

**Reactions of Breast Cancer Survivors to an Online Positive Affect Based Training Program
to Support Anti-Hormonal Medication Adherence**

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Abstract

One in eight women are diagnosed with breast cancer during their lifetime in the United States. A majority of breast cancer cases are hormonal breast cancers, leading them to be treated with anti-hormonal medications. Among breast cancer survivors, adherence to anti-hormonal medications is low and depression symptoms are common. To address this, 34 breast cancer survivors were recruited to participate in an online positive affect based program to assess its feasibility, acceptability, and potential to help breast cancer survivors adhere to their anti-hormonal medications. This study was a mixed methods design that sought to evaluate participants' reactions and responses to the program to see how it could be improved. Medication adherence, positive affect, and depression scores all improved over the course of the study. Additionally, qualitative data revealed two broad parent themes of “Helpful” and “Unhelpful” and multiple corresponding sub themes. The most common themes indicated that the program was easy and convenient. Participants generally liked both modules and the design of the program, but wished for more education on how to specifically manage side effects. Limitations of this study are mainly that it was a small, non-randomized trial in a homogenous sample. Future studies should seek to pilot a longer, randomized, more in depth program in more diverse samples of breast cancer survivors and include suggestions generated from this study, while retaining the aspects that were widely appreciated.

Keywords: Breast cancer, anti-hormonal medication, positive affect, mixed methods study, medication adherence

Introduction

Cancers are a leading cause of mortality and morbidity worldwide (Kocarnik et al., 2022). According to the American Cancer Society, it is projected that 2,041,910 people will receive a new diagnosis of cancer, and 618,120 people will die from it in the year 2025 in the United States (Siegel et al., 2025). The most frequent cancer type for women is breast cancer.

According to the American Cancer Society, breast cancer affects one in eight women in the U.S. (Macdonal, 2022). In 2022, there were 2.3 million incident cases and 670,000 deaths due to breast cancer worldwide (World Health Organization, 2024). In the United States, there were 42,250 deaths in the year 2024 (National Cancer Institute, n.d.). In the United States, 80% of all breast cancers are hormone receptor-positive (HR+), which means that they are treated with anti-hormonal therapy to prevent recurrence after primary treatments (chemotherapy, radiation, and/or surgery) have concluded (National Cancer Institute, 2022; Kohler et al., 2015; Joe BN, 2024). Anti-hormonal therapy is also called endocrine therapy, adjuvant endocrine therapy (AET), or aromatase inhibitors (AI) (National Cancer Institute, 2022). Endocrine therapy works by inhibiting the body's production of estrogen, which is the hormone feeding the growth of hormone-positive tumors. Women with HR+ breast cancer are prescribed these medications for between five to 10 years for maximum benefit (National Cancer Institute, 2022). Studies find that adherence increases survival rates and disease-free time (Eisen et al., 2008; Buzdar et al., 2008), and they reduce the risk of recurrence by 40-50% (Early Breast Cancer Trialists Collaborative Group, 2005/1998; Hershman et al., 2011).

However, adherence remains a barrier for many women on these medications (Murphy et al., 2012). Blocking the body's natural production or use of estrogen can lead to a variety of side effects including weight gain, musculoskeletal pain, vaginal dryness and discomfort, headaches,

nausea, visual symptoms, gynecological discomfort, hot flashes, cognitive symptoms (such as “brain fog”), fluid retention, poor sleep, joint pain, appetite changes, gastrointestinal problems, and low or labile mood (Lambert et al., 2018; Berkowitz et al., 2021; National Cancer Institute, 2022). These side effects lead many women to skip doses or cease taking this medication altogether.

Non-adherence is not taking the medication as prescribed (missing doses), and non-persistence is defined as discontinuing the medication before the recommended time (Stanton et al., 2014). Both are associated with increased mortality rates (Hershman et al., 2011). A systematic review published in 2012, found that as many as 31-73% of women prescribed antihormonal therapy discontinue the medication before the recommended time (Murphy et al., 2012). Additionally, a separate systematic review conducted in 2022, reported that adherence at five years of hormonal therapy ranged from 33.3% to 88.6%, with an average 25.5% adherence fall from the first to the fifth year of anti-hormonal therapy; these rates point to a need for interventions to support women taking this medication (Yussof et al., 2022).

Researchers have been investigating possible methods of increasing adherence to these medications (Bright et al., 2023). Affective attitudes have shown promise as a piece of the puzzle. Positive affect is defined as “emotional well-being, positive mood, joy, happiness, vigor, energy” (Chida & Steptoe, 2008). Although cancer was not included, a systematic review, conducted in 2019, suggests that higher positive affect has shown a correlation with improved medication adherence for chronic conditions like HIV and cardiovascular conditions (Bassett et al., 2019). A meta-analysis on interventions to promote adherence to anti-hormonal medications also found that interventions to increase positive affect towards medications significantly increased adherence, compared to interventions that only targeted decreasing negative affect

(Bright et al., 2023). The reasoning behind this association could be that positive affect helps motivate and energize participants, better cope with stress, and removes this additional barrier to taking their medications consistently (Bassett et al., 2019). It could also be that when people are feeling more positive, their cognitive resources are replenished leading them to take their medications more consistently (Bassett et al., 2019).

Other studies have found similar trends. Lower positive affect, more depressive symptoms, and higher negative affect in general and towards anti-hormonal medications are associated with non-persistence and non-adherence, which are correlated with poorer survivorship (Stanton et al., 2014; Bright & Stanton, 2018). Also, recent meta-analyses and systematic reviews have found strong support for negative or neutral attitudes toward anti-hormonal medication and decreased belief in its necessity being correlated with decreased adherence rates (Lambert et al. 2018; Lin et al., 2017). On the other hand, increased positive affect and beliefs about the necessity of medication are associated with better day-to-day anti-hormonal medication adherence rates (Bright et al., 2023; Lin et al., 2017).

A few studies have sought to investigate how positive affect interventions can help to increase positive affect and medication adherence. Positive Affect Treatment (PAT) was developed by Dr. Michelle Craske and is a behavioral intervention aimed at decreasing depressive symptoms and negative affect while increasing positive affect (Craske et al., 2019). The guiding theory behind PAT is based on neuroscience, and its goal is to increase neural reward sensitivity. Depression and anhedonia, defined as loss of feelings of pleasure in activities that used to bring pleasure or interest, are marked by decreases and dysregulation in reward sensitivity, primarily the anticipation of the reward, savoring of the attained reward, and learning to associate past rewards with future rewards (Craske et al., 2019, Craske et al., 2016). PAT seeks

to target deficits in reward sensitivity to improve symptoms of anhedonia and depression, and it has shown efficacy to this end.

Across two randomized clinical trials, PAT outperformed a cognitive behavioral treatment targeting negative affect (NAT) (Craske et al., 2019; Craske et al., 2023). Both studies investigated if targeting increasing positive affect (via PAT) would be more effective at increasing positive affect, decreasing negative affect, and decreasing depressive symptoms and suicidality than targeting decreasing negative affect (via NAT). Adults with clinically high anxiety, depression, and functional impairment ($N = 85$) were randomized to either 15 individual sessions of PAT ($n = 42$) or NAT ($n = 43$) (Craske et al., 2023). After the intervention and six-month follow-up period, researchers found that PAT was significantly more effective at increasing positive affect, and decreasing symptoms of anxiety, depression and stress, than NAT with medium effect sizes ($d \geq .44$) (Craske et al., 2023).

Regarding positive affect programs for cancer survivors, the LILAC (“Lessons in linking affect and coping”) study investigated whether a positive affect based program could help decrease depression scores for women with metastatic breast cancer (Cheung et al., 2017). Women with metastatic cancer face uncertain futures and often debilitating treatment regimens (Cheung et al., 2017). The LILAC program was developed to target the positive affect of participants and help them cope in the face of unimaginable psychological stress (Cheung et al., 2017). The program was five sessions long and delivered online or in person. Those in the experimental group (both in person and online modalities) had significant decreases in their depression scores at the one-month follow-up point, and their negative affect scores trended towards a significant decrease in their negative affect scores compared to the attention-matched control group (Cheung et al., 2017). This intervention also had good feasibility and acceptability.

To the author's knowledge, there has only been one intervention targeting endocrine therapy (ET) medication adherence for early-stage breast cancer survivors with an affective attitude and values-based intervention (Arch et al., 2022). Arch et al., (2022) designed and executed a pilot randomized trial of an online, valued-based program to increase medication adherence for early-stage breast cancer– stages 0 to 3– survivors (REACH). Participants were randomized to either REACH and Education (n = 45) or patient Education alone (n = 43). Results indicate REACH had good feasibility and acceptability (Arch et al., 2022). At month three of follow up, negative affective attitude towards anti-hormonal medications approached a significant decrease in the REACH condition compared to the control condition. Likewise, positive affect improved across conditions, but not significantly between conditions. Medication adherence (assessed with Wisepill containers) improved significantly in REACH condition compared to the Education alone condition for the first month of follow up, and it remained high until month four of follow up. However, significant condition differences in medication adherence were not sustained past the 2-month follow-up mark, pointing to a need to further refine interventions and target positive affect more effectively (Arch et al., 2022).

Despite these promising developments, no known intervention to date has directly targeted boosting breast cancer survivors' positive affect as a method for improving anti-hormonal medication adherence. There are gaps in the research literature in terms of how to improve adherence rates for early stage breast cancer survivors with a positive affect based intervention. As mentioned in Bright et al. (2023), a majority of breast cancer survivors do not adhere to their medications for the recommended amount of time, and there are few impactful interventions that aid in this. However, positive affect interventions could offer a potential avenue toward helping to address this gap.

A possible reason for the lack of effective interventions to improve adherence to anti-hormonal medications is that research has been sparse on positive affect's role in improving anti-hormonal medication adherence rates for breast cancer survivors. However, studies on positive affect and cardiovascular disease and HIV medication adherence found that higher positive affect led to higher medication adherence for these instances (Bassett et al., 2019). Studies have investigated positive affect interventions impact on helping improve depression rates for those who are clinically depressed (Craske et al., 2019) and for depression rates for women with metastatic cancer as well (Cheung et al., 2017). However, it is unknown how these approaches would also work to improve anti-hormonal medication adherence. Furthermore, even though it was not the primary aim, positive affect has been implicated as a useful target in increasing anti-hormonal medication adherence in a values and acceptance-based intervention for early-stage cancer survivors seeking to build more positive associations with their antihormonal medication (Arch et al., 2022). Following this result, researchers sought to investigate how targeting positive affect specifically could impact adherence.

Additionally, as far as the researcher knows, the only research study on increasing medication adherence with a focus on improving affective attitudes towards anti-hormonal medications for early-stage breast cancer survivors is REACH (Arch et al., 2022). This study found support for a personal values-based approach to increase positive affective attitudes towards anti-hormonal medications and thereby increase medication adherence. However, these results did not sustain long term, pointing to a need for further refinement or addition.

The Current Study

This study is embedded in a larger pilot trial. In the larger trial, researchers designed, programmed, and piloted an online program that adapts strategies from PAT (Craske et al., 2023)

to support early-stage breast cancer survivors taking anti-hormonal medications. Titled “Thriving with Anti-hormonal Therapy by Increasing Positive Emotions” (THRIVE), this online program sought to target three of the current gaps in the literature: methods for effective interventions for antihormonal medication adherence, positive affect-focused program to support such adherence, and soliciting patient recommendations and feedback to further refine the approach to support them in taking their anti-hormonal medications. THRIVE adapts PAT’s strategies to a two-session, online program (intervention) to help support breast cancer survivors in taking their anti-hormonal medications. THRIVE was designed to eventually be part of a more comprehensive program targeting breast cancer survivors medication adherence. So it is a proof of concept pilot study for the positive affect training portions. As part of the broader THRIVE study, for my thesis I will conduct mixed methods analysis of the effects of THRIVE for breast cancer survivors prescribed anti-hormonal medication. This study will analyze changes in participants' positive affect, depression, and reported medication adherence levels. I predict that participants' positive affect scores and adherence scores will increase, and depression scores will decrease from baseline to post. Additionally, this project will analyze participants' thoughts and reflections about the program in their own words to make recommendations for further refinement. This will identify what may have aided in or hindered changes in the above-mentioned constructs. I predict that the qualitative data collected will shed some light on supportive aspects of the program that can further refine the program.

Methods

Study Design

The current study uses a mixed-methods approach to examine impacts of a non-randomized positive affect based program. These questions were embedded in a larger pilot trial (Clinical Trial number: NCT06388304, Protocol #:23-0556) conducted by Dr. Joanna Arch on the possible impact a positive affect training-based program (THRIVE) may have in supporting breast cancer survivors adhere to their endocrine therapy. The pilot study was a single armed study to test the feasibility and acceptability of a brief, online, two session, positive affect based program for breast cancer survivors. The program focused on two strategies for increasing positive affect: taking credit and positive activities. The current study will focus on possible changes in participants' baseline to post-program positive affect, depression, and self-reported medication adherence. This study also seeks to qualitatively analyze participants' reactions to THRIVE during and after the program.

Participants

Participants were recruited between March 2024 and August 2024, primarily through the Rocky Mountain Cancer Centers (RMCC) Supportive Care listserv email. RMCC is a state wide multidisciplinary cancer care network. Other methods of recruitment included flyers placed throughout the Boulder, CO community and within hospitals, social worker referrals, and specific website postings. Participant eligibility criteria included 1) being a cisgender¹ woman of at least 21 years of age, with Stage 0-3 hormone receptor positive breast cancer and finished with primary cancer treatment (surgery, chemotherapy, and/or radiation), 2) scoring at least a 4 or

¹ Participants were eligible if they were cisgender women due to the nature of the hormonal medication that this program was seeking to support participants in taking. According to the World Health Organization (2024), the primary population of people that are diagnosed with breast cancer is 99% cisgender women. The anti-hormonal medications for breast cancer survivors target estrogen and progesterone receptors that differ in amount by biological sex. Therefore, it is likely that cisgender men and transgender individuals would be prescribed anti-hormonal medications differently and may suffer different side effects than cisgender women. Additionally, transgendered individuals may be taking other hormonal medications, with which the interactions between anti-hormonal medications is not well understood.

more (range 0-10) on any of the three screening questions relating to challenges taking anti-hormonal medications, 3) being fluent in English and 4) having reliable internet access and a computer/iPad or agree to use and return a study-provided iPad.

Study exclusion criteria included those who were unable to interact with the program as needed. This included those who were visually impaired to the degree they could not see or interact with the screen and individuals who cannot read and write in English (the language of the program). If participants were unable to interact with the program as needed, they were unlikely to benefit from the program. Participants were screened over the phone with one of the research team members, and if eligible, offered the chance to participate in the study. Consent was administered verbally over the phone. Each participant was sent an online DocuSign invitation to their personal email, and walked through the study with a research team member before both parties signed the online consent form. DocuSign provides a copy of the form to both parties.

Data Collection

Data was collected using REDCap survey software and Qualtrics. Specifically, the THRIVE program was built and delivered in Qualtrics, and the baseline and post surveys were delivered through REDCap, a HIPAA-compliant electronic capture tool hosted by the University of Colorado Boulder. Surveys and modules were emailed to participants via personal links. The baseline survey was sent to participants immediately after the consent process, and the post survey was administered one week after finishing the Qualtrics program.

Measures

Screening Questionnaire:

This questionnaire was administered during the screening phone call and consisted of three questions regarding difficulties these women might have taking anti-hormonal medications. Items ranged from 0 (not at all) to 10 (the most they could imagine), and possible participants had to score a 4 on at least one of the following questions to be eligible: “How upset are you by having to take anti-hormonal therapy?”, “How bothered are you by the side effects?”, “How difficult is it for you to take your anti-hormonal medication every day?”.

Demographic questionnaire:

This questionnaire had items for participants to indicate their gender identity, age, race/ethnicity, employment status, household income, education level, relationship status, and cancer history.

Positive and Negative Affect Schedule - Positive Affect Subscale (PANAS) (Watson et al., 1988):

Developed by Watson et al. (1988), the PANAS measures participants' positive affect and negative affect generally in the past week. The measure consists of 20 items, with 10 referring to positive affect and 10 referring to negative affect. A sample question measuring positive affect was answering how much the participant felt “enthusiastic” during the past week. Responses to each item were rated on a 5-point Likert type scale (1 = “very slightly or not at all”, 3 = “moderately”, 5 = “extremely”). Scores on each item were summed, and total scores ranged from 10 to 50 on both the positive affect portion of the scale and on the negative affect portion of the scale. Higher scores on the positive affect questions indicated higher positive affect, while higher scores on the negative affect questions indicated higher negative affect. The Cronbach's alpha for

the positive affect subscale of this measure was $\alpha \geq 0.88$. For this study, only the positive affect subscale was used.

Patient Health Questionnaire (PHQ-8) (Kroenke et al., 2009):

Developed by Kroenke et al. (2009), the PHQ-8, measures patients' depression in the past two weeks. An example question measuring depressive symptoms was “Over the last 2 weeks, how often have you been bothered by any of the following problems? Little interest or pleasure in doing things.” The measure consists of 8 items rated on a 4-point Likert Type scale (0 = “Not at all”, 3 = “Nearly every day”). Scores range from 0 to 24 with higher scores indicating more depressive symptoms and lower scores indicating less depressive symptoms. The Cronbach's alpha for this measure in this study was $\alpha \geq 0.83$.

Anti-Hormonal Medication Adherence (AET) (Wilson et al., 2016):

Developed by Wilson et al. (2016), this measures self-reported medication adherence. It consists of three items. The first item asked “How many days did you miss taking your anti-hormonal medication?”, with scores ranging from 0 - 30. The second item asked “How good a job did you do at taking your anti-hormonal medication in the way you were supposed to?”, with scores ranging from 1 (“Very poor”) to 6 (“Excellent”). The final item asked “How often did you take your anti-hormonal medication in the way you were supposed to?” Items ranged from 1 (“Never”) to 6 (“Always”). The baseline adherence measure was transformed in accordance with previous authors recommendations (ie. scores out of 30 was transformed to scores out of 100 (multiplied by 3.33), and scores out of 6 were transformed to be out of 100 for easier summation across items; Wilson et al., 2016). This measure was administered twice, but the time frames it referred to were different. The questionnaire administered at post referred to a

shorter time frame than the first survey and varied by participant. To make these scores comparable, researchers transformed each of the follow-up adherence measurements to be proportional to the time that the participant was in THRIVE and then also transformed this score to be out of 100. For example if participants were in this study for 20 days and missed 2 doses, their score for this item would be 90. We got the number by dividing 100 by the number of days a participant was in THRIVE. Then using this number, we multiplied it by the doses missed and subtracted that final number from 100 to get their adherence score. When the measure was run with all three items as well as with just the last two items, the Cronbach's alpha was $\alpha \geq 0.96$.²

Recommendations across Qualitative Data:

The THRIVE program and post survey consisted of many sections where participants' feedback was gathered. Each participant answered a variety of questions, including: "What was most/least helpful to you from this online session?", "What did you like best/least about the program?", and "What have you learned from the program?" The questions were open ended with no word limit, so participants were free to write as much as they preferred. The questions were asked one by one. See *Table 1* for the full list of questions analyzed in this paper.

Additional Support Question

The REDCap post survey included an additional question asking "Would it have been helpful to talk with a coach (who knows about anti-hormonal medication) to support you in doing this program and in dealing with the medication?" Answers ranged from 0 ("Yes") to 1 ("No"). If participants responded yes, they were prompted with two additional questions: "How would you have wanted to talk with this person?", and "Who would make the best coach for

² Due to the time between baseline and post not being a standard 30 days, we measured adherence with and without the item asking about how many doses participants missed since starting THRIVE.

you?” Response options to the first follow up question were in person, phone, video conference (Zoom), text, and other. Responses to the second follow up question were oncology social worker, counselor or therapist, oncologist, nurse practitioner or physician assistant, another woman with breast cancer, nurse, or pharmacist. Participants were able to select all that applied.

Procedure and THRIVE Content

Immediately after the consent was completed, the baseline survey was administered through REDCap and sent to each participant via a personal link to their preferred email address. This survey consisted of the PANAS, PHQ-8, AET measure, and demographic questions referring to gender, age, race/ethnicity, household income, education level, relationship status, and cancer history. The survey took about 20 minutes to complete, and participants were compensated \$30 for this survey, plus an additional \$10 if they completed the survey within 48 hours of receiving it.

Once participants completed the baseline survey, they were emailed a personalized link to the first module of THRIVE (in Qualtrics) and first worksheet (mailed to them as a hard copy or emailed an online version). The module was designed to take about 40 minutes to complete, and it was recommended that they finish the module within a week after receiving the link. Both modules began and ended with a brief 10 question emotional check-in survey (not included in this study) to chart patients' in-the-moment emotional state.

The first module was called *Taking Credit* and introduced the benefits of cultivating positive affect and how it can help with managing anti-hormonal therapy side effects. This module focused on helping participants take credit for all that they do in their day-to-day life, and regarding their anti-hormonal medication. The module taught participants how to break

down daily tasks into their many steps, and take credit for each and every one. The module also introduced a case study to help participants practice helping “Jane” (an example of a breast cancer survivor who is struggling to take her anti-hormonal medications) take credit for all she is doing. At the end of the module, participants filled out a brief online reflection survey capturing their thoughts and reflections on the program and what they learned. The survey asked them what was most helpful and unhelpful about the program, as well as how adequate the length and design were. The worksheet was to be completed after finishing the module and helped reinforce the idea of taking credit.

The second module was emailed five to seven days after participants completed the first module. This module was also designed to require 40 minutes to complete and had a corresponding worksheet to complete after the module. *Positive Activities* was the second module, and its goal was to help participants acknowledge the benefits of planning and partaking in positive activities to support their well-being. Positive activities were defined as activities that each participant found meaningful or made them feel happy while they were engaging in it. These could be activities like baking, reading, or spending time with friends, among many others. Savoring the moment was introduced as a way to get the most out of positive activities. Another short reflection survey came after this module. The worksheet for this module helped participants plan their positive activities, reflect on their experience of the activity, and notice possible boosts in positive feelings during them.

The post survey was administered through REDCap and sent seven days after their completion of the second module, *Positive Activities*. This included the same measures as the baseline survey, plus a section where participants were asked to reflect on the helpful and unhelpful aspect of the program, with questions asking what could be changed or if a coach

would have been a useful addition to the program. The post survey took 30 minutes to complete, and participants were compensated \$30 for their time, and an additional \$10 if they completed the post survey within 48 hours of receiving the link.

Data Analysis

Quantitative Data Analysis.

This study specifically focused on assessing participants' change in positive affect, depression, and reported medication adherence, utilizing the PHQ-8, PANAS, and AET measures. Paired samples t-tests were used to measure changes from baseline to post in each of those measures. Upon the completion of data collection, the data was cleaned by removing all identifying information. Data was uploaded to SPSS software to change the format from long form to wide form. Variables were renamed to reflect T1 (baseline) and T2 (post) for easier analysis. Total scores were computed for the PHQ-8 and PANAS measures. Data was uploaded into RStudio (RStudio Team, 2020) for analysis. Data normality checks were performed and were consistent with normality expectations for this data. There was one participant who indicated more doses missed than time spent in THRIVE, leading to a negative adherence score. Their score was imputed as a score of 0.

Qualitative Data Analysis.

The open-ended responses given by participants evaluating aspects of the THRIVE program (*Taking Credit* and *Positive Affect*) as well as the open-ended questions from the REDCap post survey were combined into one large data set for easier analysis. Qualitative data were inductively reviewed for common themes generated by participants. These themes were reviewed for general themes, working to refine the categories of inductive codes. A code book

was generated from these findings and held both the general themes and corresponding sub-themes. An example of a general parent theme is “Helpful” which captured what participants thought was useful and liked about the program. A sub-theme within the above mentioned theme was “Helpful: Taking Credit,” which referred to participants' thoughts about what they found useful about the Taking Credit session.

To ensure inter-rater reliability, I and another researcher met with one another on a regular basis during the coding process. We each took five participant responses and categorized responses into the various themes. Once complete, we compared findings and came to consensus. After this first batch of participant responses were finished, we coded the next half of the responses in batches of 5 to 6, meeting after each batch to discuss any questions that arose during the process. After we showed that the data should be reliably coded with the code book, for the sake of timeliness, I coded the other half of participant responses on my own. Following this coding, I generated a descriptive summary of qualitative data, identifying anonymized quotes and examples offered by participants in the survey and modules.

Results

Quantitative Results

The final sample size for this study was 34 women with stage 0-3 breast cancer, between ages 34 and 79 ($M = 56.35$, $SD = 11.08$). Sample demographics are recorded in *Table 2*. The adherence data was negatively skewed, but this was consistent with what the researchers were expecting from these measures in this population (Arch et al., 2022).

To examine the possible changes in participants' positive affect, depression, and AET scores from baseline to post, paired t-tests were utilized. See *Table 3* for the quantitative results

table. Consistent with our hypothesis, paired samples t-tests demonstrated that participants' positive affect at post ($M = 32.68$, $SD = 7.55$) were significantly higher than participants' baseline positive affect scores ($M = 29.59$, $SD = 6.72$; $t = 3.44$, $p = .002$, see *Figure 1 and Figure 2*). The effect size, as measured by Cohen's D, was 0.43, which corresponds to a small to medium effect size. Also in support of my hypothesis, post depression scores were significantly lower after THRIVE ($M = 6.42$, $SD = 4.85$) compared to baseline scores ($M = 8.63$, $SD = 4.89$; $t = -3.59$, $p = .001$, see *Figure 3 and Figure 4*). The effect size was -0.46, which corresponds to a small to medium effect size. As noted, the paired t-tests were run separately with 2- and 3-item versions of the adherence measure. Results including only two items demonstrated that medication adherence significantly increased after participating in THRIVE ($M = 79.41$, $SD = 31.42$) compared to baseline ($M = 72.06$, $SD = 34.09$; $t = 2.46$, $p = .02$, see *Figure 5*). Results from the three item questionnaire were very similar, with participants' scores increasing from baseline ($M = 75.75$, $SD = 32.89$) to post ($M = 82.15$, $SD = 29.68$; $t = 2.60$, $p = .01$, see *Figure 6 and Figure 7*). Both effect sizes were small ($d \geq 0.20$).

Qualitative Data

During the qualitative coding portion of this study, researchers were able to get a good sense regarding what participants thought about the program and what could be improved. All 34 participants offered feedback on the program and the following themes originated from analyzing all of their qualitative responses. See *Figure 8* for a visual of the proportions of coded responses, and see *Table 4* for the full definitions and frequencies of codes.

Helpful: Convenient:

This code was mentioned on 65 distinct occasions and was endorsed by 30 of the 34 participants (88%). Meant to convey that the program was straightforward and simple, participants enjoyed the brevity of the program and found it easy to follow. They noted that the online session content was very readable and was written at a comprehensible level. They enjoyed that they could complete it flexibly from home and could fit it in anywhere that worked in their schedule.

“Like all online learning, you can take a class that fits with your schedule and you can take it at your pace.” (Participant 2)

“Clear, straightforward and easy to use.” (12)

“Not hard at all for me. Big surprise since I am often technologically challenged.” (28)

Helpful: Taking Credit:

This code was mentioned 59 times during the coding process and was mentioned by 30 participants (88%). This code was used when participants mentioned specifically liking the *Taking Credit* module. They referred to liking the tools taught in the module including how to take credit for each part of a task, how to recognize all they are doing on a day-to-day basis, and taking time to recognize all they have done and accomplished during their cancer journey.

“I liked the part about taking credit for even small things. This helped me realize how much I do instead of focusing on how little I do.” (34)

“It helped me realize that I already am doing a good job taking care of my health in many ways. The realization that the steps I take to complete a task are worthy of taking credit for.” (28)

“How to pause and reflect on day life and give myself credit for things I didn't realize I was achieving.” (5)

Helpful: Positive Activities:

This code occurred 50 times and was mentioned by 32 participants (94%). When a participant mentioned specifically liking the *Positive Activities* module, it was coded under this code. The *Positive Activities* module was meant to help participants take stock of all the positive activities they are doing and plan some new ones. Participants mentioned finding this impactful and a good way to hold themselves accountable to make these a priority rather than an extra in their day to day lives. Participants also mentioned appreciating the long list of possible activities and the education about how positive activities can impact mood and anti-hormonal medication side effect intensity.

“It made me realize how important making time and prioritizing positive activities that mean something to me should be and not to be put off indefinitely. It improves my mood and emotional state and assists with coping strategies rather than just staying in a frustrated or bad mood.”

(23)

“Reminders of what I enjoy and used to enjoy and how they're not prioritized. Breaking down the barrier and creating steps to make these things happen” (29)

“It was fun to see all of the ideas for positive activities, some are so simple and easy!” (34)

Helpful: Mentality:

This code was mentioned 34 times during the coding process from 20 women (59%). When a participant mentioned that the program had a positive impact on their mentality outside of a specific module, it was coded as “Helpful: mentality.” Participants mentioned having a more positive outlook on life, practicing mindfulness, and liking the tone of the program.

“It really helped me realize that a shift in my focus and outlook over the whole situation was really important and how I could help myself deal with it day-to-day.” (13)

“Just the act of doing the program helped me to refocus.” (32)

“Positive approach certainly helps take the heaviness from thinking about medication.” (17)

Helpful: Recognition:

This code arose 10 times during the coding process and was endorsed by 6 participants (18%). Recognition was an important theme that emerged during the coding process. Many breast cancer survivors felt that this program helped them to recognize all that they and others have been through during their cancer journeys. They also found it was helpful that the program recognized how difficult this medication and diagnosis is.

“I like how you recognize that anti-hormonal medication is difficult to take. I certainly knew from discussing with friends who are on these drugs or have been on the drugs that it's no picnic.” (2)

“This program validates that others feel this way too.” (12)

“I was encouraged that someone is realizing the battle of coping with these medicines.” (16)

“I think other women could benefit from this.” (28)

Helpful: Other:

This code arose 23 times during the coding process, and 19 participants mentioned it (56%). When a piece of feedback was unable to be fully captured by one of the above helpful codes, it was put in the “Helpful: Other” category. These covered a range of topics from mentioning they were taking their medications more regularly, increased accountability, self-reflection, and the program being generally helpful.

“I don't know if I learned anything specifically, I just have been taking my anastrozole more regularly.” (1)

“Better accountability. It was interesting that one exercise asked us to take credit for what we do, and the second exercise asked us to plan what brings us joy. Both of those require taking stock and being accountable, which were good reminders.” (3)

“This was beneficial, I'm not sure there's anything else that can be added.” (8)

Unhelpful: Elementary:

This code only arose 8 times during the coding process from 6 women (18%). This code was meant to encapsulate feedback regarding the program being elementary or repetitive. A few participants mentioned that this program could be written at a higher reading level to keep people engaged. Participants also mentioned that some of the questions and activities felt repetitive and they could have done without those questions.

“Some of this was too basic, too 101. I think you can write the content for a higher grade level.”

(2)

“Sometimes it seems a bit repetitive and elementary.” (4)

“I’m already familiar with the concept of Positive Activities, so the introduction didn’t add much to what I already knew.” (25)

Unhelpful: Technology Issue:

This code was mentioned 22 times during the coding process from 11 women (32%). Participants encountered a few technical difficulties with the program that interfered with their learning. One of the activity sorting pages was not working on iPads or computers, and the print button also had problems for some participants which led to frustration.

“The one form I filled out for the list of positive activities was buggy. Not only did it frustrate me but it also concerned me for your success.” (10)

“There were a few things that were not accessible with the program and I let myself get irritated about it.” (23)

“It could be hard for someone to do on their phone. Laptop worked best.” (28)

Unhelpful: Side Effects:

This code arose 17 times during the coding process from 11 women (32%). This code referred to desiring more specific side effect assistance from the program. Participants mentioned wanting more education on how to manage side effects besides utilizing a positive affect

program. This code was also used when participants mentioned generally having side effects impact their daily life or that the program was unhelpful in managing or helping with side effect intensity.

“I did not get anything out of it. My mood and attitude are fine. What needs to be addressed is that anti cancer medications have caused life long injuries to me and that are worse than cancer.” (15)

“I really wanted this program to help motivate me to take these medications. I actually restarted taking them when I started this program. However, the side effects quickly overcame the motivation. I know you were focusing on our attitudes toward the medication. What would help also is more education regarding the medication. More information related to why the side effects are so problematic.” (16)

“This didn't really help me feel better about my meds or help with the side effects.” (30)

Unhelpful: Length:

This code arose 10 times during the coding process and was endorsed by 8 women (24%). Some participants mentioned wanting a longer or shorter program. This code was also used when participants liked the program enough to want a longer program.

“I would enjoy more modules with additional suggestions on how to stay positive or how to handle/offset any side effects.” (5)

“It felt a little long.” (21)

“Too short, wish it could be longer/ongoing.” (34)

Unhelpful: Mentality:

This code was mentioned 7 times during the coding process from 4 different women (12%). Some participants did not like the tone of the program. A positive outlook or mentality was not helpful for them and they found it difficult or upsetting.

“I could have used support, instead of a rah-rah ‘Oh, don't bother about the side effects, think of something else when you are in so much pain you can't walk or have a constant migraine or can't sleep etc etc’” (6)

“It's almost like the individuals running the program have no idea what the participants are battling. To just insinuate that thinking positively will make all the horrible side effects disappear is unrealistic.” (16)

“I HATE forced meditations and affirmations.” (6)³

Unhelpful: Taking Credit:

This code arose 13 times during the coding process from 10 women (29%). *Taking Credit* or aspects of it were unhelpful for a few of the participants. This code was used when it was the whole module or a part of the module that was unhelpful. Parts of the modules that were unhelpful included not having an issue taking the medication daily in the first place, some of the examples not connecting to the women's experience, and bringing up feelings of frustration regarding all that these women have to do on a daily basis.

“Ironically the program made me feel frustrated that I have to put so much effort into trying to enjoy my life. It highlighted how difficult some things have become for me.” (24)

“I don't have problems taking my medicine daily, so some of the examples didn't connect to my experience.” (19)

“I'll have to meditate on the taking credit concept. I can see why it might work for some but it feels presumptuous for me.” (10)

Unhelpful: Positive Activities:

This code was mentioned 10 times during the coding process. It was endorsed by 7 participants (21%). *Positive Activities* or a part of the module were unhelpful for a few of the

³ Note that nothing was forced during the program, but there were recommended meditations and affirmations in the modules.

participants. This code was used when it was the whole module or a part of the module that was unhelpful or when they had recommendations on how to improve it. Examples for what was unhelpful about the module for some participants were that doing positive activities themselves were challenging, and it was less interactive and impactful.

“Doing positive activities is difficult when you feel terrible from the side effects.” (16)

“Making the 2nd module more interactive for someone already taking action would be beneficial. I didn't think it really pushed me to do more positive things, just really listed out what I like to do and provided recognition of those things. I almost feel like the modules could've been flipped with the positive activities first, followed by taking credit.” (19)

“The 2nd module wasn't as impactful. A week later, it was hard to recall the takeaways. Most of the activities I listed as taking action with are things I had already planned.” (19)

Unhelpful: Other:

This code was mentioned 13 times during the coding process and was endorsed by 12 participants (35). When a piece of feedback or comment was unable to be fully captured by one of the above unhelpful codes, it was put in the “Unhelpful: Other” category. The participants mentioned various things like the program being generally unhelpful, the program making them feel tired, or it being hard to sit down and do the program.

“I am tired after a long, busy day and didn't have a lot of mental energy to put into this.” (28)

“I don't need your services.” (15)

“Only difficulties were thinking deeply on how I am feeling.” (5)

“I can't feel good about taking this poison [the medication].” (6)

Additional Support Recommended:

This code arose 32 times during the coding process and was endorsed by 20 participants (59%). When prompted by questions asking if an additional support element would be helpful

during this program, participants said it would be beneficial and others recommended other supports. Those additional participant-recommended supportive elements fell into the categories of someone to talk to in the program, more education about side effects, and personal mitigation of the intensity.

“In addition, you should create a module about how to discuss drug side effects with your doctor. Maybe list some examples that a patient should suggest (i.e., lowering the dose) with their doctor. It's my believe that the reason why women have a problem taking these drugs is due to side effects.” (22)

“Trying to find someone around my age to talk with when I was initially diagnosed would have really helped me through the process. There's just so many questions that it would have been nice to talk with someone about how they handled it.” (8)

“It would be helpful to think more about the barriers to changing my mindset around activities that take up energy. Medication has a big impact on my energy levels.” (19)

Additional support Question from REDCap

To further investigate how this support should happen, we looked into the REDCap survey question asking if having a coach in the program to guide them and help with managing their side effects would be helpful. Most participants (30/34) said it yes, it would be helpful. Of those, the most frequent options requested for how this person should contact them were in person (13/30), in a video conference (24/30), or over the phone (17/30). They requested another woman with breast cancer (17/30), a nurse practitioner (19/30), and an oncology social worker (16/30) the most frequently.

Discussion

This study sought to investigate how breast cancer survivors responded to an online positive affect based program to help support their anti-hormonal medication adherence. Consistent with our hypothesis, both participants' positive affect and reported medication adherence scores increased significantly from baseline to post. Additionally, participants' depression scores significantly decreased over the same time period. These results are consistent with previous literature probing how targeted positive affect interventions can positively impact medication adherence, boost positive affect, and decrease depression symptoms for those suffering from breast cancer and other chronic illnesses (Bassett et al., 2019, Arch et al., 2022, Craske et al., 2019, Craske et al., 2023, Cheung et al., 2017, Bright et al., 2023, Lin et al., 2017). These results add to the existing literature on how to support breast cancer survivors in adhering to their anti-hormonal medications.

This work is important because it seeks to address the gap illustrated in various studies on anti-hormonal medication adherence rates for breast cancer survivors. Primarily, Murphy et al. (2012) reported that 40%-72% of women prescribed anti-hormonal medications succeed in adhering for the full duration, whereas 31%-73% of people discontinue these medications before the full five to ten years. Similarly, Yussof et al (2022) found that as many as one third of women discontinue these medications by five years. Non-adherence remains an unaddressed issue. The second reason this study is important is because few studies seek to investigate the impact of a positive-affect based program for anti-hormonal medication adherence. As of the writing of this paper, there remained only one other intervention that sought to utilize affective attitudes towards anti-hormonal medications to increase adherence (Arch et al., 2022).

Furthermore, this study is important due to the qualitative information gathered from participants regarding how to improve their experience. Gathering their feedback in their own

words is important to understanding participant reactions in detail. Here one of the aims of the study was to gather participant feedback in order to refine the study and focus on what survivors actually want and need. By analyzing participants' qualitative feedback, this study enriched our understanding of how women benefit from an online, self-paced, positive affect based program and highlighted specific points for improvement.

Firstly, participants seemed to generally approve and enjoy the program, and wished for a longer one with more modules with different activities. *Positive Activities* was endorsed more often than *Taking Credit*, but not by much. These women liked being given the space to write out and reflect on their experiences taking anti-hormonal medications. The program facilitated positive thinking and outlook that some women took with them into their daily lives. Feelings of accomplishment were also mentioned when participants were reflecting on all they do in the day to day or for how far each of them have come on their individual journeys. Some women enjoyed this program enough to want other breast cancer survivors to be able to experience it. The online and self-paced format was convenient and appreciated by participants because they could fit it into their individual schedules and there were no timers on how long they could spend on each question or activity.

However, there is room for improvement in the program as well. Some participants desired more education on the specifics of how to manage their side effects and were disappointed that this program did not include a specific section like that. Consistent with findings in a recent meta analysis, it is possible that interventions that target side effect management are impactful for increasing medication adherence for breast cancer survivors (Bright et al., 2023). A few mentioned that this program was unnecessary and did not connect to their experiences taking the medications. While some participants mentioned wanting a longer

program with more sections, others thought it was too long and repetitive. Additionally, although the program was intended to be designed as easily readable and comprehensible, participants thought it could be written at a higher level and that it was a little elementary. In general there were more helpful aspects of the program coded than unhelpful ones. Overall, the results were promising, and they suggest that most participants enjoyed and/or experienced benefits from participating in the THRIVE program.

Study Limitations

The study had several limitations that must be taken into consideration. Firstly, the sample size for this study was only 34 participants. This is an extremely small sample size and makes it difficult to accurately estimate effect sizes, in comparison to a larger study. Additionally, the study population was a relatively homogenous sample of white women, despite researchers' best efforts at recruiting a more diverse population of breast cancer survivors⁴. This sample is not representative of the entire population of breast cancer survivors, and their experiences cannot be generalized to the entire population of survivors. The majority of breast cancer research is done with overwhelmingly white populations, and this remains a gap in the research literature that current and future studies should seek to address. Furthermore, due to this study being based on a non-randomized, single-armed pilot trial, and mostly focused on soliciting participant feedback, results are not definitive regarding changes over time due only to the THRIVE program. The larger THRIVE study was primarily aimed at evaluating the feasibility and acceptability of the THRIVE program, so a small pilot trial was acceptable. However, to test efficacy, a randomized trial with a good control group is needed to control for

⁴ Recruiting a more diverse sample is currently successfully underway. The original pilot study was reopened to recruit more women of color once this limitation was realized.

possible outside influences such as time, simply enrolling in the study, and multiple measurements.

Another limitation of this study was that the sample was already relatively adherent, with a mean baseline score of 75.75. Participants all had to indicate challenges in taking their anti-hormonal medications to be eligible to participate in this study, but this challenge took different forms for each participant, and some only reported high side effect intensity, but may not have actually been missing doses. Some participants reported they were not taking their medication at all before starting THRIVE ($n = 3$). Others indicated they were struggling to take their medication during the screening, but were not actually missing any doses ($n = 16$). Although the wide variation in the severity of struggle is good for the diversity of the sample, this study is not powered enough to properly discriminate between how this program helped those with relatively high vs really low adherence. It would be prudent for future studies to more narrowly define the specific challenges or adherence rate that participants must fit to participate and recruit a less adherent group of women. This would allow researchers to develop targeted programs for the various struggles that breast cancer survivors might be facing.

Future Directions

This study was a good step forward in addressing the serious problem of how to support breast cancer survivors in adhering to their anti-hormonal medications for the recommended amount of time. Future directions for this research involve revising and repiloting of the program utilizing the feedback gathered in this study. A second iteration of the program should include education and support around how to more concretely deal with the side effects of these medications or how to discuss options with a doctor. Additionally, support from another woman or clinician in person, over the phone, or in a video conference and clinician support were

strongly desired. Other than technical difficulties, these were the major specific recommendations described by participants.

Additionally, this program only adapted two of the many general positive affect building activities from the original PAT intervention. Other aspects of positive affect based programs typically include self-compassion generating, positive reappraisals, gratitude taking, and finding the silver lining to more negative situations, which were left out of this short pilot study (Cheung et al., 2017). A longer, more rigorous program was desired by some participants, and adding more modules focusing on the ideas above may be a possible way to implement that recommendation.

To further probe for whom this program was impactful or less impactful for, future studies should consider including qualitative exit interviews for participants. A limitation of this study was that, besides the initial screening, there was limited contact between researchers and participants, so qualitative data had to be taken at face value. Including qualitative interviews would let researchers ask follow up questions about what participants thought about the program and see if there are any commonalities between women who benefited more or less from the program. We could further investigate for whom and how positive affect programs can be used to support breast cancer survivors.

Additionally, a randomized controlled trial with a more diverse group of women with lower adherence is needed to ensure that the results are causally related to the program. Due to this study being a single-armed pilot study, we cannot infer that the results are due only to the administration of the program. There may be outside effects that led to the significant results that were not accounted for in analysis, such as time and repeated measurement. A two-armed randomized control trial would help support any favorable or unfavorable results found.

Conclusion

Overall, the current study expands our understanding of how to better support breast cancer survivors who are facing challenges in adhering to their anti-hormonal medications. Utilizing both a quantitative and qualitative methodology, we evaluated an online positive affect based program to support breast cancer survivors. More research is needed, however, this research offers valuable insights on how a positive affect based program is appropriate to help support breast cancer survivors, as long as an additional support for side effects is included. Although the study was a single-armed, non-randomized study, it provides significant insights into a possible way to support adherence for these women while increasing positive affect and decreasing depression symptoms. This study gathered important participant feedback and analyzed it for what was helpful and unhelpful about the program. Future studies should seek to implement the participant recommended changes to further address their unmet needs while maintaining the parts of the program that were widely appreciated.

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Appendix

Study Tables and Figures

Table 1

List of questions in THRIVE Surveys and REDCap Survey used in this project

Questions from *Taking Credit and Positive Activities-*

What was most helpful to you from this online session?

What was least helpful to you from this online session?

In what ways was this online session easy to use?

In what ways was this online session hard to use?

Any other thoughts or reactions?

Questions from REDCap Post Survey-

What have you learned from the program?

What did you like best about the program?

What did you like least about the program?

How could we serve you best?

Additional thoughts about a support in the program?

Table 2*Study Demographics*

Participant Characteristic	Mean, SD, %
Age	$M = 56.35$, Median = 54, Range = 34-79, $SD = 11.08$
Racial Identity	
White	100% (34/34)
Black / African American	0% (0/34)
Asian, Asian American, or Pacific Islander	0% (0/34)
American Indian or Alaska Native	0% (0/34)
Other	0% (0/34)
Ethnic Identity	
Not Hispanic or Latino	97% (33/34)
Hispanic or Latino	0% (0/34)
Prefer not to answer	3% (1/34)
Gender - Female	100% (34/34)
Relationship Status	
Married	64.7% (22/34)
Partnered (ongoing committed relationship, not married)	8.8% (3/34)
Single	20.6% (7/34)
Divorced/Separated	5.9% (2/34)
Widowed	0% (0/34)
Other	0% (0/34)
Household Income	

Less than \$29,999	5.9% (2/34)
\$30,000-\$49,999	0% (0/34)
\$50,000-\$74,999	5.9% (2/34)
\$75,000-\$99,999	26.5% (9/34)
\$100,000-\$149,999	29.4% (10/34)
\$150,000 or more	32.4% (11/34)

Education

Some High School	0% (0/34)
High School Diploma	5.9% (2/34)
Some College	0% (0/34)
2 year college degree	8.8% (3/34)
Bachelor's degree	44.1% (15/34)
Graduate Degree (MA, PhD)	38.2% (13/34)
Professional Degree (MD, JD, MBA)	2.9% (1/34)

Cancer History *

Surgery	100% (34/34)
Radiation	73.5% (25/34)
Chemotherapy	32.4% (11/34)
Anti-Hormonal Medication	100% (34/34)
Other**	17.6% (6/34)

Cancer Stage

Stage 0	3% (1/34)
Stage 1	47.1% (16/34)
Stage 2	32.4% (11/34)
Stage 3	5.9% (2/34)
Stage 4	0% (0/34)
Between Stages	11.8% (4/34)

Medication Type

Tamoxifen (Nolvadex, Soltamox)	35.3% (12/34)
Arimidex (Anastrozole)	23.5% (8/34)
Aromasin (Exemestane)	14.7% (5/34)
Femara (Letrozole)	23.5% (8/34)
Other	8.8% (3/34)

Total Participants 34

* Participants could select all that apply, so totals will be more than 34.

** Acupuncture, Diet changes, Zometa, Luporn, Prolia

Table 3*Quantitative Results Table*

Measure	Baseline Mean (SD)	Post Mean (SD)	Effect Size Cohen's D	Baseline to Post t-test, p-value
PANAS*	29.59 (6.72)	32.68 (7.55)	$d = 0.43$	$t = 3.44, p = .002$
PHQ-8	8.63 (4.89)	6.42 (4.85)	$d = -0.46$	$t = -3.59, p = .001$
AET (3 items)	75.75 (32.89)	82.15 (29.68)	$d = 0.20$	$t = 2.60, p = .01$
AET (2 items)	72.06 (34.09)	79.41 (31.42)	$d = 0.22$	$t = 2.46, p = .02$

*Positive Affect subscale (Watson et al., 1988); Patient Health Questionnaire-8 (Kroenke et al., 2009); AET adherence measure (Wilson et al., 2016)

Figure 1

Participants positive affect (PANAS) scores at baseline and post

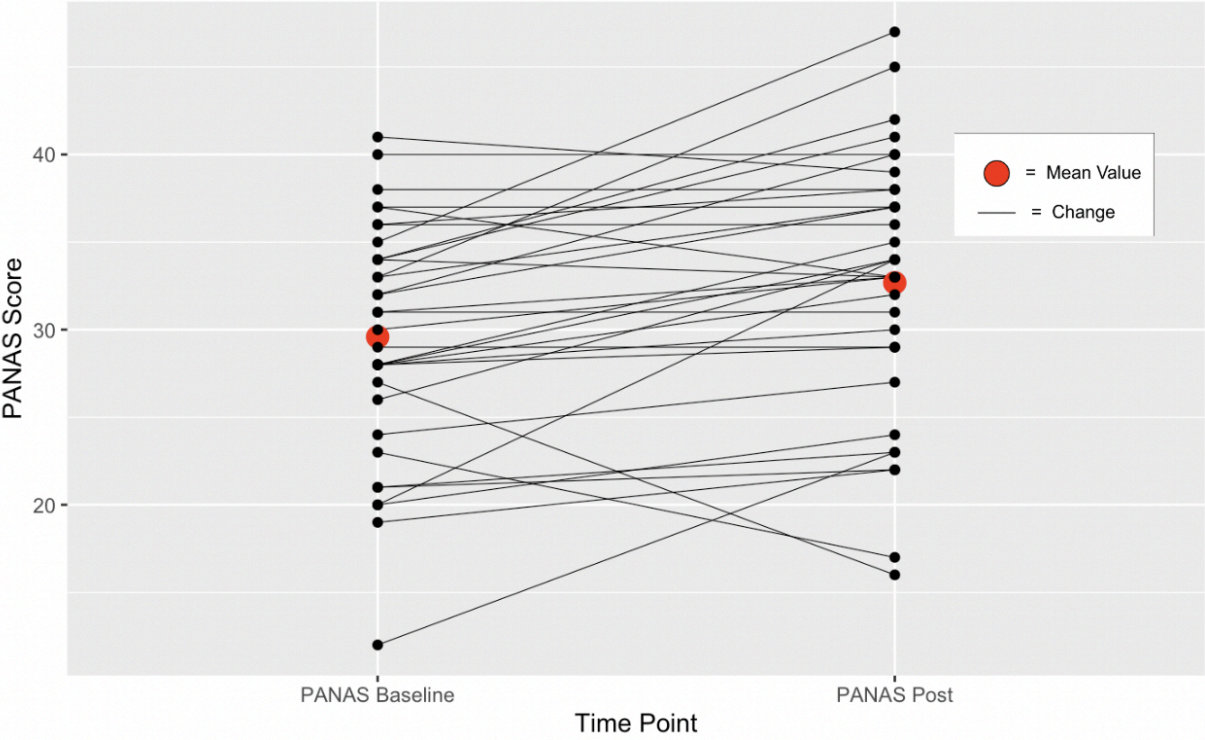


Figure 2

Graph of how many participants increased, decreased, or had no change on positive affect

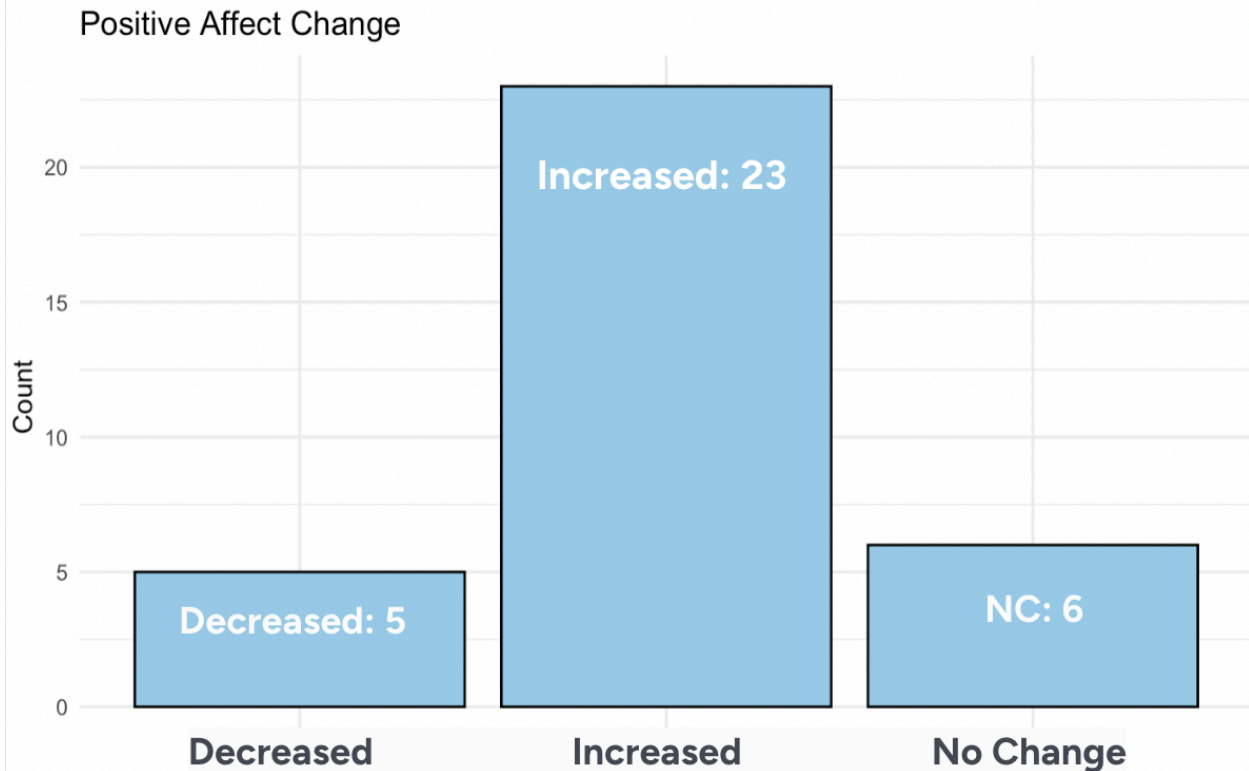


Figure 3

Participants depression (PHQ-8) scores at baseline and post

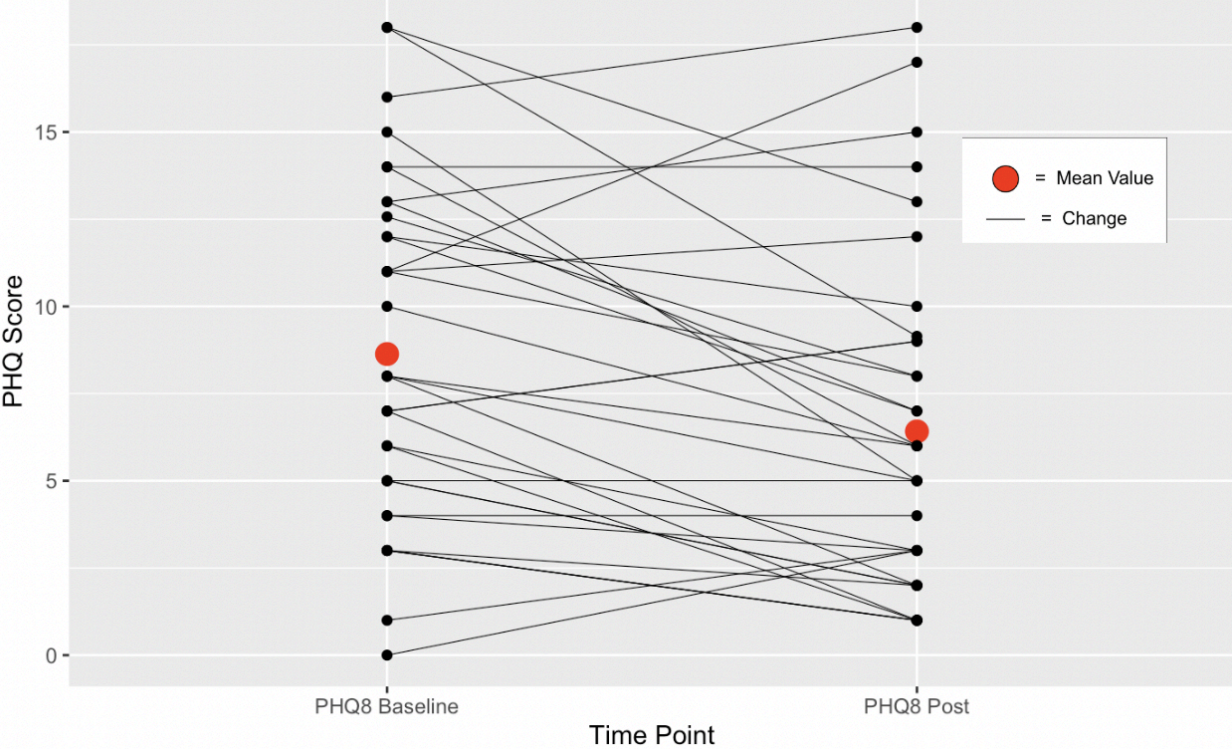


Figure 4

Graph of how many participants increased, decreased, or had no change on depression scores

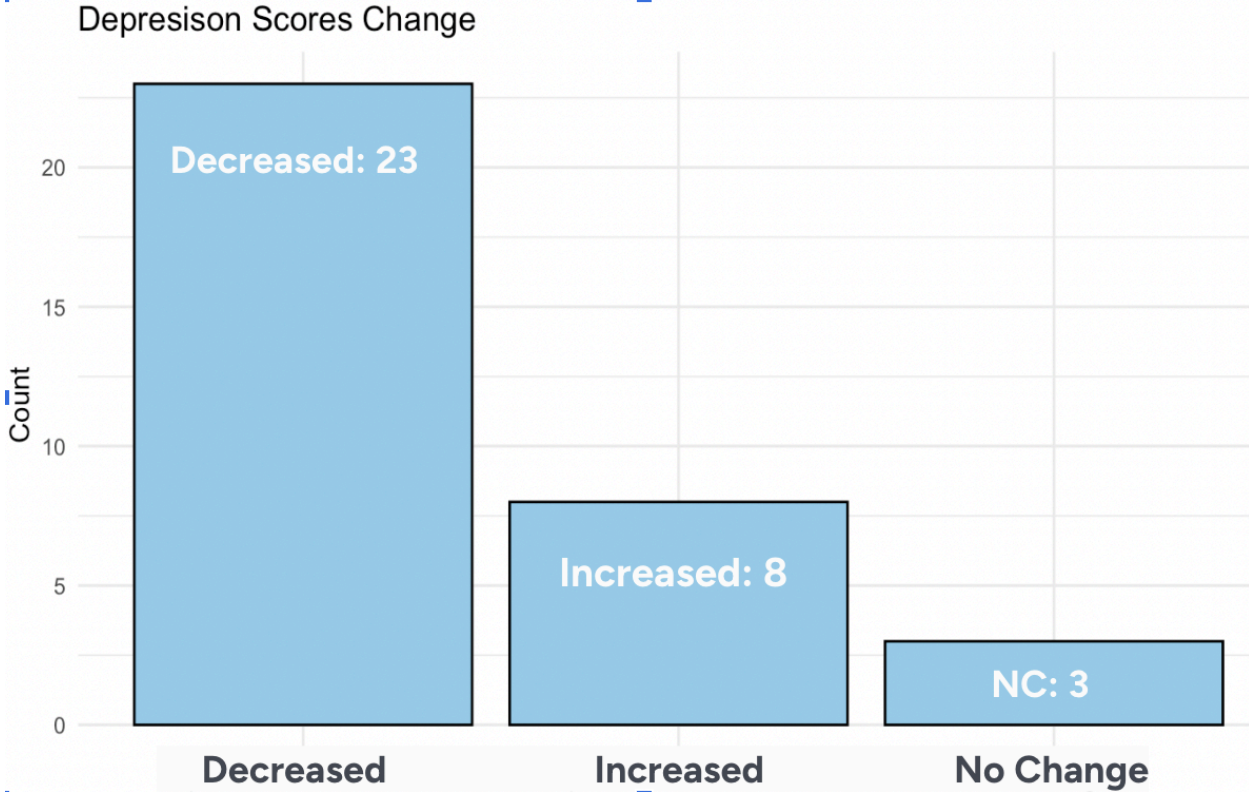


Figure 5

Participants anti-hormonal medication adherence (2-items) scores at baseline and post

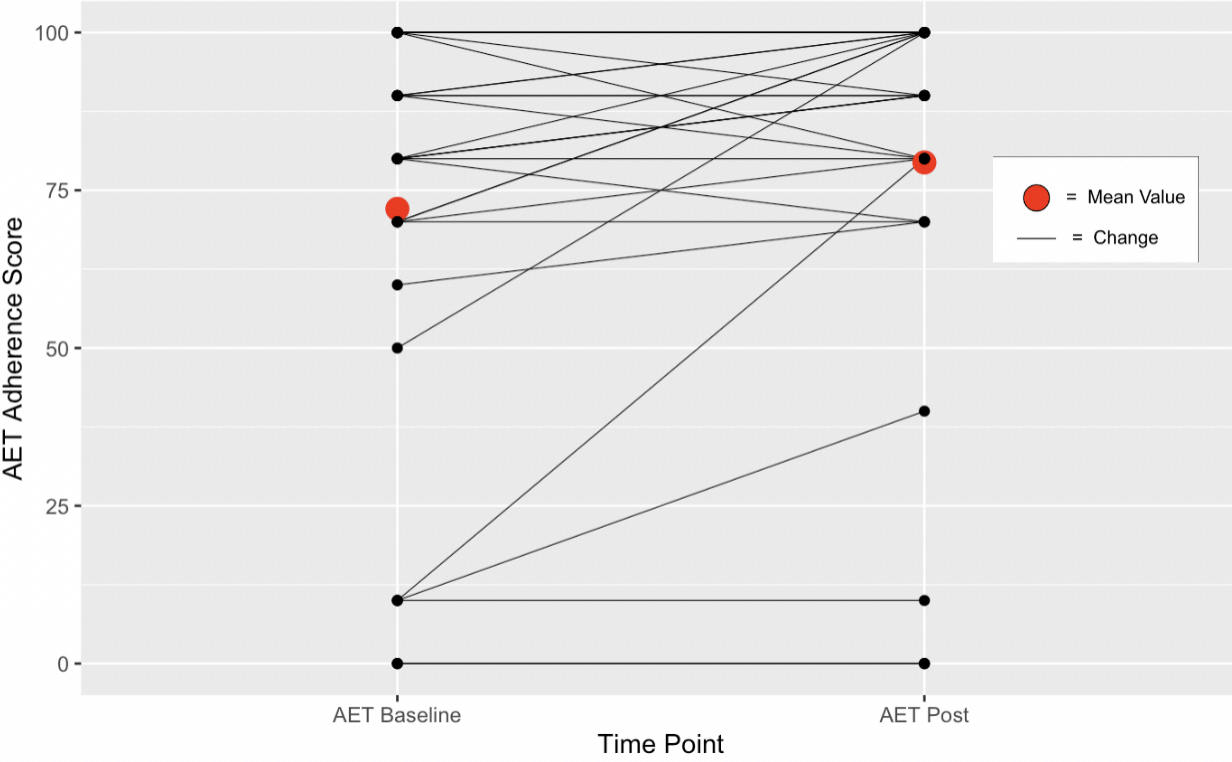


Figure 6

Participants anti-hormonal medication adherence (3-items) scores at baseline and post

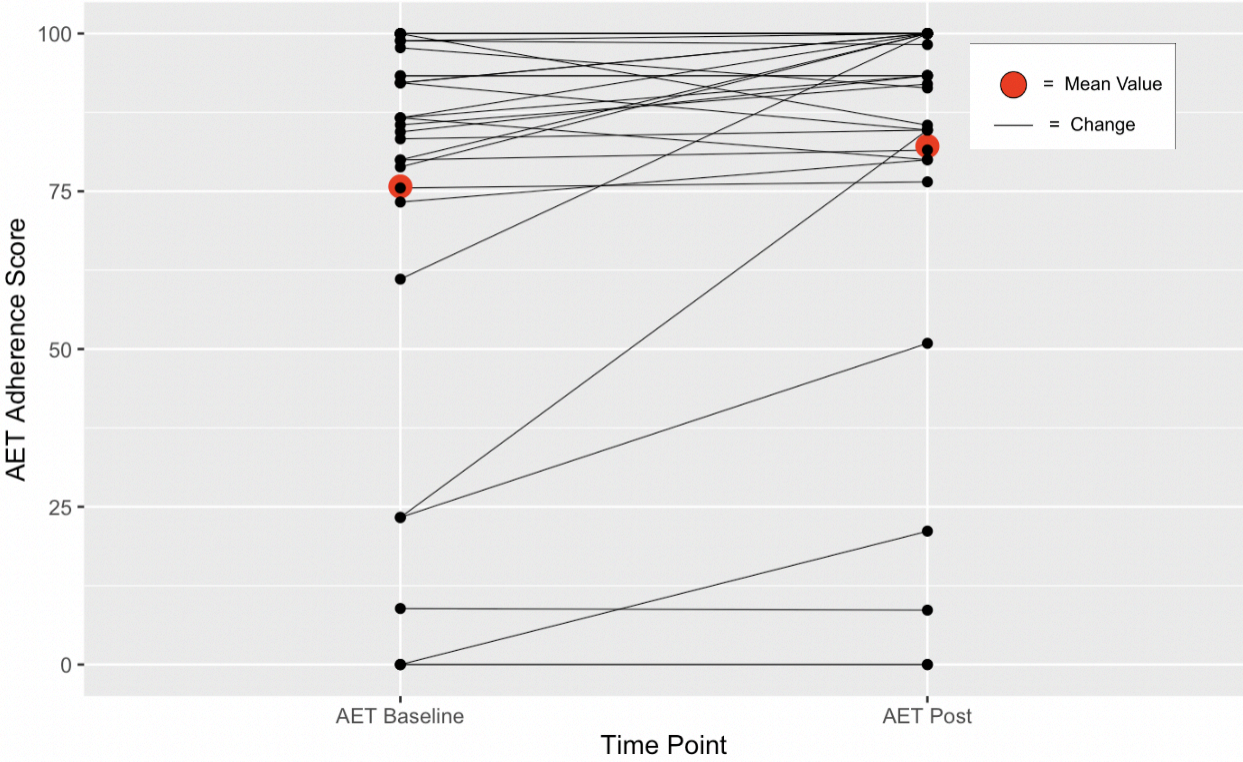


Figure 7

Graph of how many participants increased, decreased, or had no change on 3-item adherence measure

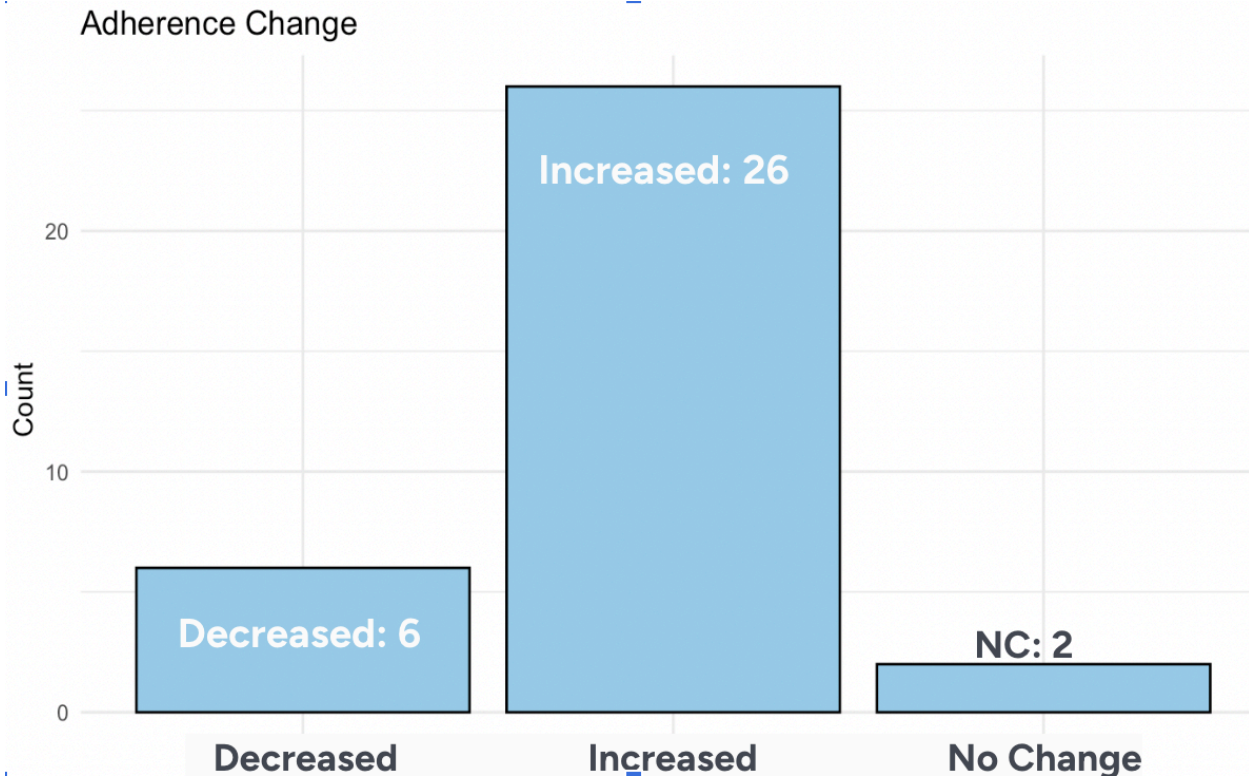


Figure 8

Representation of Qualitative Results

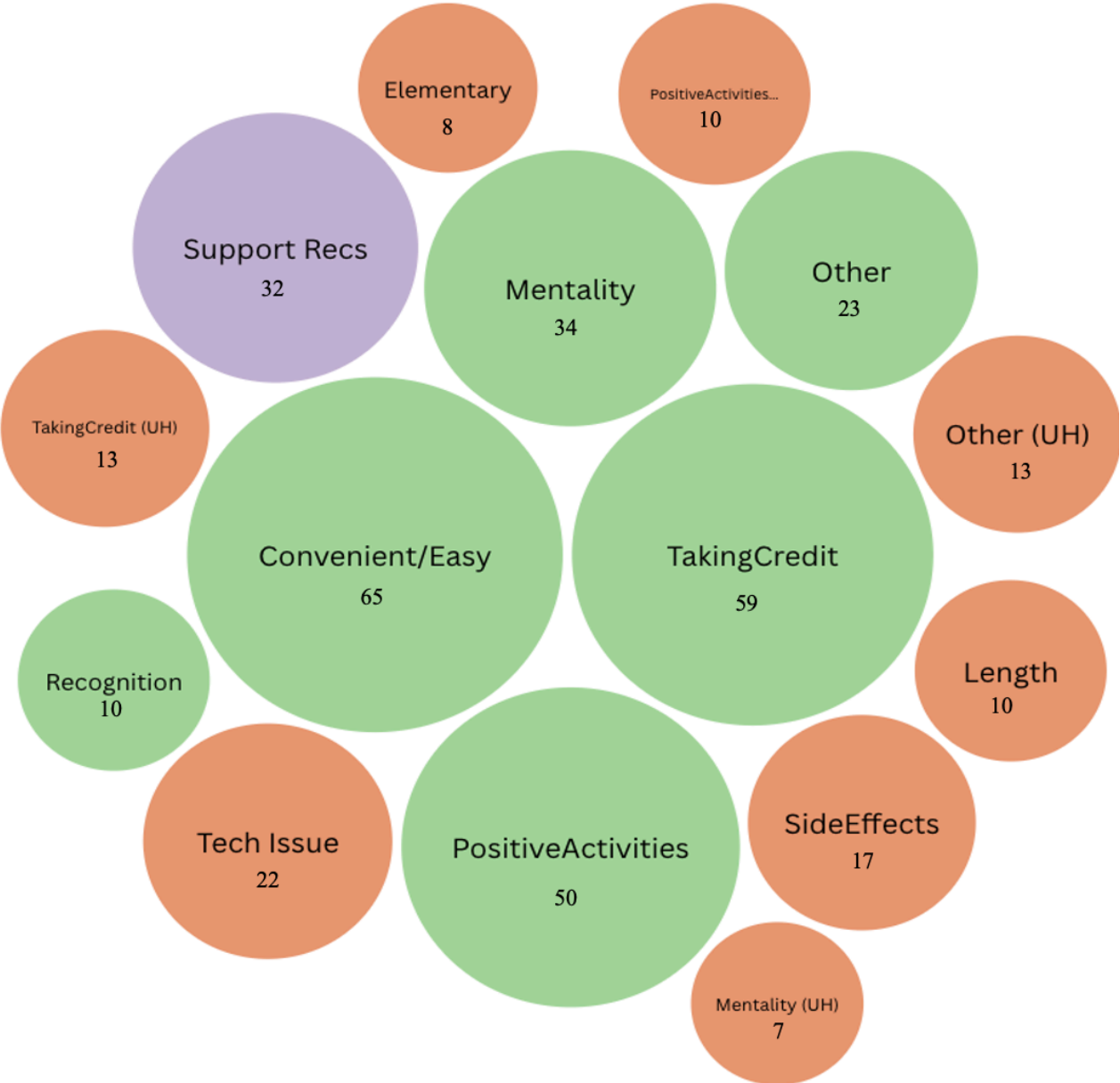


Table 4

Table of all the codes and code definitions used in the project, along with frequencies of each code

Code	Definition of Code	Number of times code was used	Number of women who endorsed code
Helpful_Convenient/Easy	Participant says the program was convenient, easy, clear	65	30
Helpful_Taking Credit	Participant mentioned liking Taking Credit, breaking things into steps, and giving self credit for all that is done. taking stock of all they are doing; in regards to the specific ways in which the content was taught	59	30
Helpful_Positive Activities	Participant mentioned liking Positive Activities, savoring them, or planning them; in regards to the specific ways in which the content was taught	50	32
Helpful_Mentality	Participant mentioned something about changing their mentality or practicing mindfulness; Participant mentioned that the program integrated positivity throughout and this was helpful-- outside of just the positive activities module	34	20
Helpful_Recognition	Participant mentioned feeling recognition for their cancer struggles (felt they were being understood - outside source); recognized for the hardships and challenges	10	6
Helpful_Other	Participant mentioned something else that was helpful that was not captured in another code	23	19
Unhelpful_Elementary	Participants mentioned that the program was too basic or elementary or repetitive. Participant mentioned already being familiar with this program	8	6
Unhelpful_Techissue	Participant mentioned something did not work or was buggy	22	11

Code	Definition of Code	Number of times code was used	Number of women who endorsed code
Unhelpful_Sideeffects	Participant mentioned wanting more on how to deal with side effects Participant wants more education on side effects or was confused about an aspect of them	17	11
Additional Support Recommended	Other support recommended to the program. What else they wanted or needed can also be used for general recommendations like utilizing a zoom formate	32	20
Unhelpful_Length	Participants wanted it to be longer or shorter	10	8
Unhelpful_Mentality	Participants mentioned the program's focus on positivity and general approach was not helpful, too preachy, didn't actually help with side effects (outside of noting that the Positive Activities module was unhelpful). If they specifically mention the unhelpfulness is linked to a specific module, put it in that module's unhelpful category	7	4
Unhelpful_Taking Credit	Participant mentioned NOT liking Taking Credit, breaking things into steps, and giving self credit for all that is done The module was hard to get through. Uncomfortable emotions	13	10
Unhelpful_Positive Activities	Participant mentioned NOT liking Positive Activities, savoring them, or planning them; the module was hard to get through	10	7
Unhelpful_Other	Something else was unhelpful not encapsulated by other codes	13	12