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Exploring Important Influences on the Healthfulness of Prostate Cancer Survivors' Diets

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Abstract

A cancer diagnosis is often conceptualized as a teachable moment when individuals might be motivated to make lifestyle changes. Many prostate cancer survivors, however, do not adhere to dietary guidelines. In this article, we explore how cancer impacted prostate cancer survivors' diets and identify important influences on diet. Twenty prostate cancer survivors completed three 24-hour dietary recalls and an in-depth dietary interview. We analyzed interviews using a constant comparison approach, and dietary recall data quantitatively to assess quality and qualitatively to identify food choices patterns. Most men reported not making dietary changes following their cancer diagnosis, but did express an interest in healthy eating, primarily to facilitate weight loss. Men portrayed barriers to healthy eating that often outweighed their motivation to eat healthy. Public health programs should consider alternative ways of framing healthy eating programs for prostate cancer survivors that might be more effective than a cancer-specific focus.

Keywords

cancer; health behavior; men's health; nutrition/malnutrition; research; mixed methods

There are more than 2.7 million prostate cancer survivors in the United States (de Moor et al., 2013). Almost all men who are diagnosed with prostate cancer (98.9%) live at least five years from their time of diagnosis (Howlader et al., 2013), and also continue to face health issues including long term physical and psychological side effects from the cancer and its treatment, including urinary incontinence, impotence, and bowel dysfunction, fear of recurrence and related distress (Bloom, Kang, Petersen, & Stewart, 2007). It is important to note that people living with a history of cancer are at increased risk of a second cancer, developing other chronic conditions (such as cardiovascular disease and diabetes), and functional decline (Aziz, 2007; Demark-Wahnefried, Aziz, Rowland, & Pinto, 2005).

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¹We use the term survivor to refer to individuals with a history of cancer. It is not a term that participants necessarily adopted themselves.

There is growing evidence demonstrating the positive impact that a healthy diet can have on the health and quality of life of cancer survivors (Chris M Blanchard et al., 2004; Chan, Van Blarigan, & Kenfield, 2014; Demark-Wahnefried, 2007; Pekmezi & Demark-Wahnefried, 2011; Rock et al., 2012). The American Cancer Society recommends that prostate cancer survivors

should strive to achieve and maintain a healthy weight, pursue a physically active lifestyle, and consume a diet that is rich in vegetables and fruits and low in saturated fat, with reliance on dietary sources of calcium that are within moderate levels (Rock et al., 2012 pg. 19).

Many prostate cancer survivors do not, however, adhere to dietary guidelines that might be beneficial for their health (C. M. Blanchard, Courneya, & Stein, 2008; Coups & Ostroff, 2005; Mayer et al., 2007).

There are a multitude of factors that influence one's food choices (Sobal & Bisogni, 2009); however, gender is consistently found to be an important determinant of variation in dietary intake pattern. Men are less likely than women to consume fruits and vegetables and high fiber foods, and are more likely to consume saturated fats, red meat, and alcohol, putting them at higher risk of diet-related diseases (Beardsworth et al., 2002; Courtenay, 2000a; Wardle et al., 2004). In the case of cancer survivors, both prostate cancer survivors and male cancer survivors more generally are less likely than female cancer survivors to report making dietary changes following their diagnosis (Demark-Wahnefried et al., 2005), supporting the significance of gender in shaping one's diet and interest in making healthy dietary changes.

A social constructionist perspective provides a framework for understanding how gender, and in the case of prostate cancer survivors, masculinity norms, influences dietary behaviors (Courtenay, 2000c; Garfield, Isacco, & Rogers, 2008). Individuals come to formulate interpretations of their own behaviors through in their social environment (Berger & Luckmann, 1992). Thus, from the time men are young boys, they are socialized to a particular understanding of what it means to be a man, which in the U.S. context is characterized by traits such as independence, risk-taking, power, invincibility, and stoicism (Courtenay, 2000b). There are social pressures for men to conform to gender norms (Courtenay, 2000c), and men's expression of masculinity has been found to take the form of engaging in health-risking behaviors, including substance use, reckless driving, high-risk sexual activities, and fighting (Courtenay, 2000a; Garfield et al., 2008; Mahalik, Burns, & Syzdek, 2007).

There is not a single conceptualization of masculinity, nor is masculinity static. Rather, notions of what it means to be a man continually evolve through interpretation of social interactions as well as social representations of acceptable masculine behaviors (Burke & Stets, 2009). How one constructs a prioritized concept of masculinity is also shaped by other factors, such as local culture, socioeconomic status, and age (Courtenay, 2000b). Considering prostate cancer, it is worth noting that older men are confronted with opportunities to reconstruct their understanding of what it means to be a man in response to life transitions, such as retirement, widowhood, and health issues, all of which can challenge

existing beliefs about masculinity (Gradman, 1994; Smith, Braunack-Mayer, Wittert, & Warin, 2007; Tannenbaum & Frank, 2011; Van den Hoonaard, 2007).

Specific food choices can be conceptualized as an expression of one's masculinity (Mróz, Chapman, Oliffe, & Bottorff, 2011; Newcombe, McCarthy, Cronin, & McCarthy, 2012). Eating is rarely simply an issue of meeting one's nutritional needs, and men and women tend to have different objectives in constructing food choices. Women have been found to often select healthier foods, such as fruits and vegetables and lean sources of protein, often with a goal of facilitating weight loss (Turrell, 1997; Wardle et al., 2004). Alternatively, men often want to build muscle or strength and view food as a source of fuel to do this (Wardle et al., 2004). More than any other food, red meat is a symbol of masculinity (Rothgerber, 2013; Sobal, 2005). Dietary guidelines tend to consist of what might be considered 'feminized' foods or eating patterns (e.g., increased consumption of fruits and vegetables, decreased consumption of red meat), and therefore rejection of these guidelines might serve as an assertion of masculinity (Beardsworth et al., 2002; Gough & Conner, 2006; Mróz et al., 2011). Not surprisingly perhaps, men who hold more traditional beliefs about masculinity have been found to have poorer diets than those who adopt less traditional beliefs (Courtenay, 2003).

A cancer diagnosis can represent a turning point in one's life, and thus may be a time when men are open to making dietary changes that are somewhat inconsistent with masculine ideals in an effort to protect or improve their health (Mróz et al., 2011; Sobal & Bisogni, 2009). However, as noted earlier, many prostate cancer survivors are not making changes to their diet following their diagnosis and do not adhere well to dietary guidelines. There is a need to better understand important influences on the quality of prostate cancer survivors' diets and the ways in which a cancer diagnosis might impact existing dietary norms, including a willingness to incorporate more feminized foods into their diet. In this article, we explore the following research questions:

1. Are prostate cancer survivors meeting dietary guidelines, and what dietary components are influencing overall diet quality?
2. How do prostate cancer survivors describe cancer as having impacted their diet?
3. What differentiates men who make post-diagnosis dietary changes from those who do not?
4. What factors do prostate cancer survivors' perceive as influencing the healthfulness of their diets?

Methods

Sample

Participants were recruited as part of the 'Eating for Life' study, which explores determinants of healthy eating among people with a history of breast cancer, prostate cancer, or non-Hodgkin's lymphoma. We constructed a purposive sample of individuals between the ages of 45 and 74 who had been diagnosed at least 3 years prior, had completed acute treatment, and did not have metastatic or recurrent cancer. We sought variation in terms of

treatment type, time since diagnosis, and self-reported race because of the possible influence of these characteristics on one's experience of cancer treatment and survivorship. Participants were recruited from the Baltimore-Washington metropolitan area during follow-up oncology visits (through chart reviews), through physician mailings, waiting room flyers, support groups and other cancer-related organizations. Johns Hopkins Bloomberg School of Public Health Institutional Review Board approved this study.

This analysis focuses on the 20 prostate cancer survivors who participated in the overall study. Men had been diagnosed an average of 4.5 years earlier (range: 3 to 10 years). Table 1 summarizes the demographic characteristics of the prostate cancer survivors. Men were on average 64.2 years old, self-identified as white or black, most were married, more than half were still working, and most had at least a college degree and a household income of \$100,000 or more. Fourteen of the 20 men had at least one comorbidity, with hypertension being the most common (n=11), and 16 men had a body mass index that classified them as either overweight or obese based on self-reported weight and height (http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html#Interpreted).

Data Collection

Participants were recruited between November 2012 and October 2013. Participants completed study activities over the course of approximately one month. First, they came in for an in-person visit where they: (1) completed a structured questionnaire on demographics characteristics, health status, and health behaviors; (2) took part in an in-depth interview about their cancer experience and the current relevance of cancer in their lives; and (3) completed the first of three 24-hour dietary recalls using the Automated Self-Administered 24-hour Recall (ASA-24), a web-based self-administered 24-hour dietary recall system (Subar et al., 2012). During the next two weeks, the study coordinator contacted men on two random days to request that they complete a dietary recall, for a total of three dietary recalls per participant. Two of the recalls collected data about diet on weekdays and one about a weekend (Sunday) to facilitate calculation of usual intake (Moshfegh et al., 2008). One to two weeks after the final dietary recall, participants came in for a second in-person visit where they took part in an in-depth interview about their eating habits and received structured feedback based on their dietary recalls (Figure 1). The in-depth interview included questions about participants' typical eating habits; social, familial, and environmental context for food purchasing and consumption; dominant foods in their diet; pre-cancer eating patterns and habits; perceptions of associations between diet and cancer; assessment of the healthfulness of current diet; and barriers and facilitators to healthy eating. At the beginning of the in-depth interview, participants were given a day-by-day and meal-by-meal summary of the foods they reported eating on each of the three recall days. Towards the end of the interview, participants were provided with a structured feedback sheet that included current recommendations for selected dietary variables (specific variables listed in analysis section below and in Figure 1) tailored to their gender, age and reported physical activity levels, their values for each of the recall days, and their average values across the three recall days. If they met a particular recommendation based on their average values, this was designated with a smiley face. Participants received a total of \$140 in remuneration for completing all four study sessions.

Analysis

This analysis is based on data from the dietary recalls and the in-depth dietary interviews conducted with men in the weeks following completion of the three recalls.

24-hour dietary recalls—Dietary recall data were used to assess the number of men meeting selected dietary recommendations. We computed mean intakes of the following dietary variables for each participant: calories, fiber, calcium, vitamin D, sodium, cholesterol, saturated fat, fruits and vegetables, and alcohol. We selected these variables because they reflect aspects of the American Cancer Society recommendations for cancer survivors (Rock et al., 2012). The 2010 Dietary Guidelines for Americans criteria were used to assess adherence (U.S. Department of Agriculture and U.S. Department of Health and Human Services, December 2010).

The dietary data were also used to assess overall diet quality. We calculated the Healthy Eating Index 2010 (HEI-2010) score to rank the quality of the diets of men participating in this study (Guenther, Casavale, Reedy, et al., 2013). The HEI-2010 score is made up of 12 components – adequate consumption of total fruit, whole fruit, total vegetables, green vegetables and beans, whole grains, dairy, total protein foods, seafood and plant proteins; moderate consumption of refined grains, sodium and empty calories (i.e., added sugars, solid fats, and consumption of alcohol above moderate levels, which for men is two drinks per day); and an appropriate ratio of unsaturated to saturated fats. The HEI-2010 score was calculated for each participant using mean values of variables from the three dietary recalls to approximate usual intake. The maximum score is 100.

In-depth dietary interviews—The first author conducted the in-depth, semi-structured dietary interviews. The interviews were audio recorded, transcribed verbatim by a professional transcription company, and analyzed using a constant comparison approach (Charmaz, 1990; Glaser, 1964; Green & Thorogood, 2009). We used an inductive process to develop the coding scheme. The first author began by reviewing each transcript for accuracy, which facilitated familiarization with the data. A subset of seven in-depth dietary interviews, which included three interviews with prostate cancer survivors and four with breast or non-Hodgkin's survivors who participated in the larger study, was then line-by-line coded, and this served as the basis for the development of a thematic coding scheme. Two other members of the study team reviewed the thematic coding scheme, and incorporating feedback from these study team members, the first author revised the coding scheme. After the coding scheme was finalized, the first author coded full set of transcripts in ATLAS.ti 7 (Frieze, 2013). Although the initial development of the thematic coding scheme was creating using a subset of transcripts, new themes that emerged during the coding of the full set of transcripts were added to the coding scheme and retrospectively applied to previous transcripts to ensure that all mentions of new themes were captured. The first author engaged in memo-writing throughout the coding and analytic process to track decision-making and to generate hypotheses about relationships between concepts.

A subset of codes from the thematic coding scheme was included in this analysis. Codes relevant to this analysis included *post-cancer dietary changes*, *perceptions of associations*

between diet and cancer, barriers to healthy eating, facilitators of healthy eating, motivators of healthy eating, influences on food choices. We analyzed these codes further to explore patterns within codes and relationships between codes. For example, to better understand the role that cancer played in prostate cancer survivors' diets, we explored the rationales that men provided for making (or not making) changes, and then looked at how men who reporting making changes talked about the association between diet and cancer compared to men who did not make changes. Given our interest in the role of cancer and other dietary influences on overall diet quality, we also looked at patterns by HEI-2010 scores, namely:

1. Did men who reported making post-diagnosis dietary changes have higher HEI-2010 scores than those that did not?
2. What factors did men with higher HEI-2010 scores emphasize as influencing their diet quality?
3. What factors did men with lower HEI-2010 scores emphasize?

We also explored the relationships between codes within individual participants to better understand how various factors worked together to impact their dietary quality.

Results

Prostate Cancer Survivors Adherence to Dietary Guidelines

Table 2 summarizes selected 2010 Dietary Guidelines for Americans recommendations and the extent to which the prostate cancer survivors in our study were adherent to them. Men were most likely to be adherent to alcohol (n=17) and fruit and vegetable (n=13) recommendations, and were least likely to be adherent to fiber (n=1) and sodium (n=0) recommendations. Using a liberal cutoff of 2,200 calories, only 9 of the 20 men were within caloric guidelines, suggesting that in addition to dietary quality, overeating may be an issue for many men.

The HEI-2010 score is not impacted by overall calorie intake because it is calculated using the amount of food groups consumed and the ratio of unsaturated to saturated fatty acids per 1,000 calories. Men's average HEI-2010 score was 56.7, with a range from 36.4 to 82.0 [maximum score: 100] (Table 3). This is similar to the mean score of 53.5 for the U.S. population (Guenther, Casavale, Kirkpatrick, et al., 2013).

The HEI-2010 sub-component scores provide insight into the dietary components that contribute most to differences in men with higher total HEI-2010 scores and those with lower total HEI-2010 scores. Men with higher scores consumed more total fruit, whole fruit, green vegetables and beans, and seafood and plant-based protein than those with lower scores; the ratio of unsaturated to saturated fats was higher in men with higher scores; and consumption of refined grains and empty calories was lower among men with higher scores. There tended to be more variation across men for intake of total vegetables, total dairy, whole grain, and sodium, meaning that men with higher total scores did not necessarily score better than men with lower scores in these areas (Table 3).

Men's interview data shed light into potential reasons for the differences in the composition of men's dietary intake. Most notably, red meat, fiber, and fatty food intake were the specific components of diet that men tended to discuss most.

Red meat—Whereas most men in the study received the maximum HEI-2010 component score for total protein intake, men with healthier diets ranked higher in terms of seafood and plant-based protein consumption. In contrast, men with less healthy diets consumed greater amounts of red meat. In line with red meat being an archetypal masculine food, the majority of men expressed a penchant for red meat. Despite this, men with healthier diets reported limiting their consumption of red meat in an effort to be healthy. One man with a healthier diet who reduced his consumption from several times a week to once a month noted, “I love steak. And that’s why I have to have meat, some red meat once a month...no matter what, I just have to have that red meat.” Although it appeared to be a sacrifice for him, he framed making this change in relation to a belief that too much red meat increased his risk for cancer. Other men described red meat consumption as being driven by taste preferences: “And I don’t like chicken. I feel like steak tastes better than chicken, so I like to eat steak.”

Fiber—Several men articulated an interest in obtaining adequate fiber in their diet because of the apparent health benefits. Most often men described doing this by eating whole grains (e.g., whole wheat bread, high fiber wraps) instead of refined grains (e.g., white bread). One participant remarked, “When I look at the food labels, I’m looking for fiber...so fiber’s something that’s important to me because it’s good for you, and it also fills you up. When you eat white flour it’s not filling.” Other men described barriers to consuming enough fiber as being related to finding and affording such foods. One man with a less healthy diet noted, “the price of that [multigrain bread], you could buy three loaves of [white] bread, or at least two. It was expensive...I’ll take it for sandwiches, but I did have white bread.”

Fatty foods—Fatty foods were frequently mentioned as a food that men were trying to avoid in their diet. Men discussed fatty foods as being unhealthy and contributing to weight gain and other health conditions (e.g., high cholesterol). Men with healthier diets appeared to be more successful in reducing their fat consumption. The primary barrier to reducing consumption that men mention was their enjoyment of the taste of fatty foods. A self-professed “lifelong fried food person” recently found out that he had to have a mitral valve repair and bypass surgery, so he was trying to limit consumption of French fries, chips, and other fried foods.

Impact of Cancer Diagnosis on Diet

During the qualitative interviews, prostate cancer survivors were asked to compare their pre-cancer and post-cancer diets. Only seven of the 20 men indicated making changes to their diet following their cancer diagnosis. Prostate cancer survivors’ reflections of whether or not they made dietary changes following their diagnosis underscored the complexity of influences on men’s eating habits. Whether or not men reported making changes was dependent on men’s perceptions of the healthfulness of their pre-diagnosis diet, as well as their articulated beliefs about the relationship between cancer and diet. Accordingly, the men who reported making changes were the ones who conveyed a belief that their diet could

impact their risk of recurrence or other cancer outcomes (e.g., ongoing side effects, risk of a second cancer). For example, a man who described making substantial changes to his diet since being diagnosed remarked,

Oh yes. Before I had cancer, I would—I wasn't conscious of what I ate, I just ate anything ... And when I was diagnosed and I started reading about things that cause—that can cause cancer, certain foods that you ate. Like, I love red meat. Prior to cancer, I ate a lot of red meat. We had red meat twice a week ... So, now, I'm conscious of the red meat. I'm very conscious of that. That has changed a lot. My portions have changed ... Prior to my cancer, I just ate anytime. There was no set schedule. And like, when I was up reading my studies, they say certain things, you don't eat, certain things you need more of it. They don't cure the cancer, but they are preventatives. Like, the vegetables. I didn't eat a lot of salads ... You only ate salads on Sunday. And now I eat salad during the week. I try to eat it twice a day sometime ... Another thing, the Snickers bar, that was my snack. And that's not good because of the sweet, the sugar, and the high calorie content was not good for me ... And so, yes, it did have a tremendous impact on me ... And so I did a lot of reading on those things. And I said, well, I already had it so now I'm trying to prevent getting another type. And hopefully it works, so, I—but all my results come back good. But I'm still conscious. In the back of your mind sometimes you feel a pain or something. What's causing that? Is that another cancer somewhere?

This survivor framed a desire to prevent a second cancer as a primary influence on his food choices and patterns. For instance, although he repeatedly professed his preference for red meat, his desire to remain cancer free superseded this and resulted in him limiting consumption of red meat because of its association with cancer incidence.

Similarly another man who reporting making post-cancer dietary changes described his cancer experience as having increased his awareness of the healthfulness, or lack thereof, of his food choices. However, unlike the previous survivor, he noted that his increased consciousness did not always translate into healthy food choices.

Even though I may deviate from what's accepted as far as what you should eat if you've been a prostate cancer patient or whatever, I'm more conscious about what I eat. Whether I follow-through with it or not, is a different story, but I may pick something up and say, "Is that good for me?" And sometimes I'll still eat it so ... the cancer has made me more cognizant of what I eat, but in not all cases do I actually alter my meal.

Interestingly, whereas he portrayed difficulty in completely overhauling his diet, one change he depicted as being able to adhere to was abstaining from coffee, perhaps because he perceived coffee as directly contributing to his diagnosis.

I used to be maybe a five-cup a day Starbucks drinker ... maybe it was kind of a self-inflicted thing, but I kept thinking, man, you know, I was drinking coffee since I was about 16, and it was this thing in the back of mind and scientifically, I had no data to support it, but I'm like, man, all that caffeine passing through, you know, my glands and everything, so it was like maybe this had something to do with it, so

who knows. But -- yeah, so it was just certain foods that I thought, man that they weren't good for me and I had to let them go.

Other men brought up caffeine as exacerbating incontinence, a common side effect among prostate cancer survivors. A survivor who gave up alcohol and caffeine at the heeding of his doctor emphasized doing so to ameliorate his incontinence.

I think I do recall vividly [surgeon's name] stating, you know moderate intakes of alcohol and caffeine, and things like that may have on frequency of urinating so I listened to that. And even now, as much as I love coffee, I've curbed that."

Whereas some men described making dietary changes to directly address cancer-specific concerns (e.g., recurrence, second cancer, side effects), others described how being diagnosed with cancer interacted with existing health issues to motivate dietary changes. Men with pre-existing co-morbidities (e.g., hypertension) who made dietary changes often described cancer as being a reinforcer or intensifier of healthy eating habits they adopted to address other health issues. One man explained it this way,

I think the cheese might have been one. I'm trying to think when I, this all kicked in because it's sort of like an evolutionary thing where you start eating less, but I would say, you know, the combination of having high cholesterol and the situation with my prostate I would say that there were some changes that were in effect, and then they became more significant after that. And changes were -- I'd have to say the cheese was a real big issue, and it took me awhile because cheese to me was like smoking, and I wanted it, and I finally just found out if I don't have cheese in the house I don't eat it, so, cheese was probably the biggest change, and that was for cholesterol and because of the prostate issue 'cause when I was, had the prostate, going through it, I did a lot of research on it. They talked about diet and stuff like that. Just like everything else they said it can't hurt to have a healthy diet, so, that was a little bit of a motivator."

Another survivor credited his cancer diagnosis as prompting him to reduce his portion sizes and his consumption of red meat, because it was another reminder of the connection between diet and health,

I said my luck's not good. I had a heart attack and then I had cancer. This is going good. So why don't you pay attention to you're eating. I mean that kind of was it. I mean, it's like, all right, you know, you want to stay around a little while longer, pay attention to what you're eating.

However, he noted his motivation for making these changes was "*general health*."

In contrast, men who reported not making changes to their diet presented their diet as healthy and/or argued that diet had little bearing on their risk of recurrence. Of note, the two men with the best HEI-2010 scores reported not making dietary changes post diagnosis. They described "always" eating healthfully, and both emphasized eating lots of fruits and vegetables. One man described a preference for vegetables being instilled in him from childhood, which reflects the importance of early life familial influences on dietary preferences.

Since I was a kid...I ate vegetables...My grandmother would cook, this was years ago when people didn't even know ... what is cauliflower or what is broccoli or what is asparagus or Brussels sprout ... There are lots of vegetables like that she would always serve them to me. I love them. You could serve it to me any time. I would eat it. I guess sometimes you have a taste for those things and sometimes you don't.

The men who perceived room for improvement in the healthfulness of their diet but who did not make changes discussed either not perceiving a risk of recurrence or not thinking that changing their diet would have any effect on their risk of recurrence. Many men talked about their cancer as something that happened in the past that was no longer a day-to-day concern, and thus would not warrant dietary changes. These men seemed to characterize themselves as essentially being 'cured' and therefore not needing to alter their diet.

Men who expressed a concern about recurrence but did not make dietary changes framed recurrence as not being preventable through dietary changes or expressed uncertainty about the relationship between diet and recurrence. As one man put it,

I don't think anybody knows. I think probably is a chance depending on – on what you eat. But I don't – my perception is, I don't think I could keep the prostate cancer coming back, I think it has a lot more to do with whether the radiation killed it.

He viewed treatment efficacy, and not diet, as primarily influencing risk of recurrence. Several men felt strongly that there was not a relationship, as illustrated by the following emphatic statement, "No I do not believe there's any relationship whatsoever."

Of note, some men who did not describe themselves as having made post-diagnosis dietary changes still described cancer as influencing their diet. However, they described these practices as being in place prior to their diagnosis. One survivor explained,

We'll I try to avoid canned foods mainly because some of the preservatives from what I learned, they are carcinogenic, so they can promote cancer cells. So that's why I try to avoid eating canned foods... It's been part of my life pattern before [the cancer].

Important Influences on Prostate Cancer Survivors' Dietary Quality

Regardless of whether or not men made changes post-diagnosis, cancer was only one of many influences on their diets. There was no clear pattern of men who reported making changes having diets that were actually healthier, suggesting that factors other than cancer also impact the healthfulness of diets of prostate cancer survivors. The majority of men described being interested in healthy eating, and weight loss was the most common reason given for wanting to eat healthy. However, for many men, the barriers to healthy eating outweighed their motivation. Comparing the perceived influences on dietary quality of men with healthier diets to those with less healthy diets shed light into why some men are able to make healthier choices than others. Important factors that emerged as influencing the quality of men's diets included: (1) perceived willpower to eat healthy; (2) lack of time to prepare

healthy foods; (3) dietary habits of wives/partners; and (4) costs/accessibility of health foods.

Perceived willpower to eat healthy—Although a few men said that they had a natural affinity for the taste of healthy foods, more often men described preferring the taste of unhealthy foods to the taste of healthy foods. Men discussed making compromises between eating the foods they liked and the foods that were good for them. Men viewed their ability to eat healthy or not as primarily being within their control, and those who made poor food choices attributed these to a lack of willpower. One survivor with a less healthy diet summed it up as “I don’t think there’s anything really to prevent me from eating healthier. It’s a choice isn’t it? ... It’s a choice and I try to make the right choice, but it’s not always done.”

Men with healthier diets framed their food choices in relation to prioritizing health-related factors (e.g., low fat items, high antioxidant levels, so forth).

So I guess I got kind of this internal thing and I look at it and I gauge whether I think it’s healthy or not, and if I think it’s not healthy, then more consideration goes into whether I eat it or not.

When men with healthier diets discussed the types of foods they ate they often used phrases such as “supposed to be good for me,” and voiced the proposed benefits of the specific foods they were consuming. For example, one man talked about incorporating black rice into his diet because of its high antioxidant levels. “I’m into this black rice now and it supposedly has more antioxidants than even blueberries and blackberries, and actually it’s pretty good.” He emphasized the health benefits and secondarily commented on its taste. Making healthy choices requires discipline. Another interviewee who reported making significant changes following his cancer diagnosis commented, “This [sticking to his healthy eating regimen] is a lot of discipline. I think it was good. It was good for a while, but I’m getting bored with it.” Thus, it appeared that even men who were determined to make healthy choices had to overcome a certain level of inertia to maintain their healthy eating habits.

Lack of time to prepare healthy foods—Men perceived healthy eating as time consuming because of the time required to prepare healthy foods and healthy foods not always being readily accessible. More than half the men in this study were still working and many of these men mentioned their work schedule as one barrier to healthy eating. Men discussed their job as being a top priority in their life and the requirements of their job sometimes limited their ability to eat healthfully even if they desired to do so. One survivor, who is a military veteran, viewed one’s profession as a primary determinant of healthy eating. He stated, “I think a lot of how we eat has to do with profession...if you’re a business executive or office worker, then you have time for those types of things, for meals. If you’re, I’m saying firefighter or policeman or certain things I would tend to think that... how you eat [is] a little different.”

Several men talked about how busy schedules resulted in them relying heavily on eating out, and they acknowledged the choices available to them were less healthy than if they prepared their own food at home. One participant with a busy work and extracurricular activity

schedule went to Subway or a similar establishment daily for lunch, and had a sandwich, drink and either cookies or chips. Then, on the weekends he was regularly on the go and relied on fast food or restaurants for his meals as well. He talked about how he was coming upon retirement and portrayed this as a period when he would have more time to dedicate to healthy eating and regular exercise. “What I’m looking forward to is I know when I’m [retired]...I’ll eat at home. I won’t go out and eat, and then I’ll eat on a more regular basis.” In general, men highlighted the need for simplicity and desired healthy foods that they could just “walk in and pick it up and eat it.” For the majority of men, although healthy eating was of interest, it was not the top or only priority in their life; therefore, to be successful healthy eating had to fit within their existing lifestyle or routine.

Dietary habits of the wives/partners—Although men generally conceptualized healthy eating as being within their control, several described their wives or partners as an important influence on the healthfulness of their diet. Generally, survivors credited their wives with doing the majority of the food-related household tasks and as being knowledgeable about health eating; therefore the decisions she made impacted his diet. Men with healthier diets often described a positive influence that simplified healthy eating. One man praised his wife’s actions as essential to making healthy eating the default option.

Well, the first thing is, what [wife’s name] cooks and so she cooks very healthy. And I think that’s probably the primary thing ... The food she buys at the store make a big difference in what’s around, and so I would say that’s the main thing. What you bring home.

Men with poor diets often attributed/blamed this at least in part on the behaviors of their wives/partners.

I don't want to blame her but she likes those things. She likes to eat, so I go along with it. I don't want to cause a problem, but if I could just change some of the things that way I could eat healthier. It's not a big deal. She's changing slowly. If she understood why I need to change more clearly, maybe she would change some things.

Regardless of whether men perceived their wives/partners to be a positive or negative influence, the diets of couples were intertwined, meaning that the choices that one partner made influenced the dietary choices of the other. This was most often brought up in the context of red meat consumption. Men often noted that if it were not for their partner they would eat more red meat than they do. In a more extreme example one survivor recounted,

Since my wife cooks four times a week -- and actually even with me, my wife is a vegetarian, so that impacts on how food is prepared, which means she doesn't [eat] any red meat. I tend to eat much less red meat than probably I ordinarily would if she wasn't a vegetarian, so on occasion she'll make something that she can add chicken too...but there's also I think a lot more days now that we'll do pasta dishes and things like that that neither one of us would get any meat out of that. So that's influential.

Almost all the men in our study were married or in committed relationships, and men frequently described deferring to their wives when it came to making food related decisions, which leads to wives/partners playing an important role in influencing the healthfulness of prostate cancer survivors' diets.

Cost/accessibility of healthy foods—Although our sample was of relatively high socioeconomic status with most men describing healthy foods as readily accessible to them, a few men did describe cost as a barrier.

During the first of the month like when my money is pretty loose or whatever, I tend to, you know, pack up with the fresh stuff. But during the course of the month, I may well let me just get something, you know a little cheapest as opposed to paying good money for the fresh vegetables and I think that's what the problem is the cost.

This man had a relatively healthy diet but attributed this to participating in a nutrition intervention in which he was provided with fresh fruits and vegetables. He voiced concern about keeping up these eating habits when the program ended. "Basically, as of lately, yes [his diet has been healthy]...better than it has been now 'cause this study I'm in. So hopefully I'll get in a pattern instead of, make sure that the majority of food that I get are fresh vegetables."

Men who perceived healthy foods as being readily accessible acknowledged this as an important facilitator of healthy eating.

I mean I think access. We live in an area that is very easy to get fresh vegetables and things like that. And the grocery stores now are more attentive I think to providing things with less preservatives, things like that, so I think overall the country and the food industry has started to respond to things that people have recognized as deficiencies in the past. So you'll get specialty stores, if I can call them that, like Trader Joe's or something that really go out of their way to make sure that you can eat -- get organic foods. You can get foods with few preservatives, things like that. So that makes it easier to access the foods you want.

Discussion

The premise of this study was that a cancer diagnosis might be an impetus for healthy eating among prostate cancer survivors. Our findings suggest that for many survivors, cancer plays little, if any, role in their dietary decision-making. Consistent with previous research (Avery et al., 2013; Demark-Wahnefried et al., 2005), many of the men in our study did not report making specific post-cancer dietary changes. The men in our study who made dietary changes articulated a belief that these would reduce their risk of recurrence, a second cancer, and/or ongoing side effects (e.g., incontinence). Those who did not make changes did not view diet as having any bearing on cancer-related outcomes and/or perceived their pre-cancer diet to be healthy.

There was substantial variation in the diet quality of the prostate cancer survivors participating in this study. Men who reported making changes did not always have healthier

diets than men who reporting not making changes. This is likely reflective of men being more successful in making single targeted changes (e.g., eliminating caffeine) rather than completely overhauling their diet, as well as the fact that factors other than cancer are influential in shaping the quality of men's diets. The mixed method design of this study allowed us to identify factors that contributed to the variation in diet quality. Both dietary composition and influences on eating patterns/food choices differed for men with healthier diets and men with less healthy diets. Men with healthier diets explained their healthy eating either on the basis of having had an existing affinity for these foods or because they were prioritizing health above other factors in selecting particular foods; whereas men with less healthy diets prioritized taste in the selection of their foods. Unfortunately, almost all men described unhealthy foods as being more tasty than healthy foods, so this resulted in men with healthy diets actively incorporating healthy foods (e.g., low fat, high fiber foods) into their diet, while men with less healthy diets consumed foods they liked, which tended to be more traditionally masculine and unhealthy foods (e.g. red meat, fried foods).

Although for many men cancer was not a primary motivator for healthy eating, most of the men were interested in healthy eating for other reasons, including weight loss and other diet related comorbidities (e.g., hypertension, high cholesterol). Therefore, prostate cancer survivors might represent a motivated group that could benefit from targeted intervention. Their motivation in part stems from an intersection of gender and age/life stage that makes healthy eating more salient and acceptable. Prostate cancer survivors are by definition older men; prostate cancer survivors are on average 66 at their time of diagnosis (Howlader et al., 2013). They are often dealing with multiple health issues and concerns about mortality are more prominent than when they were younger. While younger men may portray their masculinity through a denial of health issues, older men often come to a point where denial is not possible because of the growing impact their health concerns are having on their day-to-day life (Tannenbaum & Frank, 2011). Adopting healthy eating habits can represent a positive adaptive strategy that enables them to preserve or improve their health (Wethington, 2005). Thus, older age represents a life stage when men might be more receptive to making dietary changes that they might have rejected earlier on in life. For example, many of the men in this study mentioned red meat, a masculinized food, as one of their favorite foods, but several noted that they were trying to cut down on their consumption of red meat because of their perceptions of the health risks associated with eating too much red meat. Several men were also more receptive to 'feminized' foods, such as salads and low-fat foods.

Though motivated, men acknowledged barriers to healthy eating that for some superseded motivation, most notably lack of time. This finding is consistent with findings from previous studies of healthy eating in men (Gough & Conner, 2006). Men often prioritized their role of being a provider and described work as being an important and time consuming component of their lives. Thus, healthy eating was deemed as being difficult because men did not have time to prepare healthy foods and frequently ate out. Men described the foods they had access to when eating out as less healthy than when they ate at home. Men stressed the importance of healthy eating fitting into their existing routines. Healthy eating programs could capitalize on men's prioritization of work by emphasizing how healthy eating can benefit them at work (e.g., more energy which can lead to increased productivity).

Men also emphasized the important role wives/partners played in shaping their diets. Men's accounts of division of food related responsibilities in their households reflected traditional gender roles, with wives/female partners being primarily responsible for food related household tasks (Allen, Griffith, & Gaines, 2013; Harnack, Story, Martinson, Neumark-Sztainer, & Stang, 1998; Lachance-Grzela & Bouchard, 2010). Men with healthier diets often described their wives/partners as a positive influence and integral part of their healthy eating habits, and men with less healthy diets often placed partial blame on the choices of their wives/partners. Given that important role that wives play in informing men's food choices, efforts to promote healthy eating among prostate cancer survivors should consider including wives/partners in some capacity.

Currently, the evidence linking diet to health and quality of life in prostate cancer survivors is inconclusive (Chan et al., 2006); as the evidence evolves, and if the data become more conclusive, thought should be given as to how to best disseminate this information to survivors and how to frame messages about healthy eating. The strongest evidence links obesity/weight gain to poorer outcomes in prostate cancer survivors (Demark-Wahnefried, 2007; Joshi et al., 2011; Neugut, Chen, & Petrylak, 2004), and given that weight loss (unrelated to cancer) was a primary motivator for healthy eating for many men in our study, one strategy would be to frame reduced risk of recurrence as another potential benefit of losing weight. Many men also had diet-related comorbidities, further supporting the potential utility of more holistic messaging around healthy eating, especially because prostate cancer survivors are more likely to die from heart disease than from their cancer (Epstein, Edgren, Rider, Mucci, & Adami, 2012). Men portrayed an interest in exercising along with healthy eating to facilitate weight loss, signifying a potential need for programs that address both healthy eating and physical activity.

Efforts to promote healthy eating among prostate cancer survivors would likely benefit from a concerted focus on making it clear that healthy eating can be both tasty and feasible. Consistent with previous research (Garfield et al., 2008; Gough & Conner, 2006), men often prioritized taste as an important factor in food choice. Even men with healthier diets, wanted to occasionally indulge in their favorite foods. Recommendations that are too restrictive or rigid are not likely to be impactful. Therefore, an emphasis on healthy, but tasty foods, and moderate consumption of unhealthy foods is warranted. Also, healthy eating was perceived to be cumbersome for many men, so strategies for incorporating healthy eating into a busy schedule, including when eating out, is needed.

This study had both strengths and limitations. The primary strength of this study was the multiple data sources and mixed methods approach to analysis. Men completed three 24-hour dietary recalls over the course of two weeks and then participated in an in-depth dietary interview. The three 24-hour dietary recalls enabled estimation of men's usual dietary intake more accurately than a single recall could. Participants also received feedback from their dietary recalls during the in-depth interview so they could reflect on the extent to which the three days depicted their typical eating patterns, as well as discuss important influences on their food choices. The qualitative and quantitative data were not only analyzed separately, but also using an integrated approach that resulted in a deeper exploration and interpretation of the data.

This study sought to understand the role of both cancer and masculinity in shaping the diets of prostate cancer survivors. We did not collect data on men's cancer stage and grade, which might impact men's motivation to make lifestyle changes to reduce their risk of recurrence. We also did not assess men's masculinity beliefs because gender norms were not a primary focus of the main study, but rather a factor that emerged from initial exploratory analysis. However, we were able to use existing gender/masculinity literature to explore associations between participants' beliefs and dietary behaviors using a masculinity lens.

The findings from this study shed light on factors that could be targeted in efforts to promote healthy eating among prostate cancer survivors. Given that cancer was not portrayed as a primary motivator for healthy eating, these findings might be transferable to older men in general, who suffer from higher rates of diet-related co-morbidities than their younger counterparts (Ward, Schiller, & Goodman, 2014). Future research is warranted with both prostate cancer survivors specifically, and older men more generally, to evaluate different strategies for promoting healthy eating (e.g., masculinity informed approaches, couples based approaches), and to assess the impact of dietary changes on health outcomes.

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Day 1

7:30 a.m.	Plain bagel, apple, 8oz yogurt, and 6oz skim milk
12:00 p.m.	Jelly sandwich on wheat bread, 8oz yogurt, and 8oz bottled water
3:00 p.m.	Apple
6:00 p.m.	Chicken breast with creamy Italian dressing, 2 cups rice, 1¾ cups broccoli, 1 cup salad with iceberg lettuce, artichoke hearts, tomatoes, croutons and vinaigrette dressing, and 8oz skim milk
8:00 p.m.	2 scoops Edy's ice cream, ¾ cup pretzels, and 6oz fruit juice

Day 2

8:00 a.m.	2 cups Raisin Bran with milk, 5.6oz coffee with coffee mate and skim milk, and 8oz glass skim milk
11:00 a.m.	Peanut butter sandwich on whole wheat bread, apple and 6oz water
3:00 p.m.	2 Nature Valley granola bars, apple, and 17 pieces dry roasted peanuts
6:00 p.m.	6oz breaded pork chop, 1½ cups baked potato with Italian dressing, 2 cups cauliflower, and 8oz skim milk
8:00 p.m.	1¾ cups Chex Party mix, 10 pieces Wheat Krisps, and 6oz prune juice

Day 3

7:00 a.m.	Yogurt, 4oz coffee with skim milk and sugar, miniature apple bagel, and 8oz milk
12:00 p.m.	Jelly sandwich on wheat bread, apple, and 7.2oz water
3:00 p.m.	Apple
4:00 p.m.	¾ cup dry roasted peanuts, 1 wheat cracker, and 8oz skim milk

	Dietary Guidelines for Americans 2010*	Recall 1	Recall 2	Recall 3	Average	Meeting Dietary Guidelines? 😊
Total calories	2,200 calories or less	2,524 kcals	2,538 kcals	2,148 kcals	2,403 kcals	
Fiber	38g or more	26.5g	45.4g	38.3g	36.7g	
Calcium	1,200mg or more	1,869mg	1,757g	2,071mg	1,899mg	😊
Sodium	1,500mg or less	4,398mg	4,401mg	4,910mg	4,570mg	
Cholesterol	Less than 300mg	137mg	123mg	154mg	138mg	😊
Saturated fat	Less than 10% of calories	4.6%	6.9%	5.6%	5.7%	😊
Vitamin D	15mcg or more	8.1mcg	15.0mcg	14.6mcg	12.6mcg	
Fruits and Vegetables	2.5 cups or more	6.9 cups	8.2 cups	6.1 cups	7.1 cups	😊
Alcohol	2 drink maximum per day 1 drink = 14 g of pure alcohol (e.g., 12oz of regular beer, 5oz of wine or 1.5oz of 80 proof distilled spirits)	None	None	None	None	😊

Figure 1.

Participant feedback sheet (two-pages)

*Guidelines tailored based on age, gender, and reported physical activity levels

Table 1

Prostate Cancer Survivors' Demographic Characteristics

Demographic characteristics	# of Prostate cancer survivors (n=20)
Age	64.2 (range: 50, 74)
Race	
Black	7
White	13
Marital status	
Married/living as married	15
Widowed/divorced/separated	5
Occupation status	
Employed	11
Retired	7
Disabled	2
Educational attainment	
Completed high school	2
Post-high school training	1
College graduate	5
Postgraduate	12
Household income	
\$10,000 to \$34,999	3
\$35,000 to \$49,999	1
\$50,000 to \$74,999	4
\$100,000 or more	10
Refused	2
Self-reported health status	
Excellent	5
Very good	11
Good	3
Co-morbidities (# responding affirmatively)	
Hypertension	11
Arthritis	5
Depression	6
Diabetes	2
Heart attack	2
Angina	1
Heart failure	1
Cirrhosis	1
Stroke	1

Demographic characteristics	# of Prostate cancer survivors (n=20)
BMI (kg/m²)	
Normal (18.0 – 24.9)	4
Overweight (25.0 – 29.9)	11
Obese (30.0 and above)	5

Table 2

Prostate Cancer Survivors' Adherence to Dietary Guidelines

Dietary variable	Dietary Guidelines for Americans, 2010	Average value (range)	# meeting recommendation (n=20)
Calories	<2,200kcal	2,455 kcal (1,458; 3,489)	9 of 20
Alcohol	2 drink per day maximum (28g)	9.4g (0; 49.8g)	17 of 20
Fruits and vegetables	2.5 cups or more	3.9 cups (1.0; 10.1)	13 of 20
Cholesterol	Less than 300mg	388mg (126; 854)	7 of 20
Saturated fat	Less than 10% of kcals	11.4% (4.2; 16.7)	6 of 20
Calcium	1,000mg if 45–50 years; 1,200mg if 51 years or older	991mg (466; 1,899)	5 of 20
Vitamin D	15mcg or more if 70 years or less; 20mcg or more if older than 70 years	7.2mcg (.97; 31.5)	2 of 20
Fiber	38g or more	22.4g (7.5; 63.5)	1 of 20
Sodium	2,300mg	4,273mg (2,668; 6,688)	0 of 20

Table 3

HEI-2010 Component and Total Scores [from highest to lowest total score]

HEI- 2010 scores	Total (n=20) Mean (range)	Men with healthier diets ^a (n=5) Mean (range)	Men with middle scores (n=10) Mean (range) ^b	Men with poor diets (n=5) Mean (range) ^c
Total score (out of 100)	56.7 (36.4, 82.0)	75.2 (71.6, 82.0)	56.5 (45.4, 70.4)	38.8 (36.4, 41, 8)
Total vegetables (out of 5)	3.9 (1.3, 5)	4.7 (3.5, 5)	3.7 (1.3, 5)	3.4 (1.9, 5)
Green vegetables and beans (out of 5)	3.3 (0, 5)	4.6 (2.8, 5)	3.5 (0, 5)	1.8 (0, 3.1)
Total fruit (out of 5)	3.0 (0, 5)	4.9 (4.3, 5)	3.2 (1.2, 5)	0.7 (0, 1.5)
Whole fruit (out of 5)	3.2 (0, 5)	5 (5,5)	3.3 (0, 5)	1.2 (0, 1.8)
Whole grains (out of 10)	3.0 (0, 10)	4.5 (1.7, 10)	3.0 (1.2, 6.0)	1.5 (0, 5.6)
Total dairy (out of 10)	4.3 (0.9, 10)	5.2 (1.5, 10)	4.0 (1.9, 8.1)	4.1 (0.9, 6.9)
Total protein (out of 5)	4.9 (3.8, 5)	5 (5,5)	4.9 (3.8, 5)	4.9 (4.6, 5)
Seafood and plant protein (out of 5)	3.2 (0, 5)	4.4 (2.0, 5.0)	3.8 (0.0, 5.0)	0.7 (0, 2.3)
Fatty acids (out of 10)	4.7 (1.2, 10)	7.5 (4.8, 10)	4.1 (1.2, 7.6)	3.1 (1.2, 5.2)
Sodium (out of 10)	3.0 (0, 8.9)	3.2 (0.7, 8.9)	3.4 (0.0, 7.3)	1.8 (0.0, 3.8)
Refined grains (out of 10)	6.7 (0, 10)	8.7 (7.7, 10.0)	8.1 (5.2, 10.0)	1.8 (0, 4.9)
Excess calories (out of 20)	13.6 (3.4, 20)	17.5 (14.1, 20.0)	11.5 (3.4, 17.0)	13.8 (11.4, 17.6)

^a Men with healthier diets constitute the five men with the highest total HEI-2010 score^b Men with middle scores constitute the ten men with mid-range HEI-2010 scores^c Men with poor diets constitute the five men with the lowest total HEI-2010 scores