breast cancer survivorship guide is the National Comprehensive Cancer Network (NCCN) guideline, which is an evidence-and-consensus-based tool used to help with recommendations on treatment and breast cancer surveillance (Runowicz et al., 2016).

The NCCN has symptom-specific breast cancer survivorship care guidelines that address anxiety, pain, depression, sleep disorders, cognitive function, fatigue, sexual function, healthy physical lifestyles, immunity, and infections. According to Shapiro (2018), breast cancer survivorships should focus on screening for second primary cancers, breast cancer recurrence, health promotion, care coordination practice, and the assessment and management of psychosocial and physical long-term health effects. Shapiro further noted that it is essential to determine if female breast cancer survivors' quality of life is impacted after participating in a cancer survivorship program. There should be a change in the overall health outcome of a female breast cancer survivor posttreatment survivorship program.

Quality of Life for Breast Cancer Survivors

The well-being of an individual can determine their overall health status and be a measurement of their quality of life. According to Burckhardt et al. (1992), quality of life is the broad range of human experiences that is related to one's overall well-being and quality of life should be composed of expectations that, guided by values and goals, create a comfortable and happy standard of health for both individual and group. The Quality-of-Life Scale (QoLS) was created by John Flanagan in the 1970s to use for chronic illnesses and to determine the impact of health care when a cure isn't possible. This scale is a 15-item instrument that measures five conceptual domains of QoL. The domains are personal development, recreation, social community and civic activities, relationships with other people, and material and physical well-being (Burckhardt et al., 1992). In 2008, public health created a QoLS for breast cancer survivors, which was used to determine the standard of health for female breast cancer survivors. The new scale became the Quality of Life- Breast Cancer Survivors (QoL-BCS) tool.

The QoL-BCS measures the specific quality of life expectations of breast cancer survivors, both individually and on a societal level. The QoL-BCS is a 48-item measurement specific to breast cancer survivors and is used in almost all breast cancer research to help establish the many different well-being of health. The QoL-BCS has 8 clinical dimensions paired with the physical, psychological, social, and spiritual well-being domains. The eight clinical dimensions are anxiety/depression, short term psychological, long term psychological, physical, cancer fear, financial, and social well-being of breast cancer survivors (Ferrell et al., 2012). This study will be used to evaluate secondary data analysis on female breast cancer survivors' emotional, psychosocial, and physical well-being.

Emotional, Psychosocial, and Physical Well-Being Variables

According to Carrerira et al. (2018), breast cancer survivors have a statistically significant increased frequency of symptoms ranging from neurocognitive dysfunction, suicide, body image issues, and PTSD of cancer reoccurrence. The data can be used to support evidence-based preventative strategies like cancer survivorship programs. The emotional well-being of female breast cancer survivors consists of addressing high fear of cancer reoccurrence, body image issues, reduction of self-esteem, depression, hormone imbalance due to hormone therapy, and issues regarding reproductive health (Grassi et al., 2017). A negative emotional well-being is associated with negative health outcomes of that breast cancer survivor. According to Pintado (2017), two top concerns on breast cancer survivor's emotional well-being deals with body image issues and the fear of cancer reoccurrence. Body image issues are a significant adverse health effect as a result of a female breast cancer's journey through survivorship. Women can and do lose their breasts and gain weight due to treatment with hormone therapy. This issue may lead to self-esteem issues, which can lead to depression (Pintado, 2017). The fear of cancer reoccurrence negatively impacts the breast cancer survivor by increasing anxiety and depression levels. According to Di Wei et al. (2016), addressing the emotional well-being of breast cancer survivors lowers the chance of undetected cancer reoccurrence, which reduces the mortality rate and improves cancer survival. Improving the emotional well-being of a female breast cancer survivor allows for the improvement of their psychosocial well-being due to the interconnectedness, which improves female breast cancer survivors’ quality of life.

According to Schouten et al. (2019), psychosocial well-being is the inclusion of the physical, mental, and emotional health of a person directly related to social conditions. When applied to female breast cancer survivors, they reported cognitive changes, an increase of anxiety, depression, declination of physical activity, and reclusion of social interaction. In a study conducted by Fory et al. (2017), a decrease in social support was a significant predictor for stress, depression, and other adverse health issues, which resulted in a 4-6% increase of variance in emotional well-being outcomes compared to survivors who had social support. Therefore, public health has recommended social integration and social support resources (support groups and therapy options) to address psychosocial issues for cancer survivors. In a recent study by Trevino et al (2020), out of 1,085 female breast cancer survivors in the study, only 24.6% reported receiving psychological counseling and therapy resources to help combat psychosocial issues during survivorship. The psychosocial well-being of female breast cancer survivors is often underestimated and minimized, which is why the majority of patients do not receive evidence-based treatment (Grassi et al., 2017). The decline of the physical activity related to a decrease in psychosocial well-being significantly impacts female breast cancer survivors' physical well-being. A growing body of evidence supports increasing the physical activity of female breast cancer survivors due to the benefits on the psychosocial well-being of that cancer patient (Shin et al., 2017).

Physical well-being has shown to play the most significant part of cancer survivorship due to how cancer physically wrecks the body. In a study by Aguiñaga et al. (2018), researchers found that lower physical activity during the survivorship stage was associated with more significant depression, fatigue, and an overall lower quality of life. Physical issues for cancer survivors can be body image issues, fatigue, weight gain, amputations, and lack of motivation for physical activity due to emotional or psychosocial issues or medications. According to Nurnazahiah et al. (2020), physical well-being is a crucial element in therapy used to battle chronic disease because it decreases cancer reoccurrence, reduces anxiety, lowers mortality, and improves the overall quality of life of breast cancer survivors. Having a positive physical well-being automatically results in a healthier emotional, mental, and psychosocial well-being (Nurnazahiah et al., 2020). The interconnectedness between female breast cancer survivors' health outcomes and their emotional, psychosocial, and physical well-being is significant in future comprehensive cancer care.

In this study, the well-being in QoL Questionnaires are labeled as “functioning”. According to Giesinger et al. (2016), physical functioning is the ability to perform both instrumental and basic daily living activities. Role functioning is relative to partner relationships, family, social interactions with friends (Rowen et al., 2011). Emotional functioning is the expression, awareness, and regulation of emotions crucial in coping with colossal life events (Giesinger et al., 2016). Cognitive functioning is the decision-making, learning, memory, and perception of cancer survivors (Mazaheri, 2017). Last, according to Rowen et al. (2011), social functioning defines an individual’s interaction within their environment and their ability to full all roles within that environment such as social activities, work, and relationships with their friends and partners. Social functioning is interchangeable with psychosocial well-being for this study.

This study examined emotional, psychosocial, and physical well-being variables to address the interrelated needs of female breast cancer survivors. According to Grassi et al. (2017), the study found that a cancer survivor's emotional well-being directly impacts that cancer survivor's psychosocial well-being, which directly related to the physical activity of a cancer survivor. Public health professionals recommend that the research on cancer survivorship look at symptoms as interrelated rather than isolated.

According to Nolan et al. (2018), to provide a better quality of life to female breast cancer survivors, it is vital to view the emotional, psychosocial, and physical well-being of a cancer survivor to be interconnected. An interconnected approach can provide significant evidence, and measurements necessary to the clinical application, and interventions needed to meet the female breast cancer survivors' quality of life expectations.

Approach to Female Breast Cancer Survivorship

The approach that public health has taken on female breast cancer survivors' health outcomes has been a seemingly unsuccessful one. One strong strategy was public health officials addressing cancer survivorship as a vital part of comprehensive care and as essential in creating a higher quality of life for cancer survivors. Healthy People 2030 addresses cancer survivorship with the goals and hopes of creating and changing policy for cancer survivors. However, there are more weaknesses concerning the approach than strengths. A significant disadvantage to the public health's approach is that interventions and dissemination of breast cancer survivorship are targeted to older women as if younger women are not susceptible to breast cancer. According to Brennan et al. (2016), younger women reported more unmet needs and poorer quality of life than older female breast cancer survivors. In Saudi Arabi, younger women are found to have the higher breast cancer diagnosis compared to older women (65+) (Alotaibi et al., 2018). The most significant reason cancer survivorship has stalled in public health is that cancer issues are seen as individual and not interrelated or interconnected (Brennan et al., 2016; Grassi et al., 2017). This particular approach does not provide enough or any evidence for evidence-based interventions that can lead to large-scale implementation. According to Di Wei et al. (2016), to be resilient to illness, it is essential to address the physical, emotional, psychosocial aspects of cancer survivors, which together lowers undetected cancer reoccurrence and significantly improves cancer survival.

The independent variables of this study were emotional well-being, psychosocial well-being, and physical well-being, and the dependent variable was the quality of life shown as the health outcome of a female breast cancer survivor. Age was the covariate variable. This study attempted to determine if addressing the emotional, psychosocial, and physical well-being of female breast cancer survivors in cancer survivorship programs produces a better quality of life and health outcomes. According to Schmidt et al. (2018), researchers found an ongoing need for screening and support regarding sleep, fatigue, body image issues, cognitive issues, pain, physical performance, weight gain, for example, following breast cancer treatment. Researchers in the same study discovered that 45% of female breast cancer survivors experienced long-term problems and low quality of life in their 5-year postdiagnosis assessment. According to Cheng et al. (2016), researchers reported that breast cancer survivors' unmet needs mediate the relationship between breast cancer survivor's quality of life and cancer symptom burden. It is essential to understand all concepts and variables within this study to understand what is being hypothesized.

Gaps in Literature

There is research on the physical well-being of breast cancer survivors, and there is research on the emotional well-being of breast cancer survivors, but the combination of emotional, psychosocial, and physical well-being of female breast cancer survivors has not been adequately researched. Important recommendations for future research are the need to determine how to evaluate if survivorship care plans are effective for ongoing cancer care and how to measure program impact on improving survivor’s quality of life (Coughlin et al., 2019).

Definitions

Comprehensive Care: an approach that covers the patient’s entire health journey; all of their needs, not limited to just medical or physical needs, which is the standard at all major medical centers that treat people with cancer (American Academy of Family Physicians, 2020).

Emotional well-being: the presence of positive emotions, the ability to generate emotions that lead to good feelings, the absence of negative emotions (e.g., depression, anxiety), satisfaction with life, fulfillment and positive functioning, and the ability to manage effectively through challenges (Fong et al., 2017).

Physical well-being: ability to improve the functioning of your body through good habits to prevent diseases and conditions, ensure health, and live in a balanced state of mind, body, and spirit. (Aguiñaga et al., 2018).

Psychosocial well-being: The relating of social conditions to physical, mental, and emotional health, which includes cognitive functioning, relationships, cultural values, attitudes, family, and school (Schouten et al., 2019).

Quality of Life: the well-being of individuals and societies that outline the negative and positive life features and those features consist of all the individual's expectations or society needs to have a good life. (Guyatt et al., 1993).

The Quality of Life-Breast Cancer Survivors: is an ordinal questionnaire with 48 items and consists of physical well-being, spiritual well-being, emotional well-being, financial/material concerns, and psychological well-being and the psychosocial well-being of breast cancer survivors (Ferrell et al., 2012).

Assumptions

This study is based on secondary data collection; therefore, I assumed that female breast cancer participants answering the QoL-BCS survey responded truthfully. I further believed that all participants met all the criteria required to be able to answer the survey. It is also assumed that those who collected and assessed the questionnaires were free of bias. These assumptions are vital in the experimentation on the health outcomes and the emotional, psychosocial, and physical well-being of female breast cancer survivors. Another assumption is that the data produced from this study can be applied to other forms of cancers in the future and in different countries. This significantly increases future social implications and policy changes in healthcare.

Scope and Delimitations

Participants for this study were women who had been diagnosed with breast cancer and had transitioned to the survivorship stage. Male breast cancer survivors were excluded because they are a small percentage of breast cancer survivors. The interrelated approach to addressing quality of life and health outcomes of cancer survivors can ultimately be used on men, women, adults, and children no matter the cancer diagnosis.

Significance, Summary, and Conclusions

This study has the potential to be significant in many ways. It provides data on the emotional well-being, psychosocial well-being, and physical well-being of female breast cancer survivors as interconnected rather than individual. The purpose for this approach was to see the health outcomes from female breast cancer survivors who have participated in cancer survivorship programs or tertiary care.

Another impact is to promote a change to cancer care from individualized concepts to interrelated and interconnected variables that can produce better and healthier cancer survivors' health outcomes. Healthy People 2030 (n.d.), proposed the objective to increase the mental, emotional, and physical health-related quality of life of cancer survivors, and by addressing the situation as a multifactored issue, the health care field can provide better complete cancer survivorship.

The biggest significance of the study is the social implications it has not only for female breast cancer survivors, but for male breast cancers. Through commonalities, there is the strong potential of creating survivorship programs that clinicians and physicians can a use and incorporate into complete cancer care. Another social implication is that this study can be modeled in different countries who are also focusing on cancer survivorship. In conclusion, this study hopes to help public health get closer to meeting its Healthy People 2030 objectives on cancer survivorship and hopes to be used across all cancer settings.

Section 2: Research Design and Data Collection

The purpose of this study was to observe cancer survivors' health outcomes and determine the impact cancer survivorship programs have on their emotional, psychosocial, and physical well-being. In this section I discuss the study's research design, methodology, data analysis and data preparation strategies, and the threats to validity.

Research Design and Rationale

This cross-sectional study included three independent variables, one dependent variable, and one covariate variable. The independent variables were emotional well-being, psychosocial well-being, and physical well-being. The dependent variable was the quality of life (health outcome). The covariate variable was age since breast cancer isn't age-specific and is a factor in breast cancer symptoms and survivorship.

Research design

The research design is a cross-sectional study design. According to Setia (2016), cross-sectional studies are used for population-based surveys to help assess the prevalence of the disease in clinic-based research. Participants in a cross-sectional study are selected solely on the inclusion and exclusion criteria set for the study. The purpose of choosing a cross-sectional study was to examine the relationship between health outcomes and disease, and assess the burden of disease within a population, which helps with the allocation of health resources (Busk, 2014). A cross-sectional study helped me assess participant health outcomes by looking at the emotional, psychosocial, and physical well-being as an interrelated issue, rather than an individual issue. Researchers must collect more data to abolish or reinforce cancer survivorship resources to fulfill the public health's goals, objectives, and implementation of cancer survivorship programs.

Methodology

Sampling and Sampling Procedures Used to Collect Data

The sample for this study was taken from a previous research study. The target population for this study was female breast cancer survivors between the ages of 18 and 80 years old in cancer survivorship programs or tertiary care. The women had to have been diagnosed 6 months before the study and had to read and understand Arabic and English. Those who could not speak either language were excluded from the study. Women who had other cancers preexisting or coexisting with their breast cancer diagnosis were also excluded from the study. This study's sampling was convenience sampling, which is taken from a group of people easy to reach or to contact (Price, 2013).

Female nurses and researchers collected the data over 4 months from female breast cancer survivors to help establish a low-pressure environment. The participants were selected at random within the facility, and the team only collected them after all written consent forms were filled out and obtained. The total number of participants was 284 women. The questionnaires given to the women were the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-Core 30 (EORTC-QLQ-C30) and the Quality-of-Life Questionnaire-Breast Cancer Survivors (QLQ-BR23). According to Aaronson et al. (1993), the EORTC QLQ-30 includes global health, the five well-being domains, and symptom scales. The five well-being domains are physical, psychological, emotional, spiritual, and financial. The QLQ-BR23 helps assess breast cancer survivor's assessment on their body image, sexual enjoyment or sexual functioning, breast symptoms, systemic therapy side effects, and future perspectives (Aaronson et al., 1993). These questionnaires are internationally accepted and validated.

In this study, the questionnaires have well-being as labeled as "functioning": physical, role, emotional, cognitive, and social functioning. The data collection process for the dataset was completed by the developer Dr. Muhammad Imran, and his research staff: Shadi Salem Alkayyat and Mukhtiar Baig. All data collected were placed online in a public database that allowed for free downloading of the dataset constructed from this study. The dataset is located in the Appendix (See Appendix E)).

Instrumentation and Operationalization of Constructs

Dr. Imran developed the research in 2019, and the study and staff were granted permission and approval from The Research Ethics Committee of King Abdulaziz University for this study. Confidentiality was paramount, so the developer removed all names from the dataset. Participants were numbered, categorized by age, and whether they were pre-, peri-, or post-menopausal. The instruments used include scoring modules for both the EORTC QLQ-Core 30 and QLQ-BR23 questionnaires, and SPSS 21 was used to run all data collected, resulting in a dataset. Authors and researchers declare there were no competing interests, and their study was not funded.

Operationalization

The variables used in my study, used from from the original dataset, are emotional functioning, social functioning, physical functioning, age, and quality of life. All variables in the study are categorical variables. The age variable in the dataset age ranged from 18-100 and were separated into two categories: (a) 1-50, or (b) 50 years and older. The functioning/well-being variables were nominal levels of measurement ranked 1-4 or 1-7. Both well-being and quality of life questions are labeled Q1-53. Questions 1-28 and 31-53 were ranked between 1-4. The labels are 1 = *Not at all*, 2 = *A little*, 3 = *Quite a bit*, and 4 = *Very much*. Questions 29-30 were ranked 1 through 7 with 1 = v*ery poor*, 2 = *poor*, 3 = *just ok*, 4 = *fair*, 5 = *good*, 6 = *very good*, and 7 = *excellent*. Questions 29-30 asked about the breast cancer survivor's self-ranking of their overall health and quality of life that past week.

The scoring manuals for the questionnaires follows strict procedures. According to Fayers et al. (2001), a high score for the functional scale represents a healthy or high functioning level (well-being). A high score for the global health status represents a more elevated or healthier quality of life for breast cancer survivors. However, a high score from the symptom scale means lower well-being and high levels of problems experienced by breast cancer survivors (Fayers et al., 2001). The manual shows the Functioning scales and Symptom scales, their coding, which questions fall under each scale, and the number of questions concerning each specific scale.

Data Analysis

For this study, I conducted data analysis using IBM SPSS v. 27. I also will used the EORTC-QLQ-Core30 and QLQ-BR23 questionnaires and their respective scoring manuals. The questionnaires were the perfect data collection method for the participants used in my study. According to Xia et al. (2019), most breast cancer patients are too weak or ill to complete very lengthy questionnaires, so using the QLQ-Core30 and QLQ-BR23 allows the participants a lower response burden.

Research Question(s) and Hypotheses

Research Question 1 (RQ1): What is the association between a female breast cancer survivor's emotional well-being and participation in a cancer survivorship program?

$H_0$1: There is an association between female breast cancer survivor's emotional well-being and participation in a cancer survivorship program.

H_a1: There is no association between female breast cancer survivor's emotional well-being and participation in a cancer survivorship program.

Research Question 2 (RQ2): What is the association between a female breast cancer survivor's psychosocial well-being and participation in a cancer survivorship program?

$H_0 1$: There is an association between female breast cancer survivor's psychosocial well-being and participation in a cancer survivorship program.

H_a2: There is no association between female breast cancer survivor's psychosocial well-being and participation in a cancer survivorship program.

Research Question 3 (RQ3): What is the association between the physical well-being of a female breast cancer survivor and participation in a cancer survivorship program?

$H_0$3: There is an association between female breast cancer survivor's physical well-being and participation in a cancer survivorship program.

*H_a*3: There is no association between female breast cancer survivor's physical well-being and participation in a cancer survivorship program.

Research Question 4 (RQ4): What are the differences in female breast cancer survivor’s emotional, psychosocial, and physical health outcomes participating in a cancer survivorship program?

$H_0$4: There are statistically significant findings on female breast cancer survivor’s emotional, psychosocial, and physical health outcomes participating in a cancer survivorship program.

H_a4: There are no statistically significant findings on female breast cancer survivors' emotional, psychosocial, and physical health outcomes participating in a cancer survivorship program.

Data Preparation

After uploading the dataset into SPSS, it was essential to clean the data, look for missing data, compute scale scores, and run statistical testing. The first thing to do is clean the data. After detecting and correcting information on the dataset, it will be vital to look at missing data within the dataset. Missing data can significantly alter testing results, so I will run a descriptive analysis to see if there is any missing data and determine which solution is best suited to deal with this. Next, it will be essential to computing the scores into SPSS due to the QLQ-C30 comprised of both single-item measures and multi-item scales. The QLQ-C30 includes a global health status/ QoL scale, three symptom scales, and five functional (well-being) scales. Based on Fayers et al. (2001), each of the multi-item scales includes different items, and no item occurs in more than one scale. All of the scales and single-item measures range from 0 to 100.

The purpose of computing the scale scores is to determine the average or total sum of the questionnaire responses. The average score of the items that contribute to the scale is considered the raw score. Based on linear transformation of the standardized raw scores, and the scores ranging from 0-100, you can now place that participant in the higher or "better" level of functioning/well-being or lower level of functioning (Fayers et al., 2001). For the second questionnaire QLQ-BR23, you can either place them in the "worse" or higher level of breast cancer symptoms or lower level of breast cancer symptoms (Fayers et al., 2001). Once done computing scale scores, I then run my statistical test.

The statistical test that will be used in my study will be a multiple logistic regression. Multiple logistic regression analysis is where there is a single dichotomous outcome and has more than one independent variable. According to Shen and Gao (2008), multiple logistic regression is a model that offers predictive accuracy and provides a linear combination of all the variable test items, which can be used as a score to predict the outcome. This study's desired outcome is to determine if there is a change to the overall quality of life of female breast cancer survivors who participated in the tertiary care/cancer survivorship program. The scoring of the questionnaires helps place the participant in a healthy category or a problematic category.

Threats to Validity

Even though the participants in the dataset from are Saudi Arabia, the external validity was high due to research questions, collections, target population, and quality of life concepts being modeled after Western studies. Internal validity was also valid as the participants were not influenced by any other factors or variables and were randomly selected within the tertiary care facility. The women were examined by female researchers and nursing staff that they were comfortable with. They were secluded in waiting rooms and patient rooms and their names were not reported and were transcribed as a number into the dataset for confidentiality purposes.

Ethical Procedures

There were no ethical concerns concerning the treatment of participants or procedural strategies for this study. The participants were given consent forms, and participants filled out all consent forms correctly. Names are not provided within the study to guarantee confidentiality and anonymity. Those that were found to be filled out incorrectly were excluded from the study. All documentation, questionnaires, datasets, scoring modules, and figures used in this study have been granted permission for use, and documents providing evidence of approval are located in this study's Appendix.

Summary

In summary, this study will determine the association between the emotional, psychosocial, and physical well-being of female breast cancer survivors and cancer survivorship programs. This study's research design will be a cross-sectional study, and the statistical testing used will be multiple logistic regression. The independent variables are emotional well-being, psychosocial well-being, and physical well-being. The dependent variable is quality of life, and age is a covariate variable. Once computing scale scores and statistical testing is complete, I will compare results to hypotheses.

Section 3: Presentation of the Results and Findings

The purpose of this study was to examine the health outcomes of female breast cancer survivors who participated in a cancer survivorship program or tertiary care. Using secondary data, the emotional well-being, psychosocial well-being, and physical well-being of female breast cancer survivors was examined for the differences in their health outcomes.

Data Collection of Secondary Data Set

The data were collected within a 4-month time frame from the tertiary care department of King Abdulaziz University Hospital using convenience sampling. The recruitment of the participants of the study were female breast cancer survivors who were diagnosed 6 or more months before taking surveys, and every woman asked to participate was referred to that department. The sample size is formulated as seen in

Figure 2. *Sample Size Formula*

Figure 2.

$$n = Z_{1-\alpha/2}{}^{2}p(1-p)/d^{2}$$

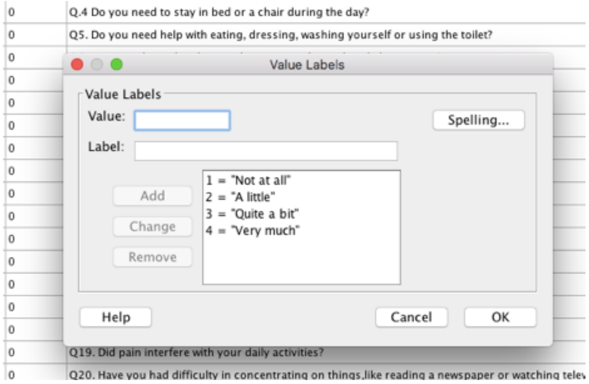
The formula used is n=z^2*p*(1-p)/e^2. *N* is the minimum sample size, *z* is the confidence interval, which is 1.96, p is the proportion of the population affected, which is 27.4% (0.274), and e is the absolute error or precision, which is 5% (0.05). The minimum sample size came out to 305.2. There were 21 surveys with significant amounts of error, which dropped the sample to 284 surveys. After SPSS removed all participants who missed two or more questions on the questionnaire, the final sample size was 192. The response rate of this dataset was at 67%, which is a good response rate for questionnaires, according to Klevebro et al. (2019).

The only discrepancy with the dataset that I was able to determine was the miscoding within one variable. According to the scoring manual written by Fayers et al. (2001), questions 44, 45, and 46 were to be reversed coded to properly and accurately score the quality of life of the participants and I had originally missed that instruction and thus had not included it in my data analysis strategy plan, but I eventually realized the need to reverse code and placed that process in the data strategy plan.

Baseline descriptive and demographic characteristics of the sample.

The dependent variable is Quality of Life (QoL), and the independent variables are Physical Functioning (PhyFun), Emotional Functioning (EmoFun), and Social Functioning (SocFun). Age is the covariate and separated into two categories: 18-50 and 50 and older. For the QLQ-Core30 and QLQ-BR23 questionnaires, the values of questions are split into four options (Figure 3): 1= *Not at all*, 2 = *A little*, 3 = *Quite a bit*, and 4 = *Very much* (see Appendix B & Appendix C). There were a few different values for a small number of questions, however. For example, for questions 44-46 (questions that asked sexual questions of breast cancer survivors), as seen in Figure 4, the values are reversed: 1 = *Very much*, 2 = *Quite a bit*, 3 = *A little*, and 4 = *Not at all.* In Figure 5, questions 29 and 30 are direct questions of their overall quality of life within the past week and have seven response values: 1 = *very poor*, 2 = *poor,* 3 = *just okay*, 4 = *fair*, 5 = *good*, 6 = *very good*, and 7 = *excellent.*

Figure 3. *QLQ-Core 30 and QLQ-BR23 values.*

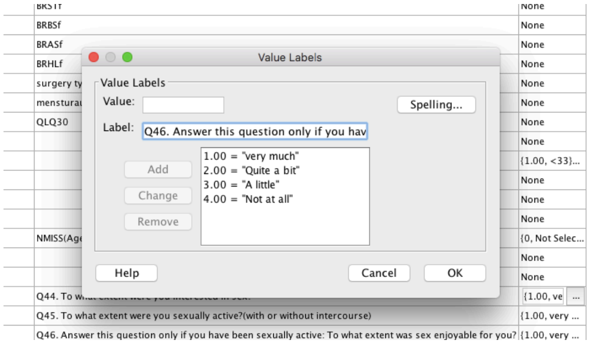


Q.4 Do you need to stay in bed or a chair during the day?
Q5. Do you need help with eating, dressing, washing yourself or using the toilet?

1 = "Not at all"
2 = "A little"
3 = "Quite a bit"
4 = "Very much"

Q19. Did pain interfere with your daily activities?
Q20. Have you had difficulty in concentrating on things,like reading a newspaper or watching telev

Figure 4. *Questions 44, 45, 46 in QLQ-BR23 Questionnaire*



BRBSf None
BRASf None
BRHLf None
surgery ty None
menstura None
QLQ30 None

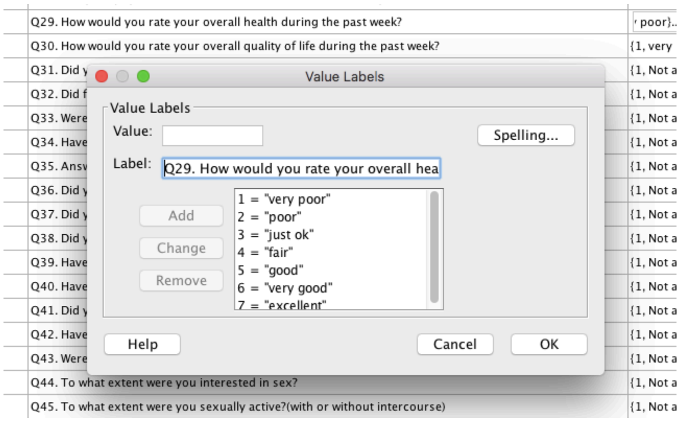
Label: Q46. Answer this question only if you hav

1.00 = "very much"
2.00 = "Quite a bit"
3.00 = "A little"
4.00 = "Not at all"

NMISS(Age {0, Not Selec...

Q44. To w {1.00, ve
Q45. To what extent were you sexually active?(with or without intercourse) {1.00, very ...
Q46. Answer this question only if you have been sexually active: To what extent was sex enjoyable for you? {1.00, very ...

Figure 5. *Questions 29 & 30 in QLQ-Core30 Questionnaire.*



Q29. How would you rate your overall health during the past week? poor}..
Q30. How would you rate your overall quality of life during the past week? {1, very
Q31. Did y {1, Not a
Q32. Did f {1, Not a
Q33. Were {1, Not a
Q34. Have {1, Not a
Q35. Ansv {1, Not a
Q36. Did y {1, Not a
Q37. Did y {1, Not a
Q38. Did y {1, Not a
Q39. Have {1, Not a
Q40. Have {1, Not a
Q41. Did y {1, Not a
Q42. Have {1, Not a
Q43. Were {1, Not a
Q44. To what extent were you interested in sex? {1, Not a
Q45. To what extent were you sexually active?(with or without intercourse) {1, Not a

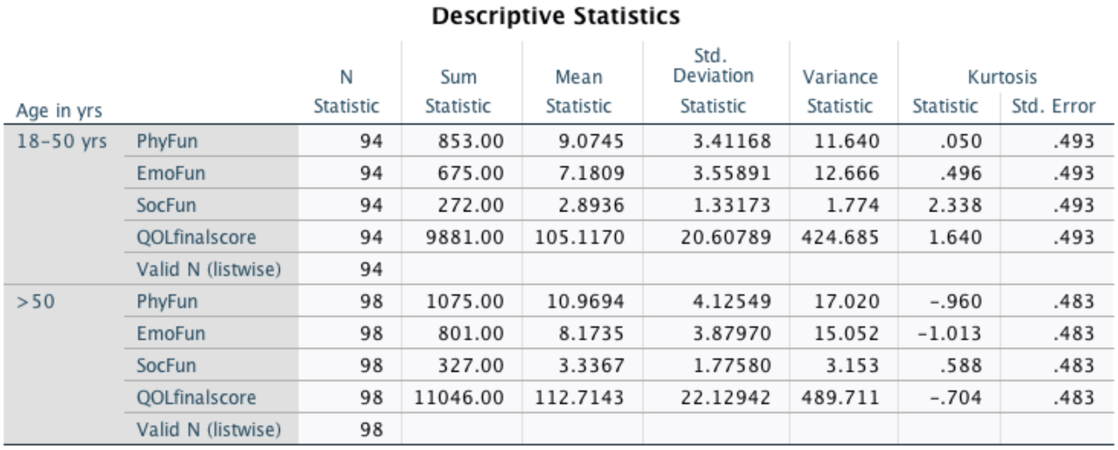
Label: Q29. How would you rate your overall hea

1 = "very poor"
2 = "poor"
3 = "just ok"
4 = "fair"
5 = "good"
6 = "very good"
7 = "excellent"

Participants and Variables

There was a total (*n*) of 284 participants in the data set. As seen in Figure 6, the descriptives are separated by age category in which survey participant fell. Ninety-four participants were between the ages of 18 and 50. The mean for physical functioning was 9.074, a 7.18 mean for emotional functioning, and a 2.89 mean for social functioning, resulting in a 105.11 mean score for QoL. There were 98 participants aged 50 and older. Their mean score is 10.96 for physical functioning, 8.17 for emotional functioning, and 3.33 for social functioning, resulting in a 112.71 total mean score for QoL.

Figure 6. *Table 1. Descriptive Statistics of the Variables in The Study.*



Descriptive Statistics

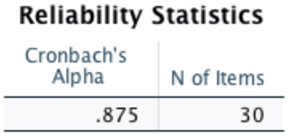
		N	Sum	Mean	Std. Deviation	Variance	Kurtosis	
Age in yrs		Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
18-50 yrs	PhyFun	94	853.00	9.0745	3.41168	11.640	.050	.493
	EmoFun	94	675.00	7.1809	3.55891	12.666	.496	.493
	SocFun	94	272.00	2.8936	1.33173	1.774	2.338	.493
	QOLfinalscore	94	9881.00	105.1170	20.60789	424.685	1.640	.493
	Valid N (listwise)	94						
>50	PhyFun	98	1075.00	10.9694	4.12549	17.020	-.960	.483
	EmoFun	98	801.00	8.1735	3.87970	15.052	-1.013	.483
	SocFun	98	327.00	3.3367	1.77580	3.153	.588	.483
	QOLfinalscore	98	11046.00	112.7143	22.12942	489.711	-.704	.483
	Valid N (listwise)	98						

The standard deviation in the 18-50 category reported as 3.41 for physical functioning, 3.56 for emotional functioning, and 1.33 for social functioning. The standard deviation for the 50 and older category reported as 4.13 for physical functioning, 3.88 for emotional functioning, and 1.78 for social functioning. Next, I determined the reliability and validity of the data before running data.

Reliability and Validity

According to Mohanjan (2017), it is essential in research to evaluate all measurement instruments or tools used for research to establish the reliability and validity of the data and ensure the results are accurate and replicable. By running reliability analysis, the Cronbach alpha of each question within each questionnaire can be viewed. In Figure 7, the Cronbach alpha of the QLQ-C30 questionnaire is 0.875, which read as 88% reliability. In Figure 8, the Cronbach alpha of the QLQ-BR23 questionnaire is 0.800, which read as 80% reliability. In Figures 9 and 10, there is a Cronbach alpha for every question asked in the two questionnaires. It is evident that all questions asked are over 70%. Therefore, all reliability percentages are over 70%, making the instrument and measurements reliable and valid for this study.

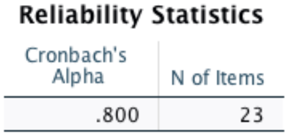
Figure 7. *Cronbach Alpha of QLQ-Core30 Questionnaire.*



Reliability Statistics

Cronbach's Alpha	N of Items
.875	30

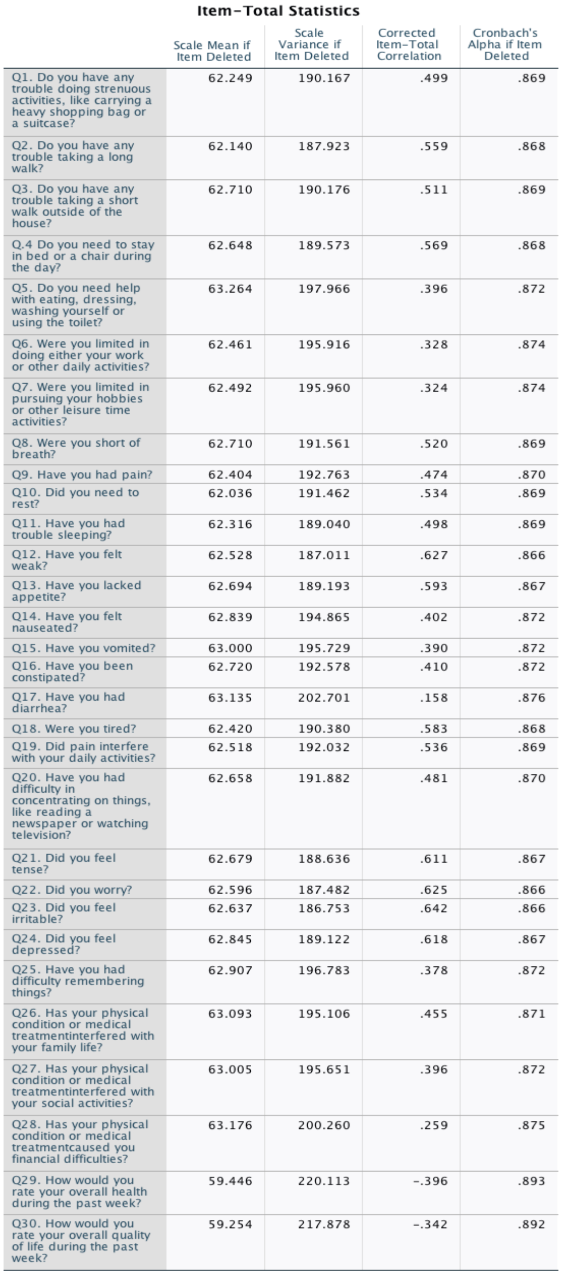
Figure 8. *Cronbach Alpha of QLQ-BR23 Questionnaire*



Reliability Statistics

Cronbach's Alpha	N of Items
.800	23

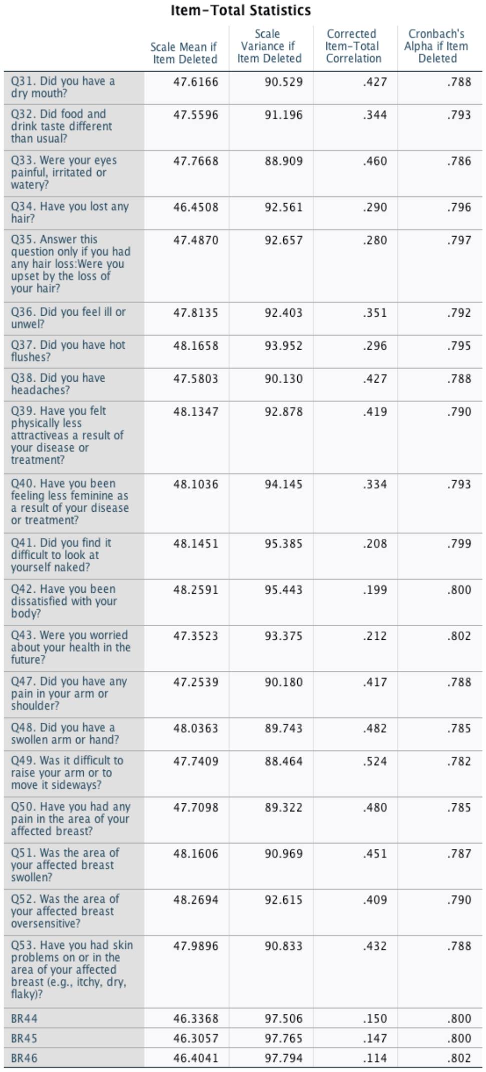
Figure 9. *Cronbach Alpha of Q1-30*



Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1. Do you have any trouble doing strenuous activities, like carrying a heavy shopping bag or a suitcase?	62.249	190.167	.499	.869
Q2. Do you have any trouble taking a long walk?	62.140	187.923	.559	.868
Q3. Do you have any trouble taking a short walk outside of the house?	62.710	190.176	.511	.869
Q.4 Do you need to stay in bed or a chair during the day?	62.648	189.573	.569	.868
Q5. Do you need help with eating, dressing, washing yourself or using the toilet?	63.264	197.966	.396	.872
Q6. Were you limited in doing either your work or other daily activities?	62.461	195.916	.328	.874
Q7. Were you limited in pursuing your hobbies or other leisure time activities?	62.492	195.960	.324	.874
Q8. Were you short of breath?	62.710	191.561	.520	.869
Q9. Have you had pain?	62.404	192.763	.474	.870
Q10. Did you need to rest?	62.036	191.462	.534	.869
Q11. Have you had trouble sleeping?	62.316	189.040	.498	.869
Q12. Have you felt weak?	62.528	187.011	.627	.866
Q13. Have you lacked appetite?	62.694	189.193	.593	.867
Q14. Have you felt nauseated?	62.839	194.865	.402	.872
Q15. Have you vomited?	63.000	195.729	.390	.872
Q16. Have you been constipated?	62.720	192.578	.410	.872
Q17. Have you had diarrhea?	63.135	202.701	.158	.876
Q18. Were you tired?	62.420	190.380	.583	.868
Q19. Did pain interfere with your daily activities?	62.518	192.032	.536	.869
Q20. Have you had difficulty in concentrating on things, like reading a newspaper or watching television?	62.658	191.882	.481	.870
Q21. Did you feel tense?	62.679	188.636	.611	.867
Q22. Did you worry?	62.596	187.482	.625	.866
Q23. Did you feel irritable?	62.637	186.753	.642	.866
Q24. Did you feel depressed?	62.845	189.122	.618	.867
Q25. Have you had difficulty remembering things?	62.907	196.783	.378	.872
Q26. Has your physical condition or medical treatmentinterfered with your family life?	63.093	195.106	.455	.871
Q27. Has your physical condition or medical treatmentinterfered with your social activities?	63.005	195.651	.396	.872
Q28. Has your physical condition or medical treatmentcaused you financial difficulties?	63.176	200.260	.259	.875
Q29. How would you rate your overall health during the past week?	59.446	220.113	-.396	.893
Q30. How would you rate your overall quality of life during the past week?	59.254	217.878	-.342	.892

Figure 10. *Cronbach Alpha of Q 31-53*



Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q31. Did you have a dry mouth?	47.6166	90.529	.427	.788
Q32. Did food and drink taste different than usual?	47.5596	91.196	.344	.793
Q33. Were your eyes painful, irritated or watery?	47.7668	88.909	.460	.786
Q34. Have you lost any hair?	46.4508	92.561	.290	.796
Q35. Answer this question only if you had any hair loss:Were you upset by the loss of your hair?	47.4870	92.657	.280	.797
Q36. Did you feel ill or unwel?	47.8135	92.403	.351	.792
Q37. Did you have hot flushes?	48.1658	93.952	.296	.795
Q38. Did you have headaches?	47.5803	90.130	.427	.788
Q39. Have you felt physically less attractiveas a result of your disease or treatment?	48.1347	92.878	.419	.790
Q40. Have you been feeling less feminine as a result of your disease or treatment?	48.1036	94.145	.334	.793
Q41. Did you find it difficult to look at yourself naked?	48.1451	95.385	.208	.799
Q42. Have you been dissatisfied with your body?	48.2591	95.443	.199	.800
Q43. Were you worried about your health in the future?	47.3523	93.375	.212	.802
Q47. Did you have any pain in your arm or shoulder?	47.2539	90.180	.417	.788
Q48. Did you have a swollen arm or hand?	48.0363	89.743	.482	.785
Q49. Was it difficult to raise your arm or to move it sideways?	47.7409	88.464	.524	.782
Q50. Have you had any pain in the area of your affected breast?	47.7098	89.322	.480	.785
Q51. Was the area of your affected breast swollen?	48.1606	90.969	.451	.787
Q52. Was the area of your affected breast oversensitive?	48.2694	92.615	.409	.790
Q53. Have you had skin problems on or in the area of your affected breast (e.g., itchy, dry, flaky)?	47.9896	90.833	.432	.788
BR44	46.3368	97.506	.150	.800
BR45	46.3057	97.765	.147	.800
BR46	46.4041	97.794	.114	.802

Sample of the population of interest

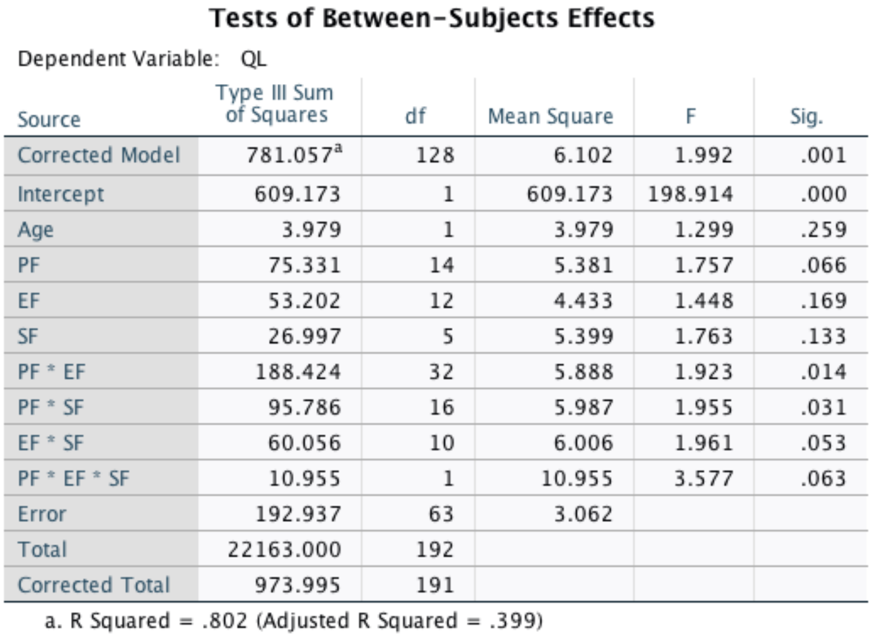
According to Fidler et al. (2017), breast cancer diagnosis accounts for the highest amounts of new cancer cases worldwide. The World Health Organization reported that in 2020 there were 2.4 million breast cancer diagnoses. By the end of 2020, there were 7.8 million women survivors, which made breast cancer the world's most prevalent cancer (WHO, 2021). Due to the prevalence of breast cancer, convenience sampling in a tertiary care oncology department represents and is proportional to the breast cancer population. The benefit of convenience sampling allows researchers to observe whether particular issues need in-depth analysis. That is determined by seeing if certain characteristics or particular traits exist in that population. According to The American Cancer Society, about 1 out of 8 women (13%) will be diagnosed with breast cancer, so having 192 breast cancer survivor participants out of the 500 women presented with the study represents 38% of this population. Therefore, this study had three times the amount of representation.

Univariate Analysis

According to Denis (2018), the univariate analysis aims to describe the data and variables used for the study and find patterns that exist within it. This inferential procedure helps test the hypotheses by looking at the variables individually to use for the general population of the study. In Figure 11, the F is 1.992 with a .001 *p*-value, which suggests significance between the group of variables. The F-test tests if the group of variables are jointly significant and can help either reject or accept the null hypotheses (Denis, 2018). For example, age had the largest *p*-value at .259 and an F score of 1.299, which translated into *age not significant* in testing the subjects. Individually, the physical function had a .06 *p*-value (moderately significant) with a 1.75 F score, the emotional function had a *p*-value of .169 (insignificant) with a 1.44 F score, and social function had a .133 *p*-value (insignificant) with a 1.76 F score. Both the F score and *p*-value were *not significant* or matched the corrected model F score.

However, the variables grouped with other variables report F scores closer to the corrected model and had significant *p*-values. In Figure 11, when physical function and emotional function are paired together, they produced a .014 *p*-value and a 1.92 F score. When the physical function was paired with the social function, it produced a .03 *p*-value and a 1.95 F score. The emotional function was paired with the social function, and it produced a .05 *p*-value and a 1.96 F score. When all three functions were combined together, they created a .063 *p*-value with a 3.57 F score. Collectively, the independent variables when paired, and not individual, resulted in significant or moderately significant values. The R-squared is .802, which is understood to be 80%, and *r* equals .399. According to Rights and Sterba (2019), r-square measures the proportion of variation in your dependent variable explained by independent variables in a linear regression model. Figure 11 reported 80% of the variance in the dependent variable is based on the independent variables. Therefore, *r* is lowered due to the addition of independent variables to the analysis.

Figure 11. *Table 2. Univariate analysis. Test of Between-Subject Effects*



Tests of Between-Subjects Effects

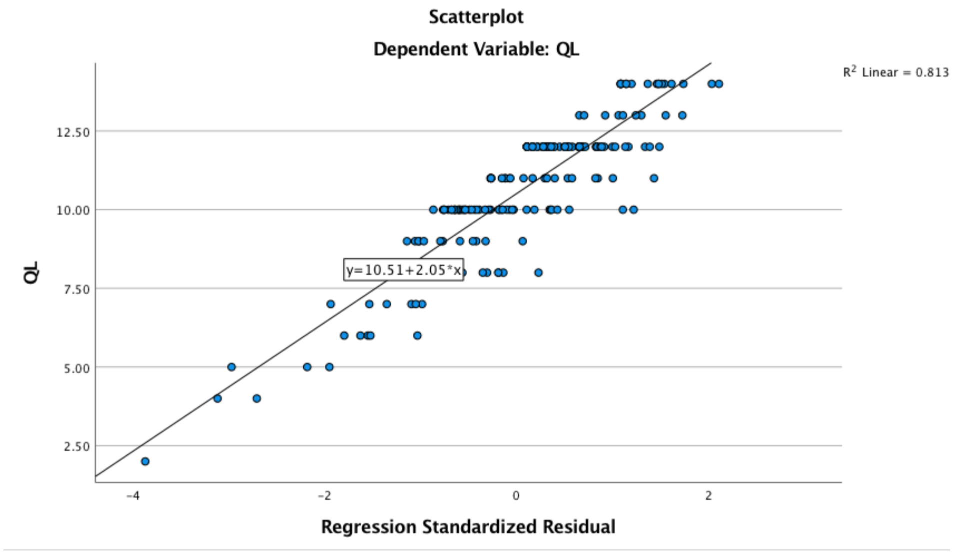
Dependent Variable: QL

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	781.057[a]	128	6.102	1.992	.001
Intercept	609.173	1	609.173	198.914	.000
Age	3.979	1	3.979	1.299	.259
PF	75.331	14	5.381	1.757	.066
EF	53.202	12	4.433	1.448	.169
SF	26.997	5	5.399	1.763	.133
PF * EF	188.424	32	5.888	1.923	.014
PF * SF	95.786	16	5.987	1.955	.031
EF * SF	60.056	10	6.006	1.961	.053
PF * EF * SF	10.955	1	10.955	3.577	.063
Error	192.937	63	3.062		
Total	22163.000	192			
Corrected Total	973.995	191			

a. R Squared = .802 (Adjusted R Squared = .399)

Before running data, it is important to make sure all assumptions have been met. Based upon the univariate analysis, descriptive and inferential statistics, assumptions had been met. Based on the scatterplot in Figure 12, homoscedasticity has not been violated and shows variance, which is important before running data.

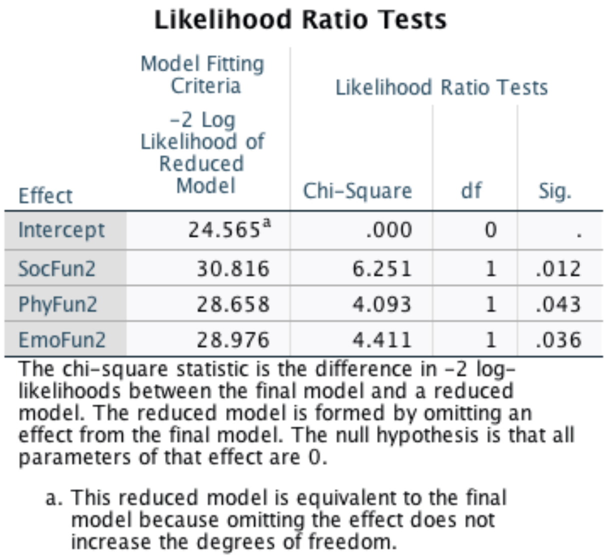
Figure 12. *Scatterplot of Homoscedasticity*



Results

According to Starkweather and Moske (2011), multiple regression is used to estimate the relationship between two or more independent variables and one dependent variable. A likelihood ratio test is the ratio of probability that the test result is correct, to the probability that the test result is incorrect. A positive likelihood score means there is a positive probability of disease and a score greater than one shows that there is an association with the disease. In Figure 13, SocFun2 has a 30.81 likelihood score, PhyFun2 has a 28.65 likelihood score, and EmoFun2 has a 28.97 likelihood score. All three scores are over 1 and are positive; therefore, there is an association with the disease. The *p*-value for SocFun2 is .01, the *p*-value for PhyFun2 is .04, and the *p*-value for EmoFun2 is .03, which resulted in all three variables being statistically significant.

Figure 13. *Table 3. Likelihood Ratio Test*



Likelihood Ratio Tests

	Model Fitting Criteria	Likelihood Ratio Tests		
Effect	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	24.565[a]	.000	0	.
SocFun2	30.816	6.251	1	.012
PhyFun2	28.658	4.093	1	.043
EmoFun2	28.976	4.411	1	.036

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

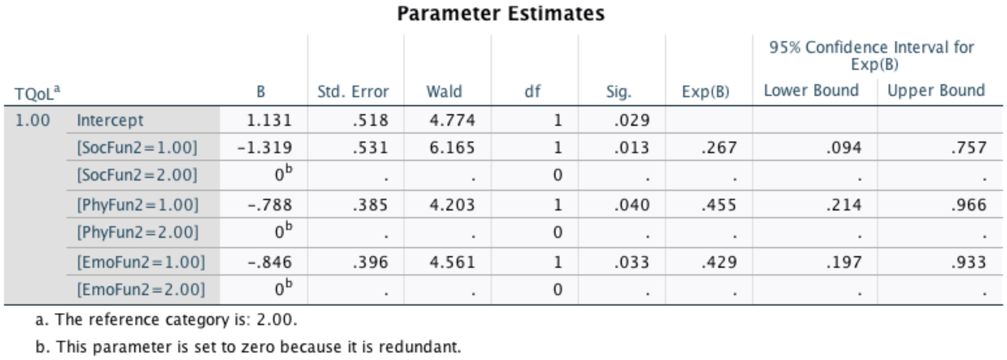
a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Effect size

Parameter estimates look at beta coefficients to compare the strength of effect of each of the individual independent variables to that of the dependent variable (effect size). According to Mehta et al. (2016), a negative coefficient indicates a decreased hazard and an increased survival time, which is significant in this study because we are testing hazard and problems and the survival of female breast cancer patients. Exp (B) is a ratio of the hazard rates (one unit) apart on the predictor variable. In Figure 14, the B coefficient for social function is -1.319, -.788 for physical function, and -.846 for emotional function. The Exp (B) for social function is .267, .455 for physical function, and .429 for emotional function. Based on the relationship between Beta and Exp (B), for every one-unit of social function, the QoL of that breast cancer survivor will increase .267, and the hazard will decrease, and survival time will increase, by 1.319. The QoL will increase .455, and the hazard will decrease, and survival time will increase by .788

for physical function. Lastly, the QoL will increase .429, and the hazard will increase, and survival time will increase by .846. As seen in Figure 14, all three variables have *p-values* under .05, which results in the effect size statistically significant.

Figure 14. *Table 4. Parameter Estimates/Effect Size*



Parameter Estimates

								95% Confidence Interval for Exp(B)	
TQoL[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
1.00	Intercept	1.131	.518	4.774	1	.029			
	[SocFun2=1.00]	-1.319	.531	6.165	1	.013	.267	.094	.757
	[SocFun2=2.00]	0[b]	.	.	0	.	.	.	.
	[PhyFun2=1.00]	-.788	.385	4.203	1	.040	.455	.214	.966
	[PhyFun2=2.00]	0[b]	.	.	0	.	.	.	.
	[EmoFun2=1.00]	-.846	.396	4.561	1	.033	.429	.197	.933
	[EmoFun2=2.00]	0[b]	.	.	0	.	.	.	.

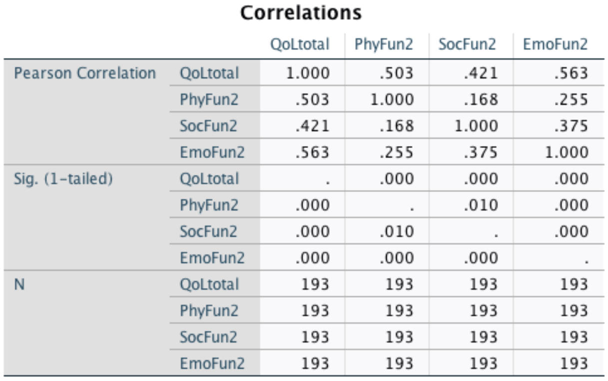
a. The reference category is: 2.00.

b. This parameter is set to zero because it is redundant.

Correlations

According to Abu-Bader (2021), Pearson's correlation is a test that measures the statistical relationship, correlation, or association between two or more variables and gives the direction of the relationship. Looking at Figure 15, PhyFun2 is .503, SocFun2 is .421, and EmoFun2 is .563. Social Function having a score of .421 is the only variable to have a moderate positive correlation to QoL. Both physical and emotional function have strong positive correlations to QoL at .503 and .563 respectfully.

Figure 15. *Table 5. Pearson's Correlations*

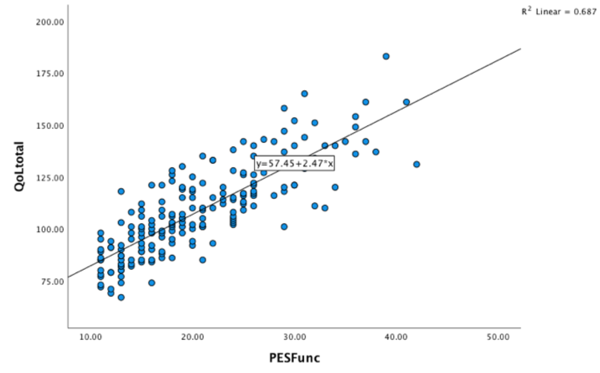


Correlations

		QoLtotal	PhyFun2	SocFun2	EmoFun2
Pearson Correlation	QoLtotal	1.000	.503	.421	.563
	PhyFun2	.503	1.000	.168	.255
	SocFun2	.421	.168	1.000	.375
	EmoFun2	.563	.255	.375	1.000
Sig. (1-tailed)	QoLtotal	.	.000	.000	.000
	PhyFun2	.000	.	.010	.000
	SocFun2	.000	.010	.	.000
	EmoFun2	.000	.000	.000	.
N	QoLtotal	193	193	193	193
	PhyFun2	193	193	193	193
	SocFun2	193	193	193	193
	EmoFun2	193	193	193	193

Looking at the scatterplot in Figure 16, on the x-axis is PESFunc, which is all three functions together and is being compared to the total score of QoL of the participants. What is seen is a distinct correlation, association, and relationship between the dependent variable and the independent variables. The higher the functioning scores for physical, emotional, and social functioning, the higher their overall quality of life.

Figure 16. *Scatterplot of Correlations*



Summary

This study has four research questions. After meeting all assumptions and running many different statistical tests that is required to run a multiple logistic regression, based on all the figures and data ran in this study, there is a positive, strong, and direct association of the physical and emotional well-being of female breast cancer survivors who participated in a cancer survivorship program. In addition, there is a moderately positive, strong, and direct association of the psychosocial well-being of a female breast cancer survivor who participated in a cancer survivorship program. Therefore, the null hypotheses are not rejected.

Section 4: Application to Professional Practice and Implications for Social Change

The purpose of this study was to examine the health outcomes of female breast cancer survivors who participated in a cancer survivorship program or tertiary care. Using secondary data, the emotional well-being, psychosocial well-being, and physical well-being of female breast cancer survivors was examined for the differences in their health outcomes.

Interpretation of the Findings

The literature recommends that there should be a multi-symptom approach rather than a single-symptom approach to cancer survivorship and that the public health field needs to provide evidence on the effectiveness of cancer survivorship programs, which will help with future implementation (Kwekkeboom, 2016). According to the findings of this study, a multi-symptom approach is significant in the provision of complete cancer care. Addressing more than one well-being at a time resulted in a higher QoL of breast cancer survivors. As previously mentioned, one of the most significant barriers to the implementation of cancer survivorship programs in healthcare is the lack of evidence that the few cancer survivorship programs or tertiary care programs available are even effective.

The findings provide evidence of higher QoL in breast cancer survivors participating in tertiary care. The results of this study confirm and extend the knowledge on the benefits of the effectiveness of cancer survivorship programs. As previously stated, some of the Healthy People 2030 cancer objectives are to collectively improve the physical, emotional, and mental status of cancer survivors. Objectives are attainable, especially following the theoretical framework of this research.

Following the SEM framework, the findings are directly associated with each of the levels of this theory and confirms future action for the societal/policy level. Physical well-being represents the individual level, the interpersonal level is represented by emotional well-being, and the psychosocial well-being represents the organization/community (Mancera et al., 2018). The findings report that all the well-being variables together confirm higher QoL results. Therefore, based upon observed health outcomes, the implementation of cancer survivorship programs should be put on the strategy plan or public health organizations that addresses cancer survivorship. According to McIntosh et al. (2019), all levels of the SEM being complete provide an evidence-based strategy of multi-symptom approach that affects the charge of change in cancer care, a change that leads to action.

Limitations of the Study

Although there are no threats to external or internal validity, resulting in good generalizability, there was one major limitation to the study: the study's time frame. According to Greener (2018), cross-sectional studies are a one-time-frame study and are unable to be used to analyze behavior over a period of time. Furthermore, the one-time measurement makes it difficult to establish cause-and-effect relationships and only answers short-term goals and studies (Greener, 2018).

A minor limitation of the study is that the data set provided no information on the participants' socioeconomic status. This information could have made the study stronger.

Still, due to it not being available, it limits the study to assume that all participants can afford the program or tertiary care, whether through insurance or out of pocket. This limitation is a significant recommendation for future studies.

Implications for Professional Practice and Social Change

Recommendations for professional practice include using a multi-symptom approach for cancer care and increased referrals to cancer survivorship programs or tertiary care. These recommendations potentially result in an increased level of communication between the oncologist and cancer team and the patient's primary care physician, furthering comprehensive cancer care. Addressing the emotional, physical, and psychosocial aspects of cancer survival allows for the creation of new professional practices and social changes by providing resources and professions that specialize in those areas to be allocated to breast cancer survivors. The addition of these new professional practices brings new social change regarding cancer survivorship.

Social Change Implications

Social change is about improving of human and social conditions, conditions that better society, and occur at all levels, whether individually, communally, familial, organizational, or through policy and government (Kaluzny & O’Brien, 2019). To create positive social change for breast cancer survivors, public health positions must be filled that provide emotional, physical, and psychosocial resources for cancer survivors and finally discuss the full implementation of breast cancer survivorship programs into public health. Therefore, using the approach and variables of this study, cancer survivorship programs and a multi-symptom approach can be used for male breast cancer survivors. In addition, public health organizations can apply cancer-specific modifications for other research investigations to other tertiary care or cancer survivorship programs. The ultimate goal of cancer survivorship is to create long-term resources and solutions for cancer survivors and meet all unmet needs of cancer survivors.

Recommendations

I recommend that future studies look into the financial and geographical factors that potentially play a significant role in cancer survivors' well-being. The second part of the Healthy People 2030 objectives is “to provide resources for the physical, emotional, mental, social, and financial issues that come with breast cancer” (Healthy People 2030, n.d.). The financial costs, limitations, barriers, and burdens are significant in implementing of cancer survivorships programs and evaluating the well-being of breast cancer survivors. According to Coughlin and Dean (2019), cancer survivorship plans typically do not deal with the financial impact of follow-up treatments and cancer treatments. Therefore, I recommend determining the connection between QoL and finances or the participants' socioeconomic status. According to Banegas et al. (2019), financial burden or costs play a significant factor in cancer survivors' well-being due to depletion of assets, inability to pay bills, health care costs and insurance failures. Therefore, to fully assess the well-being of breast cancer survivors, it is essential to test the financial well-being of cancer survivors as well.

Another recommendation is to add geography as a covariate or factor. For example, in a study conducted by Camacho et al (2017), they used SEER to examine the well-being scores of breast cancer survivors based on different geographies and regions.

The regions were California, Hawaii, Iowa, Kentucky, Michigan, New Mexico, Washington, Utah, New Jersey, and Georgia. Therefore, it is highly recommended that a study uses the same variables of well-being as this one but be used in tandem with geography as a covariate as well.

Conclusion

Cancer survivorship has become the focal point of public health organizations worldwide due to the dire need to meet this population's unmet needs and ensure the longevity of all cancer survivors. With cancer survivors in the millions, it is essential to provide effective and complete cancer care for cancer survivors since breast cancer is the world's leading most prevalent cancer. Public health has made significant progress in early detection and treatment options, but cancer survivor's well-being and survivorship needs have yet to be fully met. With millions of survivors, it is essential to provide complete cancer care that results in a higher QoL for breast cancer survivors. With my study, I found that addressing cancer survivors' emotional, psychosocial, and physical well-being in tertiary care resulted in higher QoL and positive health outcomes. Ensuring the highest QoL of breast cancer survivors is paramount to the longevity of cancer survivorship. This new approach has the potential to be modeled across different cancers and different countries, resulting in a higher global QoL and more survivor's needs being met with the field of public health leading the way.

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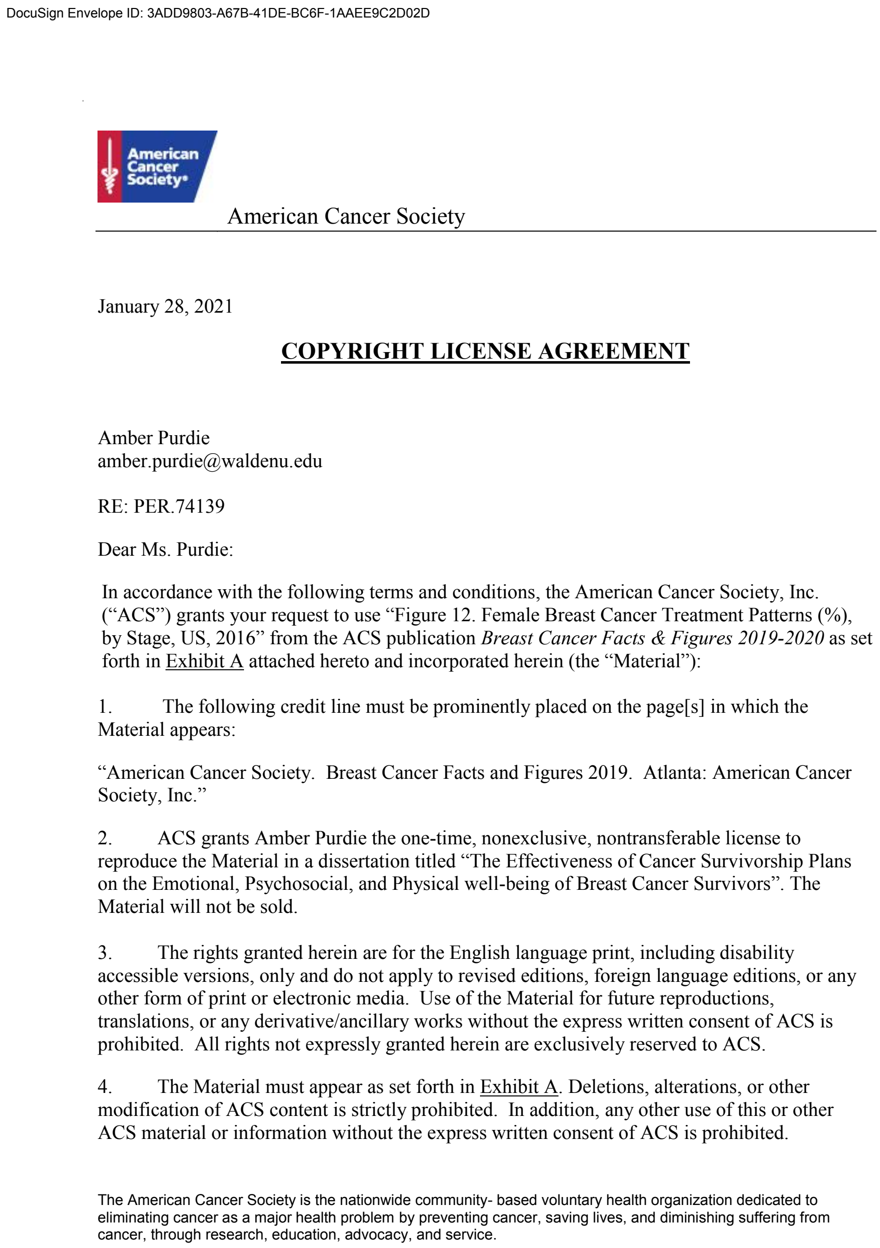

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American Cancer Society

January 28, 2021

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Appendix B: QLQ-Core 30

ENGLISH

EORTC QLQ-C30 **(version 3)**

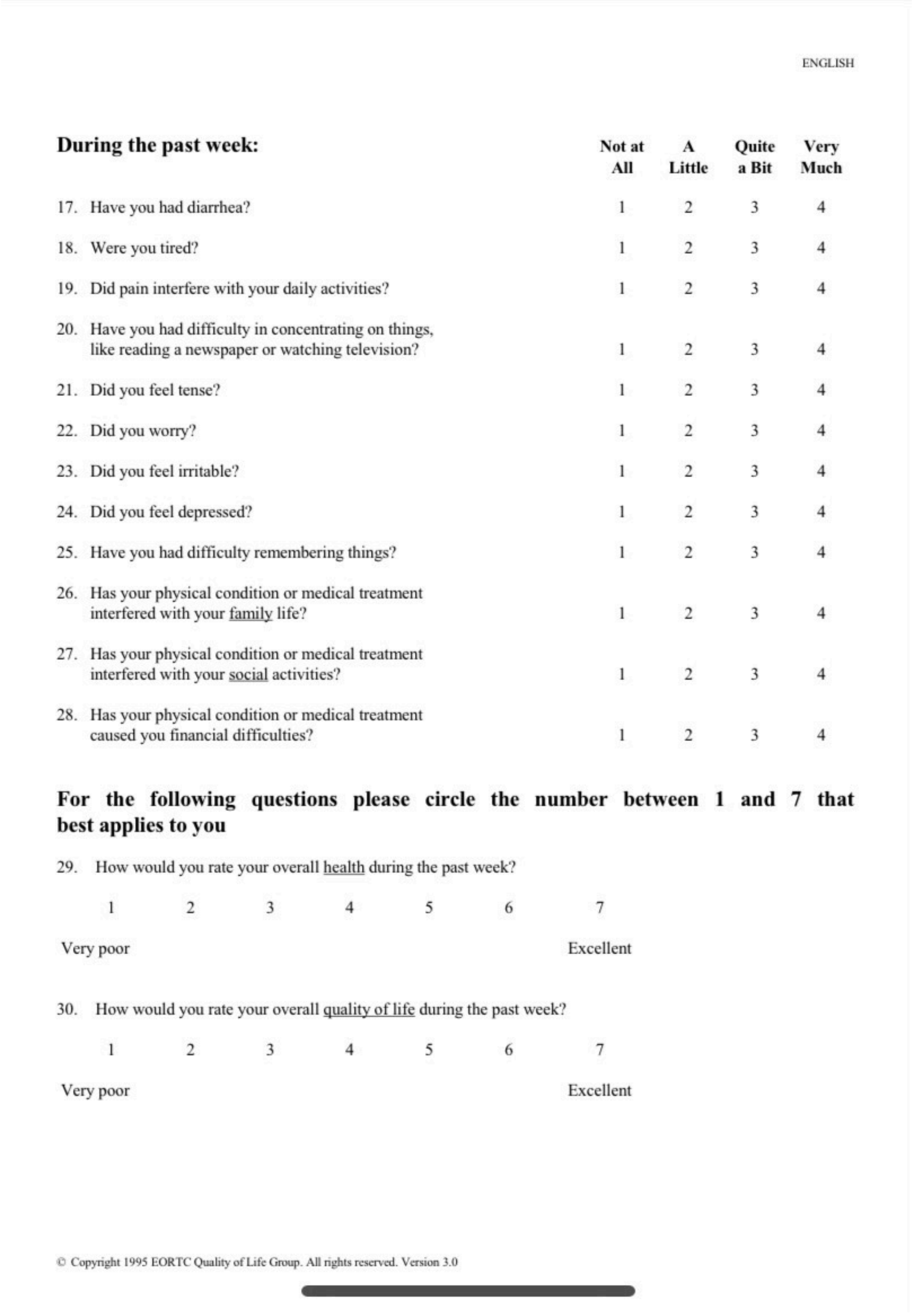
We are interested in some things about you and your health. Please answer all of the questions yourself by circling the number that best applies to you. There are no "right" or "wrong" answers. The information that you provide will remain strictly confidential.

Please fill in your initials:
Your birthdate (Day, Month, Year):
Today's date (Day, Month, Year): 31

	Not at All	**A Little**	**Quite a Bit**	**Very Much**
1. Do you have any trouble doing strenuous activities, like carrying a heavy shopping bag or a suitcase?	1	2	3	4
2. Do you have any trouble taking a <u>long</u> walk?	1	2	3	4
3. Do you have any trouble taking a <u>short</u> walk outside of the house?	1	2	3	4
4. Do you need to stay in bed or a chair during the day?	1	2	3	4
5. Do you need help with eating, dressing, washing yourself or using the toilet?	1	2	3	4

During the past week:	**Not at All**	**A Little**	**Quite a Bit**	**Very Much**
6. Were you limited in doing either your work or other daily activities?	1	2	3	4
7. Were you limited in pursuing your hobbies or other leisure time activities?	1	2	3	4
8. Were you short of breath?	1	2	3	4
9. Have you had pain?	1	2	3	4
10. Did you need to rest?	1	2	3	4
11. Have you had trouble sleeping?	1	2	3	4
12. Have you felt weak?	1	2	3	4
13. Have you lacked appetite?	1	2	3	4
14. Have you felt nauseated?	1	2	3	4
15. Have you vomited?	1	2	3	4
16. Have you been constipated?	1	2	3	4

Please go on to the next page



ENGLISH

During the past week:	**Not at All**	**A Little**	**Quite a Bit**	**Very Much**
17. Have you had diarrhea?	1	2	3	4
18. Were you tired?	1	2	3	4
19. Did pain interfere with your daily activities?	1	2	3	4
20. Have you had difficulty in concentrating on things, like reading a newspaper or watching television?	1	2	3	4
21. Did you feel tense?	1	2	3	4
22. Did you worry?	1	2	3	4
23. Did you feel irritable?	1	2	3	4
24. Did you feel depressed?	1	2	3	4
25. Have you had difficulty remembering things?	1	2	3	4
26. Has your physical condition or medical treatment interfered with your family life?	1	2	3	4
27. Has your physical condition or medical treatment interfered with your social activities?	1	2	3	4
28. Has your physical condition or medical treatment caused you financial difficulties?	1	2	3	4

For the following questions please circle the number between 1 and 7 that best applies to you

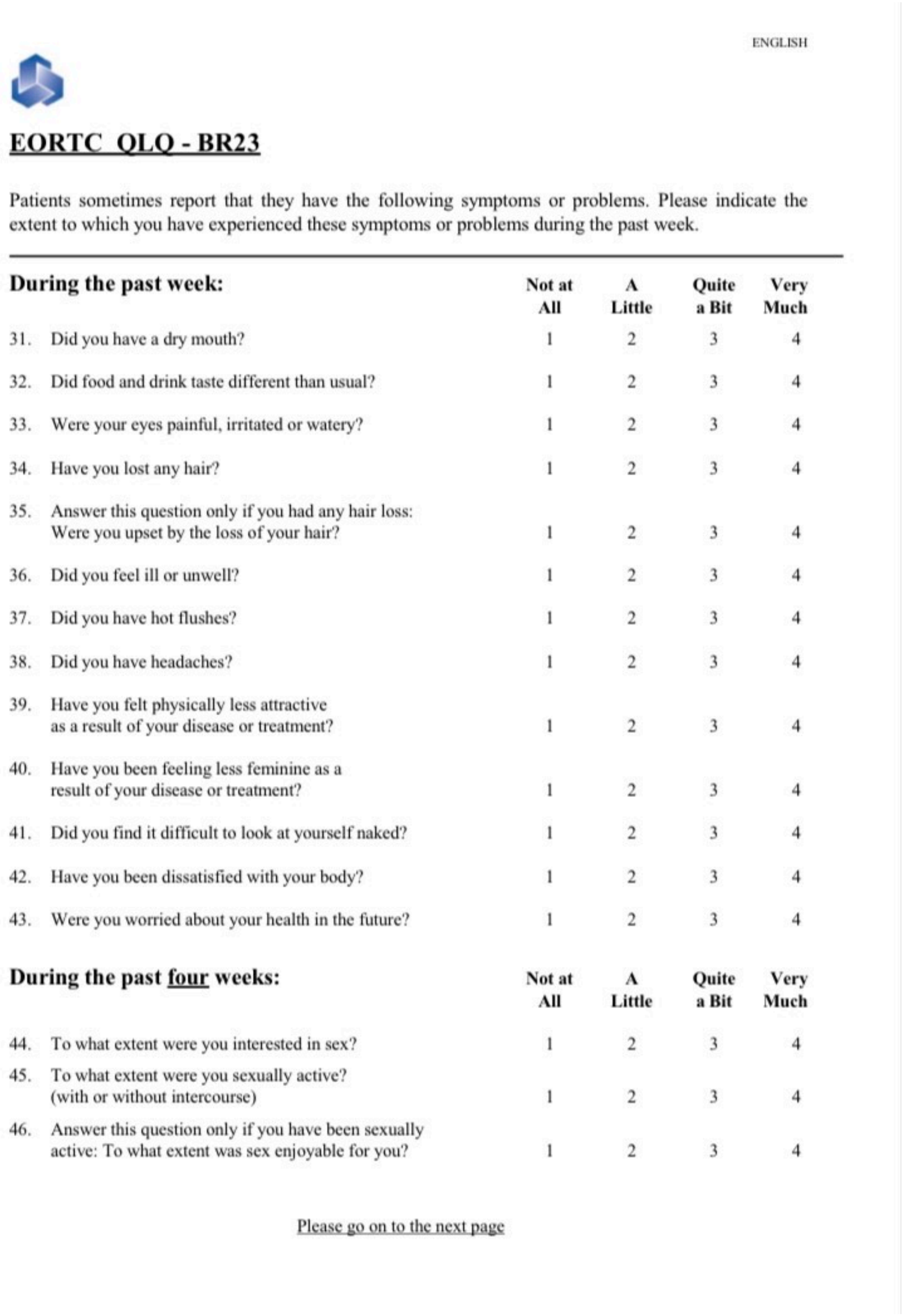
29. How would you rate your overall health during the past week?

1	2	3	4	5	6	7
Very poor						Excellent

30. How would you rate your overall quality of life during the past week?

1	2	3	4	5	6	7
Very poor						Excellent

Appendix C: QLQ-BR23



ENGLISH

EORTC QLQ - BR23

Patients sometimes report that they have the following symptoms or problems. Please indicate the extent to which you have experienced these symptoms or problems during the past week.

During the past week:	**Not at All**	**A Little**	**Quite a Bit**	**Very Much**
31. Did you have a dry mouth?	1	2	3	4
32. Did food and drink taste different than usual?	1	2	3	4
33. Were your eyes painful, irritated or watery?	1	2	3	4
34. Have you lost any hair?	1	2	3	4
35. Answer this question only if you had any hair loss: Were you upset by the loss of your hair?	1	2	3	4
36. Did you feel ill or unwell?	1	2	3	4
37. Did you have hot flushes?	1	2	3	4
38. Did you have headaches?	1	2	3	4
39. Have you felt physically less attractive as a result of your disease or treatment?	1	2	3	4
40. Have you been feeling less feminine as a result of your disease or treatment?	1	2	3	4
41. Did you find it difficult to look at yourself naked?	1	2	3	4
42. Have you been dissatisfied with your body?	1	2	3	4
43. Were you worried about your health in the future?	1	2	3	4

During the past <u>four</u> weeks:	**Not at All**	**A Little**	**Quite a Bit**	**Very Much**
44. To what extent were you interested in sex?	1	2	3	4
45. To what extent were you sexually active? (with or without intercourse)	1	2	3	4
46. Answer this question only if you have been sexually active: To what extent was sex enjoyable for you?	1	2	3	4

Please go on to the next page

ENGLISH

During the past week:	**Not at All**	**A Little**	**Quite a Bit**	**Very Much**
47. Did you have any pain in your arm or shoulder?	1	2	3	4
48. Did you have a swollen arm or hand?	1	2	3	4
49. Was it difficult to raise your arm or to move it sideways?	1	2	3	4
50. Have you had any pain in the area of your affected breast?	1	2	3	4
51. Was the area of your affected breast swollen?	1	2	3	4
52. Was the area of your affected breast oversensitive?	1	2	3	4
53. Have you had skin problems on or in the area of your affected breast (e.g., itchy, dry, flaky)?	1	2	3	4

Appendix D: Dataset

SAV1 Dataset file:

https://doi.org/10.1371/journal.pone.0219093.s001