Evaluation of a Multidisciplinary Health Promotion Program for Individuals with Cancer

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Abstract

Purpose: With the increased focus on health-related quality of life (HRQOL) and wellness for individuals with cancer, formal health promotion programs have become an integral part of the comprehensive services promoted in many cancer care centers.

Research Question: For individuals living with cancer, does participation in a structured health promotion program, that incorporates integrative health coaching (IHC) with nutrition and physical activity support, result in improved health-related quality of life (HRQOL)?

Setting/Sample: A community hospital-based cancer center in central Virginia. A convenience sample of eight patients was enrolled in the health promotion program, and six completed all elements within the study timeframe. Participants varied along the treatment trajectory, with a range of primary malignancies, mostly solid tumors.

Design/Methods: A quasi-experimental pretest-posttest design was used to address the impact of an existing health promotion program on HRQOL. Participants were enrolled from September – December 2017, and completed the multidisciplinary components of the program over a period of 9-14 weeks.

Measures: Demographics, tumor and treatment-specific information, and anthropometric measures were collected at time of enrollment, with anthropometric measures again collected at program completion. The RAND SF-36 was used to assess HRQOL indices at baseline and at completion of the program.

Findings: Six participants completed the program, and demonstrated near-statistical significance in BMI reduction (–0.7 kg/m^2, $p = .062$) and improvement in the domain of physical functioning (+10.9 points, $p = .062$). Post-intervention scores were improved over baseline in seven of the eight HRQOL domains.

Conclusions: The findings suggest that the program may have modest effect on improving HRQOL, especially within the domain of physical functioning. Several suggestions are made for program improvement.

Key Terms: integrative health coaching, health-related quality of life, well-being, cancer, physical activity, nutrition, patient-reported outcome measures

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Section I – Introduction

Though the importance of a healthy lifestyle inclusive of proper nutrition and physical activity (PA) is important to all persons, the need for consciously healthy living is of even more significance for individuals affected by cancer. Compared with the general population, cancer survivors carry higher risk of developing recurrent or secondary malignancies, functional limitations, or other medical conditions such as heart disease, diabetes, or osteoporosis (Kruk & Czerniak, 2013; Wu, Zhang, & Kang, 2013, National Cancer Institute [NCI], 2017). The relationship between PA and cancer risk is well-established, and there is substantial evidence that the two are inversely proportional (NCI, 2017). Physically active cancer survivors have been noted to have lower risk of cancer recurrence and improved survival compared with cancer survivors who are not routinely engaged in PA (Bradshaw et al., 2014; Ibrahim & Al-Homaidh, 2011; Ligibel, 2012; Vijayvergia & Denlinger, 2015). In a study of over 900,000 healthy adults, Calle, Rodriguez, Walker-Thurmond, and Thun (2003) found that a BMI $\geq$ 40 kg/m^2 was associated with a 52% and 62% higher rate of cancer-related mortality in men and women, respectively.

Recognizing the inherent health risks for individuals affected by cancer, many professional societies have developed goals to reduce morbidity and promote health within this population. The American Cancer Society (ACS), in its 2012 *Guidelines on Nutrition and Physical Activity for Cancer Survivors*, recommends that individuals with cancer take a three-pronged approach to health maintenance: 1) achieve and maintain a healthy weight, 2) engage in regular PA, 3) consume a diet that is high in vegetables, fruits, and whole grains (Rock et al., 2012). Likewise, the latest National Comprehensive Cancer Network (NCCN) *Guidelines for*

Survivorship (2017) devote much attention to maintaining a healthy lifestyle via PA, nutrition, and weight management as part of survivorship care planning. Cancer outcomes have remained an integral component of the *Healthy People 2020* guidelines, which specifies the overall goal of reducing the number of new cancer cases within the nation (Office of Disease Prevention and Health Promotion [ODPHP], 2014). Specifically, objectives C13 and C14 aim to increase the 5-year survival rate of individuals with cancer, and to increase the mental and physical health-related quality of life (HRQOL) of cancer survivors (ODPHP, 2014).

While adequate nutrition, including increased fruit and vegetable intake and limiting fat and refined/processed foods, has shown benefit in decreasing morbidity and mortality from cancer and associated chronic diseases (Vijayvergia & Denlinger, 2015), the 2008 ACS *Study of Cancer Survivors-II* suggested that, of the over 9000 survivors across six different cancer types studied, less than 20% of survivors reported actually meeting the 5-A-Day dietary recommendation (Blanchard, Courneya, & Stein, 2008). The latest update from the *Cancer Trends Progress Report* (*Figure 1*) estimates that 38.3% of cancer survivors report no PA (Cancer Trends Progress Report, 2017). Equally concerning is the increasing trend toward obesity among cancer survivors, now at 34%, and rising at an average of 2.7% each year from 2011-2015 (*Figure 2*) (Cancer Trends Progress Report, 2017).

In an effort to provide comprehensive care services throughout the spectrum of cancer treatment and to help meet national standards, many cancer centers around the United States have elected to incorporate formalized, interdisciplinary health promotion programs which focus on nutrition and improved PA. Much research has been conducted to evaluate the effectiveness and impact of such programs on HRQOL indicators. Two Cochrane systematic reviews which examined the effect of exercise interventions in the adjuvant and post-treatment setting found a

positive effect of such programs on HRQOL indices, despite heterogeneity in program design (Mishra, Scherer, Geigle et al., 2012; Mishra, Scherer, Snyder et al., 2012).

Lifestyle behaviors are considered to be the primary contributor to the development of most chronic illnesses, and such behaviors likewise aid in the progression, severity, and treatment nonadherence throughout the lifespan (Caldwell, Gray, & Wolever, 2013). Trends in the United States healthcare delivery model promote a patient-centered approach. Despite this trend, many lifestyle interventions still draw upon a conventional medical model in which an expert clinician *prescribes* a therapy or advised behavior change, rather than *equipping* an individual with the skills and support needed to effect such change (Caldwell, Gray & Wolever, 2013). This approach is antiquated, ineffective, and ultimately, not patient-centered.

Integrative Health Coaching (IHC) is a model of behavior modification support which has roots in integrative medicine values of whole-person care, patient centeredness, mindfulness, and healthy living (Smith et al., 2013). The model, in development since 2002, is grounded in a theoretical premise which maintains that behavioral changes are maximally sustainable when linked to an individual's personal values and sense of purpose (Caldwell, Gray, & Wolever, 2013). Simmons and Wolever (2013) define IHC as a "systematic, collaborative, solution-focused process that facilitates the enhancement of life experience and goal attainment regarding health" (p. 29). In this client-driven approach, individuals are supportively guided by a trained coach to learn strategies to initiate and maintain health behavior change. Patients are perceived as continuous learners who may access intrinsic motivation in order to facilitate change (Smith et al., 2013). Within the therapeutic relationship between client and coach, clients are able to consider their perception of an issue, develop formal goals to address it, and find empowerment through the generation of solutions to affect their desired change (Caldwell, Gray, & Wolever,

2013). Simmons and Wolever (2013) describe the responsibilities of the trained and licensed coach to: (a) elicit internal motivation and sense of purpose, (b) build the capacity to change by increasing autonomy, self-efficacy, and resilience within one's social/environmental context; (c) impart knowledge and education through the modeling of skills, (d) emphasize client accountability, ability to learn through the most challenging stages of change; (e) reinforce the interdependence of mental and physical health.

The graphic representation of the IHC model, the Duke Integrative Medicine "Wheel of Health" (*Figure* 3) maintains that the self-aware patient is at the center of the circle, and is constantly interacting with seven areas of self-care: Personal and professional development, physical environment, relationships and communication, spirituality, mind-body connection, movement/exercise/rest, and nutrition (Smith et al., 2013). Though there are not yet published references of IHC specifically within the oncology population, IHC has demonstrated benefit in reducing the risk of chronic disease and improving health behaviors in persons at risk for cardiovascular disease and in individuals with type 2 diabetes mellitus (Simmons & Wolever, 2013).

Clinically, the importance of robust programs which aim to optimize well-being of individuals with cancer cannot be underestimated, and the structure of such programs should reflect what is supported by the literature. Although many cancer centers in the United States offer nutrition and PA program among their services, the incorporation of health coaching within these programs is not routine. A review of literature was conducted to critically appraise the intersection of nutrition and PA alongside health coaching in formal health promotion programs aimed to assist individuals with cancer to lead healthier lifestyles, and to evaluate outcomes of these programs on HRQOL indices. This analysis was conducted in order to address the question

of whether participation in a structured health promotion program which incorporates health coaching alongside nutrition and PA support, as measured at completion compared with baseline evaluation, result in improved HRQOL indicators as measured by validated patient-reported outcome measures (PROMs).

Section II – Review of the Literature

With the plethora of guidelines and extensive literature which links PA and nutrition to health-related outcomes, this integrated review of relevant literature was limited to well-designed studies with a control group which examined the multi-tiered approach of incorporating health coaching with PA and nutrition support within a health promotion program for individuals with cancer. The search was conducted using the electronic databases CINAHL, Ovid MEDLINE, and PsychINFO. Key words were used as follows: ["health behaviors" OR "health promotion" OR "health coaching"] AND ["cancer" OR "oncology"] AND ["quality of life"]. Inclusion criteria included meta-analyses and randomized controlled trials (RCTs) which were written in the English language, involved human subjects, conducted on adults (age 19+ years), and published between January 2012-April 2017. This search yielded a total of 158 citations. Thirty-one citations were removed as duplicates.

Exclusion criteria were applied, which included studies which were: 1) not conducted on adults, 2) not specific to individuals with cancer, 3) not a health promotion *intervention* (this included citations which only specified a study protocol), 4) not inclusive of all three measures of PA, nutrition and health coaching; 5) not examining the impact of the intervention on overall HRQOL. A total of 122 studies were excluded using this criteria, first by title/abstract search, then by full-text. A total of five studies, all RCTs, met inclusion criteria for final analysis. *Figure 4* shows a schematic diagram of the search strategy. These studies were evaluated using the 25-

item CONSORT checklist to fully appraise the study design, methods, results, and discussion (CONSORT, 2017). Relevant findings are organized in Table 1.

Results

Park, Bae, Jung, and Kim (2012) conducted a study of 48 Korean adult women with breast cancer who had completed adjuvant treatment. Participants were randomized to either: 1) a control arm with receipt of an informational booklet on: cancer, adverse effects of treatment, follow-up care, and healthy eating; or 2) an intervention arm with a 12-week psychoeducational support program. The support program included face-to-face education with a participant reference handbook, telephone-delivered health coaching sessions, and small group meetings. Outcomes measured included overall symptom experience as measured by the validated PRO instrument Memorial Symptom Assessment Scale-Short Form (MSAS-SF), and overall quality of life as measured by Functional Assessment of Cancer Therapy-Breast (FACT-B) instrument. In the total scores for each instrument, the independent t-test favored the intervention group over the control at immediate completion of the study period (12 weeks) and at the 3-month follow up (MSAS-SF $P = .001$; FACT-B $P = .009$).

Hawkes et al. (2013), conducted a study among 410 Australian individuals with non-metastatic colorectal cancer (CRC). Randomized groups included: 1) a usual care arm in which participants received four publicly-available educational brochures on CRC and reducing cancer risk, diet, and PA, along with a quarterly newsletter; or 2) a health coaching intervention arm in which participants were provided with 11 telephone-delivered health coaching sessions over 6 months, a survivor handbook, regular motivational postcards, a pedometer, and a quarterly newsletter from the study center. Primary outcomes were measured at baseline, six- and 12-months, and focused on increased PA (Godin Leisure-Time Exercise Questionnaire), cancer-

related fatigue (Functional Assessment of Chronic Illness Therapy Fatigue Scale), and HRQOL (RAND 36-Item Short Form Health Survey [SF-36]). Results of the independent t-test favored the intervention group for increased intensity of PA at 12 months (P = .023) and increased physical HRQOL at 12 months (P = .072), whereas no significant intervention effects were found for mental HRQOL (P = .455 at six months, P = .472 at 12 months) or cancer-related fatigue (P = .113 at six months, P = .272 at 12 months) at any measured point. Of note, the secondary outcomes of decreased Body Mass Index (BMI) measurement and decreased total and saturated fat intake all favored the intervention group at both six- and 12-month measures (BMI: P = .035, P = .001; total fat: P = .002, P = .016; saturated fat: P = .002, P = .016).

Jacobsen at al. (2013), conducted a single-center study on 286 Americans with a variety of cancer types who were embarking on chemotherapy treatment. Participants were randomized to one of four different study arms: 1) usual care only, 2) stress management only, 3) exercise only, or 4) combined stress management and exercise. Assessments were conducted at baseline, six, and 12 weeks after the start of chemotherapy. Primary outcomes measured were HRQOL (SF-36), depression (Center for Epidemiological Studies Depression Scale), and anxiety (Beck Anxiety Inventory). Though independent t-test showed no significant difference in group-by-time interactions for HRQOL (p-values > .060), the combined stress management and exercise arm showed improved outcomes in both depression and anxiety over all other study arms (P = .019, P = 0.049, respectively). Secondary outcomes of physical activity (P = .020) and stress management (P < .001) favored the combined stress management and exercise arm at all endpoints.

Mosher, Lipkus, Sloane, Snyder, Lobach, and Demark-Wahnefried (2013), conducted a multi-center study of 543 North Americans in an effort to examine how self-efficacy may impact

the long-term maintenance of healthy lifestyle practices among cancer survivors. Participants had early-stage (in situ, localized, regional) breast and prostate cancer, were within nine months of diagnosis, and randomized to either: 1) an attention control group which received publicly-available materials on diet and PA, or 2) an intervention group which received materials that were tailored to each individuals' demographic/psychological characteristics. Outcomes were examined in the areas of dietary fat restriction (Diet History Questionnaire), physical activity (7-day Physical Activity Recall), and self-efficacy for increased health promotion behaviors (including exercise, fruit and vegetable intake, and eating a low-fat diet). Results of multiple regression analyses suggested that change in self-efficacy led to improved health behavior change, as evidenced by the ability to fat-restrict the diet ($p < .001$), increase the total number of minutes of PA per week ($p < .01$), and increased daily fruit and vegetable intake ($p < .001$). This work showed that identifying key psychosocial determinants of health behavior is critical to effective health promotion programs.

Trinh, Plotnikoff, Rhodes, North, and Courneya (2014), in a study of 32 adult Canadian kidney cancer survivors examined the impact of behavioral counseling in the long-term adherence to a prescribed PA program. Participants were randomized to either: 1) a control arm in which supervised physical activity was coupled with standard *exercise* counseling (focusing on education surrounding PA), or 2) an intervention arm which included supervised physical activity with the addition of *behavioral* counseling (with a focus on goal-setting, stimulus control, and overcoming barriers to lifestyle modification). Self-reported outcomes examined at study completion (12 weeks) included HRQOL (Functional Assessment of Cancer Therapy-Fatigue), body composition, cardiorespiratory fitness (VO_2 max), and physical function (modified version of Leisure Score Index). Though there were no significant changes in quality

of life measures, analysis of variance demonstrated near-significance favoring the intervention for increased minutes of PA per week meeting national guidelines (P = .052) and improvement in the 6-minute walk test (P = .046).

Discussion

Health promotion programs which incorporate health coaching alongside nutrition and PA interventions do seem to have a net positive effect on HRQOL indices for individuals with cancer. The five RCTs included in this review showed mixed findings on overall benefit of health promotion programs, though the trend was toward a neutral or positive benefit favoring the intervention. The usual care or control arm never outperformed the intervention group in any outcome of any of the five trials. No harm was caused to any patient. A well-designed program may have a beneficial clinical impact on overall well-being, and aid in the risk reduction of cancer recurrence or other medical comorbidities.

There were several weaknesses identified in this review of current literature. First, there exists much heterogeneity in study design, outcome measurement indices and respective instruments, length of intervention, and varied time-to-endpoint measurement. This makes comparison between studies highly variable and difficult to correlate overall significance. However, from this review, a few key observations were made to inform formal health promotion programs in clinical cancer care:

1) **Suggested HRQOL Indices for Measurement**

   Results from this analysis revealed a wide variety of different HRQOL indices to measure within a program, which supports previous statements in the literature as to the heterogeneity of program design. Indices found in this integrative review included: symptom occurrence, fatigue, level of PA, anxiety, depression, and stress management.

The impact (via statistical significance) of the interventions on each of these indices varied between studies, and was dependent upon the study aim and design. No firm conclusions could be made as to which indices should be measured within a study, except that a global assessment instrument which encompasses both physical and mental/emotional indices may allow for a more comprehensive assessment of well-being, and decrease the burden of instrument completion on patients. Researchers should focus on most up-to-date recommendations and measures which are outlined by *Healthy People 2020* and measured by *Cancer Trends Progress Report*.

2) Suggested Program Design

A greater overall intervention length appeared to have a more durable effect on the long-term adherence to PA regimens and nutritional changes. Suggested intervention duration would be 10-12 weeks, with outcomes measured incrementally thereafter. Most studies best demonstrated benefit of the inclusion of health coaching at the 12-month or longer interval. Additionally, lifestyle modifications appear to be increased and more durable when conducted in person, as opposed to via telephone or mailed materials.

3) Suggested PROM Instruments

Instruments used in these RCTs varied highly between each study. Most studies included validated PROMs, however, this was not always assured in every study, especially studies in which fruit and vegetable intake was reviewed. Future studies should use only validated PROMs in an effort to find the most meaningful measures of information, and which require a low burden of completion for the patient. The RAND 36-Item Short Form Health Survey 1.0 (SF-36) seemed to address meaningful HRQOL indices, and also yielded statistically significant measures. The SF-36 is well-validated

and widely accepted for use within HRQOL research for individuals with cancer, as demonstrated in the ACS *Study of Cancer Survivors-II* which examined cancer survivors' adherence to lifestyle behavior recommendations (Blanchard, Courneya, & Stein, 2008).

The purpose of the present study was to examine the effect of participation in a structured 10-12 week health promotion program for individuals with cancer which incorporates IHC alongside nutrition and PA support, and to compare outcomes on HRQOL as measured by the SF-36 at completion of the program compared with baseline evaluation.

Section III – Methods

Introduction and Purpose

Behavior change can be difficult when attempted individually and without support. In contrast, partnership with a health coach, in which the relationship is focused on the mutually beneficial exchange of ideas and setting of goals, can aid in the process of personal discovery and enhance the ability to make meaningful steps toward healthy living (Wolever et al., 2013). With the vast amount of existing data supporting the focus on healthy nutrition and increased PA within the cancer-affected population, meaningful health promotion programs are a vital component of comprehensive cancer services and patient-centered care values.

The study sought to identify the impact that a multi-faceted, multidisciplinary health promotion intervention including IHC, nutrition counseling, and PA support had on HRQOL indicators and an individuals' overall sense of well-being. The study attempted to answer the following research question: For individuals living with cancer, does participation in a structured 10-12 week health promotion program which incorporates IHC alongside nutrition and PA support, as measured at completion compared with baseline evaluation, result in improved HRQOL indicators as measured by a validated PROM?

Project-Specific Definition of Terms

Health: The World Health Organization (WHO) defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (International Health Conference, 2002, p. 1). The WHO has not amended this definition of health since 1948, despite wide criticism (Callahan, 2013; Sartorius, 2006). For the purposes of this study in the context of individuals with cancer, a broader definition of health was assumed as defined by Norman Sartorius, former director of the WHO's Division of Mental Health and past president of the World Psychiatric Association (World Psychiatric Association, n.d.). Sartorius, in a 2006 article entitled, "The Meanings of Health and its Promotion", makes the case to redefine health as a "state of balance, an equilibrium that an individual has established within himself and between himself and his social and physical environment" (p. 662). In light of the chronic nature of cancer and its impact on all aspects of an individuals' life, this definition serves the more encompassing view of accepting the current realities of one's health, and reckoning them to the surrounding environment.

Well-being: Well-being is a holistic term referring to an individuals' global sense that his or her life is "going well" (Centers for Disease Control and Prevention [CDC], 2016, Well-being concepts, para. 1). Though there is no formal definition of well-being, the CDC (2016) incorporates the following components to its description: the presence of positive emotions and moods, the absence of negative emotions, satisfaction with life, fulfillment, and positive functioning. Individuals with higher perceptions of well-being have been shown to have decreased risk of disease, illness and injury, higher immune functioning, faster recovery from illness, increased longevity, higher productivity in work-related activities, and tend to exhibit higher levels of community engagement (CDC, 2016, Well-Being Concepts). Health, and its

promotion, are inextricably tied to one's overall sense of well-being, and therefore these concepts are foundational to HRQOL research and outcomes (CDC, 2016, Well-Being Concepts).

Integrative Health Coaching (IHC): Simmons and Wolever (2013) define IHC as a "systematic, collaborative, solution-focused process that facilitates the enhancement of life experience and goal attainment regarding health" (p. 29). This approach to health behavior change focuses on goal-setting by the client, with focused support and direction from the trained health coach, with the ultimate goal of teaching and preparing a client to feel empowered to take control over change situations within their life.

Health-Related Quality of Life (HRQOL): "An individual's or group's perceived physical and mental health over time" (CDC, 2016, HRQOL, para. 1). HRQOL has become an important component of research, given that two of the four goals of *Healthy People 2020* are directly related to quality of life (CDC, 2016, HRQOL).

Health Promotion: The process of "enabling people to increase control over, and to improve, their health" (WHO, 2017, para. 1). Formalized health promotion programs for individuals with cancer and the communities in which they live have become integral components of providing comprehensive services, and in meeting national goals set forth by the *Healthy People 2020* initiative (CDC, 2012).

Patient-Reported Outcome Measures (PROM): PROMs are self-completed questionnaires (collected in a reliable, validated, feasible manner) which aim to capture perspectives of health or illness and the effects of healthcare treatments/interventions from the *patient's* vantage point [emphasis added] (Marshall, Haywood, & Fitzpatrick, 2006).

Research Design

The study used a quasi-experimental, quantitative, single group pre- and post-test research design to describe how the multidisciplinary approach of IHC, nutrition counseling, and PA support impact HRQOL indices. Participants evaluated their HRQOL indices, as measured by the validated PROM SF-36, at baseline and at completion of the program, a period of approximately 10-12 weeks.

Sample Description

Inclusion criteria for participation in the study was as follows: English-speaking adults 18 years or older of any gender, ethnicity, or education level who carried a cancer diagnosis of any primary site, regardless of stage of disease. Enrollment was open to individuals at any point in the trajectory of treatment, including diagnosis, active treatment, or surveillance/survivorship. Exclusion criteria included individuals who were not fluent in the English language, not able to provide consent, or not willing to participate in *all* components of the program (IHC, nutrition counseling, and PA support).

A total of eight subjects were enrolled during the study period (Table 5), and six completed all elements of the health promotion program within the available time frame. The mean age of the subjects was 64 years. Five were male, three were female; seven were Caucasian, while the remaining subject was Hispanic/Latino. Six subjects were married, and two were single/divorced. Most subjects declined to reveal their annual household income, but of the two subjects that did the incomes ranged from $50,000 – $99,999. Six subjects were no longer working due to retirement or disability. The level of education was varied among subjects, ranging from less than high school, to possessing a graduate or professional degree. Primary cancer diagnosis was varied across subjects, consisting primarily of solid tumor malignancies, but included two with lymphoma or a myeloproliferative neoplasm (MPN). A majority of

subjects had an early stage diagnosis, with five of the participants with a stage 0, I, or II at the time of CAN program. Three subjects were treated with XRT alone, three with chemotherapy alone, and two had combined modality treatment (chemotherapy + XRT). Subjects were fairly equally spread in the distance from primary treatment, with three on-treatment during CAN, three having completed treatment within 1-6 months of starting CAN, and two who were greater than six months post-treatment. Of the referral sources, three patients were enrolled on the direct recommendation of their radiation oncologist, three enrolled as a result of a promotional flyer or brochure within the cancer center, and two enrolled as direct referrals from the CAN program directors. The mean time to program completion was 11 weeks (standard deviation [SD] = 2.9) (Table 6). Of the allotted six visits each with the RD and oncology social worker, participants completed a mean of 4.4 (SD = 1.7) and 3.8 (SD = 2.2) visits, respectively (Table 6). Table 8 contains statements from several participants on their perceived value of the program, and highlights both positive and negative aspects of the program.

Setting

The study took place at a community hospital-based outpatient cancer center located in central Virginia. In 2015, the cancer center evaluated a total of 931 patients, of which 823 underwent treatment at the center. The primary tumor sites with the highest incidence were: digestive system (*n* = 144; 17.5%), breast (*n* = 142; 17.3%), respiratory system (*n* = 103; 12.5%), male genital (*n* = 84; 10.2%), and skin (*n* = 78; 9.5%) (Sentara Cancer Network, 2016).

In 2016, the center implemented a health promotion program for patients undergoing adjuvant treatment or entering survivorship entitled, the “CAN Program”, which stands for “Change, Activity, Nutrition” (Figure 5). The program is co-led by the center’s social worker, who holds a certification as an Integrative Health Coach by Duke Integrative Medicine, and the

center's Registered Dietician (RD), who is specialist-certified in Oncology Nutrition. As part of the CAN Program, which is offered at no cost to the patient, enrollees receive six sessions of IHC with the counselor, six sessions of nutritional counseling with the RD, and free participation in the Progressive Exercise (ProEx) program at the institutional-affiliated Wellness Center. Components of the ProEx program include: a free two-month membership to the Wellness Center, a pre-fitness assessment, exercise prescription developed in conjunction with the primary oncologist, 30-minute group sessions with a fitness specialist twice weekly, and a post-fitness assessment. Each component of the program with its corresponding interventions is listed in Table 2. Though the program services had been provided since early 2016, no specific outcomes or intervention effects had been measured by the program coordinators at the time this study was conducted. The involvement of this author with the program was suggested in order to research and implement appropriate and validated HRQOL indices or PROMs which would assess the effects of the program on participants. Permission to carry out this study was obtained from the Director of the organization (Figure 6).

Procedures

This prospective study examined the effects of the CAN program on HRQOL indices at baseline compared with completion of the program. Participant recruitment was via convenience sample. Participants were enrolled based on their interest in and commitment to participate in all components of the program (IHC, nutrition support and PA program). Patient enrollment was considered at any time during the treatment trajectory. The author anticipated that most participants would enroll at the completion of adjuvant treatment, and this was reflected in the enrolled population. Patient referral to the program was promoted to physicians and registered nurse staff within the cancer center via staff meeting announcements in August 2017, with an

emphasis on the implementation of HRQOL outcomes to be measured within the program. Additionally, CAN program brochures were made available in each physician exam room, in the waiting room lobby, and in the infusion area. Enrollment for interested participants who met eligibility criteria began in early September 2017. The author met face-to-face with interested participants to review the components of the program, explain how the three-tiered interventions intersect to empower individuals to achieve desired health behavior changes, the anticipated timeline for completion, the SF-36 instrument to track HRQOL indices, obtained informed consent, completed a baseline SF-36 questionnaire, and to answer any participant questions. The enrollment period continued until the end of December 2017, and had a target total enrollment of 30 participants. Participants met with the RD and IHC counselor six times each, scheduled at mutually agreeable times. When possible, appointments with both the RD and IHC were scheduled in succession so as to avoid undue appointment burden for participants. Additionally, participants arranged their own follow-up with the Wellness Center to initiate their eight-week ProEx program. At the conclusion of all visits with the RD and IHC counselor, and upon finishing the ProEx program, the follow-up SF-36 questionnaire was again administered. Participants had the option to continue meeting with either the RD or IHC counselor upon completion of the CAN Program, as both were covered services within the cancer center. Participants could, likewise, opt to continue in the ProEx program at the Wellness Center beyond eight weeks, but were required to do so at their own expense.

Measures

The following demographic information was collected from eligible patients: Current age, gender, race, ethnicity, annual household income, employment status, and highest level of education. Tumor and treatment-specific information collected from the medical record included:

primary cancer diagnosis, date of cancer diagnosis, current stage, and whether or not the patient was undergoing active treatment. Physical information collected included: weight, height, waist circumference, and the SF-36 questionnaire.

The RAND 36-Item Health Survey 1.0 (SF-36) was developed as part of the Medical Outcomes Study, a two-year observational study of patients with chronic conditions, and is a gratis, publicly-available quality of life measurement instrument (RAND Corporation, 2017). The measure contains eight domains: Physical functioning, role functioning–physical, role functioning–emotional, energy/fatigue, emotional well-being, social functioning, pain, and general health (Figure 7). Scores from each item on the raw questionnaire are recoded so that a high score defines a more favorable health state, and then the items within each domain are averaged together to create the overall domain scores, which range from 0 (worst HRQOL score) to 100 (best HRQOL score) (RAND Corporation, 2017). Each of the eight domains was measured for reliability and validity in the original Medical Outcomes Study, and have Cronbach Alpha scores ranging from 0.78–0.93 (RAND Corporation, 2017). Table 3 provides a listing of each domain with its respective statistical findings related to reliability and validity. The instrument was chosen for overall reliability and validity, low burden for patient completion, composite scoring system, validated use within the oncology population, and global assessment inclusive of both physical and emotional domains. Cronbach Alpha scores within the present study generally had very high reliability, ranging from 0.76–1.00 for five of the eight health domains, with outlier domains of emotional well-being (pre-CAN program 0.61, post-CAN program 0.50), social functioning (pre-CAN program 0.94, post-CAN program 0.60), and general health (pre-CAN program 0.16, post-CAN program 0.64) (Table 4).

Data Analysis

Microsoft Excel was used to organize and code data as it was tracked within the prospective enrollment period. Demographic and disease/treatment-specific data was analyzed and recorded in terms of means and percentages in order to provide a general description of the enrolled population. Statistical results of the data were analyzed using SPSS software. Due to the small sample size and uneven distribution of data within each of the eight HRQOL domains, a paired t-test was not able to be conducted. Rather, the eight HRQOL domains were compared using the related-samples sign test to assess for significance between pre- and post-intervention scores.

Protection of Human Subjects and IRB Approval

Informed consent was obtained from each participant interested in enrolling in the study (Figure 8). In order to ensure the accuracy and consistency of data obtained from the medical record, each participants' medical record number (MRN) was recorded at time of enrollment. To maintain participant safety and privacy of this HIPAA-protected information, the MRN was then coded into a distinct study identification number in a separate master document (Excel spreadsheet). All data files were stored on protected servers provided at the Institutional Review Board (IRB) approval center site drive, which is used for securely storing sensitive information without the need for encryption. Approval was sought from the participating site IRB prior to the enrollment of any subjects or collection of any data points (Figure 9).

Section IV - Results

Case study #1

Participant one was a 66 year-old male with stage II prostate cancer who had finished definitive radiation therapy less than six months prior to enrolling in the CAN program. He completed six visits with the RD, four visits with the oncology social worker, and had a total of

14 visits to the wellness center. He took approximately 15 weeks to complete the CAN program. He was of a healthy weight at the start of CAN (BMI 23.9 kg/m^2, waist circumference (WC) 37 inches), and finished CAN with similar anthropometric measures (BMI 23.3 kg/m^2, WC 37 inches).

The baseline SF-36 showed the poorest ratings in the domains of role limitations due to physical health, fatigue, and pain (75, 65, 67.5, respectively, on a scale of 100). In the post-CAN SF-36 assessment, though there was no change in the domain of fatigue, the role limitations due to physical health and pain domains both showed improvement (100 and 90, respectively). Likewise, there was stable or improved results within the remaining domains measured by the SF-36: physical functioning (+5 points), role limitations due to emotional problems (no change at 100), emotional well-being (+4 points), social functioning (no change at 100), and general health (+5 points). He offered program feedback, as seen in Table 8.

Case Study #2

Participant two was a 47 year-old female with stage 0 (ductal carcinoma in situ) breast cancer who had finished definitive radiation therapy less than six months prior to enrolling in the CAN program. She completed six visits each with the RD and oncology social worker, but did not attend any visits to the wellness center. She took approximately 11 weeks to complete the CAN program. She was obese at the start of CAN (BMI 48.4 kg/m^2, WC 50 inches), and finished CAN with overall decreased BMI and WC (47.7 kg/m^2 and 49 inches, respectively).

The baseline SF-36 showed markedly low ratings across all domains, particularly within physical functioning, role limitations due to emotional problems, fatigue, social functioning, and pain (45, 33.3, 5, 37.5, and 32.5, respectively). In the post-CAN SF-36 assessment, there was improvement in all the domains, except for emotional well-being (which remained stable at 64):

physical functioning (+10 points), role limitations due to physical problems (+25 points), role limitations due to emotional problems (+66.7 points), fatigue (+15 points), social functioning (+37.5 points), pain (+25 points), and general health (+10 points).

Case Study #3

Participant three was a 62 year-old female with stage I breast cancer who was undergoing definitive radiation therapy at the time of enrollment in the CAN program. She completed four visits each with the RD and oncology social worker, and three visits to the wellness center. She dropped out of the program early, citing high appointment burden. She participated in the CAN program for approximately 9 weeks. She had a healthy BMI at start of CAN (BMI 29.6 kg/m^2, WC 39 inches), and finished CAN at the same BMI (WC not able to be obtained).

The baseline SF-36 showed the poorest ratings in the domains of physical functioning, role limitations due to physical problems, fatigue, and pain (65, 0, 60, and 45, respectively). In the post-CAN SF-36 assessment, there was a mixed response in the overall change in domains. Role limitations due to emotional problems and social functioning remained stable at 100 points. There were increases in the domains of physical functioning (+35 points), role limitations due to physical problems (+50 points), and pain (+45 points). Minimal decreases were seen in the domains of fatigue (-5 points), emotional well-being (-8 points), and general health (-5 points).

Case Study #4

Participant four was a 65 year-old male with stage III lymphoma, previously treated with definitive chemotherapy more than six months prior to enrolling in the CAN program. He completed six visits each with the RD and oncology social worker, and completed 45 visits to the wellness center. He took approximately 9 weeks to complete the CAN program. He was obese at the start of CAN (BMI 40.1 kg/m^2, WC 54 inches), and finished CAN with overall decreased

BMI and WC (37.7 kg/m^2 and 51 inches, respectively). He was very enthusiastic about the CAN program, and the benefits it provided him in making health behavior change (Table 8).

The baseline SF-36 showed the poorest ratings in the domains of role limitations due to physical problems, fatigue, and pain (50, 25, and 67.5, respectively). In the post-CAN SF-36 assessment there was improvement in all three of these same domains (+50 points, +45points, and +10 points). He also demonstrated improvement in the domain of physical functioning (+10 points). The remaining domains showed no change post-CAN, including: role limitations due to emotional problems (no change at 100), emotional well-being (no change at 84 points), social functioning (no change at 100), and general health (no change at 75).

Case Study #5

Participant five was a 66 year-old female with stage I breast cancer who had finished definitive combination therapy with chemoradiation greater than six months prior to enrolling in the CAN program. She elected to complete five visits with the RD, four visits with the oncology social worker, and attended six visits to the wellness center. She took approximately 11 weeks to complete the CAN program. She was of healthy BMI at the start of CAN (BMI 25.5 kg/m^2, WC 39.25 inches), and finished CAN with a slight decrease in BMI and WC (25.1 kg/m^2 and 38 inches, respectively).

The baseline SF-36 showed markedly low ratings across all domains, particularly within physical functioning, role limitations due to emotional problems, fatigue, pain, and general health (50, 0, 40, 45, and 55, respectively). In the post-CAN SF-36 assessment, there was a mixed response in the overall change in domains. Role limitations due to physical functioning, emotional well-being, social functioning, and pain all remained stable (0, 68, 62.5, and 45, respectively). There was increase only in the domain of physical functioning (+10 points).

Decreases were seen in the domains of role limitations due to emotional problems (-33.3 points), fatigue (-10 points), and general health (-5 points).

Case Study #6

Participant six was a 66 year-old male with stage III rectal cancer who was undergoing definitive combination therapy with chemoradiation at the time of enrollment in the CAN program. After further discussion with his primary oncologist, he elected to hold off on completing the CAN elements until completion of his therapy, and ultimately his post-program completion data was not able to be obtained within the study timeframe. At the close of data collection he had completed two visits with the RD, and had enrolled in the Pro-Ex program at the wellness center just 1-week prior. He was of healthy weight at the start of CAN (BMI 21.6 kg/m^2, WC 38.25 inches).

The baseline SF-36 showed markedly low ratings across all domains, particularly within role limitations due to physical problems, role limitations due to emotional problems, fatigue, and pain (0, 33.3, 0, and 32.5 respectively). Post-CAN SF-36 assessment was not able to be obtained by close of data collection.

Case Study #7

Participant seven was a 67 year-old male with a myeloproliferative neoplasm who was on a maintenance oral antineoplastic agent at the time of enrollment in the CAN program. He completed four visits with the RD, five visits with the oncology social worker. He attended 27 visits to the wellness center. He took approximately 11 weeks to complete the CAN program. He was of healthy weight at start of CAN (BMI 24.4 kg/m^2, WC 38.5 inches), and finished CAN with stable BMI (24.3 kg/m^2, WC not obtained).

The baseline SF-36 showed the lowest ratings in the domains of fatigue, emotional well-being, and general health (70, 63, and 80, respectively). In the post-CAN SF-36 assessment there was very modest improvement in all three of these same domains (+5 points, +2points, and +15 points). The remaining domains showed no change post-CAN, including: physical functioning, role limitations due physical health, role limitations due to emotional problems, social functioning (no change at 100 points), and pain (no change at 90 points).

Case Study #8

Participant eight was an 70 year-old male with stage IV esophageal cancer who was undergoing immunotherapy treatment at time of enrollment in the CAN program. As seen by his statement in Table 8, shortly after enrolling in the study he had a change in his health which required more frequent travel to a distance center of care, and limited his ability to complete the study requirements within the data collection timeframe. At close of data collection, he had completed two visits with the RD, one visit with the oncology social worker, and had enrolled in the Pro-Ex program at the wellness center just 3-days prior. He was of healthy weight at the start of CAN (BMI 29.3 kg/m^2, WC 44.6 inches). He enrolled in the PRO-EX program at the wellness center just 3-days prior to close of data collection.

The baseline SF-36 showed the poorest ratings in the domains of role limitations due to emotional problems, fatigue, and pain (0, 55, and 45, respectively. Post-CAN SF-36 assessment was not able to be obtained by close of data collection.

Statistical Results

A statistical analysis was conducted on the data collected from the six patients who completed the CAN program using the related-samples sign test. The result for BMI was in the expected direction but not statistically significant (–0.7 kg/m^2, $p = .062$). The domain of physical

functioning as measured by the SF-36 was in the expected direction but not statistically significant (+10.9 points, $p = .062$). There was no statistically significant difference in waist circumference, nor within the seven remaining domains measured by the SF-36, however the overall change in scores post-CAN were all improved over baseline, with the exception of the domain of emotional well-being (Table 7).

Section V – Discussion

Several important conclusions may be drawn from this prospective study evaluating effect of a health promotion program on domains of HRQOL, especially as it relates to program design and outcome measurement. The findings demonstrate one way to structure a health promotion program as part of comprehensive cancer services, and exemplify the use of a validated instrument to capture changes in HRQOL which such programs may affect. Prior to this author's involvement with the CAN program, there were no outcomes being measured by validated clinical instruments, except for change in anthropometric measures of BMI and WC. An untested questionnaire specific to nutrition was administered pre- and post-CAN involvement, however, given the wide availability of gratis validated and reliable instruments available to measure dietary/nutrition changes over time, the use of these instruments should be incorporated into the CAN program moving forward. Likewise, in order to substantiate program funding in the future, and to have meaningful outcomes to share with potential participants, the program directors should consider continuing to measure outcomes specific to nutrition, physical activity, and HRQOL within a larger sample population.

Potential for Health Promotion Program Benefit

As noted in the review of relevant literature, some of the challenges in this study are thematic within the context of cancer-related wellness programs. Though none of the domains of

the SF-36 demonstrated statistical significance post-intervention, the general trend was toward a neutral or positive benefit in the post-intervention scores compared with baseline. Similarly, mixed findings were also seen in the review of literature, though, it is often demonstrated that health promotion programs favor some kind of intervention to no intervention at all for maintaining and/or improving HRQOL. Though there were some instances of decline within the domains for some participants, it cannot be determined whether this effect was directly related to the intervention.

Travel Distance from Center of Care

Travel distance from center of care was a barrier identified at several points throughout this study. It was a commonly cited screening failure during recruitment. Likewise, Participants 3 and 5 noted it as a barrier to completing all visits designated by the CAN program (Table 8). The study site pulls from a large catchment area, and it is not uncommon for patients to drive 40-90 minutes each way to receive care. Given the structure of the program, in which all meetings are conducted individually in-person, the demand on travel time was a barrier for some interested participants who were screened for potential enrollment. As the program is presently designed, the Pro-Ex component is only offered at the institutional-affiliated wellness center, and so participants must only attend there for access to the specific trainer-guided PA prescription included as part of the CAN program services.

Appointment Burden

Feedback was received from several participants that, though, the visits with both the RD and the oncology social worker were beneficial, it was a great deal of appointments to attend. The high number of visits, coupled with travel distance as previously described, led to some participants “completing” the program prior to their full six visits with the RD and oncology

social worker. Several recommendations could be made from this moving forward. Firstly, the CAN program requirements could offer a range of visits available to patients, from four-six appointments, based on individual need and mutual agreement of benefit. As the content of each visit is determined individually by the program directors, based on each patient's needs, a range of visits could be specified at the time of program initiation. Secondly, the RD and oncology social worker could consider utilizing telehealth methods of interaction with patients, including synchronous video chat or mobile health communication through tracking of nutrition metrics (Center for Connected Health Policy, 2017).

Multidisciplinary Approach Adds Benefit

As was demonstrated in the review of literature, health promotion programs are often benefitted by a psychosocial component of health coaching or self-efficacy training. The present program offered IHC strategies and techniques to aid in the effect of meaningful and sustainable change over time. Though there was no validated measure of this included in the present study, anecdotal evidence, as gathered through patient statements, demonstrated that the IHC delivered by the oncology social worker was a beneficial aspect of the CAN program.

Strengths and Limitations

Strengths of this study include the impetus to measure the impact of the CAN program on HRQOL indices. This health promotion program was developed by the institutional RD and oncology social worker in response to Commission on Cancer® Program Standards. While the program had been an available service for 18 months at the outset of this study, it had been underutilized, recruiting, on average, fewer than eight patients per year. Likewise, there was no assessment via validated instruments to measure outcomes or impact of the intervention on participants prior to this author's involvement. Upon this author's discussion with the program

directors, there was clear interest for collaboration in designing a study to evaluate the impact of the program on domains of HRQOL. Certainly, the incorporation of validated instruments to measure pre- and post-intervention data will be a success as the program continues forward.

Another strength of the study design is the ability to capture patient engagement in the program by tracking the number of visits to the RD and counselor appointments, as well as the number of visits to the wellness center. Similar studies examining the impact of health promotion programs often rely on patient-reported data of frequency of PA engagement and other physical measures including height, weight, waist circumference, etc., which can often be over- or under-reported based on perceived bias or expectations that patients feel from intrinsic or extrinsic forces (Hawkes et al., 2013).

A final strength of the study was the heterogeneity of primary site malignancies. With a range of the most common solid tumor malignancies and a very small reference of hematologic malignancies, this range of malignancies is informative for community oncology settings where a variety of malignancies are treated. A program for improving HRQOL across a range of malignancies may encourage patient recruitment based on the perception that, perhaps, they too could benefit from such an intervention.

Internal validity may have been confounded by several factors. Patients undergoing active treatment are more likely to experience treatment-related side effects such as nausea, fatigue, weight loss, or anorexia, all of which may impact their ability to complete a prescribed PA regimen. The author designed the study to include patients on both active treatment and in survivorship, as a means to accrue the desired sample size within the limited enrollment period. Interestingly, of the two patients who were undergoing active treatment at the time of enrollment, neither was able to finish program components within the designated time frame, due to physical

or time limitations as a direct result of their cancer treatment. Though both of these participants remained committed to completing all elements of the CAN program, their post-intervention data was not able to be collected. It is also reasonable to consider that the validity of HRQOL indices are not affected solely by the intervention. For patients who embarked on the CAN program immediately following treatment (within 1-6 months post treatment), perceived benefit and change in HRQOL indicators may have been confounded by the proximity to treatment completion, and it may not be possible to distinguish between beneficial effects of the CAN program and cessation of treatment therapies. These differences are difficult to distinguish, and may lead to compromised internal validity of the intervention.

Perhaps the greatest among these weaknesses were the challenges in participant recruitment. Just weeks prior to the time of study implementation, the author underwent a change in employment from the study site to another sister hospital within the same health system. As a result of this, though the author continued to maintain contact and relationships with physicians, nursing staff, and CAN program directors at the study site, it was difficult to promote and recruit eligible participants without having direct access to patients in clinical care. The author conducted multiple in-services and reminders to nursing and physician staff to promote education and awareness of the program to eligible patients, but despite these efforts there arose no “champion” of the program among the staff with the greatest amount of direct patient contact. Three participants did enroll in the study as a result of their radiation oncologist’s recommendation of the program, and this physician remains a champion of the CAN program recommending participation to appropriate patients at completion of radiation therapy.

Another key limitation to the study was that the nutrition and IHC elements of the CAN program are provided by single individuals, the RD for nutrition guidance, and the oncology

social worker for IHC. At times the availability of these individuals was limited due to personal schedules, and ability to coordinate with participant schedules. Of note, the oncology social worker was on extended medical leave starting at the end of the enrollment period which contributed, in part, to the delay in completion of all elements for the two participants who did not complete the intervention. It is unknown whether the program directors may have been able to fully accommodate more patients within the study time frame, had the originally intended sample size of 30 been reached. A key recommendation to the CAN program directors moving forward is to recruit additional trained staff from the institution to aid in counseling efforts, if expansion of enrollment is desired.

A final limitation of the study design was the lack of post-intervention follow-up. Though some benefit was perceived based on measurement of HRQOL domains post-intervention, it is not known whether these improvements were of any durable benefit, or if the health behaviors gleaned from the program offered enduring benefit, or improvement in self-efficacy to make lasting health behavior change.

Nursing Practice Implications

Literature regarding health promotion programs for cancer survivors indicates the strong need for a psychosocial component to aid health behavior change and the adoption of healthy habits (Higgins, Middleton, Winner, & Janelle, 2014). Studies examining health promotion programs indicate high variability in study design including components, interventions, duration, and overall benefit on HRQOL indices. However, in all RCTs examined in review for this study, the health promotion intervention group always outperformed usual care group (even if only modestly), thus indicating the overall benefit of such a program to no program at all (Park, Bae, Jung, & Kim, 2012; Hawkes et al., 2013; Jacobsen et al., 2013; Mosher, Lipkus, Sloane, Snyder,

Lobach, & Demark-Wahnefried, 2013; Trinh, Plotnikoff, Rhodes, North, & Courneya, 2014). This study also aimed to contribute to the growing body of literature in which health coaching, specifically the theoretical framework of IHC, may be useful in promoting health behavior modification in individuals with cancer. The underpinning goal of this research is to improve the HRQOL for individuals with cancer and decrease their risk of comorbid conditions or recurrence, thus addressing current national guidelines and cancer-specific societal recommendations.

Oncology registered nurses (RNs) and advanced practice registered nurses (APRN) are well-poised to make a meaningful impact on patients' awareness of PA and nutrition guidelines and recommendations, and to promote participation in health promotion programs as part of comprehensive cancer services. In accordance with the Oncology Nursing Society's *Oncology Nurse Generalist Competencies*, included among the role of the oncology RN is the ability to: identify resources available to people with cancer; offer education on primary, secondary, and tertiary preventive measures as related to cancer and its treatment; and to provide holistic nursing care which addresses physical, psychosocial, and spiritual needs (Oncology Nursing Society, 2016). Oncology RNs should be aware of comprehensive patient services offered within their workplace, and have a basic understanding of the literature which supports incorporation of health promotion efforts into disease management and survivorship.

APRNs may consider promoting participation in a health promotion program at any phase during survivorship. As part of cancer follow-up care, APRNs should incorporate the promotion of health behaviors alongside routine surveillance, management of disease- and treatment-related effects, and detection of new cancers (Jackowski, 2016, chapter 18). Formalized health promotion programs that focus on improving self-efficacy to establish

sustainable healthy routines have been shown to make a meaningful impact on HRQOL over time (Higgins, Middleton, Winner, & Janelle, 2014). As formal survivorship care planning and specialty survivorship clinics take shape in oncology practice, APRNs play a critical role as advocates of incorporating formalized health promotion programs into the plan, and promoting patient participation as a means of achieving their recovery and wellness goals (Jackowski, 2016, chapter 18; Mishra, Scherer, Snyder, Geigle, & Gotay, 2014).

Implications for Future Research

This study serves as an introductory examination of one health promotion program in a community hospital-based cancer program, and its effect on anthropometric measures, and various domains of HRQOL. Despite the limited sample size of six participants who completed the intervention, this study adds to the body of literature which suggests that a well-designed, multidisciplinary health promotion program may have a positive impact on HRQOL indices, especially that of physical functioning. Ongoing research is needed to help define the most beneficial design for such cancer-related health promotion programs. The literature suggests wide heterogeneity of program design, and variable results from such programs (Mishra, Scherer, Geigle et al., 2012; Mishra, Scherer, Snyder et al., 2012). This study demonstrated that placement within the cancer treatment trajectory (active treatment vs. surveillance/survivorship), appointment burden, and distance from participants' homes to the treatment facilities were barriers to completion of all elements.

Future research may consider incorporating more specific measures of health, including use of survey instruments specific to detecting changes in physical activity frequency and tolerance, dietary intake, and self-efficacy for behavior change. As the goal of all such health promotion programs is to enhance meaningful change over time, it would be beneficial to

conduct reassessments at intervals of 6 months following conclusion of the intervention, up to 24 months. Maintaining heterogeneity of primary malignancies included in a study may prove beneficial in the community oncology setting, as program results may be advertised to patients and the community as more generalizable across a variety of malignancies reflective of the actual treated population. Future researchers should also decide whether to limit eligibility criteria to patients on active treatment-only, or survivorship/surveillance-only, as it can be difficult to determine perceived benefit of the intervention on HRQOL related to the intervention itself, or to the distance from cessation of treatment. Reducing this potentially confounding variable may lead to more meaningful evaluation of the intervention.

Products of the Scholarly Project

The results will be discussed with the staff and program directors at the participating cancer center for feedback on benefits/limitations of program design, and the importance of increasing buy-in from physician and nursing staff to continue promotion of the program and recommendation to appropriate patients. The results of this scholarly project will be submitted for publication to the peer-reviewed Clinical Journal of Oncology Nursing. A draft of the manuscript to be submitted for publication may be found in Appendix A. Project results will be submitted for consideration as a poster presentation to the 2018 Virginia Doctor of Nursing Practice Conference and to the Advanced Practitioner Society for Hematology and Oncology annual meeting, 2018 JADPRO Live.

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Table 1.

Study	Subjects and Setting	Design	Intervention and Comparison Intervention	Outcomes
Park, Bae, Jung & Kim (2012)	**Subjects:** 48 enrolled **Eligibility criteria:** Age 18-70 with breast cancer within 4 weeks of treatment completion (surgery and radiation and/or chemotherapy), fluent in Korean with telephone access. **Setting**: University medical center, Republic of Korea	RCT 1:1 randomization Assessments conducted at baseline, immediately post-intervention (12 weeks), and a 3-month follow-up	**Intervention:** n = 25 Received 12-week psychoeducational support program with face-to-face education with handbook, telephone-delivered health coaching sessions and small group meetings in effort to help women prevent, identify and resolve problems and develop coping and management strategies. In-person sessions focused on diet and exercise education. **Usual Care:** n = 23 Received informational booklet on cancer, treatment adverse effects, follow-up care, healthy eating	**Symptom Experience**, measured by Memorial Symptom Assessment Scale-Short Form (MSAS-SF) - **Statistical significance favored the intervention group post-intervention** (mean difference, -0.38; 95% CI, -0.71 to -0.04; P = .028), and at 3-month follow-up (mean difference, -0.63; 95% CI, -1.00 to -0.27; P = .001) - **Subscale PSYCH also favored the intervention group post-intervention** (mean difference, 0.59; 95% CI, 0.14-1.05; P = .012), and at 3-month follow-up (mean difference, 0.76; 95% CI, 0.26-1.26; P = .004) **QoL**, measured by Functional Assessment of Cancer Therapy-Breast (FACT-B) - **Significant difference at 3-month follow-up favoring intervention group** (mean difference, -17.18; 95% CI, -27.81 to -6.56; P = .002) Participants in the intervention group experienced overall increased QoL and emotional well-being, and results were mostly consistent at the 3-month follow-up. Limitations: - Baseline difference between groups was detected in a MSAS-SF subscale for PSYCH (P < .001), which may have skewed results.

				- Education on diet and exercise was present in the intervention group, but there were no direct measurements of outcomes related to this. - Study had a small sample size.
Hawkes et al. (2013)	**Subjects:** 410 enrolled **Eligibility criteria:** Age ≥18, residing in Queensland, with non-metastatic histologically-confirmed colorectal cancer (CRC) within the previous 12 months, fluent in English, no medical conditions limiting adherence to unsupervised PA program, a telephone, and one poor health behavior (i.e. exercise <150 mins/week, < 2 servings fruit or < 5 servings of vegetables/day, or overweight [BMI > 25 kgm^2) **Setting**: Queensland, Australia	RCT 1:1 randomization Assessments conducted at baseline, 6 and 12 months	**Intervention:** Health Coaching (HC), n = 205 11 telephone-delivered HC sessions (biweekly for 5 months, followed by final telephone session 4 weeks later to promote self-management techniques), handbook, regular motivational postcards, a pedometer, and quarterly newsletter **Usual Care (UC):** n = 205 Participants received 4 freely available educational brochures on CRC and reducing cancer risk, diet and PA; quarterly newsletter to enhance retention	**Primary Outcomes:** **Physical Activity,** measured by Godin Leisure-Time Exercise Questionnaire (LTEQ) (responses scored to yield Metabolic Equivalent Tasks [MET]) - **Significant intervention effects were observed for moderate PA at 12 months** (28.5 mins/week, P = .023) - **HC more likely than UC to meet Australian PA recommendations** (16.4% *v* 9.2%; P = .047) **HRQOL**, measured by Medical Outcomes Survey 26-item Short Form (SF-36) - **Near-significant intervention effect found in HC *v* UC for *physical* component at 12 months** (4.8 *v* 3.2, P = .072) - **No significant intervention effects found in HC v UC at 6 or 12 months for *mental* components** (1.9 *v* 1.2, P = .455; 0.3 *v* 1.0, P = .472) **Cancer-related fatigue,** measured by, Functional Assessment of Chronic Illness Therapy Fatigue Scale - **No significant intervention effects found in HC v UC at 6 or 12 months** (3.6 *v* 2.2, P = .113; 3.0 *v* 2.9, P = .272, respectively) **Secondary Outcomes:** Body Mass Index (BMI): kg/m^2

				- **Favored HC at 6 and 12 months** (-0.5 kg/m^2, P = .035; -0.9 kg/m^2, P = 001, respectively) Intervention effect on PA was greatest at 12 months. Few significant differences were shown at 6 months. Intervention also showed effect on decreasing BMI at both measurement points, which was not demonstrated in the UC group. Limitations: - Measures were self-reported via telephone (can be subject to over-/under-reporting based on health behavior) - Data collected by telephone interview, and limited objective data collection (i.e. BMI)
Jacobsen et al. (2013)	**Subjects:** 286 enrolled **Eligibility criteria:** Age ≥18 with cancer, fluent in English, scheduled to receive chemotherapy for at least 9 weeks, and medically-cleared to engage in moderate-intensity exercise **Setting**: Moffitt Cancer Center	RCT Randomization stratified by gender, physical activity level (inactive/minimally active/active), chemotherapy administration schedule (i.e. ever 21 or 28 days), and concurrent radiotherapy (yes/no) Assessments conducted at baseline, 6 and 12 weeks after start of chemotherapy	**Stress Management (SM)** n = 69 Usual care (UC) + 10-min meeting with doctoral-level psychologist (Interventionist) + video, booklet, and audio recording with instructions on paced breathing, progressive muscle relaxation with guided imagery, and coping self-statements **Exercise (EX)** n = 62 UC + 10-min meeting with Interventionist + video and booklet regarding exercise	**Primary Outcomes:** HRQOL, measured by SF-36 - **No significant group-by-time interactions** (*p*-values > 0.060) **Depression**, measured by Center for Epidemiological Studies Depression (CES-D) Scale - **Group-by-time interaction UCO *v* SMEX (*p* = 0.019)** - **SMEX showed decrease in depressive symptoms over time, which was not seen in UCO (*p* = 0.048 *v* 0.186, respectively)** **Anxiety,** measured by Beck Anxiety Inventory (BAI) - **SMEX showed a trend over time for decline in anxiety, which was not seen in UCO (*p* = 0.116 *v* 0.283, respectively)**

			during chemotherapy. Provided pedometers, with 'training zone' targeted heart rate based on age and resting heart rate. **Combined stress management and exercise (SMEX)** n = 77 UC + 15-min meeting with Interventionist + video and booklet which combined information on stress management and exercise during chemotherapy. Received pedometer, and same training in exercise and stress management found in SM and EX arms. **Usual Care Only (UCO)** n = 78 Access to full range of psychosocial services at the institution (i.e. social work, free support groups, referral to psychiatrist)	**Secondary Outcomes:** **Physical Activity**, measured by LTEQ - **MET scores changed over time in SMEX group, but not in UCO** (p = 0.020 *v* 0.231, respectively) - **SMEX group was the only arm to show trend toward more intense activity over time** (p = 0.083) **Stress** Management, measured by Stress Reduction Checklist (SRC) - **Group-by-time interaction UCO *v* SMEX** (p < 0.001) - **Use of stress management techniques increased over time in SM and SMEX groups** (67% to 86%, p = 0.007; 69% to 87%, p = 0.002, respectively) Overall, SMEX group participants reported less depression and anxiety over UCO group. Participants in EX or SM arms did not experience less anxiety or depression than UCO group. Limitations: High attrition rate (34%)
Mosher, Lipkus, Sloane, Snyder, Lobach & Demark-	**Subjects:** 543 enrolled **Eligibility criteria:** Early-stage (in situ, localized, regional)	RCT Prospective analysis of self-efficacy in long-term maintenance of	**Intervention:** n = 236 Received materials that were tailored to their demographic/psychological characteristics, and	**Dietary outcomes,** measured by Diet History Questionnaire (DHQ) - **Change in self-efficacy for fat restriction negatively associated with the percentage of kcal from fat** (B = -1.28, SE = 0.26, p < 0.001)

Wahnefried (2013)	breast and prostate cancer patients within 9 months of diagnosis; English-speaking and literate; no condition precluding unsupervised PA or conditions that preclude a diet high in fruits and vegetables (F&V), (i.e. renal failure or chronic warfarin use) **Setting**: Large medical centers, or self-referral in 39 states and two provinces in North America	dietary practices and PA. Computer-assigned, participant-blinded block randomization within eight strata based on demographic data	progress toward achieving lifestyle goals. Newsletters were tailored in the following ways: - Demographics (age, race, sex) - Cancer coping style (i.e. 'fighting spirit', 'fatalist', 'cognitive avoider', etc.) - Stage of readiness - Barriers to health behavior change - Progress toward goal behaviors - Survivor's testimonial (tailored to participants' race) **Attention control:** n = 253 Received publicly-available materials on diet and PA Materials included: 'Facing Forward' booklet from the National Cancer Institute, and other publicly available materials on PA, F&V intake, and dietary fat restriction	- **Change in barriers to fat restriction positively associated** (B = 0.55, SE = 0.14, $p < 0.001$) **Physical activity,** measured by 7-day Physical Activity Recall - **Change in self-efficacy for PA positively correlated with total minutes of PA/week** (B = 17.54, SE = 5.95, $p < 0.01$) - **Change in barriers to PA negatively correlated** (B = -7.02, SE = 4.34, $p < 0.05$) **Self-efficacy,** measured by 5-point Likert scale (previously validated survey) in response to the question, 'How sure are you that you could exercise at least 30 minutes a day at least 5 days a week; eat at least 5 servings of F&V per day; or eat a low-fat diet?' - **Change in self-efficacy for F&V intake positively associated with daily servings of F&V** (B = .41, SE = .11, $p < 0.001$) - **Change in barriers to F&V intake negatively associated with this outcome:** (B = -0.25, SE = 0.06, $p < 0.001$) Intervention participants had greater self-efficacy for F&V intake, and ate more daily servings. Likewise, intervention participants reported greater change in self-efficacy for fat restriction, and had lower percentage of kcal from fat. Findings suggest that self-efficacy plays an important role in the long-term adherence to healthy dietary practices, and that identifying key psychosocial determinants of health

				behavior is critical to effective health promotion programs. Limitations: - Study population was predominantly Caucasian (85%) and educated (59% had a college degree), and may not be representative of the general population. - Financial incentive to encourage questionnaire completion may have skewed participation rates, even though it was equal between both arms of the study. This may have encouraged participation over time (retention rate at 2 years was 90%), and obstructed the intrinsic perceived value of PA programs by all participants.
Trinh, Plotnikoff, Rhodes, North & Courneya (2014)	**Subjects:** 32 enrolled **Eligibility criteria:** Age 18-80 with histologically-confirmed kidney cancer (stage I-IIIa, with no evidence of recurrent disease); English-speaking; willing to attend supervised physical activity (PA) sessions and not planning to travel for three consecutive days	2-armed, participant-blinded RCT Randomization was 1:1 by computer-generated random allocation Both arms were provided with 6 individual supervised PA sessions with a specialist focusing on aerobic activity. At completion of supervision, all participants were	**Intervention:** n = 16 Supervised physical activity + behavioral counseling (SPA + BC) Type of Counseling: - Benefits of PA for cancer survivors - Overcoming barriers - Stimulus control - Social support and making PA fun - Goal setting and planning for PA **Control:**	**Primary Outcomes:** 1. **HRQOL**, as measured by Functional Assessment of Cancer Therapy-Fatigue (FACT-F) + FACT-General instruments. **No statistically significant changes in HRQOL measures were noted.** 2. **Body composition**, by anthropometric measures of BMI and waist circumference **Slight reduction in waist circumference in intervention group** (mean change -0.6, 95% CI, -3.4 to 2.2; P = .65) 3. **Cardiorespiratory fitness**, as measured by Modified Balke Test of VO_2 max **VO_2 max, mean change +1.0 (95% CI, -4.3 to 6.3; P = .71)**

	during program; interested in increasing PA by at least 60 minutes of moderate PA or 30 minutes of vigorous PA **Setting**: Behavioral Medicine Fitness Center, University of Alberta in Edmonton, Canada.	given an individualized exercise prescription to be used at the facility Supervised PA program was 4 weeks in duration and participants were asked to exercise on their own for 8 weeks, for total of 12-week study period.	n = 16 Supervised physical activity + standard exercise counseling (SPA + EC) Type of Counseling: - Components of a PA training session - Heart rate training and PA intensity - PA guidelines and what to wear - Safety considerations - Cross training Common Outcome: Increase all participants PA levels by ≥ 60 mins of moderate-intensity PA or 30 mins of vigorous-intensity PA to minimum of achieve 150 mins moderate-intensity PA or 75 mins vigorous-intensity PA per week	4. **Physical function**, as measured by modified version of Leisure Score Index **Changes PA minutes favored intervention group by +34 minutes** (95% CI, -62 to 129; P = .47) **Participants meeting PA guidelines: 32% more participants achieved guidelines in intervention group over control group** (95% CI, -0% to 64%; P = .052) Overall, there were no statistically significant findings within the study, save for the *value of counseling session* as favored by the intervention arm (P = .027). However, increased PA did favor the intervention arm, though not achieving significance. Limitations: - Performed at a single center, with one population. - Small sample size - Short duration of study (4 weeks of actual intervention, with 12 week completion evaluation) - Used multiple PROs to evaluate the same measurement (i.e. Qol)

Table 2.

Components of the CAN program, with the associated services provided.

Component	Integrative Health Coaching	Nutrition Counseling	ProEx Program
Provided By	Cancer Center Counselor	Cancer Center Registered Dietician	Institutional-affiliated Wellness Center
Duration	6 sessions	6 session	8-weeks
Interventions/ Services	IHC including examining seven areas of self-care. Focus is on goal-setting to enhance capability for self-repair and to focus on one's own health journey.	Participants provide a food intake diary and weight history at initial appointment. Subsequent appointments focus on nutrition education on cancer-fighting diet pattern and goal setting for improved eating habits. Participants will weight in and provide food journal at each meeting. RD provides continued support for maximizing health diet and weight loss.	1) A free two-month membership to the Wellness Center 2) Pre-fitness assessment 3) Exercise prescription developed in conjunction with the primary oncologist 4) 30-minute group sessions with a fitness specialist twice weekly 5) Post-fitness assessment

Note. IHC = Integrative Health Coaching; RD = Registered Dietician; ProEx = Progressive Exercise

Table 3.

Reliability, Central Tendency, and Variability of Scales in the RAND 36-Item Health Survey 1.0 (SF-36)

Scale	Items	Cronbach Alpha	Mean	SD
Physical functioning	10	0.93	70.61	27.42
Role functioning/physical	4	0.84	52.97	40.78
Role functioning/emotional	3	0.83	65.78	40.71
Energy/fatigue	4	0.86	52.15	22.39
Emotional well-being	5	0.90	70.38	21.97
Social functioning	2	0.85	78.77	25.43
Pain	2	0.78	70.77	25.46
General health	5	0.78	56.99	21.11
Health change	1	—	59.14	23.12

Note. Data is from the original Medical Outcomes Study (N=2471) conducted by Hays, R., 1998). Table retrieved from https://www.rand.org/health/surveys_tools/mos/36-item-short-form/scoring.html

Table 4.

Cronbach Alpha scores of the SF-36 in the CAN Program

Scale	Items	Cronbach Alpha Pre-CAN Program	Cronbach Alpha Post-CAN Program
Physical functioning	10	0.87	0.94
Role functioning/physical	4	0.86	0.94
Role functioning/emotional	3	0.76	1.00
Energy/fatigue	4	0.92	0.82
Emotional well-being	5	0.61	0.50
Social functioning	2	0.94	0.60
Pain	2	0.91	0.88
General health	5	0.16	0.64

Table 5.

Sample Characteristics (N = 8)

Characteristic	Mean (SD)	Range
Age (years)	64 (7.07)	47 - 70

Characteristic	n	%
Demographics		
Sex		
Male	5	62.5
Female	3	37.5
Race/Ethnicity		
White, non-Hispanic	7	87.5
Hispanic/Latino	1	12.5
Black/African American	0	0.0
Marital status		
Single/Divorced	2	25.0
Married	6	75.0
Annual household income ($)		
<49,999	0	0.0
50,000 - $74,999	2	25.0
75,000 - $99,999	1	12.5
>100,000	0	0.0
Prefer not to answer	5	62.5
Employment status		
Disabled/Unemployed	1	12.5
Part-Time	1	12.5
Full-Time	1	12.5
Retired	5	62.5
Highest level of education		
Less than high school	1	12.5
High school graduate	1	12.5
Associate's degree	2	25.0
Bachelor's degree	2	25.0
Graduate or professional degree	2	25.0
Tumor and Treatment-Specific Data		
Primary cancer diagnosis		
Breast	3	37.5
Colorectal	1	12.5
Head & Neck	1	12.5
Lymphoma/MPN	2	25.0
Prostate	1	12.5
Stage at time of CAN program		
Stage 0/I	4	50.0
Stage II	1	12.5

Stage III	2	25.0
Stage IV	1	12.5
Treatment type		
XRT only	3	37.5
Chemotherapy only	3	37.5
Combined modality (chemo + XRT)	2	25.0
Time since completion of treatment		
On treatment during CAN	3	37.5
1-6 months prior to CAN	3	37.5
>6 months prior to CAN	2	25.0

Note. MPN = myeloproliferative neoplasm; CAN = Change.Activity.Nutrition; XRT = radiation therapy

Table 6.

Number of CAN Program Visits (N = 8)

Variable	Mean	SD
Time to completion (weeks)	11.0	2.9
Number of visits		
Oncology Registered Dietician	4.4	1.7
Oncology Social Worker	3.8	2.2
Wellness Center	12.1	16.1

Table 7.

Outcomes of CAN Program by Anthropometric Measures and RAND SF-36 Health Survey

Variable	Pre-CAN N=6 Mean	Pre-CAN N=6 SD	Post-CAN N=6 Mean	Post-CAN N=6 SD	Overall change (post – pre)	*p*
BMI	32.0	10.1	31.3	9.6	– 0.7	.062
Waist circumference (inches)	43.0	7.2	43.7*	7.3	+ 0.7*	.250
RAND SF-36 domain scores						
Physical functioning	70.8	21.8	81.7	19.4	+ 10.9	.062
Role limitations due to physical health	50.0	41.8	79.2	40.1	+ 29.2	.125
Role limitations due to emotional problems	83.3	27.9	88.9	27.2	+ 5.6	1.000
Energy/fatigue	44.2	25.6	52.5	22.5	+ 8.3	1.000
Emotional well-being	76.0	11.9	75.7	11.3	– 0.3	1.000
Social functioning	83.3	27.0	89.6	16.6	+ 6.3	1.000
Pain	58.0	21.0	75.0	19.4	+ 17.0	.125
General health	70.8	9.7	74.2	14.3	+ 3.4	1.000

Note. CAN = Change.Activity.Nutrition; BMI = body mass index. *p*-value determined by the related-samples sign test.
*missing values for 2 participants.

Table 8.

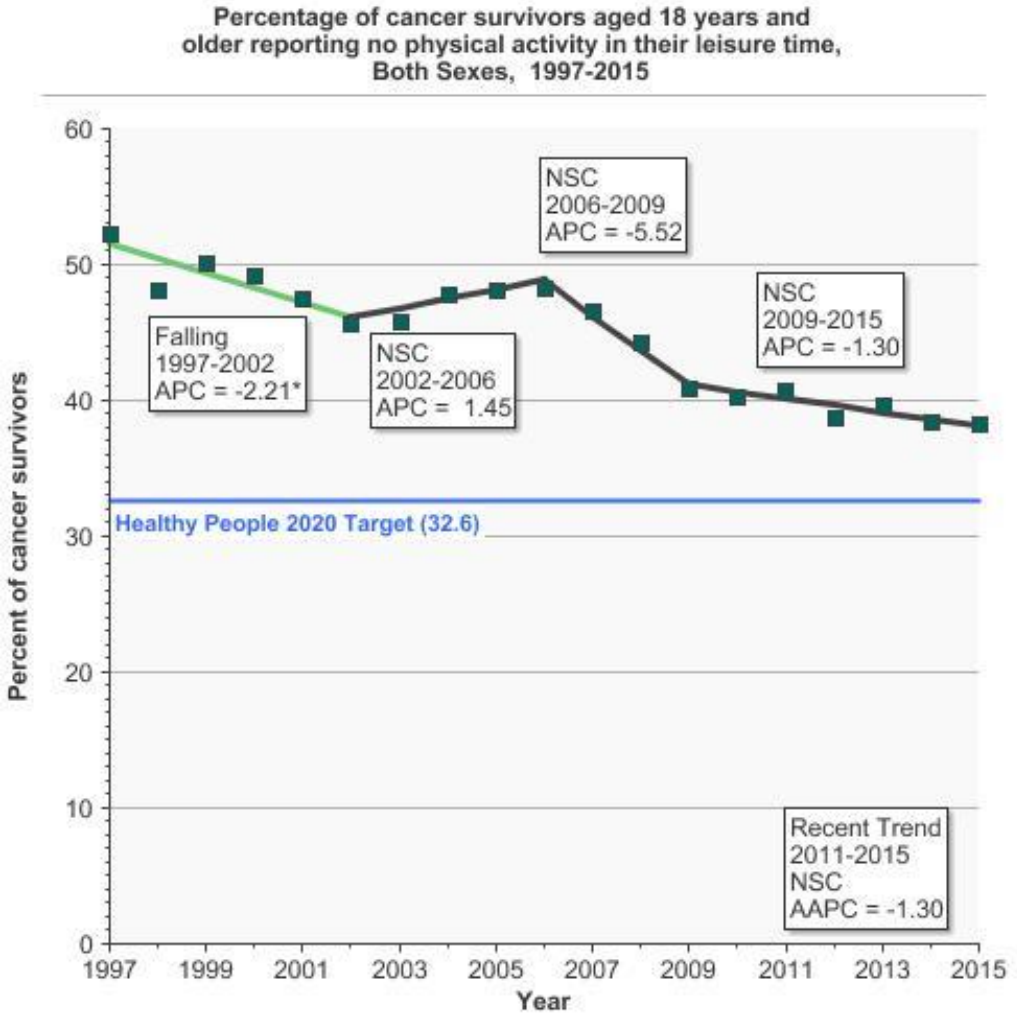
Qualitative observations from participants in the CAN program

Participant #1	"All three segments of the CAN program have been helpful. … There is a lot of information that I've been introduced to that will require time for me to fully integrate into a permanent part of my new lifestyle."
Participant #3	"I have been keeping in close contact with [oncology social worker] and [RD]. [RD] has been most helpful in learning how to eat right and [oncology social worker] has been helpful. Today I had a meeting with [oncology social worker] and we did a test on Bio Feedback of learning to breathe and calm down. I did well on the exercise and it was fun to learn how to listen to your breathing and control it. I went a couple of times to the Gym, with all the other appointments. I have not kept up with that but I am doing exercise at home and plan to get more hand weights to continue… The wellness program is good for people who live [close] but I can't justify putting 60 mile[s] round trip on my car to go there. It's a life time changing process and I feel I am doing well by eating the right things and exercise and moving. Thanks to [RD] and [oncology social worker] I have learned a lot and feel that their part of the program is a great asset to people."
Participant #4	"..The CAN program…was the spark plug that I needed to get going and I will keep on keeping on. If I had just done the wellness center on my own my diet would still be poor. If I did a diet alone then I would just sit around thinking about food. So [oncology social worker] kept my mind in the game. I am doing the chair yoga. Could not think at 65 I would be doing yoga, but I like it. Thank you and your program I feel that it is just the start of a new life style…and if you need a[n] example for anyone thinking about the program here I am."
Participant #7	"…I am enjoying the Wellness Center. I'm continuing with the exercises plus twice-weekly spinning classes & lap swimming."
Participant #8	"Things got hot and heavy in December and January. I was going…4 days a week for treatment. The result was I was unable to meet with [RD] and [the oncology social worker] or they were unavailable during the rare days I was not in treatment. Hopefully we can complete the program requirements in February and March."

Note. RD = Registered Dietician

Figure 1.

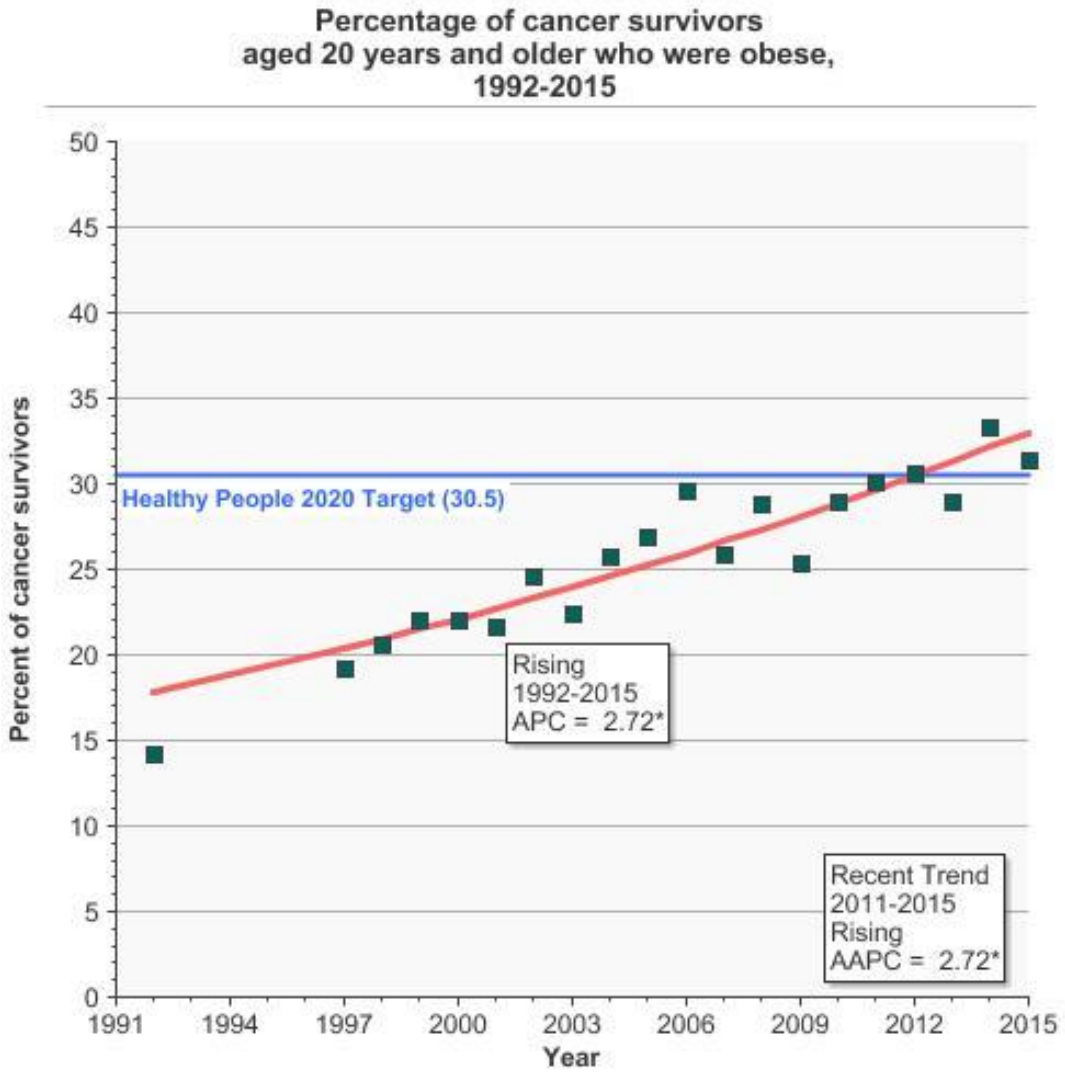
Percentage of cancer survivors aged 18 years and older reporting no physical activity in their leisure time, both sexes, 1997-2015. Obtained from Cancer Trends Progress Report (2017).



HP 2020 Target PA-1: 32.6%
Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.
Data are age-adjusted based on the age distribution of cancer patients diagnosed in 2000 in the SEER 18 areas (http://seer.cancer.gov/registries/terms.html) using age groups: 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+.
Weighted regression lines are calculated using the Joinpoint Regression Program, Version 4.3.1.0 April 2016, National Cancer Institute.
The AAPC is the Average Annual Percent Change and is based on the APCs calculated by Joinpoint.
* The Annual Percent Change (APC)/Average Annual Percent Change (AAPC) is statistically significant.
NSC: Non-Significant Change.

Figure 2.

Percentage of cancer survivors aged 20 years and older who were obese, 1992-2015. Obtained from Cancer Trends Progress Report (2017).



Obese is defined as a Body Mass Index (BMI) greater than 30.
HP 2020 Target NWS-9: 30.5%.
Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.
Data are age-adjusted based on the age distribution of cancer patients diagnosed in 2000 in the SEER 18 areas (http://seer.cancer.gov/registries/terms.html) using age groups: 20-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+.
Weighted regression lines are calculated using the Joinpoint Regression Program, Version 4.3.1.0 April 2016, National Cancer Institute.
The AAPC is the Average Annual Percent Change and is based on the APCs calculated by Joinpoint.
* The Annual Percent Change (APC)/Average Annual Percent Change (AAPC) is statistically significant.

Figure 3.

Duke Integrative Medicine's Wheel of Health (2017)

Figure 4.

PRISMA Flow Diagram of Systematic Review

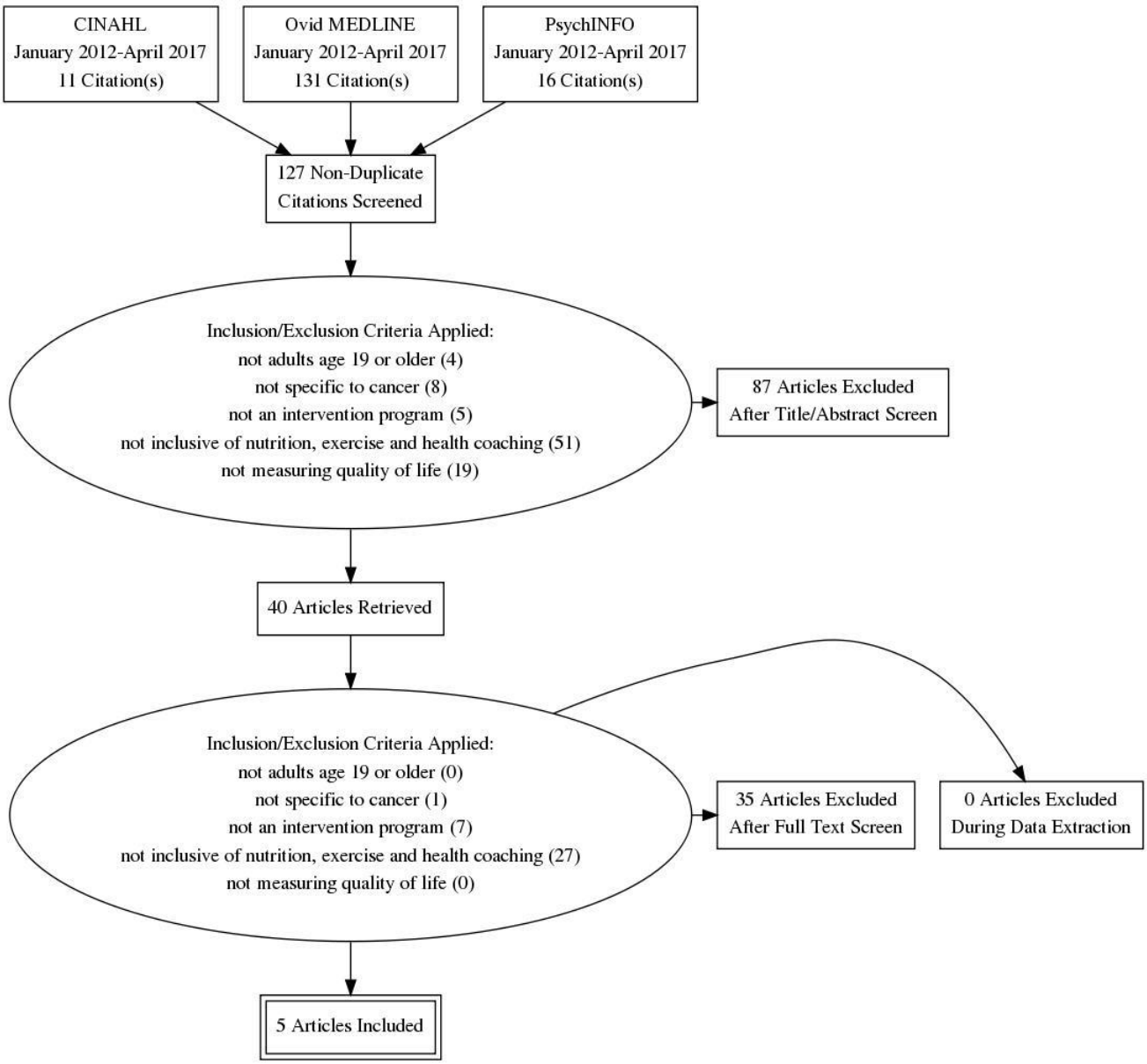
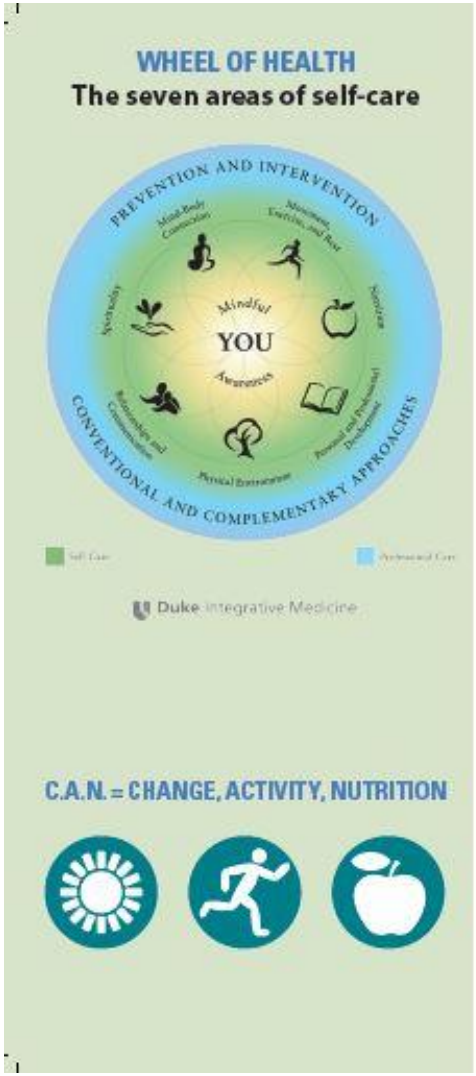


Figure 5

CAN Program Brochure



YOU C. A. N. MAKE HEALTHY CHANGES!

As a cancer patient, your current goals may be focused around getting through the day-to-day struggles of treatment. Making lifestyle choices such as proper nutrition and weight loss while in treatment might not be at the top of your priority list. However, recent research suggests that obesity and excess weight can play a role in the progression of various cancers, such as breast cancer, endometrial cancer, colon cancer and prostate cancer. For cancer patients and survivors, working toward a healthy weight could reduce risk of cancer recurrence, secondary cancers, heart disease and diabetes, and improve quality of life.

The C.A.N. Program, developed by staff at the Sentara RMH Hahn Cancer Center, is designed to be a helping hand for cancer patients hoping to lose weight in a healthy way. C. A. N. stands for: Change, Activity, Nutrition.

- Making healthy lifestyle changes
- Increasing physical activity
- Focusing on healthy nutrition

The C.A.N. Program is available to Hahn Cancer Center patients. Participants will learn how to make healthy lifestyle changes to improve health, quality of life and reduce the risk of cancer recurrence.

This free program includes:

- Integrative health coaching, 6 sessions
- Nutritional counseling, 6 sessions
- Free participation in the Sentara RMH Wellness Center's Progressive Exercise (ProEx) program, a $60 value

INTEGRATIVE HEALTH COACHING

Weight loss is a challenge. Integrative health coaching provided by oncology counselor **Elaine Dunaway, MSW, LCSW,** will help give you a better chance at changing stuck behaviors by considering the seven different areas of self-care:

1. Relationships/ communication
2. Spirituality
3. Movement, exercise and rest
4. Nutrition
5. Personal and professional development
6. Mind-body connection
7. Your physical environment

The seven areas of self-care are based on two ideas:

1. Individuals have capability for self-repair if given the proper support to make good life decisions
2. Optimal health is a journey, a process and requires our full attention

NUTRITION COUNSELING

Robin Atwood, MS, RD, CSO, a Registered Dietitian and certified specialist in oncology nutrition, will provide nutrition counseling and guide each participant to make diet changes that include more cancer-fighting foods and promote weight loss.

Counseling is done on a one-on one basis. At the first meeting, the participant will share his or her usual daily food intake and weight history with the nutrition counselor. She will then provide nutrition education on the cancer-fighting diet pattern and encouragement to set small goals to slowly change and improve eating habits. During the remaining five appointments, individuals weigh in, review food journals and continue to receive support for maximizing healthy diet and weight loss.

PROEX PROGRAM

Progressive Exercise (ProEx) is an eight week program designed to help individuals meet health and fitness needs in conjunction with a health care provider's fitness recommendations.

ProEx participants receive:

- A free 2 month Sentara RMH Wellness Center membership
- A pre-fitness assessment
- Exercise prescription
- Two 30 minute group sessions with a fitness specialist twice a week
- Post-fitness assessment

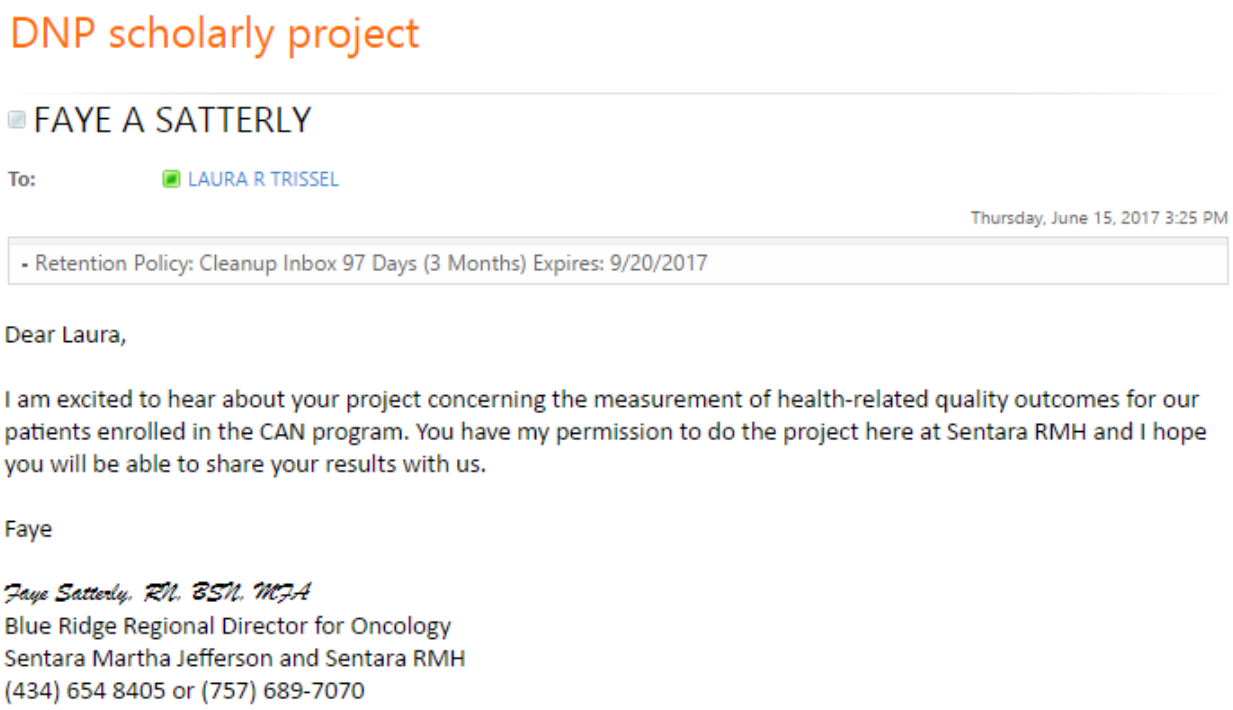
HOW TO PARTICIPATE

If you'd like to learn more about the C.A.N. Program, or to register, call Robin Atwood at **540-689-7046.**

SENTARA

Figure 6

Permission note from Faye Satterly, Director of the Sentara RMH Hahn Cancer Center



DNP scholarly project

FAYE A SATTERLY

To: LAURA R TRISSEL

Thursday, June 15, 2017 3:25 PM

- Retention Policy: Cleanup Inbox 97 Days (3 Months) Expires: 9/20/2017

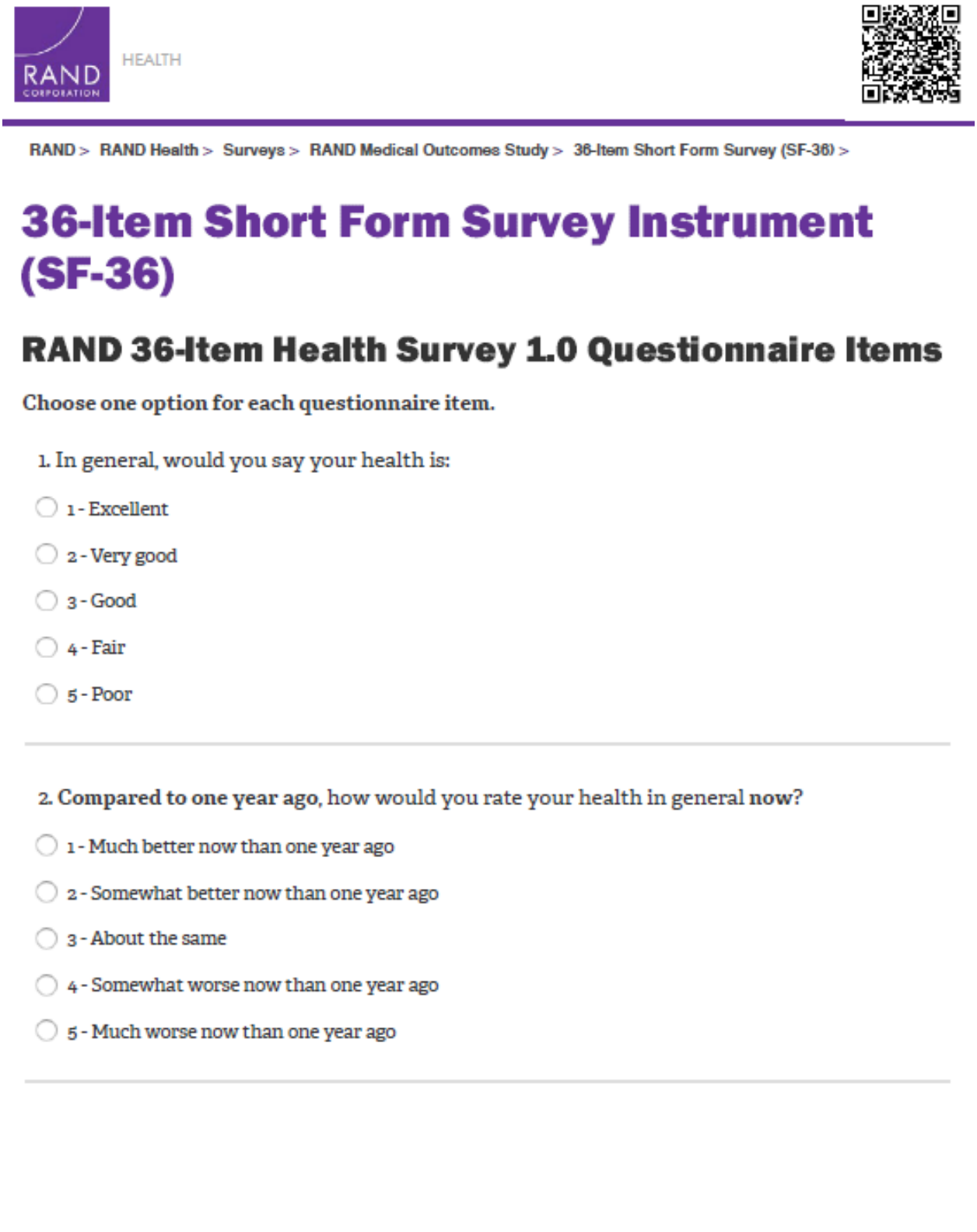
Dear Laura,

I am excited to hear about your project concerning the measurement of health-related quality outcomes for our patients enrolled in the CAN program. You have my permission to do the project here at Sentara RMH and I hope you will be able to share your results with us.

Faye

Faye Satterly, RN, BSN, MJA
Blue Ridge Regional Director for Oncology
Sentara Martha Jefferson and Sentara RMH
(434) 654 8405 or (757) 689-7070

Figure 7


RAND
CORPORATION
HEALTH
RAND > RAND Health > Surveys > RAND Medical Outcomes Study > 36-Item Short Form Survey (SF-36) >
36-Item Short Form Survey Instrument (SF-36)
RAND 36-Item Health Survey 1.0 Questionnaire Items
Choose one option for each questionnaire item.
1. In general, would you say your health is:
1 - Excellent
2 - Very good
3 - Good
4 - Fair
5 - Poor
2. Compared to one year ago, how would you rate your health in general now?
1 - Much better now than one year ago
2 - Somewhat better now than one year ago
3 - About the same
4 - Somewhat worse now than one year ago
5 - Much worse now than one year ago

The following items are about activities you might do during a typical day. Does **your health now limit you** in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
3. **Vigorous activities**, such as running, lifting heavy objects, participating in strenuous sports	○ 1	○ 2	○ 3
4. **Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	○ 1	○ 2	○ 3
5. Lifting or carrying groceries	○ 1	○ 2	○ 3
6. Climbing **several** flights of stairs	○ 1	○ 2	○ 3
7. Climbing **one** flight of stairs	○ 1	○ 2	○ 3
8. Bending, kneeling, or stooping	○ 1	○ 2	○ 3
9. Walking **more than a mile**	○ 1	○ 2	○ 3
10. Walking **several blocks**	○ 1	○ 2	○ 3
11. Walking **one block**	○ 1	○ 2	○ 3
12. Bathing or dressing yourself	○ 1	○ 2	○ 3

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**?

	Yes	No
13. Cut down the **amount of time** you spent on work or other activities	○ 1	○ 2
14. **Accomplished less** than you would like	○ 1	○ 2
15. Were limited in the **kind** of work or other activities	○ 1	○ 2
16. Had **difficulty** performing the work or other activities (for example, it took extra effort)	○ 1	○ 2

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)?

	Yes	No
17. Cut down the **amount of time** you spent on work or other activities	○ 1	○ 2
18. **Accomplished less** than you would like	○ 1	○ 2
19. Didn't do work or other activities as **carefully** as usual	○ 1	○ 2

20. During the **past 4 weeks**, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

- ○ 1 - Not at all
- ○ 2 - Slightly
- ○ 3 - Moderately
- ○ 4 - Quite a bit
- ○ 5 - Extremely

21. How much **bodily** pain have you had during the **past 4 weeks?**

- 1 - None
- 2 - Very mild
- 3 - Mild
- 4 - Moderate
- 5 - Severe
- 6 - Very severe

---

22. During the **past 4 weeks**, how much did **pain** interfere with your normal work (including both work outside the home and housework)?

- 1 - Not at all
- 2 - A little bit
- 3 - Moderately
- 4 - Quite a bit
- 5 - Extremely

These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the **past 4 weeks**...

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
23. Did you feel full of pep?	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
24. Have you been a very nervous person?	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
25. Have you felt so down in the dumps that nothing could cheer you up?	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
26. Have you felt calm and peaceful?	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
27. Did you have a lot of energy?	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
28. Have you felt downhearted and blue?	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
29. Did you feel worn out?	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
30. Have you been a happy person?	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
31. Did you feel tired?	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6

---

32. During the **past 4 weeks**, how much of the time has **your physical health or emotional problems** interfered with your social activities (like visiting with friends, relatives, etc.)?

◯ 1 - All of the time

◯ 2 - Most of the time

◯ 3 - Some of the time

◯ 4 - A little of the time

◯ 5 - None of the time

How TRUE or FALSE is **each** of the following statements for you.

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
33. I seem to get sick a little easier than other people	○ 1	○ 2	○ 3	○ 4	○ 5
34. I am as healthy as anybody I know	○ 1	○ 2	○ 3	○ 4	○ 5
35. I expect my health to get worse	○ 1	○ 2	○ 3	○ 4	○ 5
36. My health is excellent	○ 1	○ 2	○ 3	○ 4	○ 5

Figure 8

Informed Consent Form

Identification of Project	The Intersection of Nutrition, Physical Activity, and Integrative Health Coaching in a Health Promotion Program for Individuals with Cancer
Statement of Age of Subject	I state that I am over 18 years of age, in good physical health, and wish to participate in this program of research being conducted by Laura Trissel.
Purpose	The purpose of this research is to measure the impacts on health and wellness of a formal program which is focused on Integrative Health Coaching, nutrition counseling, and physical activity support.
Procedures	The procedures of this research are six (6) meetings with a Registered Dietician, six (6) meetings with an oncology social worker, and participation in the Sentara RMH Wellness Center Progressive Exercise (ProEx) program.
Confidentiality	All the information collected in this study in confidential to the extent permitted by law. I understand that the data I provide may be grouped with data others provide for reporting and presentation and that my name will not be used.
Risks	The risks involved in this research are related to the physical activity component. I will receive a structured exercise prescription to be developed by my oncologist and a fitness specialist, and tailored to my unique needs and physical limits.
Benefits	The potential benefits of this research are to understand how a nutrition and physical activity program, along with focused social support, may have in improving the quality of life (wellness) of persons with cancer.
Freedom to withdraw or ask questions	I understand that I am free to ask questions or withdraw from participation at any time and without penalty.
Medical Care	The following medical care is included in this research [NONE]. Sentara SRMH Medical Center does not provide any medical or hospitalization insurance for participants in this research or any compensation for any injury sustained as a result of my participation in this research.
Contact Information	If you have any questions about your rights as a research subject or wish to report a research-related injury, contact: Stewart Pollock, MD, Chairman Sentara RMH Medical Center Institutional Review Board 2010 Health Campus Drive Harrisonburg, VA 22801 (540) 689-1000 If you have questions about this particular study, contact: Laura Trissel MSN, AG-ACNP, RN, OCN Sentara RMH Hahn Cancer Center 2010 Health Campus Drive Harrisonburg, VA 22801 (540) 746-4008

Subject Information	Subject Name: _____ Subject Signature: _____ Date Signed: _____

Figure 9

Approval letter from study site Institutional Review Board

SENTARA®

RMH Medical Center

August 25, 2017

Laura Trissel, MSN, AG-ACNP, RN, OCN
Sentara Martha Jefferson
500 Martha Jefferson Drive
Charlottesville, VA 22911

Laura,

RE: Evaluation of a Multidisciplinary Health Promotion Program for Individuals with Cancer

A subcommittee of the Sentara RMH Medical Center Institutional Review Board reviewed your protocol via expedited review. The subcommittee, Dr. Stewart Pollock, Dr. Betsy Early and Dr. Ming Ivory, unanimously approved your protocol.

The study will expire on August 25, 2018. At that time, the annual protocol will be reviewed for continuing approval. Any serious adverse events will require reporting per the Sentara RMH Medical Center IRB Guidelines.

Sincerely,

Stewart Pollock, MD
Chairman
Institutional Review Board
Sentara RMH Medical Center

Appendix A

Evaluation of a Multidisciplinary Health Promotion Program for Individuals with Cancer

Laura R. Trissel, DNP, RN, AGACNP-BC

Sentara RMH Medical Center

Gina DeGennaro, DNP, CNS, RN, AOCN, CNL

Catherine Kane, PhD, RN, FAAN

University of Virginia School of Nursing

Acknowledgement: The author has been supported by the Graduate Scholarship in Cancer Nursing Practice, GCSNP-16-125-01-SCN, from the American Cancer Society.

Abstract

Background: With the increased focus on health-related quality of life (HRQOL) and wellness for individuals with cancer, formal health promotion programs have become an integral part of the comprehensive services promoted in many cancer care centers.

Objectives: The aim of this project was to evaluate whether participation in a multidisciplinary health promotion program which incorporated integrative health coaching (IHC) with nutrition and physical activity support resulted in improved HRQOL?

Methods: A quasi-experimental pretest-posttest design was used to address the impact of an existing health promotion program on HRQOL. Participants were enrolled over a four-month period, and completed the multidisciplinary components of the program over a period of 9-14 weeks.

Findings: Six participants completed the program, and demonstrated near-statistical significance in BMI reduction (–0.7 kg/m^2, $p = .062$) and improvement in the domain of physical functioning (+10.9 points, $p = .062$). Post-intervention scores were improved over baseline in seven of the eight HRQOL domains.

Conclusions: The findings suggest that the program may have modest effect on improving HRQOL, especially within the domain of physical functioning. Several suggestions are made for program improvement.

Key Terms: integrative health coaching, health-related quality of life, cancer survivorship, physical activity, nutrition, patient-reported outcome measures

Evaluation of a Multidisciplinary Health Promotion Program for Individuals with Cancer

Introduction

Though the importance of a healthy lifestyle inclusive of proper nutrition and physical activity (PA) is important to all persons, the need for consciously healthy living is of greater significance for individuals affected by cancer. Compared with the general population, cancer survivors carry higher risk of developing recurrent or secondary malignancies, functional limitations, or other medical conditions such as heart disease, diabetes, or osteoporosis (Kruk & Czerniak, 2013; Wu, Zhang, & Kang, 2013, National Cancer Institute [NCI], 2017). Despite what is known about protective effects of fruit and vegetable intake and limiting fat and processed foods as prevention/control of cancer and associated chronic diseases, less than 20% of cancer survivors report actually meeting the 5-A-Day dietary recommendation (Blanchard, Courneya, & Stein, 2008; Vijayvergia & Denlinger, 2015). Equally concerning is the increasing trend toward obesity among cancer survivors, now at 34%, and rising at an average of 2.72% each year from 2011-2015 (Cancer Trends Progress Report, 2017). A body mass index ≥ 40 kg/m^2 has been associated with a 52% and 62% higher rate of cancer-related mortality in men and women, respectively (Calle, Rodriguez, Walker-Thurmond, & Thun, 2003. Conversely, physically active cancer survivors have been noted to have lower risk of cancer recurrence and improved survival compared with cancer survivors who are not routinely engaged in PA (Bradshaw et al., 2014; Ibrahim & Al-Homaidh, 2011; Ligibel, 2012; Vijayvergia & Denlinger, 2015), yet, 2017 data from the *Cancer Trends Progress Report* estimates that 38.3% of cancer survivors report no designated daily PA regimen.

Recognizing inherent health risks for individuals affected by cancer, many professional societies have developed goals to reduce morbidity and promote health within this population.

The American Cancer Society (ACS), in its 2012 *Guidelines on Nutrition and Physical Activity for Cancer Survivors,* recommends that individuals with cancer take a three-pronged approach to health maintenance: 1) achieve and maintain healthy weight, 2) engage in regular PA, 3) consume a diet high in vegetables, fruits, and whole grains (Rock et al., 2012). Likewise, the National Comprehensive Cancer Network (NCCN) *Guidelines for Survivorship* (2017) devote much attention to maintaining a healthy lifestyle via PA, nutrition, and weight management as part of survivorship care planning. Cancer outcomes have remained an integral component of the *Healthy People 2020* guidelines which, among other goals, aims to increase the 5-year survival rate and the mental and physical health-related quality of life (HRQOL) of individuals with cancer (Office of Disease Prevention and Health Promotion, 2014).

In order to provide comprehensive care services throughout the spectrum of cancer treatment and to meet national standards, many cancer centers around the United States have elected to incorporate formalized, interdisciplinary health promotion programs which focus on nutrition and improved PA. Two Cochrane systematic reviews which examined the effect of exercise interventions in the adjuvant and post-treatment setting found a positive effect of such programs on HRQOL indices, despite heterogeneity in program design (Mishra, Scherer, Geigle et al., 2012; Mishra, Scherer, Snyder et al., 2012).

The theoretical framework utilized was Integrative Health Coaching (IHC), a model of behavior modification support which is grounded in the theoretical premise that behavioral changes are maximally sustainable when linked to an individual's personal values and sense of purpose (Caldwell, Gray, & Wolever, 2013). Within the therapeutic relationship of IHC, clients are able to consider their perception of an issue, develop formal goals to address it, and find empowerment through the generation of solutions to affect their desired change (Caldwell, Gray,

& Wolever, 2013). The graphic representation of the IHC model, the Duke Integrative Medicine "Wheel of Health" (Figure 1) maintains that the self-aware patient is at the center of the circle, and is constantly interacting with seven areas of self-care (Smith et al., 2013).

Review of the Literature

With the plethora of guidelines and extensive literature which links PA and nutrition to health-related outcomes, a review of relevant literature was limited to well-designed studies with a control group which examined the multi-tiered approach of incorporating health coaching with PA and nutrition support within a health promotion program for individuals with cancer. The search was conducted using the electronic databases CINAHL, Ovid MEDLINE, and PsychINFO. Key words were used as follows: ["health behaviors" OR "health promotion" OR "health coaching"] AND ["cancer" OR "oncology"] AND ["quality of life"]. Inclusion criteria included meta-analyses and randomized controlled trials (RCTs) which were written in the English language, involved human subjects, conducted on adults, and published January 2012-April 2017. This search yielded a total of 158 citations. Thirty-one citations were removed as duplicates.

Exclusion criteria were applied, which included studies which were: 1) not conducted on adults, 2) not specific to individuals with cancer, 3) not a health promotion *intervention* (this included citations which only specified a study protocol), 4) not inclusive of all three measures of PA, nutrition and health coaching, 5) not examining the impact of the intervention on overall HRQOL. A total of 122 studies were excluded using this criteria, first by title/abstract search, then by full-text.

Results

A total of five studies, all RCTs, met inclusion criteria for final analysis (Park, Bae, Jung, & Kim,2012; Hawkes et al., 2013; Jacobsen at al., 2013; Mosher, Lipkus, Sloane, Snyder, Lobach, & Demark-Wahnefried, 2013; Trinh, Plotnikoff, Rhodes, North, & Courneya, 2014). Included studies illustrated mixed findings on overall benefit of health promotion programs, though the trend was toward a neutral or positive benefit favoring the intervention. There exists much heterogeneity in study design, outcome measurement indices and respective instruments, length of intervention, and varied time-to-endpoint measurement, all of which make comparison between studies highly variable and difficult to correlate overall significance. Three key suggestions emerged from the review: 1) A global assessment instrument which encompasses physical and mental/emotional indices may allow for more comprehensive assessment of well-being, and decrease the burden of instrument completion on patients; 2) A greater overall intervention length appeared to have a more durable effect on long-term adherence to PA regimens and nutritional changes, with a suggested intervention duration of 10-12 weeks, and reassessment in 6-month increments thereafter; 3) Data should be collected only by validated patient-reported outcome measures (PROM).

Methods

This study sought to identify the impact that a multi-faceted, multidisciplinary health promotion intervention including IHC, nutrition counseling, and PA support had on HRQOL indicators and an individuals' overall sense of well-being.

Research Design

The study used a quasi-experimental, quantitative, single group pre- and post-test research design to describe how the multidisciplinary approach of IHC, nutrition counseling, and PA support impact HRQOL indices. Participants evaluated HRQOL indices, as measured by the

validated PROM, RAND 36-Item Health Survey 1.0 (SF-36), at baseline and at completion of the program.

Sample Description

Inclusion criteria for participation in the study was as follows: English-speaking adults 18 years or older of any gender, ethnicity, or education level with a cancer diagnosis of any primary site, regardless of stage of disease. Enrollment was open to individuals at any point in trajectory of treatment, including diagnosis, active treatment, or surveillance/survivorship. Exclusion criteria included individuals who were not fluent in the English language, not able to provide consent, or not willing to participate in *all* components of the program (IHC, nutrition counseling, and PA support).

A total of eight subjects were enrolled during the study period (Table 2), and six completed all elements of the health promotion program within the available time frame. The mean age of the subjects was 64 years, primarily Caucasian, with five males and three females. Primary cancer diagnosis was varied across subjects, but included a range of primarily solid tumor malignancies. A majority of subjects had an early stage diagnosis at time of enrollment in the program. Treatments received included radiation therapy alone, chemotherapy alone, and combined modality treatment (chemotherapy + radiation). Subjects were fairly equally spread in distance from primary treatment, with three on-treatment during the program, three having completed treatment within 1-6 months of starting the program, and two who were greater than six months post-treatment.

Setting

The study took place at a community hospital-based outpatient cancer center located in central Virginia. In 2016, the center implemented a health promotion program for patients

undergoing adjuvant treatment or entering survivorship entitled, “Change, Activity, Nutrition” (CAN). The program is co-led by the center’s oncology social worker (OSW), who holds a certification as an Integrative Health Coach by Duke Integrative Medicine, and the center’s Registered Dietician (RD), who is specialist-certified in oncology nutrition. As part of the CAN program, which is offered at no cost to the patient, enrollees receive six sessions of IHC with the OSW, six sessions of nutritional counseling with the RD, and free participation in the Progressive Exercise (ProEx) program at the institutional-affiliated Wellness Center. Each component of the program with its corresponding interventions is listed in Table 1. The involvement of the primary author with the program was suggested in order to research and implement appropriate and validated HRQOL indices or PROM which would assess the effects of the program on participants.

Procedures

Approval was sought from the participating site IRB prior to the enrollment of any subjects or collection of any data points. Informed consent was obtained from each participant enrolled in the study. Recruitment was via convenience sample, and participants were enrolled based on interest in and commitment to participate in all components of the program. Enrollment began in early September 2017 and continued through December 2017. The primary author met face-to-face with interested participants to review components of the program and intended benefits, obtained informed consent, and complete a baseline SF-36 questionnaire. Participants met with the RD and OSW six times each, scheduled at mutually agreeable times. Participants arranged their own follow-up with the Wellness Center to initiate their eight-week ProEx program. At the conclusion of all visits with the RD and OSW, and upon finishing the ProEx program, the follow-up SF-36 questionnaire was again administered.

Measures

The SF-36 is a gratis, publicly-available quality of life measurement instrument (RAND Corporation, 2017). The measure contains eight domains: Physical functioning, role functioning–physical, role functioning–emotional, energy/fatigue, emotional well-being, social functioning, pain, and general health. Scores from each item on the raw questionnaire are recoded so that a high score defines a more favorable health state, and then items within each domain are averaged together to create the overall domain scores, which range from 0 (worst HRQOL score) to 100 (best HRQOL score) (RAND Corporation, 2017). The instrument was chosen for overall reliability and validity, low burden for patient completion, composite scoring system, validated use within the oncology population, and global assessment inclusive of both physical and emotional domains.

Data Analysis

Demographic and disease/treatment-specific data were analyzed and recorded in terms of means and percentages in order to provide a general description of the enrolled population. Statistical results of the data were analyzed using SPSS software. Due to the small sample size and uneven distribution of data within each of the eight HRQOL domains, the related-samples sign test was conducted to assess for significance between pre- and post-intervention scores.

Results

The mean time to program completion was 11 weeks (standard deviation [SD] = 2.9) (Table 3). Of the allotted six visits each with the RD and OSW, participants completed a mean of 4.4 (SD = 1.7) and 3.8 (SD = 2.2) visits, respectively (Table 3). Two of the eight enrolled participants were unable to complete the program within the designated timeframe, due to physical limitations as a direct result of cancer treatment. Statistical analysis was conducted on

data collected from the six patients who completed the CAN program using the related-samples sign test. The result for BMI was in the expected direction but not statistically significant (–0.7 kg/m^2, $p = .062$). The domain of physical functioning as measured by the SF-36 was in the expected direction but not statistically significant (+10.9 points, $p = .062$). There was no statistically significant difference in waist circumference, nor within the seven remaining domains measured by the SF-36, however the overall change in scores post-CAN were all improved over baseline, with the exception of the domain of emotional well-being which was marginally decreased (Table 4). Table 5 contains statements from several participants on perceived value of the program, and highlights both positive and negative aspects of the program.

Discussion

Several important conclusions may be drawn from this prospective study evaluating effect of a health promotion program on domains of HRQOL, especially as it relates to program design and outcome measurement. The general trend was toward a neutral or positive benefit in the post-intervention SF-36 scores compared with baseline, though statistical significance was not achieved. The clinical significance of positively impacting HRQOL in individuals with cancer should not be underestimated, and wellness programs that provide meaningful benefit should be developed and refined in order to address the often debilitating and life-altering realities of cancer.

Travel distance from center of care and appointment burden were commonly cited screening failures described during recruitment, and proved a barrier for enrolled participants (Table 5). Given the structure of the program, in which all meetings are conducted individually in-person and the limitations of partnership with only the institutional-affiliated wellness center,

the demand for travel can be significant. A sliding scale of visits with the RD and OSW may be appropriate to consider, along with the option for group sessions or use of telehealth consultations. Partnerships with other local fitness centers to provide the physical activity component should be explored.

As demonstrated in the review of literature, health promotion programs are often benefitted by a psychosocial component of health coaching or self-efficacy training. The present program offered IHC strategies and techniques to aid in the effect of meaningful and sustainable change over time. Though there was no validated measure of this included in the present study, anecdotal evidence, gathered through patient statements, demonstrated that the IHC delivered by the OSW was a beneficial aspect of the CAN program (Table 5).

Strengths and Limitations

Strengths of this study include the impetus to measure impact of the CAN program on HRQOL indices, and to add evidence which supports the incorporation of multidisciplinary health promotion programs within the services of comprehensive cancer care. The author's involvement with the program aided in the incorporation of a validated PROM to quantify and validate impact of the CAN program on HRQOL indices. Use of validated instruments to measure outcomes should be continued, and program organizers may consider incorporation of other validated instruments to further measure impact specific to nutrition and self-efficacy for behavior change.

This study was strengthened by the heterogeneity of primary site malignancies of participants. This diversity is informative for community oncology settings where a variety of malignancies are treated. A program for improving HRQOL across a range of malignancies may

encourage patient recruitment based on the perception that they could benefit from such an intervention.

Internal validity may have been confounded by inclusion of individuals on active treatment as well as those of varying distances from completion of treatment. Individuals undergoing active treatment are more likely to experience treatment-related side effects which may impact ability to complete a prescribed PA regimen and overall HRQOL. For patients who embarked on the CAN program immediately following treatment or during active treatment, perceived benefit and change in HRQOL indicators may have been confounded by proximity to treatment, and it may not be possible to distinguish between beneficial effects of the CAN program and treatment therapies.

Another limitation of study design was lack of post-intervention follow-up. Though some benefit was perceived based on measurement of HRQOL domains post-intervention, it is not known whether these improvements were of any durable benefit, or if the health behaviors gleaned from the program offered enduring benefit, or improvement in self-efficacy to make lasting health behavior change.

Nursing Practice Implications

Literature regarding health promotion programs for cancer survivors indicates the strong need for a psychosocial component to aid health behavior change and adoption of healthy habits (Higgins, Middleton, Winner, & Janelle, 2014). This study aimed to contribute to the growing body of literature focused on patient-centered care in which health coaching, specifically the theoretical framework of IHC, may be useful in promoting health behavior modification in individuals with cancer.

Oncology registered nurses (RNs) and advanced practice registered nurses (APRN) are well-poised to make a meaningful impact on patients' awareness of PA and nutrition guidelines and recommendations, and to promote participation in health promotion programs as part of comprehensive cancer services. In accordance with the Oncology Nursing Society's *Oncology Nurse Generalist Competencies*, included among the role of the oncology RN is the ability to: identify resources available to people with cancer; offer education on primary, secondary, and tertiary preventive measures as related to cancer and its treatment; and to provide holistic nursing care which addresses physical, psychosocial, and spiritual needs (Oncology Nursing Society, 2016). Oncology RNs should be aware of comprehensive patient services offered within their workplace, and have a basic understanding of the literature which supports incorporation of health promotion efforts into disease management and survivorship.

APRNs may consider promoting participation in a health promotion program at any phase during survivorship. As part of cancer follow-up care, APRNs should incorporate promotion of health behaviors alongside routine surveillance, management of disease- and treatment-related effects, and detection of new cancers (Jackowski, 2016, chapter 18). As formal survivorship care planning and specialty survivorship clinics take shape in oncology practice, APRNs play a critical role as advocates of incorporating formalized health promotion programs into the plan, and promoting patient participation as a means of achieving their recovery and wellness goals (Jackowski, 2016, chapter 18; Mishra, Scherer, Snyder, Geigle, & Gotay, 2014).

Implications for Future Research

This study serves as an introductory examination of one health promotion program in a community hospital-based cancer program, and its effect on anthropometric measures and various domains of HRQOL. This study adds to the body of literature which suggests that a well-

designed, multidisciplinary health promotion program may have a positive impact on HRQOL indices, especially that of physical functioning. The findings should be validated within a larger sample.

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Table 1.

Components of the CAN program, with the associated services provided.

Component	Integrative Health Coaching	Nutrition Counseling	ProEx Program
Provided By	Cancer Center Oncology Social Worker	Cancer Center Registered Dietician	Institutional-affiliated Wellness Center
Duration	6 sessions	6 session	8 weeks
Interventions/ Services	IHC including examining seven areas of self-care. Focus is on goal-setting to enhance capability for self-repair and to focus on one's own health journey.	Participants provide a food intake diary and weight history at initial appointment. Subsequent appointments focus on nutrition education on cancer-fighting diet pattern and goal setting for improved eating habits. Participants will weight in and provide food journal at each meeting. RD provides continued support for maximizing health diet and weight loss.	1) A free two-month membership to the Wellness Center 2) Pre-fitness assessment 3) Exercise prescription developed by fitness specialist 4) 30-minute group sessions with a fitness specialist twice weekly 5) Post-fitness assessment

Note. IHC = Integrative Health Coaching; RD = Registered Dietician; ProEx = Progressive Exercise

Table 2.

Sample Characteristics (N = 8)

Characteristic	Mean (SD)	Range
Age (years)	64 (7.07)	47 - 70

Characteristic	n	%
Demographics		
Sex		
Male	5	62.5
Female	3	37.5
Race/Ethnicity		
White, non-Hispanic	7	87.5
Hispanic/Latino	1	12.5
Black/African American	0	0.0
Marital status		
Single/Divorced	2	25.0
Married	6	75.0
Annual household income ($)		
<49,999	0	0.0
50,000 - $74,999	2	25.0
75,000 - $99,999	1	12.5
>100,000	0	0.0
Prefer not to answer	5	62.5
Employment status		
Disabled/Unemployed	1	12.5
Part-Time	1	12.5
Full-Time	1	12.5
Retired	5	62.5
Highest level of education		
Less than high school	1	12.5
High school graduate	1	12.5
Associate's degree	2	25.0
Bachelor's degree	2	25.0
Graduate or professional degree	2	25.0
Tumor and Treatment-Specific Data		
Primary cancer diagnosis		
Breast	3	37.5
Colorectal	1	12.5
Head & Neck	1	12.5
Lymphoma/MPN	2	25.0
Prostate	1	12.5
Stage at time of CAN program		
Stage 0/I	4	50.0
Stage II	1	12.5

Stage III	2	25.0
Stage IV	1	12.5
Treatment type		
XRT only	3	37.5
Chemotherapy only	3	37.5
Combined modality (chemo + XRT)	2	25.0
Time since completion of treatment		
On treatment during CAN	3	37.5
1-6 months prior to CAN	3	37.5
>6 months prior to CAN	2	25.0

Note. MPN = myeloproliferative neoplasm; CAN = Change.Activity.Nutrition; XRT = radiation therapy

Table 3.

Number of CAN Program Visits (N = 8)

Variable	Mean	SD
Time to completion (weeks)	11.0	2.9
Number of visits		
Oncology Registered Dietician	4.4	1.7
Oncology Social Worker	3.8	2.2
Wellness Center	12.1	16.1

Table 4.

Outcomes of CAN Program by Anthropometric Measures and RAND SF-36 Health Survey

Variable	Pre-CAN N=6 Mean	Pre-CAN N=6 SD	Post-CAN N=6 Mean	Post-CAN N=6 SD	Overall change (post – pre)	*p*
BMI	32.0	10.1	31.3	9.6	– 0.7	.062
Waist circumference (inches)	43.0	7.2	43.7*	7.3	+ 0.7*	.250
RAND SF-36 domain scores						
Physical functioning	70.8	21.8	81.7	19.4	+ 10.9	.062
Role limitations due to physical health	50.0	41.8	79.2	40.1	+ 29.2	.125
Role limitations due to emotional problems	83.3	27.9	88.9	27.2	+ 5.6	1.000
Energy/fatigue	44.2	25.6	52.5	22.5	+ 8.3	1.000
Emotional well-being	76.0	11.9	75.7	11.3	– 0.3	1.000
Social functioning	83.3	27.0	89.6	16.6	+ 6.3	1.000
Pain	58.0	21.0	75.0	19.4	+ 17.0	.125
General health	70.8	9.7	74.2	14.3	+ 3.4	1.000

Note. CAN = Change.Activity.Nutrition; BMI = body mass index. *p*-value determined by the related-samples sign test.
*missing values for 2 participants.

Table 5.

Qualitative observations from participants in the CAN program

Participant #1	"All three segments of the CAN program have been helpful. … There is a lot of information that I've been introduced to that will require time for me to fully integrate into a permanent part of my new lifestyle."
Participant #3	"I have been keeping in close contact with [OSW] and [RD]. [RD] has been most helpful in learning how to eat right and [OSW] has been helpful. Today I had a meeting with [OSW] and we did a test on Bio Feedback of learning to breathe and calm down. I did well on the exercise and it was fun to learn how to listen to your breathing and control it. I went a couple of times to the Gym, with all the other appointments. I have not kept up with that but I am doing exercise at home and plan to get more hand weights to continue… The wellness program is good for people who live [close] but I can't justify putting 60 mile[s] round trip on my car to go there. It's a life time changing process and I feel I am doing well by eating the right things and exercise and moving. Thanks to [RD] and [OSW] I have learned a lot and feel that their part of the program is a great asset to people."
Participant #4	"..The CAN program…was the spark plug that I needed to get going and I will keep on keeping on. If I had just done the wellness center on my own my diet would still be poor. If I did a diet alone then I would just sit around thinking about food. So [OSW] kept my mind in the game. I am doing the chair yoga. Could not think at 65 I would be doing yoga, but I like it. Thanks to you and your program I feel that it is just the start of a new life style…and if you need a[n] example for anyone thinking about the program here I am."
Participant #7	"…I am enjoying the Wellness Center. I'm continuing with the exercises plus twice-weekly spinning classes & lap swimming."
Participant #8	"Things got hot and heavy in December and January. I was going…4 days a week for treatment. The result was I was unable to meet with [RD] and [OSW] or they were unavailable during the rare days I was not in treatment. Hopefully we can complete the program requirements in February and March."

Note. RD = Registered Dietician; OSW = Oncology Social Worker

Figure 1.

Duke Integrative Medicine's Wheel of Health (2017)