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Predictors of yoga use among patients with breast cancer

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Abstract

Objective—Emerging research suggests that yoga may be beneficial for reducing symptoms and improving quality of life among breast cancer patients (BCP). However, very little is known about the characteristics of BCP who use yoga; thus, this study seeks to identify the socio-demographic and clinical characteristics of yoga users among this population.

Design—Cross-sectional survey study.

Setting—Outpatient breast oncology clinic at a large university hospital

Participants—300 postmenopausal BCP currently receiving aromatase inhibitors.

Main outcome measurement—Self-reported use of yoga since the cancer diagnosis was collected along with sociodemographic and clinical data. Multivariate logistic regression was used to identify independent predictors of yoga use among BCP.

Results—Of 300 participants, 53 (17.7%) reported having used yoga since cancer diagnosis. White patients were significantly more likely to use yoga than non-white patients ($p=0.02$). Higher education level, lower BMI (body mass index), part-time employment status, previous chemotherapy and radiation therapy were all associated with greater yoga use (all $p<0.05$). Controlling for other factors, greater yoga use was independently associated with higher education level, adjusted odds ratio (AOR) 2.72, 95% confidence interval (CI), (1.15–6.46), and lower BMI, AOR, 0.25, 95% CI, (0.09–0.66).

Conclusion—Yoga use following breast cancer diagnosis was substantially higher for white patients and those with lower BMI and higher education levels. Considering its potential benefits for symptom management in cancer, more research is needed to understand the attitudes and barriers to yoga use among individuals with non-white race, lower education, and higher BMI level. Such investigation will help design yoga programs that are aligned to the needs of these populations.

Introduction

Yoga is a traditional health practice of Indian origin, developed around 5000 years ago, to promote physical and mental wellbeing ¹. Yoga is mainly based on the practice of physical postures, breathing techniques and meditation with the goal of connecting the mind, body and spirit for health and self-awareness ². It has gained significant popularity among adults in United States with an increase in its use from 3.7% in 1997 to 6.1% in 2007 ^{3,4}. Yoga is also one of the most widely used mind-body therapies among cancer patients, especially breast cancer patients ⁵⁻⁸. Breast cancer patients often use complementary and alternative medicine (CAM) modalities, including yoga, in conjunction with conventional medicine to reduce symptoms related to cancer and its treatment and improve quality of life ^{9,10}.

Research studies evaluating the efficacy of yoga for reducing cancer-related symptoms have reported promising findings, including improvements in quality of life, social functioning, as well as spiritual and emotional well-being ¹¹⁻¹⁴. Studies have found that yoga may reduce fatigue, pain, nausea, mood disturbance, depression and anxiety in early stage breast cancer patients ¹³⁻¹⁷; increase invigoration, acceptance, and relaxation in women with metastatic breast cancer ¹⁸; and help decrease stress and pain while increasing energy, sleep and sense of well-being in a variety of patients with cancer ¹⁹.

Despite its potential benefits and popularity among breast cancer patients, little is known about the characteristics of yoga users within this population. Although there are a number of studies examining the factors associated with the use of CAM among patients with breast cancer ²⁰⁻²⁸, to the best of our knowledge, there have been no studies so far examining the factors associated with yoga use in this population. We conducted a cross-sectional analysis to determine the factors that are associated with yoga use since cancer diagnosis in a population of postmenopausal women with stage I–III breast cancer who finished primary cancer treatment and were currently receiving aromatase inhibitors.

Study Design and Patient Population

A cross-sectional survey study was conducted at the Rowan Breast Cancer Center of the Abramson Cancer Center of the University of Pennsylvania (Philadelphia, PA). Potential participants included all postmenopausal women with a history of histologically-confirmed, stage I to III, hormone receptor–positive breast cancer who were currently taking a third-generation aromatase inhibitor (anastrozole, letrozole, or exemestane) and were seen between April and October 2007. These participants were part of a study on symptoms associated with aromatase inhibitors ²⁹. Additional inclusion criteria were completion of chemotherapy or radiotherapy at least one month before enrollment, approval of the patient’s primary oncologist, and the patient’s ability to understand and provide informed consent in English. Research assistants screened medical records and approached potential study participants for enrollment at their regular follow-up appointments. After informed consent was obtained, each participant was given a self-administered survey. For those participants who could not complete the survey in time, a stamped envelope with return address was provided for participants to mail back the survey. The study was approved by the Institutional Review Board of the University of Pennsylvania.

Outcome Measurement

Primary outcome for the study was yoga use. Participants were asked whether they have used yoga since their cancer diagnosis with a yes or no response option. Participants reported sociodemographic and medical variables. Self-reported data included age, race/ethnicity, education level, employment status, medical comorbidity, stage of cancer, and previous cancer treatments (i.e., surgery, chemotherapy, and radiation therapy).

Statistical Analysis

Data analysis was performed using STATA 10.0 for Windows (STATA Corporation, College Station, TX). Descriptive statistics were used to report the demographic variables of the study participants. Univariate analyses were then conducted to identify the factors associated with the use of yoga among breast cancer patients. Using chi square tests of independence, we compared the sociodemographic and clinical characteristics of yoga users and non-yoga users. Multivariate logistic regression model was then used to identify independent predictors of yoga use while controlling for potential confounders. Variables that were not significant at the $P = 0.10$ level in the univariate analyses were not included. All analyses were two-sided with 0.05 indicating significance.

Results

Of 484 patients screened, 50 (10%) were ineligible as a result of discontinuation of aromatase inhibitor therapy, 45 (9%) had metastatic disease, 64 (13%) did not keep their scheduled appointment, and 25 (5%) declined enrollment, leaving a total of 300 participants (response rate of 92%). The mean age of the women enrolled was 61 years, with a standard deviation of 10 years. Two hundred fifty-three patients (84%) were non-Hispanic white, 38 (13%) were non-Hispanic black, 3 (1%) were Hispanic, 3 (1%) were Asian, and 3 (1%) were mixed race. Table 1 displays the characteristics of study participants. Recognizing that most of the minority cancer patients were black, we combined them as non-whites and dichotomized the race variable as whites and non-whites.

Of 300 participants 53 (17.7%) reported having used yoga since the cancer diagnosis. We found statistically significant differences between yoga users and non-yoga users by sociodemographic and clinical characteristics (Table 2). White patients were significantly more likely to use yoga than non-white patients (20.2% vs. 4.4 %, $p=0.02$). Higher level of education was associated with greater yoga use (high school or less 8.2%, college 19.8%, graduate or professional school 28.0%, $p<0.001$). Normal (BMI < 25) weight women were much more likely to use yoga than their overweight (BMI 25–30) and obese (BMI < 30) counterparts (28.6 % vs. 16.3 % vs. 6.3 %, $p=0.0001$). Additionally, part-time employment status (35%, $p=0.005$), stage II cancer (24.1%, $p=0.016$), previous chemotherapy (23.2%, $p=0.002$) and radiation therapy (21.7%, $p=0.01$) were also associated with greater yoga use. Previous mastectomy was not associated with yoga use in the univariate analysis.

In multivariable regression analysis, (Table 3) yoga use was independently associated with education level and BMI. Breast cancer patients with a graduate or professional degree were more likely to use yoga than those with high school or less education, adjusted odds ratio (AOR) 2.72, 95% confidence interval (CI), (1.15–6.46). Additionally, obese patients were less likely to use yoga than patients with normal weight, AOR, 0.25, 95% CI, (0.09–0.66). Furthermore, race/ethnicity was no longer significant in the multivariate model AOR, 0.57, 95% CI, (0.11–2.93), this may be due to the fact that only two individuals of non-white race had practiced yoga since cancer diagnosis. Employment status and previous use of chemotherapy or radiation therapy were not statistically significant correlates of yoga use in multivariate analysis.

Discussion

In this survey study among 300 outpatient breast cancer patients 17.7 % have used yoga after cancer diagnosis. Greater yoga use was observed among white patients as compared to non-whites. Race was not found to be significant in the multivariate analysis; however, this may be due to the fact that only two non-white women practiced yoga since cancer

diagnosis. Additionally we found education level and Body Mass Index (BMI) as independent predictors of yoga use, with yoga users more likely to be well educated and with lower BMI levels. These findings provide an understanding of existing pattern of yoga use among breast cancer patients and also highlight the challenge ahead to make yoga a therapy available to individuals of greater diversity.

The prevalence of yoga use among breast cancer patients in our study (17.7%) is higher than that reported in the national studies conducted among general US population but is comparable to the prevalence of yoga use among breast cancer patients using localized samples. The National Health Interview Survey suggests that 6% of civilian non-institutionalized US adults used yoga in 2007⁴. Another study has reported that yoga was found to be one of the most commonly used mind-body techniques with a prevalence rate of 3.7%³⁰. On the other hand, prevalence of yoga use among breast cancer patients has been reported from 11.5% to 22.2% in localized samples, and the prevalence we found falls right within these numbers²⁰⁻²³.

Few studies have looked at the factors associated with yoga use among the general population, however even less is known in this area among breast cancer patients. Studies conducted among the general US population found that yoga users were more likely to be white, female, young, college educated, and urban dwellers^{31, 32}. A study conducted to understand the use of mind body therapies among breast cancer patients found the use of yoga and other components of yoga like meditation and deep breathing to be more common among non-Hispanic whites than any other ethnic or racial groups²².

Our results are consistent with most of the published yoga research findings that suggest higher education level is associated with yoga use. Unfortunately, relatively little information is available regarding the reasons for these notable differences. Some of the potential explanations could be: Patients with low education level may have limited ability to access or desire to seek health information such as practicing yoga. Lack of knowledge or familiarity about yoga, lack of access to yoga classes, or cost might be important barriers towards the use of yoga in this population. In order to target yoga to this socially vulnerable group, more research is needed to understand the specific barriers so interventions can be developed to overcome these challenges.

Our study revealed that breast cancer patients with normal weight (BMI < 30) are more likely to use yoga than obese patients (BMI >30). Similar results were found in a study evaluating the use of CAM by obese adults with yoga use less prevalent among obese individuals as compared to normal-weight individuals³³. Limited research suggests that yoga may be a useful intervention for weight management^{34, 35}, however; little is known about obese patients' barriers towards use of yoga. Some potential explanations are that obese women might have negative preconceptions about yoga being extremely challenging for obese and non-flexible individuals, the perception being partly contributed by the projected image of yoga by the mass media as being practiced by thin and very flexible individuals. More research is needed to identify specific barriers to yoga use among this population in order to design yoga programs that are aligned with the needs of obese patients.

As with prior research, we found use of yoga to be higher among whites than other ethnic and racial groups. The effect of race became non-significant in our multivariate analysis and may be due to the fact that only two out of 47 non-white (mostly black) patients used yoga since cancer diagnosis. Lower education level and higher BMI might explain some differences in the use of yoga across races however there can be other barriers towards the use of yoga among non-white patients. Additionally, yoga is often portrayed by the mass

media as being a religious practice or being practiced by whites, which might lead to further racial barriers. It is possible that deeply spiritual/religious non-white participants may consider yoga to interfere with their religious paradigm. A study conducted to evaluate the barriers to yoga practice among the general population found time constraints, yoga not being aerobically challenging, challenging for people who are not flexible, and yoga being some type of religious practice as some of the important barriers to yoga use³⁶. Similar studies among non-white breast cancer patients would yield a better understanding of the low uptake of yoga among this population for cancer-symptom management.

It is important to acknowledge several limitations of this study. The study relied on self-reports and is not a direct measure of the actual yoga use among breast cancer patients. Study participants are limited to breast cancer patients receiving aromatase inhibitors and completion of cancer treatments at least 1 month before enrollment as the participants of this study were part of a study on symptoms associated with aromatase inhibitors. Hence the study results might not be generalizable to those newly diagnosed with breast cancer or those undergoing active treatment. Additionally, our sample was predominantly white and seen in an academic cancer center; thus, studies of more racially diverse populations of breast cancer patients are needed. The study did not provide information regarding patients' attitudes towards yoga use, frequency of yoga use or use of yoga before cancer diagnosis. Future studies should focus on these important constructs in order to gain better understanding of yoga use among breast cancer patients. Also, the academic cancer center where the patients were being treated did not offer yoga to cancer patients which might impact the generalizability of the findings to other settings.

Despite the limitations, the study provides useful information about the characteristics of yoga users among breast cancer patients. In order for yoga to be an effective public health practice, it is critical to understand why differences based on race, education and BMI level exists in the use of yoga. Further research is needed to understand the specific attitudes and barriers of populations of non-white race, low education and obese individuals towards the use of yoga. Such investigation will help design yoga programs that are aligned to the needs of these populations for reducing symptom distress, promoting health and wellness, improving quality of life and ultimately reducing health disparities in cancer symptom management. Furthermore, in order for yoga to appeal to more diverse populations, the image of yoga may need to be tailored to appeal to obese individuals and individuals of diverse racial and ethnic background. As the efficacy of yoga is being investigated for different health conditions, identifying and developing strategies to deliver yoga to diverse populations at risk for health disparities is an important public health effort.

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Table 1

Characteristics of the study participants

Characteristics	N (total)	% (percentage)
Age (years)		
Less than 55	73	24.3
56–65	131	43.7
Greater than 65	96	32.0
Race		
White	253	84.3
Non-white	47	15.7
Education		
High School or less	122	40.8
College Graduate	76	25.4
Graduate or Professional Scholar	101	33.8
Employment status		
Full-time	114	38.5
Part-time	40	13.5
Not currently employed	142	48.0
BMI		
<25	112	37.3
25–30	93	31.0
>30	95	31.7
Stage of cancer		
I	100	36.5
II	142	51.8
III	32	11.7
Surgery		
No	150	50.0
Yes	150	50.0
Chemotherapy		
No	119	39.7
Yes	181	60.3
Radiation therapy		
No	106	35.3
Yes	194	64.7

Non-whites: Mostly black

BMI: Body Mass Index

Some of the cells do not add up to 300 due to the missing data.

Table 2

Characteristics of Study population by yoga use

Characteristics	Yoga Users (%)	Non-yoga users (%)	P value
Age (years)			0.08
Less than 55	18 (24.7)	55 (75.3)	
56–65	24 (18.5)	106 (81.5)	
Greater than 65	11(11.5)	85 (88.5)	
Race			0.02
White	51 (20.2)	202 (79.8)	
Non-white	2 (4.4)	44 (95.7)	
Education			0.0004
High School or less	10 (8.2)	112 (91.8)	
College Graduate	15 (19.8)	61 (80.3)	
Graduate or Professional Scholar	28 (28)	72 (72.0)	
Employment status			0.005
Full-time	22 (19.6)	91 (80.5)	
Part-time	14 (35)	26 (65.0)	
Not currently employed	17 (12)	125 (88.0)	
BMI			0.0001
<25	32 (28.6)	80 (71.4)	
25–30	15 (16.30)	77 (83.7)	
>30	6 (6.3)	89 (93.7)	
Stage of cancer			0.016
I	10 (10)	90 (90.0)	
II	34 (24.1)	107 (75.9)	
III	6 (18.8)	26 (81.3)	
Surgery			0.30
No	30 (20)	120 (80.0)	
Yes	23 (15.4)	126 (84.5)	
Chemotherapy			0.0015
No	11 (9.3)	107 (90.7)	
Yes	42 (23.20)	139 (43.5)	
Radiation therapy			0.012
No	11 (10.5)	94 (89.5)	
Yes	42 (21.7)	152 (78.4)	

Non-white: Mostly Black

BMI: - Body Mass Index

Some of the cells do not add up to 300 due to missing data.

Table 3

Factors associated with the use of Yoga

Characteristics	Univariate Analysis		Multivariate Analysis	
	Unadjusted Odds Ratio	95% C.I.	Adjusted Odds Ratio	95% C.I.
Age (years)				
Less than 55	1		1	
56–65	0.69	(0.35–1.38)	0.77	(0.33–1.80)
Greater than 65	0.39	(0.17–0.90)	0.69	(0.24–2.07)
Race				
White	1		1	
Non-white	0.18	(0.42–0.77)	0.57	(0.11–2.93)
Education				
High School or less	1		1	
College Graduate	2.75	(1.17–6.50)	1.94	(0.76–4.96)
Graduate or Professional Scholar	4.36	(1.20–9.51)	2.72*	(1.15–6.46)
Employment status				
Full-time	1		1	
Part-time	2.23	(1.00–4.95)	2.15	(0.81–5.73)
Not currently employed	0.56	(0.28–1.12)	0.94	(0.41–2.14)
BMI				
<25	1		1	
25–30	0.49	(0.24–0.97)	0.48	(0.22–1.07)
>30	0.17	(0.07–0.42)	0.25*	(0.09–0.66)
Stage of cancer				
I	1		1	
II	2.86	(1.34–6.12)	1.91	(0.75–4.85)
III	2.08	(0.69–6.25)	1.5	(0.41–5.53)
Chemotherapy				
No	1		1	
Yes	2.94	(1.44–5.98)	1.46	(0.56–3.84)
Radiation therapy				
No	1		1	
Yes	2.36	(1.16–4.81)	1.96	(0.87–4.45)

BMI = Body Mass Index. C.I. = Confidence Interval.

* = p value < 0.05