RESEARCH
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Pilot Randomized Controlled Trial of a Home Vegetable Gardening Intervention among Older Cancer Survivors Shows Feasibility, Satisfaction, and Promise in Improving Vegetable and Fruit Consumption, Reassurance of Worth, and the Trajectory of Central Adiposity

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ABSTRACT

Background Holistic approaches are sought to improve lifestyle behaviors and health of cancer survivors long term.

Objective Our aim was to explore whether a home-based vegetable gardening intervention is feasible and whether it improves diet and other health-related outcomes among older cancer survivors.

Design We conducted a feasibility trial in which cancer survivors were randomized to receive a year-long gardening intervention immediately or to a wait-list control arm. Home visits at baseline and 1 year assessed physical performance, anthropometric indices, behavioral and psychosocial outcomes, and biomarkers.

Participants/setting Participants included 46 older (aged 60+ years) survivors of locoregionally staged cancers across Alabama from 2014 to 2016. Forty-two completed 1-year follow-up.

Intervention Cooperative extension master gardeners delivered guidance to establish three seasonal vegetable gardens at survivors' homes. Plants, seeds, and gardening supplies were provided.

Outcomes Primary outcomes were feasibility targets of 80% accrual and retention, and an absence of serious adverse events; other outcomes were secondary and explored potential benefits.

Statistical analyses Baseline to follow-up changes were assessed within and between arms using paired *t*, McNemar's, and χ^2 tests.

Results This trial proved to be safe and demonstrated 91.3% retention; 70% of intervention participants rated their experience as "excellent," and 85% would "do it again." Data suggest significantly increased reassurance of worth (+0.49 vs −0.45) and attenuated increases in waist circumference (+2.30 cm vs +7.96 cm) in the gardening vs control arms (P=0.02). Vegetable and fruit consumption increased by approximately 1 serving/day within the gardening arm from baseline to follow-up (mean [standard error]=1.34 [1.2] to 2.25 [1.9] servings/day; P=0.02)] compared to controls (1.22 [1.1] to 1.12 [0.7]; P=0.77; between-arm P=0.06).

Conclusions The home vegetable gardening intervention among older cancer survivors was feasible and suggested improvements in vegetable and fruit consumption and reassurance of worth; data also suggest attenuated increases in waist circumference. Continued study of vegetable gardening interventions is warranted to improve health, health behaviors, and well-being of older cancer survivors.

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CURRENTLY, THERE ARE 15.5 MILLION CANCER SURvivors in the United States; 70% are aged 60 years or older.[1] These older survivors often report complex health needs, of which functional decline is a major concern that threatens their ability to live independently, reduces quality of life, and increases the burden borne by survivors, their families, and the health care system as a whole.[1]

Research shows that individuals who garden, and especially those who grow their own vegetables and fruit, are more physically active,[2,3] and tend to have healthier diets,[3,4] body weight status,[5] and better mental health and acuity.[4,6] In a study by Brown and colleagues[7] of 66 nursing home residents, a 5-week gardening intervention significantly improved ability to perform three activities of daily living (ie, transferring, eating, and toileting) and also enhanced reassurance of worth (defined as a feeling of adding value or deserving a place in society). These results may apply to cancer survivors who are at greater risk for many health conditions that are influenced by health behaviors (eg, second cancers, cardiovascular disease, and diabetes),[1] as well as functional decline. In addition, data indicate that few cancer survivors eat at least five servings of vegetable and fruit daily or obtain sufficient physical activity (PA); therefore, the activities of gardening and access to fresh produce may have particular value in this population.[8]

While there have been some interventions aimed at gleaning (harvesting),[9] Blair and colleagues[3] reported the first and only study of a gardening intervention among cancer survivors. In this one-arm, quasi-experimental study, 12 cancer survivors (composed equally of breast, prostate, and childhood cancer survivors) received supplies needed to grow a spring, summer, and fall vegetable garden. Home gardens, as opposed to community-based gardens, were used, given the relatively low population density of cancer survivors and well-known barriers to travel.[10] Given that many cancer survivors lacked the knowledge and skills to garden, volunteer cooperative extension master gardeners provided needed guidance. Results of this study found that all adult survivors who completed the 1-year study (6 of 8) achieved improvements in at least 2 of 3 of the following goals: increase of 1 or more vegetables and fruit servings per day; increase of $\geq$30 minutes of moderate PA per day; and improvement in three of four physical performance measures (30-second chair stand, hand-grip strength, timed up-and-go, and the 6-minute walk test).

We adapted the intervention used by Blair and colleagues[3] and re-evaluated it in a larger 2-arm National Cancer Institute–sponsored pilot, feasibility trial among 46 older cancer survivors across Alabama, hypothesizing that the study would achieve the following benchmarks: enrollment of at least 80% of the accrual target; retention of at least 80% of participants; an absence of serious adverse events attributable to the intervention; and results that, if not statistically significant, showed satisfaction and some evidence of favorable effects on health behaviors and other health-related outcomes.

RESEARCH SNAPSHOT

Research Question: Is a home vegetable gardening intervention feasible among older cancer survivors, and is it associated with improvements in diet and other health-related outcomes?

Key Findings: This feasibility trial among 46 older cancer survivors who were randomized to receive a year-long vegetable gardening intervention immediately or to a wait-list control arm achieved 100% accrual, 91.3% retention, and was safe; 100% of intervention participants rated their experience as "good to excellent," and 85% would "do it again." Data among intervention vs control arm participants suggest improved reassurance of worth, attenuated increases in waist circumference, and trends toward improved vegetable and fruit consumption.

MATERIALS AND METHODS

A detailed description of the study protocol was published previously.[11] Briefly, this was a single-blinded, two-arm, randomized controlled trial in which 46 older cancer survivors were evenly assigned to receive a 1-year gardening intervention immediately or to a wait-list control arm where they received the gardening intervention after 1-year follow-up. The protocol and the consent form were approved by the Institutional Review Board of the University of Alabama at Birmingham (UAB). The trial was registered at ClinicalTrials.gov (NCT02150148).

Eligibility/Consent

Cancer survivors were recruited across Alabama from June 2014 through August 2014 largely by mailing letters of invitation to survivors identified through the UAB and the Alabama State Cancer Registries (making sure to obtain their primary oncologist's permission for contact before the mailing). Community-based presentations at cancer support groups, fliers, television, and radio announcements also drew self-referrals or referrals by community-based physicians. Eligibility criteria included 1) age 60 years or older; 2) diagnosed with a locoregionally staged cancer associated with at least a 60% 5-year relative survival, that is, in situ bladder; localized and regional: breast (female), Hodgkin lymphoma, prostate, and thyroid; localized: cervix, colorectum, corpus and uterus, kidney/renal pelvis, non-Hodgkin lymphoma, oral cavity/pharynx, ovary, small intestine, and soft tissues; 3) completion of all cytotoxic and locoregional cancer therapy with the exception of ongoing adjuvant endocrine therapy; 4) one or more limitations on the 36-Item Short Form Health Survey physical function subscale (at greater risk for functional decline)[12]; 5) English-speaking and writing; 6) community dwelling, with residence able to accommodate one raised bed or four Earthboxes in a location receiving at least 6 hours of daily sunlight and access to running water; 7) reporting $<$150 minutes of exercise/week on average; 8) reporting $<$5 servings of vegetables and fruit per day on average; and 9) willingness to be randomized and adhere to study protocol. Potential participants were deemed ineligible if they already tended a vegetable garden or had counterindications to unsupervised PA, for example, told by their physician not to exercise or had severe orthopedic, cardiovascular, or pulmonary conditions. Written informed consent was obtained from all eligible participants.