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Breaking up Sedentary Behavior: Perceptions from Cancer Survivors

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Abstract

Background—Limited data exist on the benefits of, barriers to, and potential strategies to break up time spent sitting in cancer survivors. Such data will be meaningful given the consequences of prolonged sitting.

Objectives—To conduct a mixed method research study consisting of semi-structured telephone interviews to identify recurrent themes associated with prolonged sitting in cancer survivors.

Methods—African American breast cancer survivors ($N = 31$) were recruited from a local tumor registry. Telephone interviews were conducted and group consensus processes were used to identify recurrent themes. The a priori categories were benefits, barriers, and potential strategies to breaking up prolonged periods of sitting.

Results—Recurrent themes contributing most to prolonged sitting were leisure time interest (45%: e.g., watching television and reading) and health challenges (27%: e.g., pain and fatigue). Most (66%) women perceived improved health as benefits to breaking up time spent sitting. Nonetheless, many (41%) survivors reported health (e.g., pain and fatigue) as the biggest challenge to breaking up time spent sitting. Engaging in light intensity activities (e.g., staying active, keep moving) was the most commonly reported strategy for breaking up prolonged sitting.

Conclusions—African American breast cancer survivors identified the benefits and barriers to breaking up time spent sitting as well as potential strategies to breaking up time-spent sitting.

Implications for practice—Clinicians are integral in promoting breaks from prolonged sitting throughout the initial phases of the cancer continuum. Successful studies will begin with early intervention in the clinical setting, following with interventions during the recovery phase.

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Conflicts of Interest

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INTRODUCTION

Time spent sitting has emerged as a major risk factor for chronic disease. Prolonged periods of sitting have been associated with an increased risk for developing colorectal, endometrial, and ovarian cancer.¹ Among cancer survivors, studies have found that prolonged sitting was associated with diminished quality of life,² weight gain,³ larger waist circumference,⁴ ischemic heart disease,⁵ and premature mortality.⁶ In a recent study of breast cancer survivors, George et al.,⁷ found that survivors spent approximately 10.7 hours per day sitting, 3 hours more than observed in national data.⁸ Similarly, recent studies indicate that cancer survivors were more sedentary during waking hours than age-matched controls.^{9–11}

Importantly, breaking up prolonged sitting may help to attenuate its adverse effects.^{12, 13} Breaks from sitting have been shown to improve metabolic and cardiovascular risk factors, even after adjusting for total time spent sitting and physical activity.^{12–14} Despite the potential significance of breaking up prolonged sitting, few studies have been developed and most of the preliminary data on breaking up prolonged sitting have been epidemiological in nature. In addition, prior studies have focused primarily on healthy samples. Therefore, there is a need to extend this avenue of research to minority populations (i.e., those with chronic and debilitating health conditions). Minority populations may experience the greatest benefits from breaking up prolonged periods of sitting.

Cancer survivors have high rates of metabolic disorders and cardiovascular disease¹⁵ and are a high priority group. Given that cancer survivors experience unique challenges that contribute to prolonged sitting, this group is a unique population to study. Studies that propose to understand the mechanisms related to prolonged sitting in cancer survivors may help to create a dialogue in the field of cancer survivorship. Identifying the beliefs and perceptions about prolonged sitting would be a necessary first step (i.e., formative research) to designing interventions for cancer survivors that can be used to introduce breaks or interrupt prolonged sitting throughout the day.

Developing a better understanding of perceptions of and benefits related to breaking up prolonged sitting will provide a better understanding of the causes and conditions that contribute to prolonged sitting in cancer survivors. African American breast cancer survivors represent an important group to study the consequences of prolonged sitting. A number of studies have indicated that they have greater rates of overweight and obesity,^{16–18} lower compliance rates for physical activity,^{16, 19} and higher rates of comorbidities than women of other racial and ethnic groups.²⁰ In addition, because of having multiple risk factors and cancers simultaneously, this population is at an elevated risk for cardiovascular injury,²¹ much more so that women of other racial and ethnic groups.

Further, African American breast cancer survivors may live in urban environments with higher residential turnover, limited access to facilities for physical activity, unsafe neighborhoods, and other living conditions that pose particular challenges to an active lifestyle.^{22, 23} Understanding the perceptions of prolonged sitting in African American breast cancer survivors may help to understand the unique opportunities and potential

challenges that will need to be considered prior to developing interventions to reduce prolonged sitting.

METHODS

The purpose of this qualitative study was to identify beliefs, perceptions, and recurrent themes associated with breaking up prolonged periods of sitting. The data collected in this study addressed: (1) the factors that influence prolonged sitting, (2) the benefits of, and barriers to breaking up prolonged sitting, and (3) potential strategies that can be adopted to break up prolonged sitting. The Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist was used as the guiding framework for our study. The COREQ constitutes a set of criteria that were designed to improve the quality of reporting of qualitative studies.²⁴ The methods and results of this study are presented using the three domains of the COREQ checklist.²⁴ All study participants were consented prior to conducting the actual interview. The study was approved by the Institutional Review Board of a large cancer center prior to conducting the interviews.

Study Population

African American breast cancer survivors who received treatment at a large cancer center in Texas served as the participant pool. Inclusion criteria included being: (1) at least 18 years and older at the time of diagnosis, (2) diagnosed with Stage I–IV breast cancer between 2002 and 2010, (3) currently residing in Houston, Texas or the surrounding metropolitan area, and (4) having up-to-date contact information in the tumor registry. Data collection was completed using telephone interviews. A total of 31 out of 91 telephone calls resulted in actual interviews. The remainder of telephone calls ended in non-returned messages (n = 30), wrong numbers (n = 16), no messages (n = 7), no interest in participating (n = 6), and an ineligible survivor (n = 1).

Procedures

In this study, qualitative telephone interviews were conducted to solicit the perceptions and beliefs of breaking up prolonged sitting in a sample of African American breast cancer survivors. The semi-structured telephone interviews occurred during the day, between February 5th and March 5th of 2013. Each interview lasted approximately 10 to 15 minutes. The interviews followed a script, consisting of: 1) an introduction of the interviewer; 2) an introduction to the study; 3) information on breaking up sitting (definition and health outcomes) and a series of open-ended questions to elicit information on attitudes toward sitting (perceived benefits and challenges) and sitting habits. We identified a priori, four general categories around the topic of time spent sitting, which included: (a) contributing factors, (b) barriers to, (c) benefits of, and (d) strategies to reduce prolonged sitting. Researchers took notes during and after the interview to ensure that all relevant content was recorded. In the event that the interviewer did not hear or understand the participant, the participant was asked to clarify her response.

Characteristics of the Telephone Interviewers

The study was conducted by two male professors and two female graduate students. At the time of the study, the students were working toward a Master of Public Health degree and a Doctoral degree in Public Health. The survivors had no prior knowledge of or interaction with any of the interviewers. At the beginning of the interview, the interviewer introduced her/himself as a researcher from an academic institution and survivors were informed about the goals of the study. Following this introduction, the researcher asked a series of open-ended questions. The specific questions asked during the telephone interviews are reported in the results section verbatim. Participants were allowed to provide multiple answers to each question. All responses were recorded. Below is the framework for this portion of the conversation:

- How much time do you spend sitting while... (driving/riding in a car, watching television or videos, talking on the telephone, talking with friends, listening to music, reading, playing video games, or using a computer/Internet for leisure)?
- What are your perceptions and beliefs about prolonged sitting?

Measures

Leisure-time sedentary behavior—Sedentary behavior was measured using a 7-item modified version of the Sedentary Behavior Questionnaire (SBQ).²⁵ The SBQ has demonstrated adequate reliability and validity.²⁵ The behaviors were identified on the basis of time-use studies in Australia and metabolic equivalent values of 1.0 to 1.5 METS (i.e., sitting, reclining, lying down while awake).^{26, 27} The survey was administered over the phone and participants were asked “on how many days did you do the activity in the past 7 days, and on average, how many minutes did you do the activity on the days that you did it?” Sedentary behaviors included sitting while: driving/riding in a car, watching television or videos, talking on the telephone, talking with friends, listening to music, reading, playing video games, or using a computer/Internet for leisure. Sedentary behavior items were based on activities performed before or after work, not during work. Similar sedentary behaviors were assessed in a previous study.²⁸ For the purposes of this study, estimates represented average daily minutes spent in each sedentary behavior.

Sociodemographic and medical characteristics were extracted from the tumor registry. The specific information used for this study included current age, age at cancer diagnosis, and disease stage at diagnosis. Years out from diagnosis were computed from the differences between ages. Employment status was ascertained during the interview process.

Mixed method data analysis

To ensure that the interviews were conducted consistently and accurate data were obtained, the analysts (RJP, AA, and SS) received training from the senior faculty member (WCT) who was experienced in qualitative research methods. The research team used a consensus process guided by a specific protocol for qualitative content data analysis.^{24, 29} This process consisted of entering the transcribed notes into an Excel spreadsheet for further coding and abstracting. In the event that one or more members of the team did not understand the participants' response, an iterative process was used to clarify the statement in the context of

the study protocol. The two faculty (RJP and WCT) members were responsible for identifying and categorizing notes into emerging themes. Once the themes were identified, each team member was responsible for determining whether they agreed or disagreed with the coding of each individual theme. When consensus could not be reached regarding the coding of a statement, the data were recoded (or theme renamed) until 100% agreement was achieved. Recurrent themes that captured the essence of participants' ideas were retained, whereas ambiguous themes were categorized as other. The researchers allowed for multiple responses to a single question. After the themes were confirmed, we transferred the data to SPSS, where the frequency for each theme could be computed to determine its relevance.

RESULTS

Descriptive Characteristics of Sample

Survivors were between the ages of 22 to 75 years old at the time of the interview and had a mean of 4.2 years out from diagnosis. Most survivors were diagnosed with localized or regional stage disease and were unemployed at the time of the interview. Survivors reported sitting on average 430 minutes (7.2 hours) per day while at home. Survivors spent the most time sitting more while watching television, talking on phone, riding/driving in a car, and while reading (See Table 1).

What would you say are the factors that contribute most to the amount of time you spend sitting?

A total of 5 themes were identified as factors associated with sitting. The recurrent themes included leisure activities (45%), health challenges (27%), personal habits (12%), household responsibilities (10%), and social activities (6%). The most commonly reported themes associated with sitting were watching television, pain, and fatigue, laying down to relax, paying bills, and talking on the phone (Table 2). Examples include:

- Leisure activities: "Older people take a longer time on the Internet;" "I spend too much time watching television;" "I like to sit and read."
- Health challenges: "When I move too much, my joints get stiff;" "I usually get tired;" "I need to rest a little more."
- Personal habits: "I usually sit down to eat dinner;" "Sitting down to do homework with my son;" "I have a long commute to and from work."
- Household responsibilities: "I sit when I read my bills;" "managing finances;" "I sit when I'm taking care of business."
- Social activities: "Talking;" "Being on the phone;" "Sitting with grandkids."

What do you think are some of the benefits to breaking up or interrupting prolonged sitting?

Three themes were identified, which related to the benefits of breaking up prolonged sitting. Survivors reported health benefits (66%) and health problems (problem avoidance, 16%) that can be avoided if time spent sitting was reduced. Common health benefits of breaking up prolonged sitting were gaining more energy, and improvement in weight and memory.

Additional benefits reported by survivors were classified as other (17%). Examples are below:

- Health benefits: “It’s good to be active;” “It’s good for the heart;” “I will be able to breathe better.”
- Avoidance of health problems: “If I stand more, I’ll have fewer blood clots;” “My hands and knees will be less stiff;” “It will stop the numbness in my legs.”
- Other: “I’ll be able to finish what I get started,” “Be able to get a little exercise;” “I can find things to do.” “Getting things done around the house.”

What are challenges that prevent you from breaking up or interrupting prolonged periods of sitting? For example, some survivors have indicated that they were too tired

Four themes were identified related to the challenges of breaking up time spent sitting. The majority reported health challenges (41%) as a barrier to breaking up prolonged sitting, followed by challenges with emotional well-being (23%). Other challenges reported were related to time constraints (16%) and a combination of other challenges (20%). Examples are provided below:

- Health challenges: “I could not get up. I had knee and back surgery;” “I just don’t feel well all the time;” “The dialysis makes me tired.”
- Emotional well-being: “Sometimes I’m stressed and need to lay down;” “I’m just lazy;” “My personality has changed.”
- Time constraints: “Being a wife and a parent, I don’t have a lot of time for myself;” “The bills have to be paid;” “I’m constantly going to the doctor. I just don’t have the time.”
- Other: “Once you form a habit, it’s hard to change;” “I don’t have an active life;” “Sometimes I need to just get off my feet.”

What are potential strategies that you can use to break up or interrupt prolonged periods of sitting?

Potential strategies reported by survivors to reduce time spent sitting included engaging in leisure and recreational activities (54%), household chores (33%), and activities classified as other (13%). Examples include:

- Recreational activities: “Going for a walk;” “Moving around the house;” “Do some exercises.” “I could decorate.”
- Household chores: “I can rake up leaves;” “I could always do more chores;” “Washing clothes.”
- Other: “I can do things for others;” “I could try to make myself expendable;” “When I don’t have to sit, I won’t sit.”

DISCUSSION

In this study, we collected quantitative data on the sedentary habits of African American breast cancer survivors and qualitative data to identify their perceptions, beliefs, and recurrent themes related prolonged sitting. Our data indicates that African American breast cancer survivors were sitting approximately 7.1 hour per day during their leisure time and an additional 5 hours per day if they were employed. Despite the habitual nature of their sedentariness, survivors readily described the pros and cons of breaking up prolonged sitting. Many of the beliefs were centered on health benefits and health challenges that they experienced. Encouragingly, survivors expressed the need to engage in light intensity activities during their leisure and recreational times to break up prolonged periods of sitting. Overall, these data suggest that survivors were aware of the unhealthy consequences of prolonged sitting as well as potential strategies to adopt to reduce prolonged sitting throughout the day.

This study presented a unique opportunity to explore the behavioral habits and beliefs of minority cancer survivors. African American breast cancer survivors were targeted for this study because of their high vulnerability to health risk factors and complications compared to other breast cancer survivors.^{16, 18} Our data suggest that African American breast cancer survivors, especially those who are currently employed are sitting more than the general population⁸ and more than other populations of cancer survivors.¹⁷ Differences between the amount of time spent sitting reported by our women and those observed in other studies could be due to the fact that we used a self-report instrument, rather than accelerometers to capture these data. Often, individuals are not cognizant of the amount of time that they spend sitting. In fact, highly active individuals can also engage in prolonged sitting (e.g., active couch potatoes). The use of accelerometers may help to account for the reporting biases associated with self-report instruments. Despite these methodological differences, our data paint a grim picture for this population, and suggest that African American breast cancer survivors are in need of studies to help them transition gradually from prolonged periods of sitting to incorporating brief segments of light intensity physical activities. A gradual transition from prolonged sitting to such activities may help to shield African American breast cancer survivors from the adverse consequences of prolonged sitting.^{3, 6, 30–32, 16, 20}

Leisure choice practices such as watching television and reading contribute to prolonged sitting. Sitting while watching television is problematic for all and may facilitate further adverse complications for African American breast cancer survivors. Prior studies have indicated that sitting, while watching television is associated with consuming high fat, high sugar, and energy dense foods.³³ Although, we did not assess snacking behaviors in this study, the combination of sitting and snacking may be the culprit behind excess weight gains that African American breast cancer survivors experience following cancer treatment. Sitting and watching television appears to be relaxing for this population and may provide an opportunity for survivors to unwind after a stressful day. Although these behaviors may appear to be relaxing, they elevate the risk for obesity and premature mortality for many cancer survivors.^{1, 3, 6}

Of interest was the emphasis placed on pain and fatigue as factors that contributed most to prolonged sitting. Previous studies examining the relationship between time-spent sitting and patient-reported outcomes have been decidedly mixed.^{31, 34, 35} For example, two recent studies^{30, 31} observed no association between time spent sitting and patient reported outcomes in cross-sectional or longitudinal analysis. In another recent study,⁷ objectively measured sitting was associated with physical function and general health, but not pain or fatigue (or vitality). Here, survivors perceived that breaking up sitting would improve physical and mental well-being as well as prevent pain and stiffness in joints. Thus, pain and fatigue may be antecedents of prolonged sitting and lower levels of pain and fatigue may be a consequence of reducing prolonged sitting. The reciprocal nature between behavior and psychological/physiological states have been proposed in the Social Cognitive Theory³⁶ may apply here. Education about the hazards are prolonged sitting should be discussed during the treatment phase of the cancer control continuum because cancer-related fatigue and pain may contribute to declines in cardiorespiratory fitness and functional status.³⁷ Declines in fitness may exacerbate prolonged periods of sitting throughout the treatment and recovery phases of the cancer continuum. These habits may ultimately contribute to enjoying sedentary hobbies and results in further functional decline over time as survivors proceed through the distal phases of the cancer continuum. This hypothesis is supported by prior studies, which indicate that lower levels of physical activity and physical functioning and higher levels of sedentary behavior among African American breast cancer survivors when compared to other racial and ethnic groups of cancer survivors.^{16, 17}

Health challenges were perceived as the greatest barriers to breaking up time spent sitting. Although survivors perceived that breaking up sitting would relieve pain and fatigue, these were also the greatest barriers to breaking up time-spent sitting. Practitioners and researchers should consider encouraging survivors to weigh the pros and cons to breaking up time-spent sitting. Decisional balance sheets (i.e., weighing the pros and cons)³⁸ have been effective in physical activity research and may help cancer survivors see the tangible benefits of breaking up the time they spend sitting throughout the day. Stress-related components were also prevalent in this population. Many women reported that ‘just being too lazy’ or ‘feeling mentally whipped’ were barriers to breaking up time spent sitting. We are not sure whether feeling mentally whipped or lazy were components of fatigue or whether these comments represented the daily life stressors of African American breast cancer survivors.

Survivors were queried about possible strategies that they could adopt to break up the time they spent sitting. Surprisingly, survivors recommended light intensity leisure and recreational activities around the home as possible strategies to break up prolonged sitting. These activities included ‘staying active’ and doing chores. One potential strategy that survivors could adopt would be to incorporate chores while watching television or during commercial breaks.³⁹ Being active during commercials could help survivors minimize the amount of high-fats foods that men and women consume unconsciously while watching television.⁴⁰ Similarly, survivors may benefit from standing periodically while reading their mail or books.³⁹

Implications for Practice

Practitioners should recommend that survivors break up prolonged periods of sitting by reallocating time from sedentary activities into light-intensity physical activity.⁴¹ Light-intensity physical activity has been associated with improved body mass index⁴² and functional status.^{43–45} Additionally, breaking up sitting may be more acceptable and feasible than promoting moderate-to-vigorous physical activity in cancer survivors.^{32, 46} Prior studies have advocated for strategies such as walking or calisthenics exercises.^{47, 48} In particular, calisthenics exercises were associated with greater energy expenditure and heart rate response when compared to other light-intensity physical activities.⁴⁷ Also, moving during television commercials and while talking on the telephone can be easily incorporated into one's lifestyle. However, it should be noted that these strategies were implemented in healthy samples and not cancer survivors. More research is needed to understand what strategies are viable for cancer survivors to implement during and after treatment.

Strengths and Limitations

This study had a number of strengths including being among the first studies to examine themes associated with breaking up time spent sitting and presenting information on a underserved population of cancer survivors. In addition, there are a number of strengths associated with qualitative studies. Primarily, these data were derived from participants' perceptions of a priori determined categories; this study provides new data on the antecedents and consequences of behaviors that remain relatively unexplored in the field of cancer survivorship. Despite these strengths, there are a number of weaknesses that should be acknowledged. In particular, hand-written notes were taken, which may have introduced error in interpreting the responses. Further, no comorbidity data or other data that may characterize the lifestyle habits (i.e., body mass index, physical activity, etc.) of this population were collected; these data may not be generalizable to other groups of cancer survivors; also, it is inappropriate to draw causal inferences from our data or test hypotheses. However, these data provide a basis to better understand perceptions and misperceptions about interrupting prolonged sitting and all responses were clarified before the telephone call ended.

Conclusions

This study provides data related to benefits, challenges, and potential strategies for interrupting prolonged sitting among African American breast cancer survivors. It would be interesting to know to what extent these data are unique to the cultural beliefs of African American women and to their specific experiences of breast cancer survivors. In the absence of relevant data from other racial and ethnic groups and other types of cancers, there is an insufficient basis to speculate. Future research can address whether prolonged sitting is different for cancer survivors compared to those with other chronic conditions. Also, as mentioned earlier, among cancer survivors are their racial, ethnic, and cultural differences related to prolonged sitting? In addition, more research is needed to identify the specific adverse consequences of prolonged sitting related to quality of life, years of life lost, and monetary costs.

In summary, this study provides new data about the benefits and barriers of breaking up prolonged sitting as well as potential strategies that African American breast cancer survivors can adopt to break up prolonged sitting throughout the day. Navigating the challenges associated with cancer and its treatment can be a constant struggle for cancer survivors. If the perceptions of the benefits perceived by cancer survivors are true, breaking up time spent sitting may help survivors gain physical and psychological benefits. Future studies are needed to ensure that these results can be generalized to other populations of cancer survivors and expand the study of sedentary behavior in the field of cancer survivorship.

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Table 1

Sociodemographic and medical characteristics of study participants.

Characteristics	N=31
Age	
Mean (SD)	52.6 (14.3)
Range	22 – 75
Years out from diagnosis	
Mean (SD)	4.2 (2.1)
Range	1 – 10
Staging, n (%)	
Localized	16 (52)
Regional	13 (42)
Distant	2 (6)
Employed, n (%)	8 (26)
Minutes of sitting/day, Median (25% CI, 75% CI)	
Total sitting (not including work)	430 (300, 630)
Computer	30 (0, 60)
Reading	60 (30, 60)
Music	0 (0, 30)
Talking face-to-face	60 (30, 120)
Talking on the phone	30 (15, 60)
Watching television	120 (60, 180)
Riding/driving in a car	60 (30, 60)
Work (n = 8)	300 (180, 420)

Table 2

Synthesis of Themes from Survivors statements.

Factors associated with sitting: Theme	% Of Total Comments (N = 64)	Examples
1. Leisure – Choice elective (enjoyment)	44.8	Watching television and reading
2. Health challenges	26.9	Pain, fatigue, tiredness, and stiff joints
3. Other personal habits	11.9	Eating, laying down, relaxing
4. Household responsibilities	10.4	Reading mail and paying bills
5. Social	6.0	Talking on the phone or face-to-face
The benefits of breaking up time spent sitting: Theme	% Of Total Comments (N = 62)	Examples
1. Health benefits	66.1	Gives you more energy; Helps you manage weight; Helps memory
2. Avoid/Prevent health problems	16.1	Hands and knees wont be stiff; No back pain
3. Other	17.7	Helps to get things done; chores
The challenges of breaking up time spent sitting: Theme	% Of Total Comments (N = 51)	Examples
1. Health Challenges	41.2	Pain; fatigue; not feeling well
2. Emotional well-being	23.5	Being lazy; stress; Feeling mentally whipped
3. Other	19.6	Taking a break; Getting off my feet
4. Time constraints	15.7	Difficult to find time; Getting Overwhelmed; No time for self.
Potential strategies for reducing time spent sitting: Themes	% Of Total Comments (N = 79)	Examples
1. Leisure and recreational activities	54.4	Staying in motion; being active
2. Chores	32.9	Putting things away; cleaning up
3. Other	12.7	Finding other things to do