

The Effect of Yoga on Barriers to Occupational Engagement in African American Breast Cancer Survivors

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Abstract

Objective: The purpose of this pilot study was to determine if occupational therapy informed yoga could decrease barriers to occupational engagement in African American breast cancer survivors.

Methods: A single-arm pretest-posttest design was used to study African American breast cancer survivors who participated in six weekly group yoga sessions that were delivered by occupational therapists. Variables were selected to operationalize barriers to occupational engagement and included mental health, bodily pain, role-physical and emotional, fatigue, self-efficacy, acute pain, balance, and upper extremity disability. Descriptive statistics and repeated measures analysis via linear mixed effects modeling were conducted to describe the participants and determine the efficacy of occupational therapy informed yoga.

Results: Barriers to occupational engagement (health related quality of life, self-efficacy and balance, pain, upper-extremity disability) were evident in participants at baseline. Occupational therapy informed yoga reduced some of these barriers through significant changes in pain, mental health, and balance.

Conclusion: These findings provide initial support for the development of group programming to deliver occupational therapy informed yoga to African American breast cancer survivors.

Keywords: *Breast cancer survivors; African American women; Psycho-social interventions*

Received Date: August 08, 2018; **Accepted Date:** September 03, 2018; **Published Date:** September 10, 2018

Citation: Julie Hunley, The Effect of Yoga on Barriers to Occupational Engagement in African American Breast Cancer Survivors. *Cancer Med J* 2018; 1(1) 3-11.

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Introduction

Breast cancer disproportionately affects African American women as illustrated by a 42% higher death rate and an 11% lower 5-year survival rate when compared to White women [1]. Reasons for these disparities include biological and structural barriers to higher survival rates [2]. Despite these disparities, 81% of African-American women diagnosed with early stage breast cancer will survive at least five years [1]. Many of these women face challenges related to physical functioning (including weight gain, fatigue and pain), and social and emotional support [3,4] which can impact their occupational engagement. Regular physical activity and resistance training is recommended by the American Cancer Society to support improved survivorship (2016). To date, few efforts have targeted African American survivors who may experience greater survivorship challenges than Whites [1,5,6].

Yoga is a safe and effective means for breast cancer survivors to exercise and gain positive physical and psychosocial outcomes [7-10]. A Cochrane review of 24 yoga studies focused on improving the quality of life breast cancer survivors found moderate support for yoga when compared to no treatment and psychosocial interventions [11]. A systematic review of cancer survivor interventions within the scope of occupational therapy concluded that there was moderate evidence to support the use of yoga to improve mental health, quality of life, and sleep [12]. Occupational therapists did not author reviewed studies, so findings must be contextualized before being applied to practice [12].

Only two studies, 10 years apart, have provided evidence about the efficacy of yoga for African American breast cancer survivors (AABCS) [13,14]. Moadel found that quality of life, well-being, and mood significantly improved in a yoga randomized control trial that included 32.8% (n=42) AABCS diagnosed 0.03-4.96 years prior to study participation (2007). Taylor, et al. studied AABCS at least 12 months after breast cancer treatment ended (2017). Eighteen participants were assigned to a restorative yoga condition, and the remainder (n=15) served as the control. Survivors in the yoga group showed significant improvements in depression. Despite contributions from these authors, additional studies of yoga interventions that target occupational engagement; include objective outcomes, and engage AABCS will extend our current knowledge.

The purpose of this study was to determine if occupational therapy informed yoga (OT-Yoga) could decrease barriers to occupational engagement in AABCS.

Methods

The study used a single arm pretest–posttest design. The institutional internal review board approved the research, and participants provided informed consent for study participation.

Participants

Recruitment was conducted via television, paper and electronic fliers. Women were eligible if they were: African American, had completed treatment for American Joint Committee on Cancer (AJCC) stages I-III breast cancer at least 3 months prior to starting OT-Yoga, and had no physician-imposed activity restrictions.

Data Collection

Data were collected at baseline, mid-intervention, and post-intervention. Participants completed paper surveys and rotated through physical assessment stations. Mid-intervention data collection was completed to support occupational therapy clinical decision-making and optimize outcomes of remaining sessions.

Instrumentation

The Health & Activity questionnaire was developed by the principal investigator to gather demographic, health history, and physical activity data. It was validated in a previous study (N=52) [15].

The Short Form-36 (SF36) Health Survey is a standardized, self-report of health-related quality of life (HRQOL) that is valid and reliable [16] across diverse patient groups [17]. The 36 items measure physical and mental health in the 4 weeks prior to administration using 8 scales. Scale norms and standard deviations (SD) referenced in this study are: mental health (70.38(21.97)), bodily pain (70.77(25.46)), role-physical (52.9(40.78)), role-emotional (65.78(40.71)), and vitality (52.15(22.39)) [16]. High scores (100 point maximum) indicate the perception of greater HRQOL. Low scores in the vitality (FATIGUE) scale are conceptualized for this study as fatigue because the floor of the scale is defined as “Feels tired and worn out all of the time” [18]. SF-36 validity for a large sample of women at high risk for breast cancer was tested in a multicenter study [19].

The National Institutes of Health Toolbox Self-Efficacy Computer Adaptive Test Age 18+ v2.0 (NIHSE) is a general self-efficacy measure valid for diverse populations and administration settings [20,21]. Self-efficacy is the belief that one has the capacity to meet daily life challenges [20]. Items in the NIHSE were selected with confirmatory factor analysis with a norm of 50 and scores plus and minus 1 SD (10) considered low and high self-efficacy [21].

Functional Reach (BALANCE) is a clinical measure of balance during a maximal forward reach from a fixed base of support [22]. Duncan and colleagues found good concurrent validity ($r=.71$) between BALANCE and center of pressure excursion and the norm for women 41-69 years old is 13.81(SD=2.20) inches [22]. Galentino, et al. [23] used functional reach in a yoga intervention for women with breast cancer (2012).

The Universal Pain Assessment Tool (UPAT) with Wong-Baker faces, although originally developed for pediatric practice [24], has been validated for use with adults [25]. The scale uses simple facial images reflecting expressions to represent a pain range from none to extreme. The format used for this study employed text descriptors of pain and functional limitations.

The Quick Disabilities of the Arm, Shoulder, and Hand (QDASH) is a self-report measure of upper-extremity function that is standardized, valid and reliable [26]. Self-ratings from 11 items are used to calculate an overall percentage of disability in people who have one or more upper-extremity diagnoses. Higher scores indicate more disability. Circumferential measurements of upper extremities are valid and reliable means for detecting lymphedema [27].

Intervention

The intervention, OT-Yoga, met weekly for six, 60-minute sessions. The yoga sequencing for practice sessions was designed and upgraded by two occupational therapists, one had yoga certification and the other had 20 years of clinical and research

experience with breast cancer survivors. Each session started with a seated warm-up to coordinate breath and movement and promote upper extremity mobility. Standing postures followed to target BALANCE. Sessions closed with restorative postures in seated and supine variations. The full protocol will be published separately [28].

Data Analysis

Baseline characteristics were described using counts and percentages. Outcome measures were summarized at each time point using mean and SD. A repeated measures analysis via linear mixed effects modeling with a random subject effect was conducted separately for each outcome. This approach accounted for within-subject correlation due to the repeated measures, and allowed incorporation of missing observations under a missing-at-random assumption. Standardized effect size was computed as the ratio of the estimated change to the baseline between-subject SD of the measure. All analyses were performed using R 3.2.3 (R Foundation for Statistical Computing, Vienna, Austria).

Results

Participants

Nineteen of the 22 women who inquired about the study were enrolled; three did not meet eligibility based on race and disease history (Figure 1). Scheduling conflicts and an unrelated health event account for dropouts. Retention at the post-intervention follow-up was 94.7%. Participants were AABCS aged 43 to 75 years old (Table 1). They were survivors of AJCC clinical stages I (52.6%), II (26.3%), III (21.1%) breast cancer, who completed treatment 3 months to 21 years before the first intervention session. All had graduated from high school with most attending college and 36.9% earning bachelors and graduate degrees.

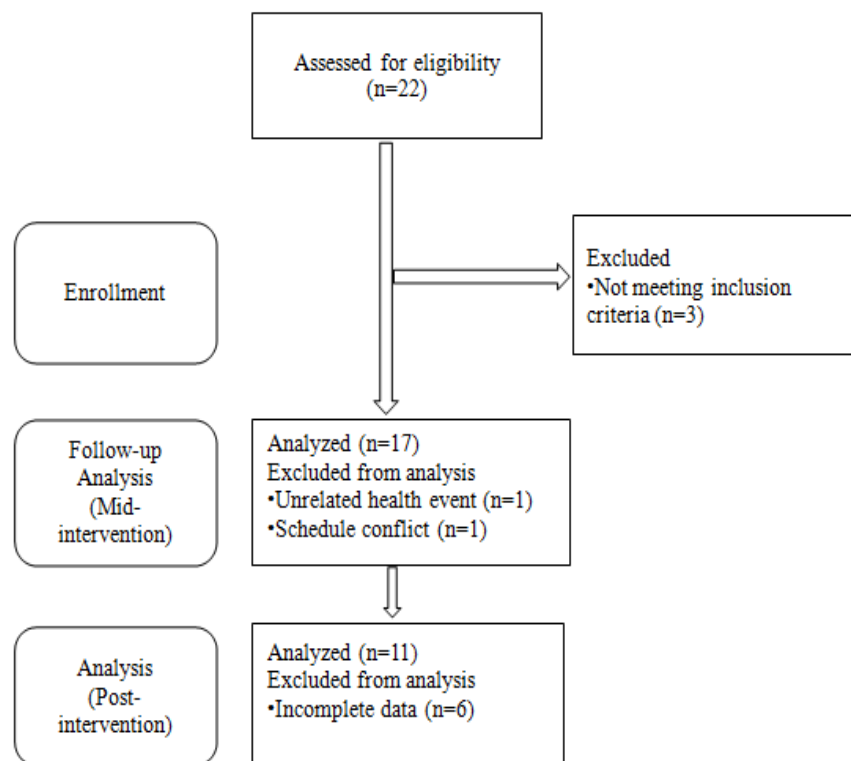


Figure 1: Participant Flow

Occupational engagement

At baseline, measures of HRQOL, self-efficacy and BALANCE were sub-normative and the sample reported mild-moderate acute pain with 25.5% upper extremity disability (QDASH). These barriers to occupational engagement were all reduced post-intervention (Table 2).

Variable	
Age (years)	59.5(±10.3)
Breast Cancer Stage	<u>(n(%))</u>
I	10 (52.6)
II	5 (26.3)
III	4 (21.1)
Education level	
High school	6 (31.6)
Some college, no degree	4 (21.1)
Associate's degree or diploma	1 (10.6)
Bachelor's degree	4 (21.1)
Graduate degree	3 (15.8)

Table 1: Descriptive participant characteristics

Variables	Intervention Pre	Mid	Post	Pre to Mid	Pre to Post
	Mean (SD)			p-value	Standardized effect size
SF36-Mental Health	66.9 (±12.4)	-	73.8 (±17.8)	-	.034*
					0.76
SF36-Bodily Pain	56.6 (±25.2)	-	71.1 (±23.2)	-	0.066
					0.66
SF36-Role Limitations-Physical	48.1 (±45.7)	-	58.3 (±41.5)	-	0.37
SF36-Role Limitations- Emotional	70.2 (±38.3)	-	66.7 (±44.1)	-	0.71
					0.11
SF36-Vitality (FATIGUE)	52.2 (±21.5)	-	62.4 (±18.1)	-	0.18
					0.45
Self-efficacy	37.4 (±8.1)	-	38.6 (±9.0)	-	0.091
					0.34
BALANCE (Functional Reach)	12.1 (±3.5)	17.4 (±3.7)	18.7 (±3.0)	<.0001***	<.0001***
				1.44	1.88
Pain (UPAT)	2.6 (±2.1)	-	1.3 (±1.2)	-	.003**
					-0.64
Upper extremity Disability (QDASH)	25.5 (±18.6)	25.2 (±14.8)	17.5 (±16.3)	0.57	0.25
					-0.24

Note: * = significant at $p \leq 0.05$, ** = significant at $p \leq 0.01$, *** = significant at $p \leq 0.001$

Table 2: Descriptive data and results of models of occupational engagement

SF36-mental health increased 6.9 points ($p=.034$). SF36-bodily pain improved 14.5 points ($p=.066$). Other HRQOL changes were not significant, but remained meaningful because of the magnitude of changes from baseline: SF36-physical limitations to roles (10.1 points, $p=.37$), and FATIGUE (10.2 points, $p=.18$). BALANCE increased a robust and significant 8.6 inches ($p<.0001$), while acute pain decreased 1.3 points ($p=.003$). Although upper extremity disability decreased 8 percent ($p=.25$), the change was not significant, nor was the change in self-efficacy (increased 1 point ($p=.09$)). As hoped, arm circumferences stayed stable ($p>.05$).

Discussion

Barriers linked to breast cancer are multifaceted and may disproportionately affect AABCS [5,6]. Our findings emphasize the effect that OT-Yoga had on normalizing barriers to occupational engagement like mental health, fatigue, physical role function, pain level, and balance in AABCS with outcomes equivalent to that of the general population. Once barriers are normalized, evidence supports health promotion through occupational engagement in community-dwelling adults [29].

OT-Yoga raised HRQOL through meaningful changes in mental health, bodily pain and FATIGUE (SF36-vitality). Changes in bodily pain and mental health were of moderate-large effect size and raised scale values to general population normative levels [16]. These findings aligned with literature reviews that support the efficacy of yoga for HRQOL [8,10,11]. A separate measure of acute pain further supported the efficacy of OT-Yoga for significant pain reduction with large effect size. Vitality (FATIGUE) increased to a normative level [16] post OT-Yoga despite lacking statistical significance. Other yoga studies with African American [14] and African American and Hispanic [13] breast cancer samples did not find that fatigue was significantly changed by yoga. However, Cochrane review findings, dependent on primarily White samples, [11] did report a significant reduction in fatigue. Physical role function increased to a normal level [16], but lacked significance. Findings that lacked statistical significance may reflect the difficulty associated with capturing cancer-related fatigue and physical role function with a general HRQOL instrument.

Clinical measures of BALANCE and upper extremity disability may be closer linked to occupational engagement. Balance is the biomechanical basis of engaging in many occupations. Breast cancer survivors may experience treatment side effects like peripheral neuropathy, fatigue, and generalized weakness [30] that can contribute to falls and subsequent injuries [31]. OT-Yoga improved BALANCE from below to well above the norm with large effect sizes [22]. In contrast to other studies, we used mid-intervention assessments of BALANCE and upper extremity disability (QDASH) to inform a shift toward upper extremity rehabilitation in stance. Post-intervention, upper extremity disability reached a minimal clinically important difference as defined by Mintkin, Glynn & Cleland [32] with 8% less disability (2009). We believe that AABCS in our study were more fully able to engage in occupations because barriers were reduced by OT-Yoga.

Implications for OT Practice

This study demonstrates the efficacy of a weekly yoga group delivered by occupational therapists to African American breast cancer survivors.

- Occupational therapists have a unique skill set that includes ongoing assessment, activity grading, and therapeutic use of self that can optimize individual engagement in a group setting, and adjust programming to optimize individual and group outcomes.
- Yoga is a mode of exercise that can be graded to be accessible and effective for individuals at different points in treatment recovery in a group setting to increase indicators of occupational engagement in AABCS.

- OT-Yoga may be replicated with similar populations to extend occupational therapy service delivery into the AABCS community.

Feasibility and Limitations

This study is replicable and may benefit other similar populations especially if sufficient participants are available for a control group to enhance study design. A limitation of this study was that many participants were part of a preexisting, ongoing group prior to this intervention. Disrupting the continuous nature of group participation to create a control group would not have been ethical and would have reduced the sample size for primary analysis. Compromised collection of post measures were the primary limitation of this study. Despite a high attendance rate, the final data collection session had limited attendance. Surveys distributed at this final meeting were not all returned. Attempts to collect data in the immediate post intervention time-period were largely unsuccessful. It was later determined that many participants had travelled to the southern United States for family reunions. Data analysis and conclusions were therefore limited to participants providing data. This study's use of standardized, normed instruments like the Short Form Health Survey, the National Institutes of Health Toolbox Self-Efficacy Computer Adaptive Test and Functional Reach strengthen the validity of this pilot study's findings. Norms from these instruments provided comparators to represent the general population in the absence of a larger sample size. Statistical treatment of missing observations under a missing-at-random assumption accounted for data lost to follow-up in the analysis. Despite being limited by data lost to follow-up, effect sizes were large, strengthening the validity of the findings for this population of African-American breast cancer survivors.

Conclusion and Future Research

These pilot findings provide initial support for the development of programming to deliver occupational therapy informed yoga to African American breast cancer survivors. Future studies should analyze larger randomized samples achieved through proactive means for follow-up data collection. Qualitative measures may enhance understanding of concepts underlying barriers and promoters of occupational engagement.

Acknowledgement

We are indebted to the women of Sisters 4 Cure, Incorporated who committed to this intervention to further their mission of education about survivorship strategies to moderate health disparities for women in a hyper-segregated Midwestern city. Mount Mary University occupational therapy students helped collect and enter data, and we are grateful for their assistance. We are thankful for alumnae Sharon Stoffel, MA., OTR/R, FAOTA who provided financial support, and Jane Olson, PhD, OTR., FAOTA for her reviews. We declare no conflicts of interest.

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