



Enhancing behavioral change among lung cancer survivors participating in a lifestyle risk reduction intervention: a qualitative study

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Abstract

Purpose Early detection and improved treatment have increased lung cancer survival. Lung cancer survivors have more symptom distress and lower function compared with other cancer survivors; however, few interventions are available to improve health-related quality of life (HR-QOL). Lifestyle risk reduction interventions have improved HR-QOL in other cancer survivors. The purpose of this study was to explore lung cancer survivor perspectives on making behavioral changes in the context of a lifestyle risk reduction intervention.

Methods Twenty-two lung cancer survivors participated in interviews after completing the Healthy Directions (HD) intervention. Interviews were audiotaped, transcribed, and analyzed using inductive content analysis. Demographic and clinical characteristics were gathered through a survey and analyzed using descriptive statistics.

Results Five main themes were identified: (1) the diagnosis was a motivator for behavior change, (2) participants had to deal with disease consequences, (3) the coach provided guidance, (4) strategies for change were initiated, and (5) social support sustained behavioral changes. Other important subthemes were the coach helped interpret symptoms, which supported self-efficacy and goal setting, and survivors employed self-monitoring behaviors. Several participants found the recommended goals for physical activity were difficult and were discouraged if unable to attain the goal. Findings underscore the need for individualized prescriptions of physical activity, especially for sedentary survivors.

Conclusions Lung cancer survivors described the benefits of coaching to enhance their engagement in behavioral change. Additional research is needed to validate the benefit of the HD intervention to improve HR-QOL among this vulnerable and understudied group of cancer survivors.

Keywords Lung cancer · Health goals · Multiple health behavior change · Coaching · Health-related quality of life · Lifestyle risk reduction

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Introduction

In 2018, 234,030 cases of lung cancer are expected to be diagnosed in the USA [1]. Early detection and improvement in treatments have increased survival [2–4]. The number of lung cancer survivors is estimated to grow from 526,510 to 673,370 by 2026 [5]. As the length of survival increases, it is important to identify interventions that improve health-related quality of life (HR-QOL).

Lung cancer survivors experience lower function and higher symptom burden compared with survivors with other types of cancers [2, 4, 6–8]. Research focused on interventions that improve HR-QOL have been underrepresented in this population [2, 6]. A promising intervention already associated with improved HR-QOL among breast, prostate, and colorectal cancer patients is to promote adherence to multiple lifestyle

behaviors [9]. Blanchard and colleagues [10] found a strong positive relationship between increased adherence to lifestyle recommendations and improved HR-QOL in a group of heterogeneous cancer survivors. To date, no studies have been conducted among lung cancer survivors that have focused on increased adherence to multiple lifestyle behaviors and outcomes [8, 11–13].

Research has been conducted on identifying the relationship between isolated behaviors and improved HR-QOL among lung cancer survivors. Behavioral changes such as smoking cessation and physical exercise were associated with improved HR-QOL among lung cancer survivors [14]. Exercise is an effective way to improve physical fitness and HR-QOL [15]. However, exercise guidelines have not been established for lung cancer patients [16–18]. Setting goals and implementing behavioral change can be challenging after a cancer diagnosis [2, 3, 7, 8]. Gathering information about ways to enhance behavioral change from the patients' perspective is essential to refine and strengthen future interventions. To our knowledge, this is the first qualitative study that has examined lung cancer survivors' perspectives about participation in a multiple lifestyle risk reduction program. The specific aims for this study were to explore lung cancer survivor perspectives on making behavioral changes in the context of a lifestyle risk reduction intervention.

Methods

The primary study examined the feasibility and acceptability of the “Healthy Directions” (HD) intervention for lung cancer survivors [19]. Patients who completed HD were interviewed about the acceptability of the intervention. Institutional Review Board approval was obtained from the Dana Farber Cancer Institute and the University of Massachusetts Boston. The data reported in this article was a secondary analysis of the data collected for evaluation of the acceptability of the intervention [20].

Patients ($n = 27$) completed the 8-week coaching intervention implemented by a registered nurse, who was trained in health education, lifestyle coaching, and evidence-based tobacco treatment. The intervention focused on increasing physical activity, increasing fruits and vegetables' consumption, decreasing red meat consumption, and smoking cessation for those who smoked. Description of HD and adaptation for lung cancer survivors have been previously published [19, 21, 22]. In brief, HD consisted of a (1) toolkit (educational materials, available resources, and a pedometer), (2) baseline lifestyle questionnaire, (3) personalized report to track progress, and (4) five biweekly contacts that focused on goal setting and attainment [19].

Data to examine feasibility and acceptability were collected at baseline, and 1 and 4 months after study enrollment [19]. A

semi-structured interview to evaluate the acceptability of HD was conducted after data collection was completed. Inclusion criteria for analysis of qualitative data for this study were (1) participants completed HD, (2) participants completed the interview, and (3) transcribed transcripts were available for analysis.

Procedure

Once quantitative data collection was completed, participants were informed that they would receive a follow-up phone call from an independent member of the research team to discuss participation in a semi-structured telephone interview. All study participants who completed the HD intervention were invited to participate in the telephone interview. Participation in the interview was optional. Participants were contacted by telephone and a mutually agreeable time for the interview was scheduled. The interviews lasted approximately 30–40 minutes and were guided by an interview guide focused on evaluation and acceptability of the intervention. However, participants provided additional information describing their experiences with behavioral change during the lifestyle risk reduction intervention, and these data were used for the secondary analysis.

A qualitative inductive approach was used as the qualitative methodology [23]. This approach is a systematic procedure for analyzing qualitative data and is guided by formulating specific objectives and allows findings to emerge from the frequent, dominant, or significant themes evident in the data [23]. The specific purpose of using this approach is it allowed the research team to (1) condense textual data into a brief summary format, (2) recognize themes and categories evident in the data, and (3) develop a framework of the underlying processes evident in the data [23, 24]. This approach was chosen because it provided the research team with an easily used and systematic set of procedures for analyzing qualitative data that produces reliable and valid findings [23, 25].

Data analysis

Interviews were audiotaped and transcribed verbatim. Transcripts were checked for accuracy, uploaded into NVivo 9 (QRS International Pty, Ltd., 2010), and later updated to NVivo 11 (QRS International Pty, Ltd., 2015). Three research team members (DS, ACB, and MEC) coded all transcripts utilizing an inductive content analysis approach, identifying concepts and themes derived from the data [23]. The inductive content analysis is an analytic process that allowed the researchers to conduct open coding, create categories, and abstraction of the study data. Line-by-line coding was done to examine text across and within interviews to identify key themes. Coders discussed interpretations, developed codes, and grouped codes into categories representative of the

identified themes. During this process, researchers stayed close to the transcripts to ensure that the themes reflected the actual data and not the researchers’ interpretations [26]. The coders met as a group to read excerpts of transcripts, code the data, and develop a code-book for common understanding of coding categories. Subsequently, coding was done individually, and then all coding was reviewed as a group to discuss and obtain feedback about ongoing interpretation of data to ensure accuracy and consistency and maintain integrity of data. Any differences/conflicts in the interpretation of the data were discussed among all team members and resolved by consensus.

Codes were clustered together to create descriptive categories of barriers, facilitators, and processes of change. Five themes emerged and associated narrative data were reviewed again to summarize the most common themes and subthemes. A treemap was created to visualize the data to identify patterns and support the themes that were emerging from the analysis. A treemap shows the main themes of the data as a set of nested rectangles of varying sizes and provides visual feedback to the researchers about the most frequent and prominent themes emerging from the data [27, 28]. The size of the rectangle corresponds to the number of coded items within that particular theme, with a larger rectangle resulting from a larger number of codes. Additionally, the “rectangle’s color”

identifies the number of codes included in the (category), where red indicates the highest number of codes followed by yellow and then green indicating most prominent to less prominent themes (Fig. 1).

Although this was a secondary analysis, data saturation was reached according to criteria provided by Morse [29] and Guest, Bunce, and Johnson [30]. Morse [29] identified principles of saturation in qualitative research, and our study fits several of these criteria, including the following: (1) selection of a culturally cohesive sample that shares the characteristics that address the research topic (i.e., early stage NSCLC survivors, recently completed treatment, and participated in a lifestyle risk reduction intervention), (2) use of a convenience sample rather than a random sample (saturation with a convenience sample will occur more slowly than theoretical sampling as opposed to random sampling, which may never achieve saturation), (3) we sampled all variations appearing within the data and paid attention to negative cases, and (4) our data provided information about underlying processes involved with behavioral change. Guest et al. using their data set, which contained 60 interviews, evaluated how many interviews were enough to reach data saturation. Based on their analysis, they found that data saturation occurred within the first 12 interviews and basic elements for themes were present as early as within the first six participants. We analyzed data from 22 participants for this qualitative analysis, thus

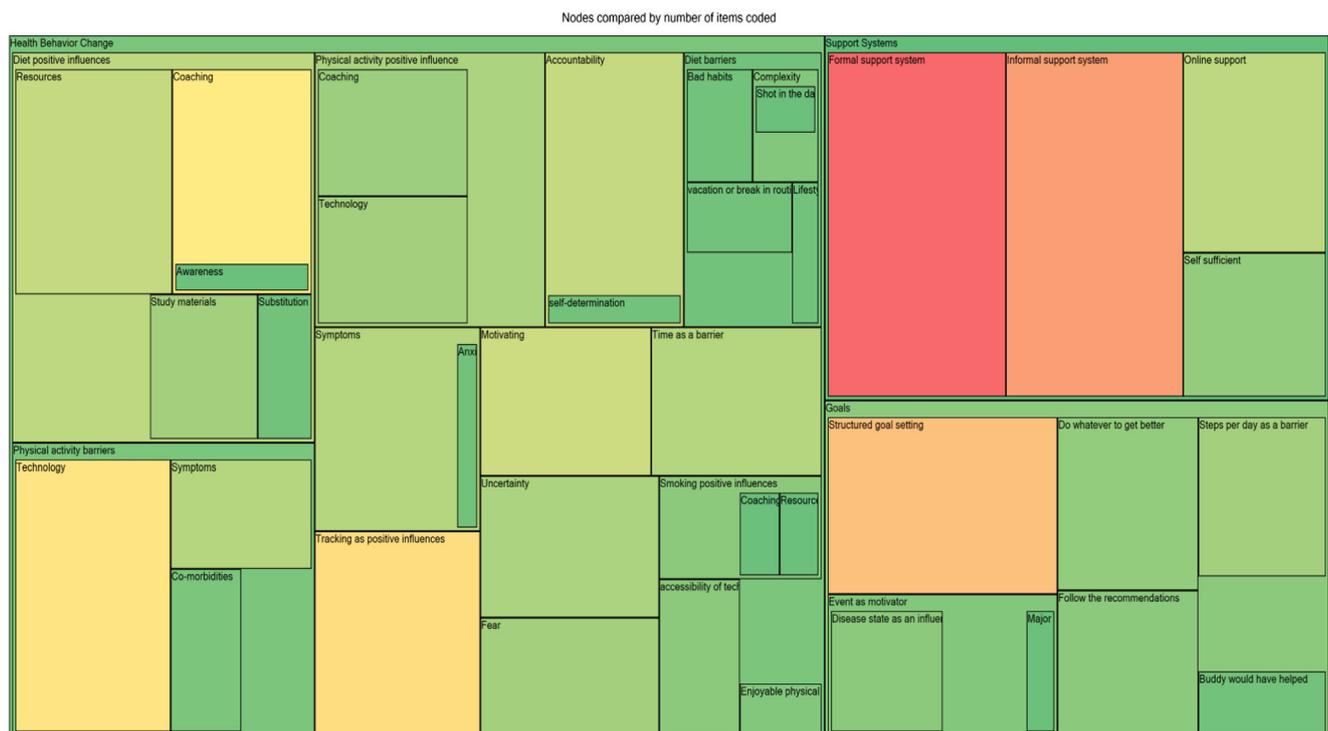


Fig. 1 Conceptual treemap of themes. The size of the rectangle corresponds to the number of coded items within that particular theme, with a larger rectangle resulting from a larger number of codes. The

“rectangle color” identifies the number of codes included in the node, where red indicates the highest number of codes followed by yellow and then green.

exceeding the number of participant interviews needed to reach saturation as identified by Guest et al. [30].

Results

Sample

Twenty-seven participants completed the HD intervention for lung cancer survivors [17]. Of these, 24 completed the interview at the conclusion of the parent study and of these, 22 were eligible for this secondary analysis. The reasons that the two participants did not meet eligibility criteria were that the interview was not audiotaped and transcribed due to faulty equipment ($n = 1$) and the interview included a family caregiver ($n = 1$). Participants were primarily female, married, and had early-stage lung cancer. Table 1 provides participant demographic and clinical characteristics. A pseudonym name was added to each excerpt from the interviewees.

Themes

Prominent themes included (1) *motivation*, (2) *dealing with consequences of the disease*, (3) *coach as navigator*, (4)

making changes, and (5) *social support*. Figure 1 shows a visual depiction of the themes, and Fig. 2 shows the process of change that emerged from the data. Further information about each theme is provided below.

Theme 1: motivation

Participants talked about having their diagnosis act as a “wake-up call” to get healthy again. After learning about their diagnosis, participants reacted in different ways to manage their disease. Some patients found that technology was helpful as a motivator to enhance their efforts, whereas others found it difficult to use and discouraging.

Disease as an event to initiate behavioral change Participants used their diagnosis to make healthy changes. A lung cancer diagnosis became a pivotal episode in their life that needed to be addressed to improve their health and wellbeing.

I was ready to make some changes, it turned a lot of things around for me. I’m eating more healthfully. And I’m getting more exercise, and I quit smoking. How can you lose when you’ve gained all that? (Mary)

Do whatever you need to do to get better The management of “whatever it takes” to get better helped some patients gain a sense of control over their recovery. Participants expressed the need to push themselves to make healthy changes even when times were challenging.

Some days I would say, I don’t feel like going out for a walk. And I would say, oh, let’s go. We have to—have to do this. It’s good for me. (Ann)

Technology Participants discussed both positive and negative experiences with technology. For some patients, it was informative and motivating.

I find wearing the pedometer was a motivator, and then writing stuff down every day. So after it was over, I set up an app on my iPhone. I’m still checking the miles and then I go home and I put on the calendar how many fruits and vegetables I ate that day. (Paul)

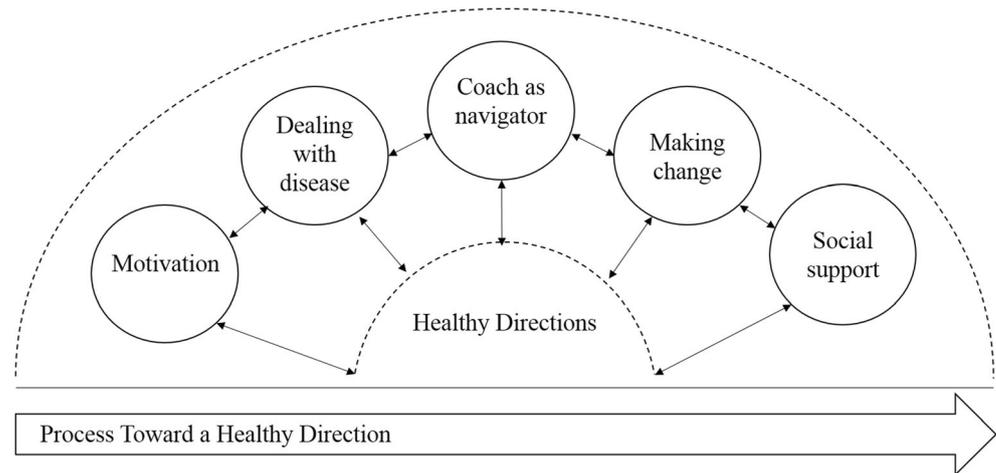
For others, monitoring steps with a pedometer was disappointing because they could not make the expected 10,000 steps per day.

Unless you hit that 10,000 mark, you don’t get the little happy smiley face saying “Congratulations, you have met your goal for the day” If you’re getting over

Table 1 Demographic and clinical characteristics

	N	%
N	22	100
Demographic characteristics		
Gender		
Male	7	31.8
Female	15	68.2
Age, median (range)	60	40–75
Education		
< College	10	45.4
≥ College graduate	12	54.6
Marital status		
Single/never married	2	9.1
Married/partnered	15	68.2
Divorced/widowed	5	22.7
Stage		
I	11	50.0
II	6	27.3
III	5	22.7
Surgery type		
Pneumonectomy	5	22.7
Lobectomy	9	40.9
Wedge/section resection	7	31.8
Other	1	4.6

Fig. 2 The process of change that emerged from the data



surgery, and not walking that much yet; basically every day, I kind of felt like a loser. (Janet)

Technology was also uncomfortable for a few of the participants. Participants felt compelled to wear the wearable technology devices, despite feeling uncomfortable. They were committed to reaching their goals.

So you have the choice of being uncomfortable and wearing it, or not wearing it and then feeling like you're not giving an accurate portrayal of your activity. (John)

But it was mainly the, the little thing, the clip-on where it, it would dig into my skin sometimes. (Mary Ann)

Theme 2: dealing with the consequences of the disease

Participants had to manage symptoms, disruption in their routines, and uncertainty associated with their diagnosis. Learning they had lung cancer was overwhelming for participants. They had to devise ways to manage the uncertainties and certainties that accompany the diagnosis of lung cancer including dealing with ongoing symptoms, concern about future risk of disease recurrence, and returning to their previous level of function such as return to work.

Symptoms Different strategies were identified to manage symptoms. Participants drew from available resources that included educational materials provided through the intervention, information from family members and/or guidance, and support gained from their health care providers.

This program was great and it helped with symptoms and shows you what would make you feel better versus what

to do if that happens or what to do if this happens. I use the materials even now when I get tired – because I went back to work in April. So going back to work after eight months of surgery, and chemo, it was rough. (Barb)

Uncertainty Some participants waited to make plans for the future based on results from postoperative follow-up appointments and disease status.

My goal was always to do the Pan-Mass Challenge. So I'm signed up. I just haven't met that goal because it's not until August. I just had a scan last week. Everything was good so based on that, a couple days after that. That's when I joined. (Jerry)

Theme 3: coach as navigator

Participants relied on coaching calls to ask questions to better understand their recovery. Three subthemes emerged: expertise, personal accountability, and awareness.

Expertise Participants identified the benefit of being able to ask questions from a trusted source. Participants relied on the expertise and availability of the nurse to answer their questions and address their concerns.

I loved being able to talk to a nurse, because I was post-surgery, and you always have a million questions, like, why two weeks after surgery do I have all this pain in my chest that I didn't have before. And having a nurse call afterwards, you had somebody to talk to, because you can't call a doctor with all the little things that come up. (Margaret)

Participants talked about needing encouragement during recovery when issues arose. Recovery was different for each

of the participants. The nurse was able to assess and address each participant's specific need.

If you're an active person and you're exhausted all the time, you don't know why. So you get very encouraging remarks, "Well, this is probably going to last about six to twelve months, Do you notice you're getting better month-to-month?" So it was perspective and encouragement. (Margaret)

Personal accountability Participants expressed feeling accountable to the coach which helped the participants make healthier changes to meet their goals.

I knew the coach would be calling then I could tell her how much more I had done and track my progress. (Suzanne)

Receiving a coaching call felt like a check and balance for some participants. Although they were motivated, they also felt obligated to meet goals because they made a commitment to the program.

I'm someone who if I commit to something, I feel compelled to do it, and having the check-in meant that, I'm an honest person, but there's someone monitoring me on top of that. (Janet)

Awareness Participants found that HD increased their awareness of their health behaviors. Participants became mindful about everyday lifestyle health behavior choices and subsequent health-related outcomes.

It gave me feedback about am I or am I not on a healthy path. You know, the path being fruits and vegetables, meat, and walking. Am I really doing it, and to what extent. (Margaret)

Awareness of health behaviors was an awakening experience. Participants talked about misconceptions about food portions and level of exercise fitness.

I'm kind of a lard bucket. It was really an eye opener to see. You know, that you're supposed to walk eight to ten thousand steps a day and that I can barely make four thousand. (Lori)

I did like the fact that she opened my eyes a lot. The size of your servings and types of food selected. (Ruth)

Theme 4: making change

Participants used a variety of resources to facilitate behavior change and noted some aspects of changing behaviors were challenging.

Diet was complex Some participants found that HD provided simple straightforward information about making healthy diet choices, whereas other participants found that diet was complicated and difficult to understand because of conflicting information.

The program could get into some of the fresh and organic food issues. For example, if people eat chicken, they may be eating some kind of chicken that is processed and has a lot of bad stuff in it. (Mary)

I can't figure it out. The literature is so confusing. One day, it will say butter is bad and the next day that chocolate is good. (Mary)

Tracking was helpful Participants discussed how tracking exercise and diet activities were helpful to facilitate healthier choices, even if they did not meet their goals every day.

My best behavior was when I was doing the 5,000 steps or that first—10,000 steps. At first when I started in this program, I thought they were nuts. I said, 'do you realize how many miles that is per day?' But, ironically you can meet that goal. (Ruth)

Find an enjoyable physical activity Some participants identified that finding activities besides walking was important for them to meet their activity goals. Participants realized they had other options to meet their goals in creating and sustaining a healthier lifestyle.

While I enjoy walking every now and then I don't know that I'd want to get all of my exercise from it...and I just didn't this winter. I went to Pilates classes. (Mary)

Structured goal setting Setting goals that were organized worked as a successful strategy for many to live a healthier lifestyle.

It's nice to have a third party reinforcing some of the things. There's diet, and exercise and—setting up goals that are more structured than just doing it. I found that

useful, especially when I was tracking my progress and I'm still tracking it. (Jerry)

Follow the recommendations Others discussed the benefit of guidelines provided by the study in reaching their goals. Well-structured diet and exercise plans were of value to many HD study participants.

We went with what they recommended. They're saying to eat properly. Eat the vegetables; eat the fruit, plenty of water. We paid more attention to that than we did in the past. (Charles)

Theme 5: Social support

Participants identified types of social support that were used to enhance and sustain their behavioral changes. Clinicians, research staff, family, and friends provided a broad array of support in a time of participant need or crisis to provide a buffer against adverse life events and improve quality of life.

Formal support Some participants identified that structured support from clinicians and the research team, which included setting goals for behavioral change, was helpful.

The phone call that you would get allowed you to talk about the plan that you had set. It helped me stay focused because I knew that I had somebody to answer to. (Anita)

Material Participants used the study resources (educational materials) for guidance during their recovery.

I had a little depression and the pamphlet encouraged me. I did speak to a social worker because I didn't think I was progressing fast enough, and I don't know if I would have been as likely to call if the pamphlets weren't encouraging you to do that if you needed to. (Lori)

I went through the book quite a few times...having the illness and then going through everything I wanted to read up on everything. So anything in the book that applied to me was helpful. (Anita)

Informal support Participants mentioned their family members as a significant form of informal support to make and sustain healthy goals.

My husband walked with me. It was him, the kids, and my grandkids that helped me. Because, when we got into the exercise mode they would ride their bikes and we would go walking with them. When the weather was nice we were trying to do our daily routine when they came over. He was extremely helpful and he lost a few pounds too. My husband is my best friend. We've been through a lot together. Because we know how far we can push each other. (Ruth)

Self-sufficient A few participants discussed not needing the support of family or friends to accomplish what they thought was important in their recovery. They expressed the ability to be self-reliant and could manage their disease on their own without the support of others. They were independent before a lung cancer diagnosis.

I had choices to have people help me, and I didn't want it. I guess my attitude about it was this is kind of like a project. It was — I had a tumor, it was coming out. I was getting well immediately. (Jennifer)

Others talked about wishing they had a significant other to talk to about their recovery.

I think people that are married probably are in a lot better shape where they could share their deep-down stuff. I just have to live with instead of sharing it, because I just think it would be too painful for the people that are close to me to share it. (Fred)

Discussion

This study provided insight into lung cancer survivors' experience with participation in a lifestyle risk reduction intervention and offers direction for strengthening future interventions to enhance engagement in behavioral change. Participants reported that "the intervention came at the right time" to make positive behavioral change. This finding appears to be consistent with the "teachable moment," defined as a "cueing" event that prompts an increase in the perception of personal risk [31, 32]. McBride, Emmons, and Lipkus [31] propose that these cognitive responses precede motivation, skills acquisition, and self-efficacy, which affect the likelihood of behavioral change. Bluethmann and colleagues [33] examined associations between length of time from diagnosis and lifestyle behaviors among breast, prostate, and colorectal cancer survivors and found that greater time since diagnosis was associated with lower fruit and vegetable consumption and a higher smoking

rate. This provides evidence that proximity to the diagnosis provides a teachable moment to improve health behaviors.

Coaching calls, especially provided by a nurse, helped participants initiate behavioral change. One of the key roles the nurse played was helping participants interpret symptoms and understand the expected trajectory of recovery. Helping lung cancer survivors interpret and manage their symptoms enhances their self-efficacy (confidence) to manage distressing symptoms and engage in positive behavioral change. Several studies have found that increasing self-efficacy was associated with decreased symptom distress and increased physical activity among lung cancer survivors [34, 35]. A systematic review examined the benefits of telephone-based coaching among those with chronic illness and found that coaching was associated with improvements in lifestyle behavior, self-efficacy, and health status [36]. Galantino and colleagues [37] examined the influence of coaching on lifestyle behaviors among breast, prostate, and colorectal cancer survivors and found, similar to our study, that coaching helped patients improve lifestyle behaviors through goal setting and increased awareness of food choices and exercise.

Some participants found that current recommendations for physical activity seemed like lofty goals and were discouraged if they didn't meet the targeted goal. Coups and colleagues [38] examined physical activity among individuals who completed surgical treatment for lung cancer and found that nearly 2/3 of participants did not engage in sufficient physical activity to meet recommended guidelines. Bourke and colleagues [39] examined interventions for promoting exercise in sedentary cancer survivors and found that expecting most sedentary cancer survivors to achieve current exercise recommendations is unrealistic. Individualized prescriptions focused on an individual's capability for exercise were recommended to increase adherence. Other behavior change strategies associated with higher adherence included setting goals and self-monitoring, which were components of HD. Another finding from our study was that walking may not be the best approach for exercise among all lung cancer survivors, as some participants found it was important to "find physical activities that they enjoyed."

Although use of a pedometer for tracking steps motivated some participants, others found the technology uncomfortable or difficult to use. Studies have identified that tracking activity levels through commercially available devices such as the Fitbit was associated with increased physical activity even among older adults [40, 41]. Mercer and colleagues [42] evaluated acceptance of activity trackers among adults over age 50 with chronic illness and found they were perceived as useful and acceptable. In fact, after wearing the devices for 3 days, 74% of participants planned on purchasing a device. It is important to note that older users needed additional support to set up the device and would benefit from comprehensive paper-based manuals and assistance in interpreting their data. It is

essential to address these factors in future studies to enhance long-term use of wearable devices [43].

Social support was important to participants in implementing and sustaining behavioral change. Participants talked about the value of formal support provided by clinical staff to increase their knowledge related to their disease. They also appreciated a structured program to guide them in setting goals and creating a sense of accountability to stay on task. Informal support of family and friends was identified to impact participants' success in making lifestyle changes. This finding is similar to Greaney and colleagues [44] who found that engagement of one's social network leads to greater change across multiple lifestyle risk behaviors. Participants in this study were English-speaking adults from two urban health centers scheduled for primary care visits, including those requiring chronic disease management. In their study, individuals who identified one support person had 61% greater reduction and those identifying multiple support persons had 100% reduction in multiple lifestyle risk behaviors as compared to those who did not seek support.

Taken together, the results of our study appear to be consistent with other studies conducted among cancer survivors that have identified interventions using concepts based on social cognitive-based theory (self-efficacy, goal setting, self-monitoring, self-instruction, and social support) have been associated with positive behavioral change [45, 46]. Thus, social cognitive theory-based interventions appear to be a promising approach to promote positive behavioral changes after a cancer diagnosis [47].

Strengths and limitations

This study provided information on making lifestyle behavioral changes in the context of an intervention from the lung cancer survivor's perspective. The majority of the participants that completed the intervention were interviewed about their experience. Although current recommendations for cancer survivors focus on reducing multiple lifestyle risk behaviors, previous studies conducted among lung cancer survivors have focused on single behaviors and have collected quantitative data [35]. Qualitative data provides information from the participant's perspective that can be used to enhance acceptability of interventions. Given the increasing number of lung cancer survivors, acceptable interventions that improve HR-QOL are essential.

Limitations of the study were that participants were recruited from one cancer center, there were more female participants than males, and there was a lack of minorities included in the sample. The most recent estimated number of new lung and bronchus cancer cases in the USA is higher in males (121,680 cases) than females (112,350 cases), which was not represented in our sample of 68% female and 32% male

participants [48]. However, the increased number of female participants in our study is consistent with other health promotion studies and underscores the need to increase recruitment efforts for men. The lack of diversity in our sample is consistent with enrollment into clinical trials across cancer centers nationwide, and initiatives are underway to address this problem [49, 50]. Efforts to recruit minorities are labor-intensive and require more personal contacts. Successful strategies for increasing minority participation, such as use of culturally matched research staff and creating a patient advisory board, need to be incorporated into future research. This study was a secondary data analysis of the existing data and was not the main objective of the interviews; therefore, the data may not be as in-depth and rich as if it had been included in the original aims of the study [20].

Conclusion

Lung cancer survivors described the benefits of coaching to enhance their engagement in behavioral change. Although the diagnosis was a motivator for positive behavior change, the coach assessed and evaluated symptoms to provide recommendations so that participants could set goals and initiate strategies for change. Further research is needed to validate the benefit of HD to improve HR-QOL among this vulnerable and understudied group of cancer survivors.

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Compliance with ethical standards

Conflict of interest Authors Somayaji, Blok, Hayman, Colson, and Jaklisch have no conflicts of interest to disclose. Dr. Cooley reports grant support from the Lung Cancer Research Foundation. Dr. Cooley has control of all primary data and agrees to allow the journal to review their data if requested.

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