Dance/Modified Yoga: A Health Strategy for African-American Women at Risk for Chronic Diseases

Candace Crosby Johnson
Richmond, Virginia

BA, University of Virginia, 1996
MPH, Medical College of Virginia, 1999
BSN, Virginia Commonwealth University, 2007

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Ann Gill Taylor, EdD, MS, RN, FAAN,
Chair of Committee

Joel G. Anderson, PhD

Randy A. Jones, PhD, RN, FAAN

Diane E. Whaley, PhD

ABSTRACT

African-American (AA) women are the segment of the population that experiences the highest incidence of metabolic syndrome (MetS). Yoga has been shown to decrease the risk of MetS, yet there have been no yoga studies of AA women with or at risk for MetS. The purpose of this 4-week study was to test the feasibility and acceptability of a culturally-tailored, Internet-based intervention, yogic dance (YD), using digital videos in a sample of AA women (ages 35-64) at risk for MetS. The study examined (a) the rates of participant eligibility, accrual, attrition, and reasons for attrition; (b) the feasibility of using the Internet to assess study participation and to deliver the intervention; (c) the acceptability of the structured intervention; and (d) any other benefits and/or limitations of the intervention. The study used a single-group, mixed-methods design underpinned by social constructivist theory and Pender's Health Promotion Model. Twenty-four study participants were recruited and completed the study. After completing in-person screening and baseline measures using the Pre-Screening Checklist, Physical Activity Readiness Questionnaire, Eligibility Screening Checklist, Individual Characteristics Form, and Internet-based International Physical Activity Questionnaire (IPAQ), consented participants engaged in the 4-week Internet-based YD video intervention. After the 4-week YD intervention, participants were invited to participate in one of two audiotaped focus groups to voice their perceptions of barriers to and benefits from YD and the acceptability of using the YD intervention. In addition, data derived from the rates of participant eligibility, accrual, attrition, and the number of completed study measures were calculated. Focus group data were analyzed using content/thematic analysis and matched with themes from write-in responses to paper surveys. The majority (86%) of the women in the study found YD feasible as a complementary, health enhancing modality. Themes that emerged from the focus groups included: (a) stress is

both a motivator for and a barrier to participating in more YD; (b) social support is an important mediator for YD; and (c) cultural dance favorably enhances the YD experience. The integrated results from this mixed-methods study will form the foundation for a program of research exploring the complex determinants that influence health promotion behaviors in AA women.

TABLE OF CONTENTS

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"A village that has no organized music or neglects community singing, drumming, or dancing is dead."

-J.H. Kwabena Nketia, African musicologist

CHAPTER ONE: INTRODUCTION

African American (AA) women are a segment of the population that experiences the highest prevalence of metabolic syndrome (MetS), a group of symptoms that results from overweight/obesity related to sedentary lifestyle and leads to chronic diseases such as type 2 diabetes (T2D) and cardiovascular disease (CVD). AA women are often understudied and undertreated for MetS (Lloyd-Jones et al., 2009), and they often explore complementary therapies for symptom relief because usual allopathic pharmacological treatment may inadequately address individuals' symptoms, may be too expensive, or may have unappealing side effects (Dessio et al., 2004). Yoga users are less likely to be AA than White (Birdee et al., 2008), and there is scant research demonstrating how acceptable yoga is to AA women.

Inactivity and obesity continue to place AA women at highest risk for mortality because of chronic diseases such as T2D and CVD (Jago et al., 2011). Current approaches to improve these risks are person-centered and target behavior modifications such as increasing energy expenditure through physical activity (PA). Drawing from the theoretical constructs of the Health Promotion Model (HPM) (Pender, Murdaugh, & Parsons, 2010), the yogic dance (YD) intervention was developed, using social and cultural influences and Internet-based methods, to determine the feasibility and acceptability of a culturally tailored yoga-based program targeting AA women at highest risk for chronic diseases. The HPM (Pender, Murdaugh, & Parsons, 2010) is a multivariate model used for explaining and predicting the complex factors associated with participating in behaviors such as PA in AA women. The HPM allows for the concomitant examination of several influencing factors and has been used to examine the impact of health-

promoting factors on PA (Brady & Nies, 1999) in older women (Walker, Volkan, Sechrist, & Pender, 1988), in AA women (Ahijevych & Bernhard, 1994; Duffy, 1988), and in AA women at risk for chronic disease (Jefferson, Melkus, & Spollett, 2000).

YD was developed specifically by and for overweight, sedentary AA women, addressing PA at multiple focal points. Because this study explored the feasibility of increasing PA in a time- and cost-efficient manner, the YD intervention was offered in a format that allowed the participants to learn to fit three 10-minute sessions of PA into their daily schedules, thus improving the likelihood of being able to meet current PA guidelines. More importantly, YD affirms collective identity and restores personal identity, concepts important to health promotion and maintenance (Parham et al., 2011). African dance, with its rich symbolism and meanings, was chosen to enhance the intervention for this research because it offers an opportunity for AA women to have an identity-affirming means of increasing leisure time PA in a way that is stress reducing and healthy. African dance also has unique qualities such as an emphasis on family, community, communication, esteem-building, and spirituality that makes it desirable as a template upon which to integrate the beneficial properties of yoga. The potential for cultural dance and yoga to be combined to bring about improvements in mental and physical outcomes for AA women makes this combination a viable option for increasing PA (Johnson & Taylor, 2011).

The YD intervention, a cultural dance-inspired yoga intervention specifically developed for AA women, may be an important additional approach to managing MetS and its related complications in the AA target population. Given that PA has been a public health priority since the inception of the *Healthy People 2020* initiatives (Fielding & Kumanyika, 2009), effective interventions that emphasize prevention of the chronic diseases that contribute greatly to the

nation's financial health care burden will be of significant value. YD offers a response to the calls of many federal health care agencies for public health programming that supports PA in community-based settings.

This dissertation is the product of a scholarly process that began with a review of the literature and proceeded through to the design, development, implementation, and evaluation of a study. As described in the format given in the University of Virginia School of Nursing Student Handbook, Doctorate of Philosophy, 2009-2010, this dissertation follows the *manuscript dissertation* design. The final dissertation contains the following: journal titles for submission of five manuscripts, with associated author guidelines, and five publishable manuscripts written in the format of the destination journals.

Chapter Two: Review of the Literature is a manuscript, titled, *Yoga and Dance-based Therapies as Complementary and Supportive Care Modalities for the Management of Symptoms Related to Metabolic Syndrome: Focus on African-American Women*, that examines the status of AA women's health disparities, specifically, the disproportionate morbidities that result from MetS, a constellation of risk factors for CVD and T2D. Further, research studies and interventions that have targeted behavioral approaches to changing these disparities are explored with specific attention to faith-based/placed PA programs. Chapter Two concludes by exploring yoga and dance as possible supportive therapies for individuals at risk for MetS. A brief review of AAs' access to digital communication tools (i.e., cell phones, Internet access, computers) provides context for the design and methods used in the study.

Chapter Three: Research Design and Methods contains the manuscript, *Development, Recruitment, and Feasibility Testing of an Internet-based Intervention to Increase Physical Activity in Overweight African-American Women at risk for Chronic Diseases: Lessons Learned*.

This manuscript gives rationale as to how the HPM theory, strategies, and approaches used in the study were selected, the challenges faced during the study, and how these challenges were addressed.

Chapters Four and Five: Results are provided in two manuscripts, the first of which, *"I Go by How I Feel": African-American Women's Perceptions of Obesity, Stress, and Yoga/dance-based Physical Activity*, focuses upon the study participants' views, attitudes, and beliefs of the facilitators and barriers to the current study, a yoga/physical activity/dance-based intervention, and is shown in Chapter 4. Chapter Five contains the second results manuscript, *Results of a 4-week Internet-based, Mixed-methods Feasibility Study to Increase Yoga/dance-based Physical Activity in African American Women with and at Risk for Metabolic Syndrome*, which describes the research procedures and reports the feasibility and acceptability of the study intervention using surveys and write-in and focus group data collected from the women in the study. A concluding narrative, titled *Promoting Health Using Yoga- and Dance-based Activity in African-American Women at Risk for Metabolic Syndrome: Implications for Community/Public Health Nursing*, makes up Chapter Six: Conclusion. This manuscript frames the dissertation research within the current context of public health promotion, delineating YD's potential for translational interventions on primary, secondary, and tertiary levels. Chapter Six concludes with implications for future research and theory development for the future of public health nursing translational research.

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CHAPTER TWO: REVIEW OF THE LITERATURE

Manuscript One

Running Head: Yoga/Dance as Therapy for AA women

Yoga- and Dance-based Therapies as Complementary and Supportive Care Modalities for the Management of Symptoms Related to Metabolic Syndrome: Focus on African-American Women

*Candace C. Johnson RN, MPH, PhD(c), PhD student, University of Virginia School of Nursing, McLeod Hall, Charlottesville, VA 22908, p: 804-475-9376, f: 434-243-9938, cmc8k@virginia.edu

Ann Gill Taylor, EdD, RN, FAAN, Betty Norman Norris Professor of Nursing, University of Virginia School of Nursing, McLeod Hall 4013, Charlottesville, VA 22908, p: 434-924-0113, f: 434-243-9938, agt@virginia.edu

Diane E. Whaley, PhD, Professor, University of Virginia Curry School of Education, Memorial Gym 201, Charlottesville, VA 22908, p: 434-924-6193, f: 434-924-1389, dew6d@virginia.edu

Joel G. Anderson, PhD, Assistant Professor and Roberts Scholar, University of Virginia School of Nursing, McLeod Hall 4010, Charlottesville, VA 22908, p: 434-243-9936, f: 434-243-9938, jga3s@virginia.edu

Randy A. Jones, RN, PhD, FAAN, Associate Professor and Assistant Director of Research, University of Virginia School of Nursing, McLeod Hall 5030, Charlottesville, VA 22908, p: 434-924-0125, f: 434-982-1809, raj9c@virgina.edu

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Abstract

Addressing unchanging health disparities is a continuing challenge to the field of nursing. The potential for yoga, a proven complementary health-enhancing therapy that reduces the risks associated with metabolic syndrome, to be beneficial to African-American (AA) women has been understudied. The purpose of this review is two-fold: (1) to identify the current understanding of yoga- and dance-based therapies as complementary/supportive care modalities for management of symptoms related to metabolic syndrome; and (2) to interpret these findings in the broader context of the social determinants of health behavior and lifestyle change, particularly physical activity. The potential for cultural dance and yoga to be combined to bring about improvements in mental and physical outcomes for AA women makes these modalities viable options for increasing physical activity. The potential to use the Internet as a vehicle for delivering behavioral change interventions to AA individuals in their own homes also requires further investigation.

Introduction

Addressing unchanging health disparities is a continuing challenge to the fields of public health and nursing. In terms of chronic diseases such as metabolic syndrome (MetS), type 2 diabetes (TD2), and cardiovascular disease (CVD), African-American (AA) women remain the highest at-risk group. Previous research has uncovered the determinants and correlates of poor health outcomes, including sedentary lifestyle and overweight/obesity. Interventions to address these correlates have failed to change health behaviors and improve health disparities long term. More theoretically based, culturally appropriate investigation is needed to find time- and cost-efficient translational approaches to address the racial/ethnic disparities that increase the fiscal burden of an already distressed U.S. health care system.

The potential for yoga, a proven complementary therapy that reduces the risks associated with obesity, heart disease, and TD2 (Yang, 2007), to be beneficial to AA women at risk for these chronic diseases has been understudied. In addition, principles and choreography from African dance, along with its cultural significance, can be integrated with yoga to create a constellation of body movements that are doable by and motivating to AA women.

The Internet is visited often by AAs looking for information about their health and by AAs seeking to view videos online (Moore, 2011). The potential to use the Internet as a vehicle for delivering a health behavioral change program to individuals in their own homes also requires further investigation, and while modest enhancements in sedentary lifestyle have resulted in some short-term benefits (Catenacci et al., 2013; McKay, King, Eakin, Seeley, & Glasgow, 2001; Napolitano et al., 2003; Riiser, Løndal, Ommundsen, Sundar, & Helseth, 2013; Tate, Wing, & Winett, 2001), Internet-based programs have not had the opportunity to demonstrate improvements in physical activity (PA) that rival face-to-face programs.

The purpose of this review is two-fold: (1) to identify the current understanding of yoga- and dance-based therapies as complementary/supportive care modalities for management of symptoms related to metabolic syndrome; and (2) to interpret these findings in the broader context of the social determinants of health behavior and lifestyle change, particularly PA.

Metabolic Syndrome

AA women suffer disproportionately from MetS (Berman et al., 2001; Lloyd-Jones et al., 2009), a condition characterized by the presence of three of the following symptoms: fasting glucose ≥100 mg/dL; waist circumference (WC) ≥35 inches; systolic blood pressure (SBP) ≥130 mmHg/diastolic blood pressure (DBP) ≥85 mmHg, HDL ≤50 mg/dL; and triglycerides ≥150 mg/dL (Ford, Giles, & Dietz, 2002). Factors associated with MetS include age, low education, and low levels of PA, obesity, psychological stress, and parental history of T2D (Ford et al., 2002). The age-adjusted prevalence of MetS is 57% higher among AA women than AA men, making them a group at increased risk for both developing and dying from MetS-related co-morbidities such as T2D and CVD (Lloyd-Jones et al., 2009).

The consequences of obesity are a scourge to AAs, women in particular. Seventy-eight percent (78%) of AA women are overweight (Bowman, 2009) (i.e., have a BMI ≥25), and 49% are considered obese (i.e., have a BMI >30). An inverse relationship between abdominal adiposity and activity level exists (Ford et al., 2002), and AA women have a higher age-adjusted prevalence of abdominal obesity than other ethnic groups. Non-Hispanic AA adults (16.7%) are more likely to report PA than are Hispanic and White adults (10.7%) (Lloyd-Jones et al., 2009), thereby demonstrating another risk factor that leads to obesity and MetS, (Barnes & Schoenborn, 2003; McGinnis, 1992; Nies & Kershaw, 2002).

AA women are at exceptionally high risk for CVD, experiencing a mortality rate that is 69% higher than that of White women (Williams, 2009). Among AAs, 10.2% have CVD and 31.7% have hypertension (Lloyd-Jones et al., 2009). The prevalence of having ≥2 risk factors for CVD was highest among AAs (48.7%) (Lloyd-Jones et al., 2009), and more AAs than Whites are diagnosed with high blood pressure (67% vs. 52%) (Lloyd-Jones et al., 2009; Williams, 2009). Moreover, menopause, with its noticeable decline in estrogen levels and increases in physical and psychological aging, brings an even higher increase in CVD risk (Innes, Selfe, & Taylor, 2008).

Physical Activity

An effective way to prevent and reduce the morbidity and mortality associated with the MetS in AA women is to promote PA in sedentary individuals, which would result in lowering mortality rates associated with CVD, obesity, and T2D (Eyler et al., 2003; Jago et al., 2011; Pi-Sunyer et al., 2007). PA is defined as "all bodily movements that cause an increase in physical exertion beyond that which occurs during normal activities of daily living" (Marcus & Forsyth, 2009). Increased PA has been positively associated with a reduced risk of developing T2D and CVD (Lloyd-Jones et al., 2009; Pate et al., 2010). When compared to exercise, which refers to planned, structured, and repetitive PA, general PA more appropriately addresses the lifestyle issues of sedentary individuals who need to find ways to increase energy expenditure during their everyday activities. The 2008 Physical Activity Guidelines for Americans (Pate, Yancey, & Kraus, 2010) recommend that older adults, particularly those with chronic conditions and/or disabilities, should consider how these conditions affect their ability to do regular PA and, after determining their effort and fitness levels, engage in exercises that maintain or improve balance and cumulatively include 150 minutes of moderate intensity PA each week.

Previous PA research in AA women. Compared with all other ethnic groups, AA women have the lowest rates of engagement in high or medium intensity PA (Barnes & Schoenborn, 2003). The moderators (personal characteristics) and mediators (modifiable factors) of PA are similar for older AA women when compared to older women of other races, with some important nuances. Consistent PA moderators include younger age, good health status, higher education, higher income, partnered marital status, and White race (Eyler et al., 2003; Ransdell & Wells, 1998; Wang & Beydoun, 2007). Additional moderators for AA women include the number of chronic health conditions and BMI (Bopp et al., 2006; Whitt-Glover, Taylor, Heath, & Macera, 2007).

Mediators of PA typically include positive correlates: self-efficacy, greater pros than cons, safety from crime, perceived stress, social support, social strain, and knowing someone who participates in exercise; negative correlates include depressive symptoms, perceived sidewalk/traffic issues, and lack of health care provider discussion of PA (Cotter & Lachman, 2010; Eyler et al., 2003; Wilcox, Bopp, Oberrecht, Kammermann, & McElmurray, 2003). However, certain unique mediating influences such as outcome expectations (Murrock & Madigan, 2008), self-regulation (independent of social support) (Anderson, Wojcik, Winett, & Williams, 2006), and PA enjoyment (Bopp et al., 2006) are seen primarily in AA women when compared to other racial groups and should be considered when developing PA programming.

The African American Collaborative Obesity Research Network (AACORN), building on the National Institutes of Health's obesity research agenda, has cited the importance of considering social, cultural, and environmental contextual determinants when developing PA interventions in AA communities (Eyler et al., 2003; Kumanyika et al., 2007; Kumanyika et al., 2010). Programs culturally tailored to be relevant to AA women may be more effective than

conventional allopathic interventions (Bopp et al., 2006; Lee et al., 1997; Yancey, Ortega, & Kumanyika, 2006). Until recently, PA interventions that used cultural tailoring techniques did so primarily in terms of targeted media during the recruitment process and used research personnel of similar ethnicity to the subjects (Banks-Wallace & Conn, 2002).

Traditional PA approaches for AA women generally are comprised of spiritually based and faith-based/placed interventions that address cultural tailoring on surface structure levels (Resnicow, Baranowski, Ahluwalia, & Braithwaite, 1999), as these provide social support (Williams et al., 2013) and safe environments for PA (Campbell et al., 2007). Such approaches also provide cultural tailoring on a deep structural level given the focus on core values such as spirituality, an important concept to AAs (Newlin, Knafl, & Melkus, 2002; Parham, White & Ajamu, 2011). Faith-based and faith-placed PA programs for AAs have resulted in increases in PA, usually over the short term (Bopp, Peterson, & Webb, 2012). Recommendations for faith-based PA programs include incorporating improved PA measures, larger sample sizes, repeatable procedures with appropriate dose-response levels, longer study and follow-up periods, and the use of theory in design and evaluation (Bopp et al., 2012).

Researchers who have attempted to increase PA in AA women have been met with challenges. Approaches to improve health disparities, such as increasing PA in AA women, have been largely unsuccessful in reducing sedentary lifestyle and improving health outcomes (Baranowski et al., 1990; Brownson et al., 1996; Lasco et al., 1989; Wilcox et al., 2007; Young & Stewart, 2006). While there have been interventions that demonstrated modest enhancements in PA (Agurs-Collins, Kumanyika, Ten Have, & Adams-Campbell, 1997; Keyserling et al., 2002; Parra-Medina, Wilcox, Salinas, Addy, Fore, Poston, & Wilson, 2011; DeHaven, Ramos-Roman, Gimpel, Carson, DeLemos, Pickens, & Lee, 2011), none have sustained PA beyond

3 months, and most PA studies of AA women have been unsuccessful in significantly increasing PA, even for a short period (Lasco et al., 1989; McNabb, Quinn, Kerver, Cook, & Karrison, 1997; Robinson et al., 2008; Wilcox et al., 2007; Yanek, Becker, Moy, Gittelsohn, & Koffman, 2001; Young & Stewart, 2006). Sustaining PA against a backdrop of limited resources requires programming that works within the structures and issues (e.g., cultural relevance, spirituality, trust in the health care system) (Zhan, Cloutterbuck, Keshian, & Lombardi, 1998) presently existing within the target community (Eyler et al., 2003; Yancey et al., 2005; Yancey et al., 2006).

When planning PA programs for minority populations, researchers are being encouraged to identify broader influences, including sociocultural issues (Gordon, 2004; Kumanyika et al., 2005; Lee, 2005), and perceived barriers such as conflicts stemming from social pressures and AA women's own ambivalence (Wexler, Elton, Pleister, & Feldman, 2009); low motivation (Gordon-Larsen et al., 2004); lack of time and equipment (Dutton et al., 2005); lack of facilities (Powell et al., 2006); perceptions of body image (Setse et al., 2008); and hair-related issues such as sweating or messing up the hair (Airhihenbuwa, Kumanyika, Agurs, & Lowe, 1995; Carter-Nolan, Adams-Campbell, & Williams, 1996; Hall et al., 2012; Railey, 2000; Resnicow et al., 2000). With a limited availability of public recreational facilities (Powell, Slater, Chaloupka, & Harper, 2006), interventions for low income and minority community-dwellers also must be cost-effective and easy to access.

Yoga and AA Women

Seventy-five percent (75%) of yoga and yoga-based randomized, controlled trials report improvements in blood pressure (BP), with 10 mmHg reductions in systolic BP and 5 mmHg reductions in diastolic BP observed after as few as one session (Innes, Bourguignon, & Taylor,

2005). For every 10 mmHg reduction in systolic BP, the risk for any complication related to diabetes is reduced by 12%, and reducing diastolic BP from 90 mmHg to 80 mmHg in people with T2D reduces the risk of major cardiovascular events by 50% (Centers for Disease Control and Prevention, 2011). In a descriptive study of a group of 28 AA community-dwelling elders coping with chronic conditions, yoga and karate were the only formal exercises offered by their community center; however, only one participant mentioned participating in yoga (Loeb, 2006). In adults with or at risk for T2D participating in an 8-week yoga-based clinical trial, all who continued to practice yoga did so in home- or work-based environments in rooms that had another function as well (DiBenedetto et al., 2005). Women with or at risk for T2D who participated in the aforementioned trial discussed readiness for continuing/integrating yoga into their daily lives and having environmental support for yoga (e.g., space available in the home for yoga practice (Alexander et al., 2010). Yoga practice also incorporates mindfulness (Salmon, Lush, Jablonski, & Sephton, 2009; Salmon, Hanneman, & Harwood, 2010), a mental strategy that involves being present in the current moment and non-judgmental about one's shortcomings, a feature that may aid the participant in restoring a positive self-image and rebuilding the self-confidence needed to continue with regular PA. In older women, yoga practice, even for a short time, has the potential to decrease physiological risk factors for CVD and may attenuate symptoms, reduce complications, and improve prognosis for those with clinical or underlying disease (Innes et al., 2008).

The potential for yoga to improve risk factors associated with MetS has been demonstrated in interventions for older women (Hagins, Moore, & Rundle, 2007) and women with T2D (Alexander, Taylor, Innes, Kulbok, & Selfe, 2008); however, the use of yoga in AA women has been understudied. AA women generally underutilize yoga (Adams, Hendershot, &

Marano, 1999), primarily preferring prayer (Dessio et al., 2004; Jones et al., 2006; Newlin et al., 2002) and herbal supplements as complementary therapies (Bausell, Lee, & Berman, 2001; Cuellar, Aycock, Cahill, & Ford, 2003; Cushman, Wade, Factor-Litvak, Kronenberg, & Firester, 1999; Factor-Litvak, Cushman, Kronenberg, Wade, & Kalmuss, 2001). Only two studies (Haber, 1986; Pullen, Thompson, Benardot, Brandon, Mehta, & Khan, 2010) have evaluated yoga in AA men and women with MetS-related conditions. In a study of 98 low-income residents (Haber, 1986) who participated in a health promotion intervention designed to lower BP levels, 91% were AAs. Participants were randomly assigned to one of the following four arms of the study: a weekly yoga class, a weekly aerobics class, a 3 times per week yoga class or a 3 times per week aerobics class. Though results were not statistically significant, the researchers recognized a trend in a reduction of 4 points (from 143 to 139) on systolic BP levels of participants in the two 3 times per week classes when compared to the weekly class offerings. Comparing yoga to aerobics students revealed no differences in systolic BP levels or attendance rates, possibly because of confounding by inferior instructor effectiveness, an important but unexamined factor in the study (Haber, 1986).

Another study (Pullen et al., 2010) examined the effects of yoga in AA individuals with CVD, specifically 40 heart failure (HF) patients randomized to a supervised hospital-based yoga group or a control group in addition to usual care that included pharmacotherapy (e.g., beta-blockers and ACE-inhibitors). One-hour yoga sessions were conducted twice per week by a Yoga Alliance® registered yoga teacher. Each session consisted of a 5-minute warm-up, a 40-minute period of standing and/or seated hatha yoga postures, and a 15-minute relaxation phase. BP and other inflammatory and quality of life indicators, including exercise capacity and flexibility, were recorded before and after each of 16 supervised classes that took place over an

8- to 10-week period. Students in the intervention group (n = 21, age 55.8 ± 7.6 years) also were asked to practice at home with a goal of 3 yoga sessions per week. While the study observed significant improvements in exercise (treadmill) time and oxygen capacity, no significant changes in BP or BMI were observed. This may have been influenced by medications and the fluctuations in body weight typically observed in patients with HF (Pullen et al., 2010). This study demonstrated the potential for yoga to be a beneficial adjunctive therapy that may be appropriate to add to cardiac rehabilitative care in AA patients with congestive HF.

Several other yoga studies examining non-AA individuals that have demonstrated favorable improvements and trends in MetS risk factors (Alexander et al., 2008; Cade et al., 2010; Cohen, Chang, Grady, & Kanaya, 2008; DiBenedetto et al., 2005; Field, Diego, & Hernandez-Reif, 2010; Hagins et al., 2007; Innes et al., 2005; Innes et al., 2008; Yang, 2007; Yogendra et al., 2004) have done so in as few as one 90-minute practice session in a group class setting. The potential benefits for yoga to improve MetS risk factors have been established; however, environmental barriers to yoga present challenges to AA women. White women with or at risk for T2D who participated in a yoga-based trial (Alexander et al., 2010) reported having environmental support such as a convenient, in-home location for practicing yoga when they were unable to practice in a yoga studio. AA women, however, cite finding the time, facilities, and financial resources to do PA as barriers (Dutton, Johnson, Whitehead, Bodenlos, & Brantley, 2005; Eyler et al., 1998; Nies, Vollman, & Cook, 1999).

The stress-reducing properties of yoga and similar mindfulness-based complementary practices make it an inviting mental health therapy for women in the U.S. (Birdee et al., 2008), particularly for AA women at risk for hypertension (Woods-Giscombé & Black, 2010). Yoga, with its cardiovascular and metabolic benefits, has the potential to improve the health status of

older AA women; however, there have been no descriptive or interventional yoga studies targeting AA women, the group most at risk for MetS-related morbidity and mortality. As there have been no studies that have looked at the effectiveness of yoga in AA women, specifically, the reasons for its underuse are unknown, revealing a need for further investigation.

African Dance

An African-centered approach to improving health risk factors that affect AAs (Azibo, 2003; Parham, White, & Ajamu, 2011) is recommended to address the unique psychological manifestations of AAs. This approach embraces a cosmology of *spiritness* that permeates everything that exists in the universe, *collectivistic* value systems that inform one's own identity and the possession of self-healing power (Parham et al., 2011, p. 48). The African-centered perspective provides deep cultural contexts, e.g., the significance of the AA family, coping with racism, spiritual and culture-bound mental illness (Parham *et al*, 2011, pp. 50-84), which may inform researchers' attempts to address behavioral strategies to reduce mortality and morbidity.

Because of its cultural connections, African dance may hold great potential for therapeutic application in AAs. Drawing from cultural traditions originating in West African societies, dance has been incorporated into modern AA culture and has been seen in daily life, family gatherings, religious meetings, and educational- and work-related tasks (Banks, 2010; Boykin, Tyler, & Miller, 2005; Cole & Boykin, 2008; Jackson, 2001; James, 2000; Murrock & Gary, 2008). An established healing art, dance offers an alternative method of improving health care outcomes (Block & Kissell, 2001; Lane, 2005; Lewis, 2003; Murrock & Higgins, 2009; Picard, 2000). In Africa, particularly West Africa, dance affirmed fertility and health (Hanna, 1973) and helped to control tensions (Hanna, 1978). Dance in West Africa was used as a method of socialization and was considered a means for glorifying fertility and sexuality. Dance also was

thought to be cathartic, helping to reduce the potentially destructive emotional impact of threatening experiences such as physical maturation, childbirth, death, and other tensions of adulthood (Hanna, 1978). West African dance also motivated individuals to participate in work-related activities by simulating resolution of conflicts, stimulating the individual's involvement, providing distractions, and making work less of a chore (James, 2000). Dance also is akin to worship in many African societies and in the modern West African countries of Nigeria and Ghana, and community-affirming dancing traditions connecting back to early Manding society are still practiced (Hanna, 1978).

Much of modern AA culture is thought of as being grounded in principles of West African ideology and principles brought to the New World during the Diaspora (Herskovits, 1945; Herskovits, 1952; Mintz & Price, 1992). West African dance also has unique qualities such as an emphasis on family, community, communication, esteem-building, and spirituality that make it desirable as a template upon which to integrate the beneficial properties of yoga. Dance involves embodiment (Block & Kissell, 2001), reforms cultural connections lost by the Slave Trade (James, 2000), and provides a constellation of motor behaviors acceptable to AAs (Kealiinohomoku, 1965). Dance is an important mainstay of modern AA culture (Jackson, 2001). Cultural and spiritual dance have been essential to many facets of modern AA life, including communication (Hanna, 1978), cultural identity (Hazzard-Gordon, 1983), and expression of feelings (Hanna, 1988). Much of modern AA culture is grounded in West African ideology (Herskovits, 1952; Mintz & Price, 1992), and this type of cultural dance is thought to encourage community solidarity, positive self-esteem, and cultural diversity while honoring indigenous cultural knowledge, thus providing a type of social/cultural healing of the wounds of colonialization (Banks, 2010). A PA program that incorporates the cultural infrastructure already

present in a particular target group is likely to have more success than those that do not consider the social and cultural characteristics that mediate the desired behavior (Kumanyika et al., 2005). The support for dance-based PA is building, giving researchers an exceptional opportunity to intervene in a meaningful way.

Dance is an enjoyable way to increase PA (Gordon-Larsen et al., 2004; Grieser et al., 2006) and has been associated with improved psychological well-being (Hui, Chui, & Woo, 2009) and prevention of weight gain (Robinson et al., 2003). In AA girls, dance has brought about improvements in BMI and sedentary lifestyle (Klesges et al., 2010; Robinson et al., 2008), and while cultural dance has been shown to improve functional capacity in AA women, reductions in BMI also occurred (Murrock & Gary, 2008). In descriptive studies of AA women and their daughters, respondents preferred dancing and non-competitive social and physical activities to sports and other competitive physical games (Day, 2006; Gordon-Larsen et al., 2004).

The Internet and AAs

At one time, the "digital divide," which refers to the gap in access to the Internet, cell phones, and other digital communication technologies, was thought to be wide and linked to race, income, and education (Hoffman & Novak, 1998). It was presumed that AAs were underrepresented in their access to computers, cell phones, and the Internet when compared to other racial subgroups. However, recent large-sample surveys have demonstrated that AAs are more likely than Whites to have wireless access to the Internet (Fox, 2011). Fifty-one percent of AA adults have a laptop at home with a broadband connection, and 79% of AA adults have cell phones with wireless access to the Internet. When on the Internet, 76% of AA adults use video sharing sites. Video sharing site usage has increased rapidly and steadily over time, with the total

percentage of Internet users who visit sharing sites reaching 71% (Moore, 2011). In terms of wireless access, 79% of U.S. adults ages 30-49 and 71% of U.S. adults between the ages of 50 to 64 use the Internet (Dolan, 2011). In general, 74% of American adults go online (Fox, 2011), and searching online for health information is the third most common online activity behind checking email and using a search engine (Dolan, 2011). Over half of adults who go online have had a recent health change or have a chronic disease, and 66% of Internet users are looking online for information about a specific disease or medical problem (Fox, 2011). People with chronic disease are more likely than those without a chronic condition to consult online health resources and use social networking sites for health-related activities (Thackeray, Crookston, & West, 2013).

Just being exposed to health-related information can improve health behaviors (Irvine, Gelatt, Seeley, Macfarlane, & Gau, 2013). Seemingly ubiquitous, the Internet offers an opportunity to effect behavioral PA change in AAs by providing high-risk populations accessibility to health promotion programs. The Internet offers mobile, cost-efficient, and individualized opportunities for information gathering (Papacharissi & Rubin, 2000) and behavioral management such as engaging in PA.

Using the Internet to deliver PA. Several studies (Catenacci et al., 2013; McKay, King, Eakin, Seeley, & Glasgow, 2001; Napolitano et al., 2003; Riiser, Løndal, Ommundsen, Sundar, & Helseth, 2013; Tate, Wing, & Winett, 2001) have demonstrated the use of the Internet as a resource for delivering PA interventions. An investigation of a theory-based Internet intervention using behavioral PA strategies supplemented with weekly, individualized information (tips sheets) to enhance PA uptake in sedentary adults demonstrated short-term benefits of moderate-intensity PA both at 1- and 3-month follow-ups. Because the intervention Web site was static and

did not change over time, the participants did not feel the need to visit it after a while. This behavior supports the notion that Web sites need individualized, up-to-the-minute feedback and information to keep the participants engaged, thus diminishing the short-term benefits of the program (Napolitano et al., 2003).

Email and the Internet are viable means of delivering structured behavioral weight loss programs. In an Internet-based behavioral treatment program that included lessons using email, self-monitoring diaries, and customized feedback, patients in the treatment group experienced better weight loss than control group members who were given only links to health information (Tate et al., 2001). The Internet is useful as a complement to PA interventions. Although Web-based delivery of PA interventions shows promise for enhancing diabetes and chronic disease self-management, more methods to sustain involvement with Internet-based PA interventions are needed (McKay et al., 2001). In a randomized, controlled trial of an Internet PA intervention versus printed workbooks alone, those in the printed workbook group were less likely to remain in the study and did not improve their sedentary behavior when compared to those in the Internet group (Catenacci et al., 2013).

Lessons learned from the aforementioned studies include the need to have researcher-administrated PA measures; objective means of evaluating when, how often, and for what reason the participant is visiting the study Web site; and recognition of the fact that while these types of programs might not produce weight losses that rival face-to-face programs, there could be an advantage to Internet-based interventions in increasing the audience of PA health promotion programs in overweight individuals. Future Web-based studies should be more structured (Kuijpers, Groen, Aaronson, & Harten, 2013) than those conducted thus far. The involvement of stakeholders also is critical in the planning and design of a mobile application to

enhance program appeal, relevance, and the matched needs of the user (Hong et al., 2013) Additionally, the role of duration and frequency or dose-response needs to be more firmly established. Translational research to understand how behavioral theories are translated into practical strategies needs further investigation, too (Richards et al., 2013).

Conclusion

Healthy People 2020 goals currently emphasize the importance of ascertaining and exploring the social determinants of health (e.g., poverty and education) in an attempt to enact improvements in unchanging health disparities (Fielding & Kumanyika, 2009). Sustaining PA against a backdrop of limited resources requires programming that works within the structures and issues (e.g., cultural relevance, spirituality, trust in the health care system) (Zhan et al., 1998) presently existing within a target community (Yancey et al., 2005; Yancey et al., 2006). A multifaceted, multidisciplinary approach is required to understand the complexities of AA women's life- and health-related experiences and to plan effective and sustainable health promotion programs for them. Interventions to increase PA in AA women need to be theory-based and culturally sensitive on surface and/or deep structural levels (Eyler et al., 1998; Resnicow et al., 1999).

Yoga, a well-established healing art known to reduce BP (Innes et al., 2005), CVD (Pullen et al., 2010), and T2D risk factors (Field et al., 2010), has been understudied in AA women. Dance as a therapeutic modality has been shown to have potential for enhancing PA by making it more enjoyable than general exercise (Dishman, 1991), a desirable attribute that helps ensure sustainability and maintenance of PA. African dance offers a constellation of movements that are familiar and amenable to AAs (Kealiinohomoku, 1965). African dance, with its rich symbolism and meaning (Janisse, Nedd, Escamilla, & Nies, 2004; McAdoo & McAdoo, 2008) is

an appropriate approach to increasing PA in AA women because it offers an opportunity for AA women to have an identity-affirming means of increasing their leisure-time PA in a way that is stress-reducing and healthy (Hanna, 1988**;** Azibo, 2003; Parham et al., 2011). The potential for cultural dance and yoga to be combined to bring about improvements in mental and physical outcomes for AA women makes these modalities viable options for increasing PA (Johnson & Taylor, 2011).

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CHAPTER THREE: RESEARCH DESIGN AND METHODS

Manuscript Two

Development, Recruitment, and Feasibility Testing of an Internet-based Intervention to Increase Physical Activity in Overweight African-American Women at risk for Chronic Diseases: Lessons Learned

*Candace C. Johnson RN, MPH, PhD(c), PhD student, University of Virginia School of Nursing, McLeod Hall, Charlottesville, VA 22908, p: 804-475-9376, f: 434-243-9938, cmc8k@virginia.edu

Ann Gill Taylor, EdD, RN, FAAN, Betty Norman Norris Professor of Nursing, University of Virginia School of Nursing, McLeod Hall 4013, Charlottesville, VA 22908, p: 434-924-0113, f: 434-243-9938, agt@virginia.edu

Diane E. Whaley, PhD, Professor, University of Virginia Curry School of Education, Memorial Gym 201, Charlottesville, VA 22908, p: 434-924-6193, f: 434-924-1389, dew6d@virginia.edu

Joel G. Anderson, PhD, Assistant Professor and Roberts Scholar, University of Virginia School of Nursing, McLeod Hall 4010, Charlottesville, VA 22908, p: 434-243-9936, f: 434-243-9938, jga3s@virginia.edu

Randy A. Jones, RN, PhD, FAAN, Associate Professor and Assistant Director of Research University of Virginia School of Nursing, McLeod Hall 5030, Charlottesville, VA 22908, p: 434-924-0125, f: 434-982-1809, raj9c@virgina.edu

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Abstract

Drawing from theoretical constructs of the Health Promotion Model, the intervention, yogic dance, used Internet-based methods to determine the feasibility and acceptability of a yoga-based program targeting African-American women at highest risk for metabolic syndrome. Internet-based research offers culturally appropriate translational approaches to achieving physical activity in African-American women at high risk for developing metabolic syndrome and related chronic diseases.

Introduction

Inactivity and obesity continue to place African-American (AA) women at highest risk for mortality related to chronic diseases such as type 2 diabetes (T2D) and cardiovascular disease (CVD).[1] Current strategies to improve these risks are person-centered and target behavior modifications such as increasing energy expenditure through physical activity (PA). *Healthy People 2020* goals currently emphasize the importance of ascertaining and exploring social determinants of health (e.g., poverty and education) to enact improvements in unchanging health disparities.[2] Sustaining PA against a backdrop of limited resources requires programming that works within the structures and issues (e.g., cultural relevance, spirituality, trust in the health care system)[3] presently existing within the target community,[4,5] in this case, AA women. A multifaceted, multidisciplinary approach is required to understand the complexities of the AA female experience and to plan effective and sustainable health promotion programs for them. Interventions to increase PA in AA women need to be theory-based and culturally sensitive on surface and/or deep structural levels.[6,7] However, these interventions also need to be accessible and time- and cost-efficient to be realistically applicable in the lives of AA women.

The effects of yoga, a well-established healing art known to reduce blood pressure (BP)[8,9] and CVD risk factors[10-12] and T2D symptoms,[8,13] has been understudied in AA women. Additionally, African cultural dance offers a constellation of movements that are familiar and amenable to AAs.[14-17] The intervention in this study, *yogic dance* (YD), used social and cultural influences and Internet-based methods to determine the feasibility and acceptability of a culturally tailored yoga-based PA program targeting AA women at highest risk for chronic diseases. The potential for cultural dance and yoga to be combined to bring about improvements in mental and physical outcomes for AA women makes these modalities viable options for

increasing PA.[18] AA women, however, report finding the time, facilities, and financial resources to do PA as barriers[19-21] to engaging in PA. Because this study explored the feasibility of increasing PA in a time- and cost-efficient manner, the YD intervention was offered in a format that allowed the participants the opportunity to fit three 10-minute sessions of PA into their daily schedules, thus improving the likelihood of being able to meet the current PA guidelines of 150 cumulative minutes of moderate intensity PA each week. The most effective delivery of PA interventions is not known, though it is clear that the behavior of individuals can be influenced by PA interventions.[22]

The purpose of the current 4-week study was to assess the feasibility of a newly-developed, Internet-based, PA intervention and whether or not this intervention consisting of digital videos influenced sedentary lifestyle behaviors in AA women (ages 35-64) at risk for or with metabolic syndrome (MetS). With the input of an interdisciplinary team consisting of PA researchers, expert yoga practitioners, and cultural dance choreographers, the authors developed an innovative yoga-based intervention infused with symbolism, meaning, and movement drawn from principles of West African cultural dance to promote PA behaviors in the targeted population. Yoga was chosen because of its proven success in various populations at risk for and with MetS.[8] West African dance was included given evidence that AA individuals benefit from African-centered approaches[23,24] to health-related behavior change. The Internet was chosen as a means for delivering the YD intervention because of its potential for direct measurement of YD participation and because Web-based interventions have demonstrated success in increasing PA behaviors.[25-31]

Methods

Health Promotion Theory

The adapted Health Promotion Model (HPM, Figure 1)[32,33] guided the theoretical basis for construct selection, measurement, and the study framework. The HPM is a trans-theoretical model that combines concepts from multiple theories to facilitate nurses' understanding of the background factors that influence health-promoting behaviors. The HPM is a multivariate model that allows for the concomitant examination of several different influencing factors in one model. The HPM constructs, *prior related behaviors, personal factors-self perceptions, benefits of and barriers to health promoting behavior, interpersonal influences-models, situational influences-culture, and commitment to a plan of action/goal-setting* were adapted to form the theoretical basis for the YD study. These foundational constructs were incorporated into YD at multiple focal points, including the pre-intervention phase when preliminary interviews were held to establish the prior-related PA behaviors of participants and self-perceptions associated with their obesity.

The HPM component *prior related behavior* refers to the individuals' past experiences with the desired behavior. The supposition is that individuals who have had, in their past experiences, opportunities to successfully demonstrate desired outcomes will be able to draw upon those successful experiences, thus increasing their chance for demonstrating the desired behaviors in the present.[34] During preliminary face-to-face interviews and Internet-based surveys, the women were asked about their past experiences with yoga and PA to explore the meanings behind AA women's participation (or lack thereof) in yoga and PA.

The HPM component *personal characteristics*: *self-perceptions* is based in the theory that one's values and beliefs about oneself influences participation in desired behaviors.[34] The

women's self-perceptions were assessed in preliminary semi-structured interviews that took place prior to the commencement of the study. *Interpersonal influences*: *role modeling* refers to a person's increased propensity to demonstrate a desired behavior when s/he sees a significant other (i.e., family member, peer, health care provider) modeling the behavior and subsequently providing outcome expectations and social support.[34] The intervention utilized role modeling in the videos, which contained images of AA females of various sizes demonstrating the yogic dance movements. The HPM concept *benefits* of and *barriers* to *health-promoting behavior* is based in the theory that one's personally derived values drive her/him to behavior change.[34] The benefits of and barriers to PA were covered during an informational video the participants watched at the onset of the study. Additionally, strategies to overcome barriers were explored. The concept *situational influences-culture* captures the manner in which elements of the external environment influence participation in the desired behavior.[34] The YD intervention is culturally relevant on surface structure and deep structure levels. At the surface level, the study utilized models and research personnel of the same racial/ethnic background as the participants, while on a deeper level, the intervention was imbued with widely used African symbology and tradition to create a favorable experience that motivates PA. Lastly, the HPM component *commitment to a plan of action* follows the theory that the greater the commitment to a plan of action, the more likely the action will be maintained over time.[34] During the aforementioned informational video, the women were provided an opportunity to learn about and make goals for increasing PA in their daily lives.

Study Design

Approach. Mixed-methods research provides corroboration to give deeper, contextual meaning to the broad, descriptive correlates that are identified during a study. Mixed-methods

studies can integrate results of two or more strands of the study into coherent inferences more comprehensively and meaningfully than those of quantitative and qualitative methods alone.[35] Given the complex determinants of PA in AA women, the current study used a mixed-methods approach in its design, data collection, and analyses to gain an integrated understanding of the facilitators and barriers to yoga- and dance-based activities. Yoga- and dance-based postures were developed by the first author with the assistance of an AA certified yoga instructor with experience teaching yoga in West Africa; AA and West African dance choreographers; and an AA certified physical trainer with experience training women in the target population.

The approval for this study was obtained from the Institutional Review Board of the University of Virginia. The specific aims of this study were to determine the feasibility of a 4-week yoga- and West African cultural dance-inspired, home-based video PA intervention, YD, for sedentary AA women between the ages of 35 and 64 years with or at risk for MetS. Specifically, the study examined the: (a) rates of participant eligibility, accrual, attrition, and reasons for attrition; (b) feasibility of using the Internet to assess study participation and to deliver the YD intervention, including acceptability of the YD intervention as structured; and (c) any other benefits and/or limitations of the intervention. Understanding the complex factors that mediate PA and providing additional empirical support for efficacious, theory-based PA programs further advance the nursing and public health discourses, offering fresh and personal perspectives previously understudied in sedentary AA women.

Women living independently in the community were recruited using printed flyers, word-of-mouth, and Internet-based recruitment strategies, including Facebook™ and Craig's List™. Preliminary semi-structured interviews of a subset of women in the study (n = 8) exploring beliefs and attitudes toward yoga practice were held prior to the commencement of the study. All

participants completed baseline demographic and anthropometric measures prior to engaging in 4 weeks of at-home YD practice. Web site-based videos and YD participation logs were used to administer and record YD activities. Paper survey booklets and DVDs were used as a backup method in case of failure of online-based methods. Participants engaged in a 2-part YD intervention that combined informational and behavioral approaches to help overweight, sedentary study participants develop the foundational and personal performance skills[36] needed to increase PA behaviors. Following the 4-week intervention, an Internet-based evaluation survey was administered and focus groups were held to gather descriptive data about the acceptability of the YD intervention as structured. Focus group data provided contextual understanding of the relationships among study variables from surveys designed using theoretical constructs of the HPM.[32,33] For a more thorough description of research procedures, see the manuscript in Chapter Five, *Results of a 4-week Internet-based, Mixed-methods Feasibility Study to Increase Yoga/dance-based Physical Activity in African American Women with and at Risk for Metabolic Syndrome.*

Video production process and rationale. The YD postures were developed using concepts from Hatha yoga,[37] the chakra system,[38] and an ancient African health practice called *ankhing.*[39] The word *ankh* means "to enliven," and *ankhing* was a ritual during which a talisman of an ankh (a symbol that has, over centuries, come to represent the West African icon of fertility as well as the American symbol for the female gender; see Figure 2) was placed on the forehead of the practitioner in an effort to invigorate mental and physical health. Practiced by kings and temple priests in ancient Nubia, this purification ritual included prayer (asking questions of the gods) and meditation (awaiting answers from the gods). During meditative periods, which could last for hours or days, varied kneeling and seated postures helped alleviate extremity numbness

and stimulated blood circulation. *Ankhing* was thought to purify the individual by integrating mental, spiritual, and physical techniques that maintain and promote good health. Anthropologically and linguistically, the tenets of the *ankhing* ritual formed the foundation of what would 6,000 years later evolve into yoga.[39]

Manipulation of the human chakra system was understood during ancient times to be a way to promote wellness. The *chakra* concept uses multiple imageries including wheels, vortices, and/or beaded chains to describe the centers of life force that exist within humans; forces that, when stimulated, bring vital, life-restoring energy to the individual manipulating or aligning the chakras.[38] The chakra-aligning positions selected for the current study were intended to ground and center, increase personal power, and promote cardiovascular health in the study participants.

Chakra-aligning yogic postures were integrated with movements from the West African dance lexicon[15,40] wherein body positions that maintain a low center of gravity (e.g., squats and lunges) combine with large gross upper body movements (e.g., wide sweeping arm circles and lateral reaching) to create balance and relieve tension within the practitioner**.**[17,41,42] Tenets from KuKu, a woman's circle dance arising from Guinea and Ivory Coast traditionally performed during coming of age and rites of passage ceremonies**,**[43] were used to make the YD warm-up and postures meaningful, identity-affirming, and motivating.

Postures from West African dance were chosen because principles of West African village life are threaded throughout the history and symbolism of the dance movements, which typically depict fishing and agricultural scenes, food preparation techniques and traditions, worship, and conflict resolution strategies.[43] The YD poses were named for the connections of the poses to nature and references to strength and survivorship, which are key concepts in the life

experiences of AA women.[44-47] Also incorporated into the development of YD were nasal breathing cues,[37] African drumming patterns,[48] and principles from mindfulness,[49] a concept in which a person's awareness is focused in a non-judging manner on the present moment. The YD video was filmed under the direction of a certified personal trainer and certified yoga instructor using multiple AA models of varying BMIs to provide role modeling for the desired behavior and to demonstrate YD practice at both beginner and more advanced levels of stretching and movement.

The YD study Web site. The YD video was edited and subdivided into seven video training modules and uploaded to the YD Web site. The modules populated an online video library of content with brief descriptors to inform the participant about what each module contains (Table 1). The study Web site was created as an online course on a university-based learning management platform (UVaCollab—see Appendix), which allowed non-university guests the ability to be enrolled in and to log in to the YD study Web site. The Web site allowed researchers to invite participants using temporary changeable passwords and email addresses as usernames. The Web site also contained a media gallery tab under which all YD videos were catalogued; a test/quizzes tab containing all YD surveys; an announcements area containing pertinent, chronological, study-related information; and an interactive syllabus that served as a portal to the Web site with quick hyperlinks to YD Web site materials.

Internet-based recruitment. The Internet was chosen as the format for this video intervention because of its accessibility and ease of use. Sixty-six percent (66%) of AAs go online regularly, and 47% go online looking for information about their health.[50] During the recruitment phase of the study, the study coordinator used her own Facebook™ page and an IRB-approved recruitment flyer attached to a Facebook™ event page titled "The Yogic Dance

Study" (see Appendix) to recruit AA women into the study. The Facebook™ event page contained a link to a local Craig's List™ advertisement page with information about the details of the study and an encrypted, anonymous link to the first author's email, which the women used to express their interest in participating in the study. The invited women had no access to the identities of other interested individuals who clicked the link to the Craig's List™ Web site, thus offering greater protection of a potential participant's privacy. To further prevent violations of privacy, the researchers adjusted the event page preferences in such a way that individuals could not post comments that would reveal their identities and potentially provide unwarranted private health information to other event page viewers. The "Like" function, an option that permits Facebook™ page visitors to indicate support for an event, allowed individuals, including those who were ineligible and/or not interested in enrolling in the study, to demonstrate their approval of the event, thus establishing trust with individuals who use social comparisons[51] to guide their behaviors. In addition to Internet-based recruitment, usual recruitment strategies were used to distribute printed materials throughout the recruiting catchment area, as well as word-of-mouth referrals from local health care providers seeing patients in a university-based secondary care clinic.

Recruited women who were deemed eligible to participate were consented to the study. After providing baseline data and making a commitment to increase PA using the SMART goals video (SMART is the acronym for a goal-setting technique that encourages participants to set specific, measurable, achievable, realistic, and time-contingent goals), participants selected 3 of 6 available 10-minute YD training modules, which totaled 30 minutes of PA each day. Immediately following each YD training module, the participant used the post-training evaluation tool (YD diary) on the Web site to keep a daily log of type(s) and duration (in

minutes) of YD activity. DVDs/DVD-ROMs containing all YD videos and paper versions of the daily logs were provided to the women in case of equipment or Web site failure. Each 10-minute mini-lesson involved instruction using visual and audio cues for checking body position and motivating the participant to practice safe, purposeful movement.

Findings and Discussion

Lessons Learned

The women in the study, all of whom had "smart phone" cellular technology, responded well to text communication and preferred text communication to telephone conversations, particularly when the information being exchanged was simple and brief. Additionally, smart phone scheduling and reminder applications were useful to some of the women for prompting and tracking YD activity prior to transferring it to the YD diary. Currently, studies to improve the usefulness of smart phone-based applications are focused on keeping the content fresh and ever-changing, as this is an important factor for keeping individuals in Internet-based interventions engaged after the short-term.[52,53]

Recruiting participants using social media networks and online community advertisement boards offered expanded opportunities and some unforeseen challenges. By recruiting this way, the researchers were able to meet potential participants where they were spending their leisure time on the Internet. Compared to traditional print flyer distributions, Internet-based methods used in the study reduced paper usage and printing costs and offered a wider, more diverse recruitment catchment area. Internet-based methods also were beneficial in that these allowed the researchers to more easily track interest in the study. The Facebook™ event page was equipped with report-making capabilities that made it possible to monitor how many individuals were using the Web site.

Challenges to using Facebook™ and Craig's List™ to recruit women for the study were associated with the need to protect the privacy of potential participants, requiring the researchers to restrict participants from being able to post comments on the event page. Not allowing participants to post comments may have contributed to a loss in momentum as the Facebook™ event page visitors were unable to use social cues from one another to share and help shape their thoughts and ideas about joining the study. In turn, the Facebook™ event page, though referenced by some of the women in email correspondence with the first author, was not the primary means by which women expressed their interest in the study. The greatest benefit to using the Internet for recruiting was having a convenient means for follow-up via email. Interested women who contacted the first author directly by email were tracked and followed up until they either enrolled or declined participation in the study. The majority of the women who enrolled in the study were recruited during one-on-one, in-person contacts with the first author, who in some cases followed up with interested women several times by telephone, text, and email to provide clarification and information about the goals of the research and the commitments involved.

In future studies, the Internet-based recruitment challenges experienced during this study might be overcome by further promoting the event page (at an additional fee to Facebook™) to more diverse networks, thus increasing the availability of the recruitment flyer to varied social circles. Despite the challenges to recruiting using the Facebook™ event page, within a 3-month period, 49 women expressed interest in the study and 28 women were enrolled. Of the 28 enrolled, 24 were retained. The rapid enrollment and low attrition was likely a result of the use of an AA study coordinator who showed commitment to follow up with the interested women and who remained in close telephone, email, and personal contact with the participants during the 4-

week study. Because of its potential to provide access to a target group known to be underrepresented in scientific research, exploring the challenges to these Internet-based recruitment strategies will be worthwhile going forward.

In terms of data collection, the study coordinator encountered an unanticipated challenge when, despite earlier prospects of being able to track the number of minutes of YD video usage, it was discovered that this would not be a feature in the current version of the study Web site. This presented a challenge in having an objective measure of YD activity by the study participants, leaving the self-report data as the primary measure of YD usage. Study surveys were administered using both a write-in survey booklet containing all study surveys and Internet-based surveys available on the YD study Web site. The women's preferences for the paper booklets over the Web site-based surveys may have been related to the ease of use and convenience of having the booklets on hand near their computers/DVD players for quick data entry. The women reported that the longer-than-desired time spent logging in to the study Web site was a time-consuming deterrent to using the Web site-based surveys. Having to log in and take several steps to initiate a survey or YD diary entry precluded many of the women from regularly using this resource. Compatibility problems between the study Web site and a popular Web browser, Google Chrome™, made it difficult for several of the participants to access the surveys and online YD diary. When the women did not have problems or delays in attempting to log in to the Web site, they used the online-based surveys, generally providing more lengthy, detailed typed responses compared to the short, handwritten responses found in the survey booklets. Of the respondents who completed both the online and printed survey books, the women tended to respond more thoroughly when typing responses online than when writing in the booklets. This may be a result of the women's frequent use of digital data entry methods such

as sending text messages and posting social media messages. In qualitative data collection, typed messages may be preferred to write-in responses as individuals who have become adept at communicating with others through text and social media are more apt to provide thorough, detailed feedback when compared to handwritten survey responses. This anecdotal finding is supported in a study that suggests an online option for surveys is a reasonable and useful strategy for researchers.[54]

In terms of video access, the aforementioned compatibility problem within the study Web site caused the YD videos to be inaccessible by those using the Google Chrome™ Web browser. Because of this, some of the women required the DVD/DVD-ROM for viewing the YD videos. Of those participants who had no problems accessing the videos, some women still preferred to use the DVD-ROM in their computers versus going online to open and access the site because of the protracted login times. For others, computer screens tended to be too small to comfortably view the activities or the speakers did not play the audio loud enough. In these cases, the women played the DVDs in their TV DVD players, around which they could control the workout space, the sound volume, the viewing angles, and the amount of time it took for opening instructions to finish and for actual PA to begin. In the next iteration of the YD program, participants would benefit from having videos produced with better viewing angles of all of the models in the same frame so that participants' modifications can be applied in real time instead of waiting for the frame containing the model that best suits the participant's fitness level to come onto the screen. Also, the women requested more audio and visual cues to inform them of what to do when holding poses for extended time periods. In several instances, the women found the silence and lack of movement confusing and assumed they were doing YD incorrectly. Future videos should include more verbal direction and supportive reassurance during the holding of poses, indicating

to the participants that silence, stillness, and associated mindfulness techniques are acceptable, desired responses to YD practice.

Limitations

It should be noted that the nature of this study, with its limitations in resources and assistive research personnel, contributed to the over-involvement of the first author in areas such as YD video production, baseline and focus group data collection, and in follow-up and technical support for the study Web site. This may have introduced bias into the research, as the participants, some of whom were recruited from the first author's Facebook™ page, were not blind to the researcher's intent to gather feasibility data on YD. The first author's multiple roles as model in the video and voiceover narration for the audio cues lends itself to bias, possibly causing the women to over-report their activity and other feasibility outcomes to please the researcher. While researcher bias is stated here as a limitation, it also may be a benefit to the study to have the foundations of YD postures and YD program delivery be developed and researched by an AA woman. Integrating surface structure contributes to the success of this culturally sensitive programming.

Implications

For connecting, sharing, and providing opportunities for linking in to social networks; sharing pictures and stories; and reaching out to one another, social networking sites have offered many opportunities. Given that social support is an important factor in the maintenance of PA over time,[19,55-60] social networking sites may offer an intriguing opportunity to enhance and motivate individuals to sustain PA. Use of social media for health information is applicable for specific segments of the population such as those people who are trying to manage a chronic health condition.[61] Future Internet-based studies may integrate the community-building aspects

of social networking sites with the ease of use of well-designed PA Web sites to efficiently replicate in-person social support for those individuals who find this motivating.

The implications for using apps, abbreviated program applications typically used on small operating platforms such as those used on 'smart' cellular phones and tablets, are far-reaching. Future YD research could develop and deliver apps that may help improve intervention fidelity, increase ease of use, and increase enjoyment of the YD program. Using apps to deliver the intervention (i.e., still pictures and video images of the poses, along with verbal audio cues and/or visual graphic tools that facilitate the learning of the new poses) brings the intervention out of the confines of the participants' homes, affording them the opportunity to make YD/PA more accessible and convenient. To help negotiate AA women's busy lives, apps also can increase time efficiency by sending out automatic and/or customized prompted reminders to do YD activities with connectivity to email, phone calendars, and other applications that have scheduling features. Apps can administer surveys in ways that are easy to access by the participants. Apps also allow researchers to readily download study data to a private, closed database that uses cloud-based Internet-technology capable of protecting the confidentiality of the data. Apps may assist researchers and participants in objectively tracking YD activities using the accelerometers that are present in most commercial smart phones. Apps also may collect anthropometric measures (e.g., waist circumference, weight, BMI), MetS biomarkers (e.g., cholesterol, BP, blood glucose) and other health and fitness measures (e.g., calories burned, steps walked). Apps can be integrated with the study Web site and other Web sites such as social networking sites, yoga/physical activity tracking sites, blogs, mindfulness podcasts, and health information Web sites, giving participants opportunities to have fresh, current encounters with the study Web site.

Conclusion

Determining the feasibility of YD and understanding the experiences and thoughts that influence its use in AA women could have an impact on the improvement of clinical obesity-related outcomes such as CVD and T2D for these women. Understanding the complex factors that influence PA and providing additional empirical support for efficacious, theory-based PA programs will further advance nursing and public health discourse, offering fresh and personal perspectives previously understudied in sedentary AA women. The potential for YD to be a translational, real-world approach to increasing PA in sedentary populations makes the Internet-based intervention an innovative and novel alternative mechanism for delivering yoga to AA women.

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Figure 1. Health Promotion Model Adapted (Pender et al, 2011)

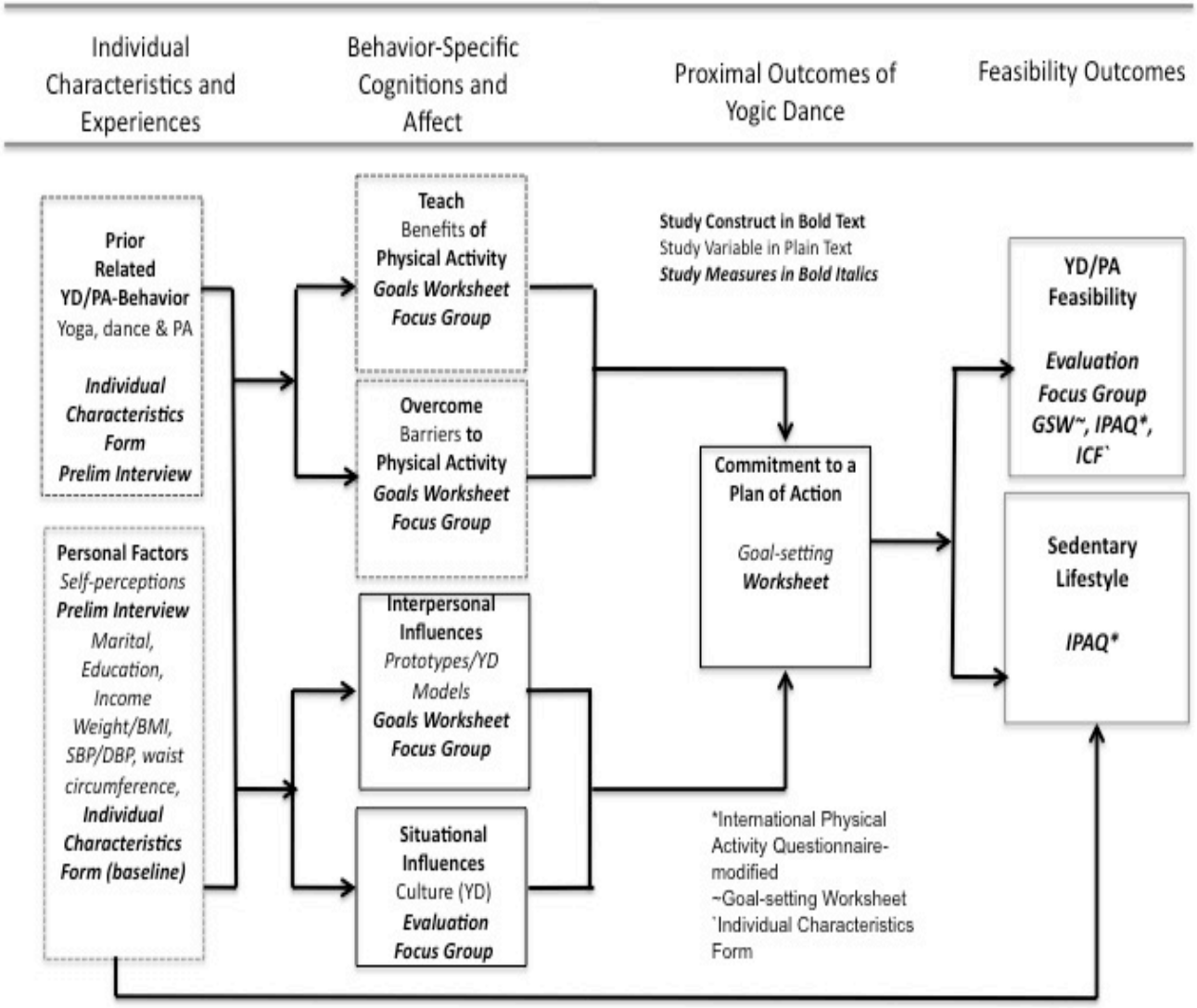

Table 1. YD Intervention Description

Chapter	Content	Foundation	Description
1	Setting goals for PA	SMART goals protocol	30-minute health lecture and goal-setting module targeting AA female health
2	YD Warm-up	West African dance	10-minute moderate activity warm-up based in the KuKu dance tradition[43]
3	Mini-Lesson of War Pose	Yoga-Prayer Twist	10-minute activity that increases the suppleness of the legs, waist and back; tones the muscles of the shoulders and sides; builds stamina and strength; and improves balance[37]
4	Mini-Lesson of Worship Pose	Yoga-Crescent Moon	10-minute activity that strengthens and tones the muscles of the hips, thighs, and abdomen and increases the flexibility of the spine; helps develop a sense of balance[37]
5	Mini-Lesson of Uplifting Pose	Yoga-Extended Triangle	10-minute activity that stretches the body; strengthens and tones the leg muscles; improves the flexibility of the hips[37]
6	Mini-Lesson of Swaying Tree Pose	Yoga-Gate	10-minute activity that is a powerful sideways stretch that strengthens the muscles of the waist and helps trim the waistline[37]
7	YD Stretching Sequence	Physical training	10-minute stretching sequence developed by a physical trainer[47]

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CHAPTER FOUR: RESULTS

Manuscript Three

Running Head: WOMEN'S PERCEPTIONS

"I Go by How I Feel": African-American Women's Perceptions of Obesity, Stress, and Yoga/dance-based Physical Activity

*Candace C. Johnson RN, MPH, PhD(c), PhD student, University of Virginia School of Nursing, McLeod Hall, Charlottesville, VA 22908, p: 804-475-9376, f: 434-243-9938, cmc8k@virginia.edu

Ann Gill Taylor, EdD, RN, FAAN, Betty Norman Norris Professor of Nursing, University of Virginia School of Nursing, McLeod Hall 4013, Charlottesville, VA 22908, p: 434-924-0113, f: 434-243-9938, agt@virginia.edu

Diane E. Whaley, PhD, Professor, University of Virginia Curry School of Education, Memorial Gym 201, Charlottesville, VA 22908, p: 434-924-6193, f: 434-924-1389, dew6d@virginia.edu

Joel G. Anderson, PhD, Assistant Professor and Roberts Scholar, University of Virginia School of Nursing, McLeod Hall 4010, Charlottesville, VA 22908, p: 434-243-9936, f: 434-243-9938, jga3s@virginia.edu

Randy A. Jones, RN, PhD, FAAN, Associate Professor and Assistant Director of Research, University of Virginia School of Nursing, McLeod Hall 5030, Charlottesville, VA 22908, p: 434-924-0125, f: 434-982-1809, raj9c@virgina.edu

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Abstract

Purpose: To explore and assess meanings associated with yoga-based activity in 24 African-American (AA) women participating in a yoga/dance-based intervention (YD). **Design:** A mixed-methods design was used to elicit descriptive data from semi-structured preliminary interviews (*n* = 11), write-in survey responses (*n* =12), and two focus groups. Data provided information about the experience of YD in the lives of the study participants. **Results:** Two major themes emerged: *not identifying with BMI/obesity was a barrier to participation* and *stressful lives were both a barrier to and a motivator for participation.* **Discussion:** The majority of women in the study could not reconcile the current BMI standards with their own perceptions of a healthy BMI. **Conclusions:** Facilitating yoga and dance-based activity should involve strategies that place the emphasis on countering effects of stress in the lives of AA women and not merely reduction of BMI. **Implications for Research**: Biomarkers associated with stress and obesity in AAs are discussed.

Keywords: African American, women, yoga, cardiovascular disease, physical activity, metabolic syndrome, obesity, exercise behavior, health promotion, dance, type 2 diabetes.

Background/Significance

African-American (AA) women are the sub-population at highest risk for obesity and metabolic syndrome [MetS], a group of risk factors that place individuals at high risk for developing cardiovascular disease (CVD), obesity, and type 2 diabetes [T2D] (Ford, Giles, & Dietz, 2002; Lloyd-Jones et al., 2009). A suggested way to prevent and reduce the risk of developing the MetS is to promote physical activity (PA) in sedentary individuals, which would result in lowering mortality rates associated with the above-mentioned morbidities (Eyler et al., 2003; Jago et al., 2011; Pi-Sunyer et al., 2007). AA women have the lowest rate of engagement in high or medium intensity PA compared to other ethnic groups (Barnes & Schoenborn, 2003). AA women also are less likely than White women to practice yoga (Birdee et al., 2008; Cuellar, Aycock, Cahill, & Ford, 2003), a low to medium intensity PA (Hagins, Moore, & Rundle, 2007; Ross, Friedmann, Bevans, & Thomas, 2012).

Seventy-five percent (75%) of yoga and yoga-based randomized, controlled trials have reported improvements in blood pressure (BP), with 10 mmHg reductions in systolic BP and 5 mmHg reductions in diastolic BP observed after as few as one session (Innes, Bourguignon, & Taylor, 2005). Yoga is generally effective in lowering body weight and glucose levels (Yang, 2007), and yoga practice has the potential to decrease risk factors for CVD, T2D, and MetS while improving the prognosis for those persons with clinical disease (Cade et al., 2010; Cohen, Chang, Grady, & Kanaya, 2008; Field, Diego, & Hernandez-Reif, 2010; Pullen et al., 2010; Yogendra et al., 2004).

Yoga as an intervention in AA women has been understudied, with only two identified studies (Haber, 1986; Pullen et al., 2010) exploring the use of yoga in AAs with and at risk for CVD. AA women generally underutilize yoga (Adams, Hendershot, & Marano, 1999), primarily

preferring prayer (Dessio et al., 2004; Jones et al., 2006; Newlin, Knafl, & Melkus, 2002) and herbal supplements as complementary therapies (Bausell, Lee, & Berman, 2001; Cuellar, Aycock, Cahill, & Ford, 2003; Factor-Litvak, Cushman, Kronenberg, Wade, & Kalmuss, 2001). But many AA women with or at risk for MetS seek out the aforementioned complementary therapies because the usual allopathic pharmacologic care may inadequately address symptoms or are not a good cultural fit (Dessio et al., 2004).

Yoga, with its cardiovascular and metabolic benefits, has the potential to improve the health status of older AA women; however, more exploratory research is needed. Given the gaps in the literature relative to the effectiveness of yoga in AA women, the reasons for its underuse are unknown, revealing a need to investigate its potential impact. Conventional approaches to improve health disparities in AA women, such as increasing PA, have been largely unsuccessful in reducing sedentary lifestyle and improving longstanding health disparities (Baranowski et al., 1990; Brownson et al., 1996; Lasco et al., 1989; Wilcox et al., 2007; Young & Stewart, 2006). The purpose of this descriptive study was to assess and explore the meanings and experiences associated with yoga-based PA and the self-perceptions that facilitate or prohibit its use in a subgroup of AA women participating in the yogic dance (YD) study (methods described in the manuscript in Chapter Three), a yoga/dance-based feasibility study targeting AA women at risk for chronic diseases. Understanding the experiences AA women have with yoga will influence the direction of future PA and yoga-related research.

Methods

Design, Sample, and Setting

A qualitative methodological approach was used because of the exploratory nature (Creswell, 2009; Hulley, 2007; Polit & Beck, 2008) of yoga-based PA research in AA women.

The goal of this approach was to elicit ‘thick’ (Geertz, 1973) descriptive data essential to understanding the lesser known meanings and experiences of yoga in the lives of AA women. Specifically, focus groups, one-on-one preliminary interviews, and write-in responses to open-ended surveys provided data about barriers to PA and the experience of the yoga-based intervention in the lives of the participants.

Underpinned by social constructivist theory (Crotty, 1998), the study reported here explored meaningful data from the participants as they engaged in the YD study. Culture, historical context, and social interaction worked together to construct meanings for the participants engaged in and discussing the study, providing the primary data for analysis. Focus groups were chosen as a method of qualitative data collection because such groups are supportive of and lead to more elaborate accounts than those generated in the preliminary individual one-on-one interviews and Internet-based open-ended surveys (Stewart, Shamdasani, & Rook, 2007).

Research on known personal characteristics that influence health-promoting behaviors, specifically past experiences with and self-perceptions of those behaviors (Pender, Murdaugh, & Parsons, 2010), were used to develop the focus group questions**.** In consultation with an AA PA research expert on the use of focus groups in AA women, six unstructured, open-ended questions and prompts were developed by the first author. The questions were reviewed and validated for content by the research team and consultant (see Box 1). Following institutional IRB approval, one-on-one interviews were conducted immediately prior to the baseline data collection phase of the YD study. The focus groups were comprised of participants in the YD study who were recruited through email, printed flyers, and telephone. Data from two focus groups (n = 4), write-in survey responses (n = 12), and semi-structured preliminary interviews (n = 11) were combined

to provide information about the experience of YD in the lives of the study participants. Demographics and selected characteristics of the study sample are included in Table 1. Audio-recorded focus groups led by the first author lasted between 48 and 65 minutes and were held in a neutral community-based office meeting space. Focus group, semi-structured one-on-one interviews and write-in survey data were triangulated (Creswell, Klassen, Clark, & Smith, 2011) to increase the credibility and validity of the results.

Data Collection

The data were organized, analyzed, and interpreted using hermeneutic phenomenology (M. Z. Cohen, Kahn, & Steeves, 2000; Gadamer, 2004), an editing analysis style wherein the data are read in search of meaningful segments using the development of category schemes and corresponding codes to organize (reduce) the data as well as to analyze (construct) meaning. Following the focus groups, the audio-recorded data and the subsequent field notes were transcribed in digital form. Transcription initially indicated who was speaking, any overlap in speaking turns, nonlinguistic utterances, emphasis of words, digressions, and abrupt changes in topics (Polit & Beck, 2008). The spoken language of the informants was then simplified by eliminating conversational terms (e.g., “you know”) (Cohen et al., 2000). The transcribed data also were de-identified of any private health information mentioned during the recorded interviews.

Initial reading of the data was done to identify underlying concepts. Next, the researchers developed the overarching category schemes, representations of ideas that unified the nature of the experience into a meaningful whole (Cohen et al., 2000). Under category schemes, concepts were organized into constructs called codes or units of meaning. To have a complete grasp of the category and the emerging conceptual “codes,” the data, including all previously coded material,

were reread until the concept was identified as salient. The researchers used the theory-building software ATLAS.ti to organize the data and to build relationships between concepts.

Data Analysis

Hermeneutic phenomenology proposes that to reach understanding of qualitative material, the researcher moves between the parts and the whole of the data being analyzed, forming a circular, iterative interpretive process called the hermeneutic circle (Gadamer, 2004). Preliminary analysis began during the data collection phase when the interviewer/moderator, a member of the research team, was actively listening to and thinking about the meanings of what study participants were saying. This process, member checking (Polit & Beck, 2008; Silverman, 2009) during the focus group discussions, was done to clarify and confirm accurate conveyance of the women's beliefs and perceptions. Once the data were transcribed, the actual analysis phase of the data began with a search for themes and an exploration for patterns in the data.

Once an understanding of the overall text was obtained, relationships among themes emerged. Exemplar phrases in the vernacular of the informants that captured the essential meaning of themes were separated from the text and labeled with tentative theme names alongside passages with the same label. Field notes and open-ended survey data from the YD study were used to clarify and refine themes and to provide context (Agar, 1990; Cohen et al., 2000). Themes emerged from within categories of the coding scheme and across the categories. Validation of codes and themes was done using ATLAS.ti software to manage the data and to perform quasi-statistics and cross-tabulations of frequently mentioned terms.

Findings

Five category schemes were identified: (1) Stress, (2) Obesity, (3) Barriers, (4) Facilitators, and (5) Motivators. These categories formed the bases of two themes: (1) *Not identifying with BMI/obesity was a barrier to PA/YD participation* and (2) *Stressful lives were a barrier to and a motivator for participation in PA/YD*.

Theme #1: Not Identifying with Obesity

Three of the five categories, Obesity, Barriers, and Motivators, each contained the codes *I go by how I feel*; *Obese, compared to whom*?; and *If I were the perfect BMI, I would look too thin*, indicating a salience of the concept that AA women's own perceptions of themselves as overweight, obese, or normal weight varied from the established BMI standards. This idea forms the basis of Theme #1: *Not identifying with BMI/obesity was a barrier to PA/YD participation*. Consistently, the women were reluctant to self-identify as overweight or obese, even when, according to the BMI guidelines, this was the case. One obese (BMI = 34) respondent exemplifies this concept in her response to the question "Do you believe you are obese?"

> I guess I would have to say what does obese mean before I answer that? Because it's so strange, certain times I do feel that way. Then other times when I go places and I see other people I don't feel that way. It all boils down to … how you feel. …Overweight, yes. A tiny bit … and then there are times I go around to some of these buffet places and I say, "*I'm* not overweight. When I get *there*…(points and chuckles)."

This respondent expressed some ambivalence in her self-perception as an obese person. This noncommittal attitude towards being perceived as obese was relative to the weight of individuals in her environment. This was consistent in the utterances of many of the women,

both overweight and obese. Another respondent, an overweight woman (BMI = 27.8), piggybacked on this sentiment when she commented:

> By the charts, it says that I'm overweight … depends who I'm around. Like my mother, she fiercely says "I don't see it! Those doctors don't know what they're talking about. You look fine to me." And then I could be around a peer [who is] smaller and then I do see it or feel it. So, I think it just depends on what environment that I'm in. … It's known in the Black community that … *the White man's scale* [is] for the little skinny White girls, so there's kind of a subculture that … affirms … we shouldn't be so bound to those scales. … Being African-American, there's always those conflicting messages … but even by the chart, I think the weight that they have me at, which might be 155 [lbs] or something like that [would make me] look like I'm smoking drugs, so that's not my ideal weight—that's the doctor's. I think my ideal weight would be 165 [lbs].

In this case, the participant is referring to her physique at a normal BMI as being comparable to that of a drug (specifically, crack cocaine) addict's BMI, which is generally thin and wasting. Consistently, participants expressed mixed feelings about identifying themselves as overweight and/or obese. The women often used their own concepts (e.g., "I go by how I feel," and "it depends on who I am around") to define what obesity looked like (and not published BMI guidelines) to determine whether or not they fell into those categories.

This theme was refined using the one-on-one preliminary interview data. When asked the question "Do you believe you are overweight or obese?" a morbidly obese participant (BMI = 45) responded, "I don't believe I am obese, but I know I am overweight … the only thing I don't feel right about myself is my stomach. Other than that I feel great." Another obese woman (BMI

= 30) responded “I’m overweight, not obese … I need to lose about … 40 pounds. I think a person who is obese needs to lose about a hundred pounds. And that’s my personal opinion.”

Identifying with obesity was a conflicting matter for the obese and extremely obese women in the study. The women’s perceptions of themselves as obese or pathological in their body shape and size was influenced by their surroundings and based on their positive feelings about their bodies and affirmations from their loved ones.

Theme #2: The Role of Stress

The four categories of Stress, Barriers, Motivators, and Facilitators each contained the codes *I put myself last; busy, hectic schedules* and *I believe yoga helps you de-stress*. These codes were linked to passages of text that represented the idea that a common barrier to participating in yoga-based activity is related to the women’s stressful lives. This idea forms the basis for Theme #2: *Stressful lives were a barrier to and a motivator for participation in PA/YD.* When asked the question “What stops you from being able to do more PA/YD?,” the participants repeatedly responded with issues involving constraints on their time and being too busy to do more PA/YD. Stressors included family issues, work responsibilities, and economic strain. An extremely obese (BMI = 80) teacher described what precludes her from doing more PA: “Time management and school, working on a master’s degree. … Because we are bred to take care of other people, you think of yourself last. You work to the bone to take care of those kids … and then you get what’s left.”

An overweight (BMI = 28) 40-year-old business owner provided the following exemplar passage:

> Time was a factor in my regimen. ... My days are very hectic from the time I wake up to the time I go to bed, so if I didn’t get to do it, it was because of the time factor and then

> when it was time for me to do it or when I thought about doing it, I was tired … sometimes it would be just so tight, my sleeping schedule, that it would be just so ridiculous, it's like, "No, brush your teeth and get in the bed. There's no room for anything tonight" … so that's how it was working with me and my time constraints. … Definitely, I have stress. I'm a business owner and I'm the oldest child, so … it's been engrained in me that I would be the 'go to person' for my siblings and my mother. I was just parentified [*sic*] at a young age doing big girl stuff when I really should have just been … a girl, so definitely the stress is there … money has definitely made a difference on how that stress plays out. Because when my bills are taken care of I can travel and do things that I want to do to help de-stress myself, but when the money's tight, I have to be way more creative in finding things to get back to myself. The money issue definitely makes a change in how I would relieve that stress.

Additionally, in one-on-one preliminary interviews, participants were asked about their perceptions of the health benefits of yoga/yoga-based programs and the women repeatedly noted "slowing down" as a potential benefit of practicing yoga, reiterating stress as both a barrier to and a motivator for more PA. Regarding yoga, one of the participants said:

> I am a counselor, so I know about the benefits of meditation and things like that. I think it can slow you down and kinda center you. I think spiritually, you can be connected, which has a whole bunch of benefits as far as decreasing stress and anxiety and just helping you think more logically.

Another respondent, a 59 year-old retiree, reiterated the concept that AA women consider the stress of their lives when contemplating PA and yoga-based activity. When asked about the potential benefits of yoga, she responded:

> I thought it was a way to de-stress. And I think it's about … some *me* time. Yoga, to me, is just *me* time. Time to get away from everything and concentrate on me and de-stress and meditate. … I believe that stressing [has] a big effect on health. So, if yoga helps to de-stress, it will help with your health.

One woman saw finding an appropriate stress relief as an important goal for her:

> I am now learning that stress, like *she* [pointing to another participant] said, is a part of life and it's how you deal with it. So, I'm learning now … how to balance it where I don't know that I'm stressed … I don't even know that all my busyness is causing me to be stressed … causing me to have … [the] stomach issues that I'm having. So I have to learn how to balance it … I can still enjoy those things but not let it overwhelm me to the point of I'm internalizing it because I'm just so busy. So, I'm learning how to balance.

The women in the study saw stress-reduction as an important motivator for participating in yoga-based programs. The value these women placed on stress-reduction was reinforced throughout their discussions about their busy, stressful lives. The participants believed yoga was appropriate for stress relief based upon their notions of yoga's benefits as well as their experiences with the YD program.

Discussion

From the aforementioned category schemes and coding methods, two themes emerged: (1) *Not identifying with obesity is a barrier to PA/YD participation* and (2) *Stressful lives are both a barrier to and a motivator for participating in PA/YD*. These themes cut across codes and categories and were salient among the data sources.

BMI and Body Acceptance

The majority of women in the study could not reconcile the current BMI standards with their own perceptions of what a "healthy" BMI looked like for them personally. Among these women there was an environmental acceptability of large size. Being accepting of an overweight body affects one's physical activity and healthy lifestyle behaviors (Dutton, Johnson, Whitehead, Bodenlos, & Brantley, 2005). Because of the cultural acceptance of large body types (DiGioacchino, Sargent, & Topping, 2001; Padgett & Biro, 2003; Railey, 2000), AA women have the highest BMI of any female group; however, they tend to be reasonably well satisfied with their bodies (Yates, Edman, & Aruguete, 2004). In self-perception studies of overweight women, AA women were least likely to self-identify as overweight even when they were (Yancey, Simon, McCarthy, Lightstone, & Fielding, 2006). The AA men in these women's lives also are supportive of a larger body type and compliment their large women on their figures (Baturka, Hornsby, & Schorling, 2000). AA men, in some instances, prefer their women to have rounder, fleshier curves, and, given this, AA women adjust their body sizes to meet the approval of the men in their lives (Flynn & Fitzgibbon, 1998; Walcott−McQuigg & Prohaska, 2001); many women find it advantageous to maintain a larger than recommended weight/BMI. Moreover, an excess of fat has been associated with wealth, healthiness, and sturdiness (Bailey, 2006), particularly in impoverished communities where the threat of obesity is less likely and the threat of wasting conditions such as drug addiction and HIV/AIDS are more likely.

Acceptance of larger female body types also may have been an evolutionary adaptation based on seasonal weight losses among African agriculturalists, who experienced occasional and ubiquitous food shortages. Because of the energy stores in slow-releasing peripheral body fat, and the associated reproductive advantages, women who were predisposed to become obese

were selected over those who were thinner (Brown & Konner, 1987). These factors, while paradoxical to facts that AA women recognize the importance of PA (Dutton et al., 2005) and actually desire *more* PA than what they experience in their daily lives (Banks-Wallace, 2000), help explain psychologically and anthropologically why such substantial numbers of AA women remain overweight according to current BMI standards.

There is little evidence in the literature to support obesity as an important risk factor for CVD mortality in AA women. Several studies (Abell et al., 1998; Calle, Thun, Petrelli, Rodriguez, & Heath, 1999; Carroll et al., 2008; Katzmarzyk et al., 2011; Sanchez, Reed, & Price, 2000; Stevens et al., 1998; Stevens et al., 2000) demonstrate that BMI fails to predict mortality risk in AA women. Even though AAs have equivalent or higher average BMIs than Whites, unadjusted mortality rates are consistently lower in AAs than in Whites (Sanchez, Reed, & Price, 2000). The impact of BMI on mortality is modified by educational level in AA women, but overall BMI is a less potent risk factor in AA women than in White women in the same category of educational status (Stevens et al., 1998). In general, the optimal BMI threshold values (for cardiometabolic risk factors) are about 3 kg/m^2 higher in AA women than in White women (Katzmarzyk et al., 2011). Overall, the risk associated with a high BMI is greater for Whites than for AAs, and obesity does not explain the racial disparities in congestive heart failure, stroke, and CVD. Women's own ambivalence about their perceptions of themselves as obese, and the failure of BMI to predict mortality in AA women challenges previously held assumptions regarding the role of overweight/obesity in the higher mortality experienced by AA women. Different BMI cutoff points are necessary to reflect adequately the risk within and among different racial/ethnic groups.

The benefits of improved superficial physical appearance or mere reduction of BMI to fit within a prescribed weight category may not be a sufficient motivator for AA women to decrease weight/BMI. Instead, being positively supported in an identity that suggests one can be both "fleshy and fit" could be seen as self-affirming to AA women as they consider pursuing PA for its health-related benefits. Addressing issues around pathologizing the AA female body involves challenging a BMI categorization table that places nearly 80% of AA women in the unhealthy range and also gives voice to a contingent of women who believe the current BMI standards are not representative of the average woman and are therefore flawed (Bailey, 2006). Obese women want more health information on stress management and increasing self-esteem when choosing a weight loss program; therefore, weight loss messages need to be specifically marketed to obese women compared to overweight and normal weight women who want to lose a few pounds (James, 2012).

Stress Reduction as a Motivator for Physical Activity

Stress is a significant issue in the lives of AA women. How they demonstrate strength in the face of multiple stressors (Murry et al., 2003; Woods-Giscombé, 2010), how they respond to perceived racism (Steffen, McNeilly, Anderson, & Sherwood, 2003), and a historical legacy of forced labor (Bopp et al., 2007) have been noted as barriers to PA in previous qualitative studies in AA women. The women in the YD study noted stressful, hectic lives as a key reason for their lack of participation in PA; however, they identified stress-*reduction* as a key motivating factor for initiating and/or continuing PA/YD. Overweight, CVD, and T2D are positively associated with higher acute stress (Gary, Crum, Cooper-Patrick, Ford, & Brancati, 2000); therefore, an exploration of the contribution of perceived environmental stress to MetS-related morbidity/mortality would be appropriate. Yoga practice demonstrates improvements in stress

(Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012; West, Otte, Geher, Johnson, & Mohr, 2004), anxiety (Field, Diego, & Hernandez-Reif, 2010; Lakkireddy et al., 2013), and other psychophysiological morbidities (B. E. Cohen, Chang, Grady, & Kanaya, 2008; Danucalov, Simoes, Serafim, Kozasa, & Leite, 2008; Melville, Chang, Coagiuri, Marshall, & Cheema, 2012; Raub, 2002; Salmon, Lush, Jablonski, & Sephton, 2009). Yoga practice also may be curative, bringing about an improvement of perfusion during anxiety (Huang, Chien, & Chung, 2013). There is potential for yoga to mitigate stress and improve MetS outcomes in AA women.

Conclusion

Descriptive studies of AA women's experiences incorporating yoga-based activity into their daily lives, in their own words, are limited. Given these perspectives from the study participants, lifestyle modification programs that include practical and patient-targeted exercise programs and information on stress-reduction may well be interventions that health care professionals can use to direct overweight, sedentary AA women to improve their risk of MetS. Given these women's perceptions, perhaps facilitating the use of yoga and dance-based PA should involve motivation strategies that place the emphasis on countering the effects of stress in their lives and not merely reduction of BMI.

Implications for Future Research

Logical next steps following this study include examining the perceived and objective levels of stress in AA female study participants and the influence of YD on baseline stress levels. Consistent and reliable measures of stress should be explored in this target population. Given that the women did not generally identify themselves as obese, future YD research should continue to include models who resemble physically the women participating in the study, including those who are overweight and obese.

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Box 1. Preliminary interview and post-YD Study focus group questions

Semi-structured questions (Preliminary one-on-one interviews)
1. What comes to mind when you think about yoga? 2. Have you ever practiced yoga or seen it practiced? 3. How did (or how do you think) yoga make(s) you feel physically & mentally? 4. What comes to mind when you think about how you look physically? Do you believe you are overweight or obese? 5. What are some of the things and issues that keep you from being able to be more active (barriers)? 6. What are some of the things that motivate you to be more active (benefits)?
Focus Group Protocol: (Post-*yogic dance* study)
1. Describe your experiences with the yogic dance intervention, what did you like and what did not work as well for you? 2. Discuss the roles that individual and group PA could play in helping you achieve PA goals. 3. Describe the benefits and constraints of using the Internet to deliver the intervention. 4. If you stopped participating in the study, what were your reasons for stopping? If you had days where you weren't able to do it, what were the reasons behind that?

Table 1. Demographics and clinical characteristics of participants (*N* = 11)

Characteristic	***n* (%)**
Age range (y)	
35-39	4 (36.4)
40-44	3 (27.3)
50-59	2 (18.2)
60-64	2 (18.2)
Income	
$0-19,999	2 (18.2)
$20,000-29,999	3 (27.3)
$30,000-49,999	4 (36.4)
$50,000+	2 (18.2)
Partner status	
Partnered	5 (45.4)
Unpartnered	6 (54.6)
Education (y)	
Less than high school	1 (9.1)
High school	5 (45.5)
College degree	4 (36.4)
Post-college education	1 (9.1)
Employed	
Yes	10 (90.9)
No	1 (9.1)
Insurance	
Private	9 (81.8)
Uninsured	2 (18.2)
Dependents	
0-1	7 (63.6)
> 1	4 (36.4)
BMI category	
Overweight	4 (36.4)
Obese	3 (27.3)
Extremely obese	4 (36.4)
Systolic BP (Average of 3)	
Normotensive	10 (90.9)
Hypertensive	1 (9.1)
Diastolic BP (Average of 3)	
Normotensive	6 (54.5)
Hypertensive	5 (45.5)

CHAPTER FIVE: RESULTS

Manuscript Four

Results of a 4-week Internet-based, Mixed-methods Feasibility Study

to Increase Yoga/dance-based Physical Activity in African American Women

with and at Risk for Metabolic Syndrome

*Candace C. Johnson RN, MPH, PhD(c), PhD student, University of Virginia School of Nursing, McLeod Hall, Charlottesville, VA 22908, p: 804-475-9376, f: 434-243-9938, cmc8k@virginia.edu

Ann Gill Taylor, EdD, RN, FAAN, Betty Norman Norris Professor of Nursing, University of Virginia School of Nursing, McLeod Hall 4013, Charlottesville, VA 22908, p: 434-924-0113, f: 434-243-9938, agt@virginia.edu

Diane E. Whaley, PhD, Professor, University of Virginia Curry School of Education, Memorial Gym 201, Charlottesville, VA 22908, p: 434-924-6193, f: 434-924-1389, dew6d@virginia.edu

Joel G. Anderson, PhD, Assistant Professor and Roberts Scholar, University of Virginia School of Nursing, McLeod Hall 4010, Charlottesville, VA 22908, p: 434-243-9936, f: 434-243-9938, jga3s@virginia.edu

Randy A. Jones, RN, PhD, FAAN, Associate Professor and Assistant Director of Research, University of Virginia School of Nursing, McLeod Hall 5030, Charlottesville, VA 22908, p: 434-924-0125, f: 434-982-1809, raj9c@virgina.edu

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Abstract

African-American (AA) women are the segment of the population that experiences the highest mortality from metabolic syndrome (MetS). Yoga decreases risk of MetS, yet there have been no yoga studies of AA women with or at risk for MetS. The purpose of this 4-week study was to test the feasibility and acceptability of a culturally tailored, Internet-based intervention, *yogic dance* (YD), using YD digital videos in a sample of AA women (ages 35-64) at risk for or with MetS. The investigators examined the rates of participant eligibility, accrual, attrition, and reasons for attrition; the feasibility of using the Internet to deliver the intervention; the acceptability of the structured intervention; and any other benefits and/or limitations of YD. The study used a single-group, mixed-methods design underpinned by social constructivist theory and Pender's Health Promotion Model. Twenty-four women were recruited and consented to the study. After completing in-person screening and baseline measures using the Physical Activity Readiness Questionnaire, Eligibility Screening Checklist, Individual Characteristics Form, and the Internet-based International Physical Activity Questionnaire, consented participants engaged in the 4 week YD video intervention. After the intervention, four women participated in focus groups to voice their perceptions of barriers to and benefits from YD and the acceptability of using the YD intervention. Focus group data were analyzed using content/thematic analysis and validation of themes with write-in responses to paper surveys. The majority of the women (79%) found YD acceptable. Themes that emerged from the descriptive data include: (1) *With some modifications for ease-of-use, the Internet is an acceptable means for delivering YD*; (2) *Culture is important;* and (3) *Social support would enhance YD participation.* The integrated results from this mixed-methods study will inform research exploring the complex correlates that influence health behaviors in AA women.

Keywords: African-American, women, yoga, physical activity, cardiovascular disease, metabolic syndrome, dance, type 2 diabetes, health promotion, obesity.

Introduction/Significance

African-American (AA) women experience higher age-adjusted blood pressure (BP) and cardiovascular disease (CVD) mortality than all other ethnicities [1,2], and AA women are the segment of the population that experiences the highest incidence of metabolic syndrome (MetS) [3,4]. MetS contributes significantly to the progression of obesity, type 2 diabetes (T2D) and CVD, three chronic conditions that create a significant burden on the nation's health care system [3,5,6]. Though increased physical activity (PA) has been associated with lowered risk of mortality and CVD death, AAs are less likely to participate in PA when compared to Whites, regardless of income, education, age, sex, BMI, or presence of a chronic condition (i.e., T2D, hypertension, and/or hypercholesterolemia) [4].

An effective way to prevent and reduce the morbidity and mortality associated with MetS in AA women is to promote PA in sedentary individuals, which would result in lowering the rates of CVD, obesity, and T2D [3,7-9]. Modest weight reductions can have a beneficial effect on hypertension management [10], and increased PA has been positively associated with a reduced risk of developing T2D and CVD [3,7]. PA refers to "all bodily movements that cause an increase in physical exertion beyond that which occurs during normal activities of daily living" [11]. The 2008 Physical Activity Guidelines for Americans [6] recommend that older adults, particularly those with chronic conditions and/or disabilities, should consider how these conditions affect their ability to do PA and, after determining their effort and fitness levels, engage in exercises that maintain or improve balance for a minimum of 30 minutes each day for 5 days each week. The guidelines recommend 150 minutes of moderate intensity PA each week, with an acceptable option of accumulating three 10-minute sessions toward the 30-minute daily minimum. The dose-response nature of PA leads to a decreased risk for chronic disease and/or

prevention of weight gain when individuals *exceed* the minimum recommended amounts of daily PA [6]. When compared to exercise, which refers to planned, structured, and repetitive PA, general PA more appropriately addresses the lifestyle issues of sedentary individuals who need to find ways to increase energy expenditure in their everyday activities.

Yoga and Health

In terms of metabolic expenditure, yoga practice is considered a low-level PA [12]; however, low-level PA is an appropriate entry level for sedentary individuals, as incremental behavior changes positively influence the maintenance of PA [11]. Yoga can improve blood pressure, heart rate, and metabolic rate as well as exercise capacity [13]. Yoga is useful in managing symptoms of MetS [14] and can bring about improvements in lipid profiles [16], perfusion, and cardiopulmonary function [13]. Yoga improves insulin sensitivity and is generally effective in reducing the risk of T2D [16]. Yoga practice is protective against heart failure [17] and atrial fibrillation [18], the CVDs suffered most frequently by AA women [2]. These CVDs also create the largest cost burden to the current health care system [3].

Yoga is thought to work by stimulating the relaxation response and accessing parasympathetic pathways in the autonomic nervous system [19]. Neurohormonal pathways, such as the renin angiotensin aldosterone system, are thought to be important in the control of elevated heart rate, elevated BP, myocardial infarction, atrial fibrillation, and congestive heart failure [20-22]. These pathways also are thought to be important in the mechanisms of yoga **[**19]. Because of its effect on multiple mechanisms in autonomic pathways, yoga has positive effects on reports of stress [20] and heart rate variability, another stress indicator [23]. Yoga is a cost-effective adjunct to traditional medical care. Yoga practice attenuates psychological symptoms, promotes health, and can be an efficacious self-care practice in the prevention and maintenance

of cardiac and metabolic wellness [20]. AA women generally underutilize yoga [24], primarily preferring prayer [25, 26] and herbal supplements [27-29] as complementary therapies. The use of yoga in AA women, specifically, has been understudied, with only two identified studies [17, 30] evaluating yoga in AA individuals with CVD.

Cultural Dance

Various empirical studies have examined the relationship of dance to wellness and health promotion [31-39]. Dance therapy improved quality of life, stress, and stress management strategies [40]; led to psychological stress reduction in patients with fibromyalgia [41]; and produced improvements in psychological well-being in persons with rheumatoid arthritis [37]. In a study that compared the health benefits of practicing African dance to those produced by hatha yoga practice, African dance increased the participants' positive affect scores and reduced their perceived stress scores on a level similar to that of yoga [42]. According to Serlin [43], "dance therapy is essentially holistic." Lewis [44] also espoused dance to be a form of holistic medicine first recognized in 1992 by the Office of Alternative Medicine (since 1998, the National Center for Complementary and Alternative Medicine). Because of its holistic characteristics, dance therapy has been established as a legitimate complementary/supportive health care intervention.

Because of its cultural connections [45-46], African dance may hold great potential for therapeutic application in AAs. Drawing from traditions originating in West African societies [47], cultural dance has been incorporated into modern AA culture and has been seen in daily life, family gatherings, religious meetings, and educational and work-related tasks [45]. African dance, with its rich symbolism and meanings, was chosen to enhance the intervention used in this research study because it offers an opportunity for AA women to have an identity-affirming means of increasing their leisure-time PA in a way that is stress-reducing and healthy. African

dance also has unique qualities, such as emphasis on family/community, communication, esteem-building, and spirituality, which make it desirable as a template upon which to integrate the beneficial properties of yoga. The purpose of this 4-week study was to test the feasibility and acceptability of a novel Internet-based, PA intervention, yogic dance (YD), using YD digital videos in a sample of AA women (ages 35-64) at risk for MetS.

Materials and Methods

Operating under the theoretical assumptions that people act to achieve reachable goals with valuable outcomes and that to change one's behavior one has to change the way s/he thinks about the behavior, the Health Promotion Model (HPM) [48] is used to assist the nurse in working collaboratively with the client to achieve a healthy lifestyle [49]. The current intervention was proposed to lead to increased participation in YD, which the investigators proposed would, in future studies of longer duration, lead to direct and indirect effects on improving modifiable biological characteristics such as body mass index (BMI) [50-53], BP [53] waist circumference (WC) [50, 54], and sedentary lifestyle. Supported by social constructivist theory [55] wherein meanings from human beings are derived as they engage with the world they interpret, focus groups and semi-structured one-on-one interviews were integrated to elicit a "thick" [56] description of what it was like to participate in the YD study.

Study Design

A single group, mixed-methods approach combining quantitative and qualitative research methods was used because of the complex determinants of PA. Focus group data provided contextual understanding of the relationships among study variables [57] and theoretical constructs of the HPM. This study was advertised using the criteria outlined in Figure 1. Exclusion criteria included physical attributes that indicated potential risks for harm with PA/YD practice. Provisional inclusion criteria, or conditions such as hypertension or T2D, for which a physician's clearance would be needed prior to study enrollment, were used to further protect the women from risk of harm. Because of the pilot nature of this study, a power analysis was not conducted. A convenience sample of 28 women was targeted for enrollment with a 40% expected attrition rate, a higher-than-average rate noted in PA studies involving AA women [58].

Setting/Recruitment of Sample

Forty-nine women expressed interest in the study by email and social media messaging and were prescreened by telephone (Figure 2). Twelve women were unable to advance to the eligibility screening phase with the reasons including ineligible (3), refused enrollment (3), and lost to follow-up (6). Four of the women were unable to obtain a physician's clearance for the following reasons: the patient had not been seen in the past year (2), uninsured/no physician (1), and the physician was worried about potential physical harm to the patient (1). Of the 49 interested women, 28 participants enrolled in the YD study, signing consent forms and completing the eligibility screening phase and baseline measures. Four participants withdrew from the study, stating "too hectic a schedule/not enough time" (2) and "illness" (2) as reasons for dropping out.

Intervention

After IRB approval and completing in-person screening and baseline measures, consented participants engaged in a 4-week, Internet-based YD video intervention. Participants were guided toward setting achievable goals to increase PA incrementally and recorded daily YD participation using the YD diary. After the 4-week intervention, all recruited participants were invited to participate in an audiotaped focus group to voice their perceptions of barriers to and benefits from YD, the experiences of yoga and dance in their daily lives, and the acceptability of using the YD intervention. To minimize attrition of study participants who experienced Internet connectivity problems, all participants were offered the opportunity to complete the study using DVD/DVD-ROM-based video training and/or paper versions of the study measures.

Measures

YD Pre-Screening Checklist. The YD Pre-Screening Checklist, developed by the first author, was used to determine potential study participants. Using the inclusion criteria to screen for eligibility, five yes/no questions were asked of interested individuals. A “no” answer to any of the questions resulted in exclusion from the study (see all study measures in Appendix).

Physical Activity Readiness Questionnaire (PAR-Q). The PAR-Q [59] identified adults who may not be appropriate for PA participation or for whom physician approval should be obtained before proceeding further with PA.

YD Eligibility Screening Checklist. The YD Eligibility Screening Checklist was used to collect data to determine eligibility. Inclusion, exclusion, and provisional inclusion criteria were used to determine if prescreened women would be able to continue to the eligibility/baseline measures phase of the study.

Individual Characteristics Form. The Individual Characteristics Form, developed by the first author, was used to record the provisional inclusion criteria, baseline demographics, health status indicators, and prior PA-related experiences of the participants. Anthropometric measures (e.g., height, weight, BMI, and waist circumference) and cardiovascular fitness measures (e.g., blood pressure) that were collected during the eligibility phase were recorded on this form.

International Physical Activity Questionnaire-modified (IPAQ). The IPAQ, a 7-question survey of PA at moderate and vigorous levels [60], was used to evaluate PA behaviors in the past 2 weeks and to determine whether or not the participant was sedentary prior to participating in the study. When compared to measures that assess continuous numbers that indicate duration of PA in discrete amounts (e.g., 2, 3, 4, or 50 minutes of PA), the IPAQ reports duration of PA in categories (e.g., 10-15, 16-30, or 31-40 minutes of activity). In the current study, the IPAQ was intended to determine nominal (yes/no) baseline sedentary status. The IPAQ was offered in both online and paper booklet versions in case of equipment and/or Web site failure.

Goal-Setting Worksheet/Contract. The Goal-Setting Worksheet/Contract contained questions assessing the participants' perceived benefits and barriers to PA and used the SMART goals protocol [61] to help the participants set realistic, achievable goals to increase PA/YD activities. The Goal-setting Worksheet was offered in digital and booklet formats in case of equipment or Web site failure.

YD diary. The YD diary was used as a daily self-regulation tool for the participants to help measure their goals and was the equivalent of a PA diary. The YD diary was offered in both

paper and online formats in case of equipment or Web site failure. The YD diary was used as a measure of time devoted to both YD and PA.

YD program evaluation. The YD program evaluation survey was used to collect data on the acceptability of the YD intervention as structured and included questions about specific components of the program, including the cultural aspects. The survey used a "strongly agree" to "strongly disagree" Likert scale to determine which components the women found most and least useful.

Semi-structured focus group questions. Semi-structured and open-ended questions were used to explore the intrapersonal (self-perceptions) and interpersonal (models) constructs from the HPM [48]. A full description of the intervention, approaches used in data collection, and study procedures are presented in Chapter Three: Manuscript Two-*Development, Recruitment, and Feasibility Testing of an Internet-based Intervention to Increase Physical Activity in Overweight African-American Women at risk for Chronic Diseases: Lessons Learned*.

Data Analysis

To determine feasibility, recruitment and retention rates were calculated from the (1) percentage of participants who completed the prescreening, eligibility, and enrollment phases of the study; (2) the percentage who completed all study measures; and (3) the percentage who preferred DVDs and printed study booklets over Web-based study materials. In post-intervention evaluation, each of the seven Web site-based videos were deemed acceptable if a majority of the women (more than 50% of the respondents) answered the question: "I enjoyed the ____ video" with the answers "agree" or "strongly agree" on a Likert-type scale. Because of the unforeseen failure of the study Web site to adequately measure participants' login times, the cost-prohibitive nature of accelerometers to objectively measure PA in the participants, and the inability to detect

differences in PA in the short period of 4 weeks, PA was not objectively measured in this study (see Chapter Four: *"I go by how I feel": African-American Women's Perceptions of Obesity, Stress, and Yoga/dance-based Physical Activity* for an in-depth description of the qualitative analyses methods used in the YD study).

Research Procedures

In-home appointments were scheduled for women who were not excluded during the prescreening phase. During the initial in-home visit, the women were assessed by the study coordinator, a registered nurse, to determine eligibility for enrollment in the study based on demographic (e.g., age, socio-economic status indicators, sedentary status) and anthropometric [e.g., BMI, WC] measurements. Results from the average of three WC, BMI, and BP measurements (taken after 15 minutes of seated rest) were used to determine eligibility for enrollment. If deemed eligible, the women were consented to the study and oriented to the study Web site. Prior to the onset of study, a subset (n = 11) of the women participated in a one-on-one semi-structured interview examining their prior experiences with yoga-based activity and assessing their self-perceptions regarding their health status, BMI, and self-image. Each of the 28 women consented to the YD intervention was encouraged to participate in 30 minutes of Web site-based YD activities 5 days per week for 4 weeks and to record their activities on the Web site-based YD Diary. In addition to printed paper booklets containing all Web site-based surveys, DVDs containing all YD video modules were given to the study individuals as a backup in case of problems accessing the Web site. Although post-intervention WCs were not being measured at the end of the 4-week study period, each woman was given a tape measure and told that the target WC for maintaining her heart health would be 35 inches or less.

To promote intervention adherence and to assist the women in navigating the YD study Web site, a printed tip sheet and an online tip video were created. Both contained identical content about how to access the online videos and surveys. The printed tip sheet was given to each woman during baseline data collection, and the online videos were made available on the study Web site during enrollment. The online tip video also was included as content on the DVD. Prior to the beginning of YD activities, participants were asked to view the "Setting SMART goals for PA" module and to complete the goals worksheet, which included a yes/no question about being ready to commit to YD/PA.

Weekly, the study coordinator contacted study participants by telephone and text message to ask about the YD intervention, discuss changes or issues encountered during the week, and to troubleshoot any potential or new problems that arose. These responses were recorded in the study coordinator's field notes and in weekly telephone communication logs. The study coordinator also made additional home visits during the 4-week study period to advise study participants about methods for preventing physical strain and to check the participants' body positioning. After the 4-week YD intervention, a subgroup (n = 4) of the 24 women who completed the study participated in two post-intervention audiotaped focus groups. Participants voiced their perceptions of barriers to and benefits from YD, the experiences of yoga and dance in their daily lives, and the acceptability of using the YD intervention.

Findings

Description of the Sample

Twenty-four women completed the YD study (Table 1). The mean age of the women in the sample was 43.4 years (SD ± 7.9 years). Most of the women (45.8%) were ages of 35 to 39 years. Over half (54%) of the women were single or unpartnered; the rest of the women were

married or engaged. The mean number of years of education was 16.2 years (SD ± 2.2 years). Forty-six percent (46%) had 4 or more years of post-secondary education. In terms of socioeconomic status, all but one of the women were employed, half (50%) had an income of greater than $40,000, and 83% of the women had health insurance coverage. Thirty-eight percent (38%) of the women had no dependents, and 30% had only one dependent living in the home. The remaining 32% of women had two or more dependents living in the home. At baseline, 62.5% of the women were considered sedentary based on the modified IPAQ score. At the conclusion of the study, there was a non-significant (p = 0.188) reduction in the number of sedentary women (15 before, 12 after) participating in the study (Table 2).

In terms of risk for MetS symptoms, 79% of the women belonged to the obese (BMI = 30-39) or extremely obese (BMI = 40-49) category. Twenty-two (92%) of the participants were at risk for MetS with waist circumferences ≥35 inches. Conversely, the mean systolic BP of the women was 122 ± 11.8 mmHg, with 58% of the women at low risk for MetS, having a systolic BP <130 mmHg. Heart rates were generally (88%) normal, falling under 100 beats per minute. The respondents provided an oral report of their family histories of MetS symptoms. Primary (mother, father, brother, and sister) and secondary (aunt, uncle, cousin, and grandparent) family members' histories of CVD, obesity, and T2D were present in most (83.3%, 75%, and 58%, respectively) of the women (Table 3).

Feasibility of the Yogic Dance Study

All of the participants found the YD intervention acceptable enough to complete some or all of the study components. Seventeen participants (71%) completed all study measures. Eleven (46%) of the women requested the paper version of the study measures, indicating a preference for written versus online self-regulation methods. Eight (33%) of the women preferred the online

surveys and another three (13%) used both methods interchangeably. More (71%) women preferred the online YD tips video tutorial to the paper version provided at baseline. Eighty-six percent (86%) of the women completed the written YD diaries; 86% completed the goal-setting worksheet, and 68% completed the program evaluation. Participants used the Web site-based videos more often than the Web site-based surveys, though they (77%) generally preferred the DVD/DVD-ROM played on their televisions or computers for viewing the YD videos. Based on *a priori* criteria, the cutoff percentage by which the study would be deemed feasible was rates over 50%. Triangulated themes from the focus group and survey data demonstrated that the majority (59%) of women found the yoga-based postures to be doable, particularly for helping them to increase their energy levels and/or help them feel relaxed for bedtime. To varying degrees, participants found all seven YD videos acceptable (Tables 4 and 5).

Descriptive Study Findings

Integrated results from the qualitative portions of the study (i.e., focus group data, written/typed responses to open-ended survey questions, and one-on-one semi-structured interviews conducted with the participants prior to the beginning of the study) reveal three themes within the data: (1) With some modifications for ease-of-use, the Internet is an acceptable means for delivering YD; (2) Cultural dance favorably enhances the YD experience; and (3) Social support is an important mediating factor for YD. These themes were consistent across data sources.

Theme #1 - With modifications, the Internet is acceptable. The most notable exemplars representing Theme #1: *With some modification, the Internet is an acceptable means for delivering YD*, were demonstrated in the following passages. One participant, who chose to

use the backup DVD to view the YD videos instead of logging onto the study Web site each day, stated the following:

> I preferred the DVD just because I have symptoms of ADHD … so I need it on the TV where it's louder and … there's more room over there near the TV. Even logging on to … [the computer], I was overwhelmed and just shut down once my password didn't work.

Another focus group participant described what it was like to use YD videos from the study Web site stating "When I did the Internet, I did have to turn a certain way to be able to see [the YD trainer] and do what [the trainer] was doing in the mirror ... I had a mirror in front of me so I had to turn a certain way, so I guess the DVD would have been better in that aspect."

Dialogue between a focus group participant 2 and the moderator further illustrated Theme #1:

> Participant: I did the Internet and I didn't care for the grid that was to the left, [where] you had to click on some stuff. I know I didn't have to do that part. … All I had to do was the videos, but I wanted to try to add to it to keep up with what I was doing. It just wasn't as user friendly. Moderator: Had it been more user-friendly, do you think you would have preferred to access it online over the DVD or do you find that, in the end, the DVDs were the best way? Participant: No, the Internet would have been just fine.

Theme #2 - Culture is important. The YD study took principles and symbology seen in West African cultural dance and combined these with postures of hatha yoga to make yoga more palatable to AA women. The two 10-minute videos containing the warm-up and stretching were infused with deep cultural elements such as African dance-inspired choreography and African drumming/timing cues. The intervention also included AA female models of varying BMIs and

body compositions. The women in the study were overwhelmingly impressed by the inclusion of these deep structural concepts and reported feeling a sense of purpose and pride in the activity.

When the women were asked what they enjoyed about the YD intervention, they spoke of the referential connections to African cultural heritage as being almost spiritual in its significance to them. One focus group participant had the following to say:

> I like when every time [the narrator] came on, [she] explained the culture of what you were doing in the dance, so *that* had the spiritual connection for me, like where it came from, where it was derived from, and a lot of it was over there in Africa, so that to me was the spiritual piece for me. … I enjoyed learning the history of what I was doing.

Another participant noted "…with the history piece, that made me feel prideful; it's just more of a connection, so I would say that was more spiritual for me."

Refining the themes using the write-in survey responses, one study participant described her experience with the culturally inspired warm-up and stretching videos using the following words: "I really enjoyed the warm-up and stretching videos the most. They were easy to follow and the instructions were clear and step-by-step."

The women echoed this sentiment throughout their responses. Seventy-five percent (75%) of the women reported enjoying the 10-minute African dance-based warm-up video. This moderate-intensity dance video taught the participants five symbol-rich, culturally derived dance moves in succession, ending with a choreographed flourish. Two of the women who were mothers of young children believed the warm-up not only motivated them to move more but engaged other members of the family as well. One respondent said, "The warm-up and stretching were my favorite! My husband and little kids (ages 1-4) joined me at times when I did those

[dance moves] during day hours." On this same topic, another mother shared, "Whenever I put the video in, my 4 year-old-did … [the dance moves] with me. He loves music, so it was inviting and made him want to try it. He even tried the posing and the stretching."

From the theoretical underpinning for this research (HPM framework), sociocultural influences can include role modeling of the desired health behavior, in this case, PA achieved through YD. Interview questions about the benefits of the YD program yielded several responses about the video use by AA women who were larger than the BMI typically seen in exercise videos. The women used key terms, including "connection" and "good" to bring together the theme, supported with the following exemplar statement:

> But the little skinny White girls on the workout videos, I don't have a connection to them, and … just looking at their bodies and thinking, "you guys and me, there's just no connection." So, with the different body types in the [YD] video, that made me feel good.."

Two participants reiterated the benefits of the cultural connection YD brings, engaging in the following dialogue:

> Participant 1: Today it was, "Okay let me get this task off my list." I wasn't necessarily excited about it, but … once I get here and the conversation [began], I'm going, "If I would have known … this is a pretty decent group!"
>
> Participant 2: That's how I felt, too. I called it a task because I have a 'to do list'. Girl Scouts, then … [the YD focus group] … then I have to go meet my mother-in-law … then go put in grades. Now I'm here, I'm like, "Oh, this is good."
>
> Participant 1: It [YD] feels like it's for me and I mean it feels good.

The cultural theme was refined using the written/typed responses to open-ended survey questions asking the participants to provide their thoughts about the YD program. An overweight (BMI = 28.5) participant had the following to say at the conclusion of the intervention: “I really enjoyed the [African-dance based] warm-up and stretching videos the most … I plan on using the warm-up/stretching to begin a personal journey for myself.”

Theme #3 - Social support would enhance YD participation. A salient theme throughout all sources of the descriptive data (e.g., preliminary one-on-one interviews, goal-setting worksheet and program evaluation write-in responses, and focus group data) was that participants believed they would have been likely to practice more YD if they were in a group environment. In a group setting, the women believed they would have felt accountable to one another and would not have wanted to disappoint one another, thereby promoting more PA. This is demonstrated by a study participant who said:

> [I prefer] the group setting because I’m social, even like us meeting today, I think my commitment would go up because I would be thinking about me letting you down and “they’re waiting for me.” So I do think that if I was in a group setting I would be more vested.

Group practice was mentioned by many of the participants as a demonstrated motivator for PA. One participant said:

> I was doing a church workout regimen and because it was a group setting, I would make sure I made it there, but doing it individually, you know, that’s on the back burner. … it would be the last thing because it was rude … that commitment or that camaraderie of us working out together … so now that I know that, I would be willing to come back to the same group next week and say, “Let’s do some of this yoga and knock it off.”

Another participant, after attending the focus group with other YD study participants, noted the rapport that she quickly developed with the other women in the study. In doing so, she acknowledged the importance of the social support and a manner in which it could be implemented. This thread of the focus group discussion led the women to spontaneously begin to suggest ways the group could begin to meet to practice YD together with the following:

Participant 1: "Like a book club. You read the book at home … then you come together and talk about it."

Participant 2: "We meet once a week or once a month to do this as a group and learn a new step … when you get home, 'let's see how you do over the next couple of weeks.' I can see something like that."

This sentiment was echoed in the second focus group:

> The social aspect would help. Like, if I was doing this with a group of girlfriends and it helps you to become a little bit more accountable, because if you don't necessarily feel like it that day, they will be like, 'C'mon!' to help that motivational piece that also kind of plays in because when you do it as an individual *you* are the motivator.

In each of the data sources used to triangulate themes, the women found social support through group practice to be a key motivator for initiating and maintaining YD activities.

Discussion/Conclusions

Survey and focus group data from this feasibility study were integrated to provide insight into AA women's attitudes and beliefs about yoga-based PA and preferences regarding the delivery of the YD intervention. Overall, the women in the study found the YD intervention to be feasible and acceptable. The women were willing and able to use the Internet to complete surveys and to watch the online videos. The cultural dance component of the YD program

received notably more enthusiastic responses than the yoga-based postures (73% and 59%, respectively) from the participants, who found the African dance to be interesting and enjoyable. The women found social support through their families, who often joined in with their female relatives practicing the YD activities, as well as during the focus groups when the women were able to come together and share their experiences with the study.

The women in the study also found the use of the Internet to complete surveys and to watch one-time video tutorials to be acceptable. However, the participants did provide some key areas in which the delivery of the intervention could be improved. These included having a more user-friendly Web page interface that indicates more clearly how to use the Web site tools (e.g., how to track PA, how to access study questionnaires, and how to view videos from an online catalog), and increased support and compatibility with multiple Internet browsers. The women found the backup DVDs useful and viewed these as DVD-ROMs on their computer monitors. When they experienced difficulty hearing the audio cues or seeing the models on the computer screen clearly, the women tended to prefer to play the DVDs on their TVs.

Fifty percent (50%) of the women in the study had annual incomes of $40,000 or more. This is consistent with known findings that income is a predictor of Internet access, as only 51% of adults with an annual salary ≤$30,000 have access to the Internet. [62]. All of the women in the study had home access to a computer and the Internet, and many (79%) had more than one Internet-accessible device (e.g., smart phone, tablet, laptop, and/or desktop). The digital divide [63] among this population is not as wide as once thought. In terms of wireless access, 64% of AAs, 75% of women, 79% of U.S. adults ages 30-49, and 71% of U.S. adults between the ages of 50-64 use the Internet. Fifty-one percent (51%) of AA adults have a laptop at home with a

broadband connection, and 71% percent of adults use video-sharing Web sites when on the Internet [64].

Several PA studies [65-70] have demonstrated the use of the Internet as a resource for delivering PA interventions. Lessons learned from these studies include the need to have researcher-administrated PA measures; objective means of evaluating when, how often, and for what purpose the participant is visiting the study Web site; and recognition of the fact that while these types of programs might not produce weight losses that rival face-to-face programs, there could be advantages to Internet-based interventions in increasing the available audience of PA health promotion programs for overweight individuals.

The deep structural cultural enhancements to the intervention (e.g., African dance-inspired choreography in the warm-up and African drumming in the warm-up and stretching videos) were acceptable to the participants because the women felt a sense of pride and positivity in seeing the AA models of varying BMIs and the African cultural content and symbols. The majority of the women preferred the 10-minute African dance-based warm-up to the yoga-based postures, citing their enjoyment in learning about African cultural principles and history while moving in rhythm with the YD instructor. In studies with AA girls/mother dyads, BMI, dietary intake, self-esteem, adverse events, and AA cultural identity were evaluated, showing improvements when girls and their mothers participated in dance programs [71,72]. Dance-based interventions have the potential to provide cultural themes and unique opportunities for learning in AAs [73]. With its cultural relevance, spiritual implications, psychological benefits, and physically stimulating properties, cultural dance holds promise as an adjuvant therapy for various forms of healing in AA women.

Social Support

Social support is a well-known mediator of PA and weight management in AA women [74-77]. In the current study, social support also emerged as a potential mediator to YD. The adapted HPM was useful in acknowledging and confirming the direction of influence from past experiences with yoga/yoga-based activity to an increase in PA via social support. Other important influences integrated into the creation of YD and suggested in the HPM included the use of role modeling using prototypes [78], a variable in the design of this pilot research that was not directly measured. The possible selves theory [79], a concept of one's sense of self, is derived from incorporating representations of oneself in the past (feared self) and in the future (hoped for self) to promote or prevent certain health behaviors. Possible selves research theory [80] was integrated during the production and editing of the "Setting SMART goals for Physical Activity" video. Images of AA women, including celebrities and real-world women, were used throughout the video presentation to allow the participants many ways to think about themselves, particularly in the context of a woman who participates in PA for the sake of her health. On the goal-setting worksheets, the women, no matter their weights/BMIs, cited wanting to have a smaller waistline. Often the women compared their body parts to other women and used social comparison as a means for setting their goals. Possible selves theory addresses the influence of self-perceptions on health promoting behavior in a more explicit manner than that seen in the broad constructs of the HPM model.

Participants suggested various forms of social support (e.g., support from friends, co-workers, family members, significant others) as benefits or facilitators to previous positive experiences with PA. On the goal-setting worksheets, many of the women named their daughters, other family members, and co-workers as people to whom they would like to be

accountable for meeting their PA goals. In AA women, family plays an important role in the uptake and maintenance of PA [81-83]. The mothers in the study whose children participated in YD alongside them noted the West African drum rhythms as a motivator for their children's participation. In terms of family support, several mothers found that being able to do their PA along with their children was an enjoyable experience.

It is worth noting that the participants considered the YD intervention itself to be a form of social support and they consistently mentioned during the focus groups that they wished they had met one another sooner in the study to practice the YD postures together. Future YD interventions should take advantage of opportunities for social support from family members and friends by incorporating different types of Internet-based and face-to-face support such as social networking forums and/or in-person group workouts offered on a drop-in basis.

Limitations

Having a small sample size and homogeneous target population limits generalizability of these finding to the population at large. The YD study targeted AA women with computers who had Internet access; therefore, the study participants may be different from AA women without computers/Internet access who were not eligible for this study. The women in the study had a relatively high education level. This could be considered a limitation, as education level is predictive of PA.

Implications

In the field of epigenetics, which explores heritable changes in gene expression that relate to non-genetic processes and the effects on development and disease [84]**,** obesity, stress, T2D, and hypertension biomarkers, have been identified. Exploring the mechanisms that regulate gene expression such as histone modification and DNA methylation [85] offer researchers

opportunities to examine the stress-related correlates of MetS in high-risk populations. Epigenetic markers change in response to environmental cues such as obesity, T2D, and other modifiable lifestyle characteristics that lead to chronic disease in AAs [86]. These epigenetic changes may identify biomarkers that can be used in future research to study the impact of environmental determinants on chronic diseases.

A multi-generational, family-centered intervention would be appropriate for AA mothers in the target demographic. Nurse-managed health centers [87] offer an opportunity to close the gap in health care disparities for medically underserved populations such as AAs by offering health promotion education, secondary screening, and community-based rehabilitation using yoga and dance as motivating, cost-effective methods for improving mortality and morbidity from MetS-related diseases. Given the importance of social support and culturally-tailored concepts to AAs, further examination of the impact of YD on PA behaviors is needed.

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Figure 1: Inclusion and exclusion criteria for participation enrollment

Inclusion criteria	African American woman (self-identified) Between 35-64 years of age (valid ID) BMI ≥25, calibrated scale & tape measure Sedentary (per IPAQ) At-home Internet and computer screen access Email access (confirmation email) Able to navigate the YD Web site (per YD login) Readiness for exercise (per PAR-Q)
Exclusion criteria	Currently undergoing physical therapy Had surgery in the past 2 weeks Evidence of untreated musculoskeletal injury Housebound because of physical disability Walks with assistance Is at high risk for falls related to hypoglycemia Is at high risk for falls related to hypotension Dangerously elevated blood pressure (>180/100) History of myocardial infarction, stroke, congestive heart failure, COPD, or diabetic coma Wears pacemaker in situ Diagnosis of cancer Unable to secure a physician's clearance to participate in the YD intervention
Provisional inclusion criteria	Blood pressure >140/90; (per nurse observation) Answers "yes" to at least one of the seven questions on the PAR-Q Reports taking medications or being under a physician's care for a diagnosis of T2D, CVD, hypertension, or other chronic illnesses for which exercise would be a contraindication

Figure 2. Consort diagram

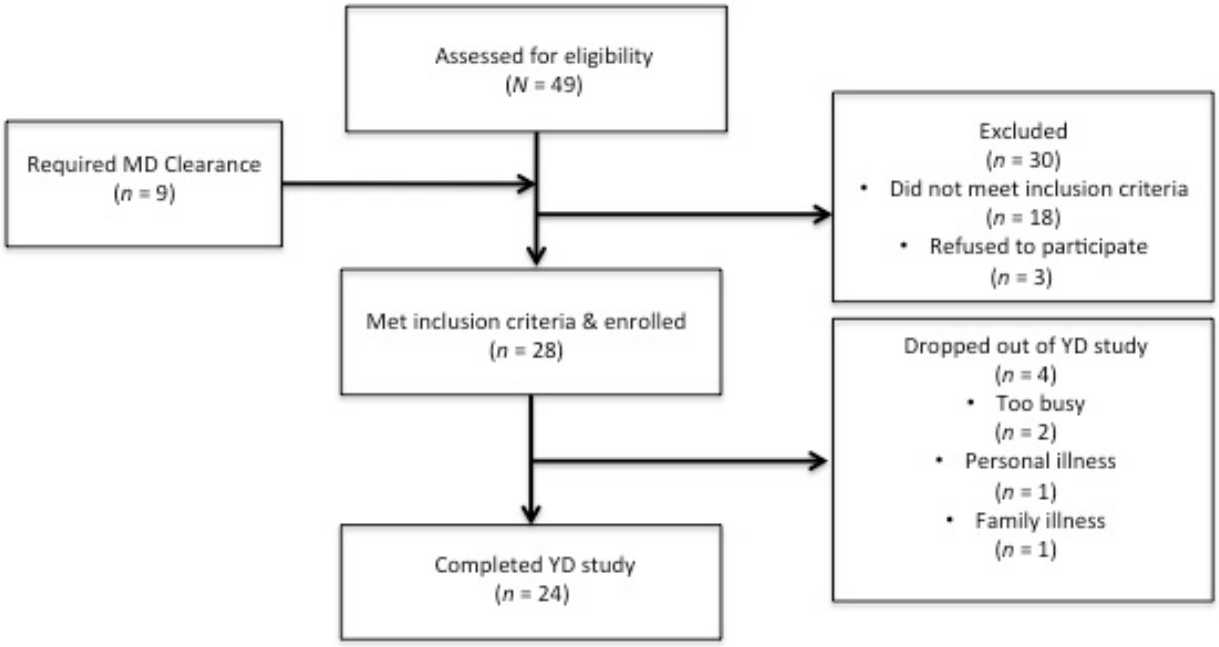

Table 1. Baseline characteristics of YD study participants (*N* = 24)

Characteristic	*n* (%) Mean (±SD)
Age, mean, (±SD)	**43.4 (7.9)**
Age categories, y	
35-39	11 (45.8)
40-44	7 (29.1)
45-49	1 (4.2)
50-54	1 (4.2)
55-59	3 (12.5)
60-64	1 (4.2)
Marital Status	
Married/Partnered	13 (54.1)
Single/Unpartnered	11 (45.8)
Education, mean, (±SD)	**16.2 (2.2)**
Education, categories, y	
13-15	10 (41.6)
16-19	12 (50.0)
20+	2 (8.3)
Employed	
Yes	23 (95.8)
No	1 (4.2)
Income, categories, $	
$0-9,999	2 (8.3)
$10,000-19,999	1 (4.2)
$20,000-29,999	4 (16.7)
$30,000-39,999	5 (20.8)
$40,000-49,999	5 (20.8)
$50,000+	7 (29.1)
Dependents, categories, #	
0-1	16 (66.7)
2-4	6 (25.0)
5-7	1 (4.2)
8+	1 (4.2)
Health Insurance Status	
Yes	20 (83.3)
No	4 (16.7)

Table 2: Clinical characteristics of YD study participants (*N* = 24)

Characteristic	*n* (%)
Family history of CVD	
Yes	20 (83.3)
No	4 (16.7)
Family history of obesity	
Yes	18 (75.0)
No	6 (25.0)
Family history of T2D	
Yes	10 (58.3)
No	12 (41.7)
BMI, mean (±SD) (m^2/kg)	**40.8 (10.9)**
BMI categories (m^2/kg)	
Overweight (BMI 25-29.9)	5 (20.8)
Obese (BMI 30-39)	7 (29.1)
Extremely obese (BMI 40-49)	9 (37.5)
Extremely obese (BMI≥50)	3 (12.5)
Waist Circumference, (±SD) in	**44.2 (7.6)**
Waist Circumference	
WC normal	2 (8.3)
WC at risk for MetS (≥35 inches)	22 (91.7)
Systolic Blood Pressure, mean (±SD) (mm/Hg)	**121.88 (11.8)**
Systolic Blood Pressure (mm/Hg)	
SBP normal	14 (58.3)
SBP at risk for MetS (≥130mm/Hg)	10 (41.7)
Diastolic Blood Pressure, mean (±SD) (mm/Hg)	**85.9 (8.6)**
Diastolic Blood Pressure (mm/Hg)	
DBP below MetS	14 (58.3)
DBP at risk for MetS (≥85mm/Hg)	10 (41.7)
Heart Rate, mean (±SD) (bpm)	**76.58 (15.82)**
Resting Heart Rate (bpm)	
HR bradycardia bpm ≤ 60	**3 (12.5)**
HR 61-69 bpm	**7 (29.1)**
HR 70-79	**5 (20.8)**
HR 80-89	**3 (12.5)**
HR 90-99	**3 (12.5)**
HR tachycardia bpm ≥100	**3 (12.5)**

Table 3. Sedentary status before and after YD intervention (*n* = 17)

PA Status Indicator	Before YD	Post YD	*p*-value
Mean number of minutes per day of PA (SD)	29.1 (19.5)	31.4 (19.4)	0.657
Mean number of days per week of PA (SD)	3.1 (2.4)	3.6 (1.7)	0.191
Mean number of minutes per week of PA (SD)	108.5 (105.3)	135 (123.8)	0.245
Number of Sedentary Women (%)	15 (62.5)	12 (50.0)	0.188

Table 4: Acceptability outcomes (*N* = 24)

Measure	Number (%)
Commitment to PA	
Yes	18 (75%)
Online Video	
Yes	17 (71%)
Warm Up	
Yes	18 (75%)
Worship Pose	
Yes	15 (63%)
Uplifting Pose	
Yes	17 (71%)
Swaying Tree	
Yes	14 (58%)
Data Entry Methods	
Online	8 (33%)
Booklet	11 (46%)
Both	3 (12.5%)
Not completed	2 (8%)

Table 5: Feasibility and acceptability of YD (*N* = 24)

	Measure	*n* (%)
Feasibility of using the Internet	**40 consented women who remain in study**	**24 (85.7)**
	women in study who requested paper surveys	12 (50.0)
	women in study who completed online surveys only	7 (29.2)
	women in study who used both online and paper forms	5 (20.8)
	completed YD entries	17 (70.8)
	completed Goal-setting paper worksheet	21 (87.5)
	completed program evaluation	16 (66.7)
	completed IPAQ-Baseline	24 (100.0)
	women who preferred the DVD or DVD-ROM to the online video	19 (79.2)
Acceptability of YD	**consented women who remained in study**	**24 (100)**
	women in study who completed all components of YD	16 (66.7)
	women who enjoyed the Warm-Up	18 (72.7)
	women who enjoyed the YD poses	15 (62.5)
	women who found online Tips useful	17 (70.8)
	women who found paper Tips useful	12 (50.0)

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CHAPTER SIX: CONCLUSION

Manuscript Five

Running Head: Promoting Health: Implications for Nursing

Promoting Health Using Yoga- and African Dance-based Activity in African American Women at Risk for Metabolic Syndrome: Implications for Community/Public Health Nursing

*Candace C. Johnson RN, MPH, PhD(c), PhD student, University of Virginia School of Nursing, McLeod Hall, Charlottesville, VA 22908, p: 804-475-9376, f: 434-243-9938, cmc8k@virginia.edu

Ann Gill Taylor, EdD, RN, FAAN, Betty Norman Norris Professor of Nursing, University of Virginia School of Nursing, McLeod Hall 4013, Charlottesville, VA 22908, p: 434-924-0113, f: 434-243-9938, agt@virginia.edu

Diane E. Whaley, PhD, Professor, University of Virginia Curry School of Education, Memorial Gym 201, Charlottesville, VA 22908, p: 434-924-6193, f: 434-924-1389, dew6d@virginia.edu

Joel G. Anderson, PhD, Assistant Professor and Roberts Scholar, University of Virginia School of Nursing, McLeod Hall 4010, Charlottesville, VA 22908, p: 434-243-9936, f: 434-243-9938, jga3s@virginia.edu

Randy A. Jones, RN, PhD, FAAN, Associate Professor and Assistant Director of Research, University of Virginia School of Nursing, McLeod Hall 5030, Charlottesville, VA 22908, p: 434-924-0125, f: 434-982-1809, raj9c@virgina.edu

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Abstract

The yogic dance (YD) study is the first of its type to examine the experience of and acceptability of yoga by African-American (AA) women, the segment of the U.S. population at highest risk for death from cardiovascular disease and type 2 diabetes. YD is theory-based and addresses issues of time and cost efficiency, accessibility, and translatability. Using a closed Internet-based Web site to deliver the YD intervention provided opportunities for improved intervention fidelity. The potential for YD to be a translational, real-world approach to increasing physical activity in sedentary populations makes this intervention an innovative and worthwhile mechanism for delivering preventive therapies to AA women. Understanding the complex factors that mediate physical activity and providing additional empirical support for efficacious, theory-based physical activity programs further advance the nursing and public health discourse, offering fresh and personal perspectives previously understudied in sedentary AA women.

Keywords: African-American, women, community, community health, community health nursing, public health nursing, yoga, cardiovascular disease, physical activity, metabolic syndrome, obesity, exercise behavior, health promotion, dance, type 2 diabetes, nurse-managed health centers, Affordable Care Act.

Introduction

The potential for cultural dance and yoga to be combined to bring about improvements in mental and physical health outcomes for African American (AA) women makes this combination a viable option for increasing physical activity (PA) (Johnson & Taylor, 2011). Yogic dance (YD) uses social and cultural influences as well as goal setting to mediate PA behaviors and teach foundational and performance skills (Vealey, 2007) for adopting a more active lifestyle than AA women generally have. AA women, the segment of the U.S. population at highest risk for death from cardiovascular disease (CVD) and complications from type 2 diabetes (T2D), require preventive interventions that address health promotion at all levels of care. YD was developed specifically by and for overweight, sedentary AA women, addressing PA at multiple focal points. The potential for YD to be a translational, real-world approach to increasing PA in sedentary populations makes this Internet-based intervention an innovative and worthwhile mechanism for delivering preventive therapies to AA women.

Descriptive studies of AA women's experiences incorporating yoga-based activity into their daily lives, in their own words, are limited. Given these perspectives from the study participants, lifestyle modification programs that promote social support, are culturally competent, and are user-friendly may be interventions to which health care professionals can direct overweight, sedentary AA women to improve the risk of metabolic syndrome (MetS). According to the women in the study, facilitating the use of yoga and dance-based PA should involve motivational strategies that place emphasis on counteracting the effects of stress in their lives and not merely reduction of body mass index (BMI).

Stress/Mental Health Issues Related to Sedentary Behaviors in AAs

AAs can experience stress and mental health issues resulting from a history of disenfranchisement and the associated emotional trauma (Grant, Jack, Fitzpatrick, & Ernst, 2011; U.S. Department of Health and Human Services, 2001; Ward & Heidrich, 2009). AAs are half as likely to seek treatment for mental health issues, and, when they do, they are 1.5 times more likely than Whites to be diagnosed with a psychotic disorder and to be treated with antipsychotic medications versus being offered talk therapy or complementary/supportive therapies for their symptoms (Wang *et al*., 2005). In the YD study, stress was seen both as a motivator and a barrier to PA. Some of the women reported that the YD activity provided them with increased energy, while others reported that the activity induced a restful, somnolent state. The women saw relief of stress, lowering of blood pressure, and reduction of anxiety as positive results of the yoga-based activity and expressed interest in continuing the activities for these health benefits. In this study, the participants' busy, hectic lives played a large role in their inabilities to do more PA than they were able to do on any given day. Even when they realized the benefits of PA, the women were often challenged by their stressful life circumstances when making decisions about doing more PA.

There are many factors that influence stress in the lives of AA women. The environmental determinants of illness are connected by stressors such as inadequate finances (Steffen, McNeilly, Anderson, & Sherwood, 2003), multiple responsibilities (Banks-Wallace, 2000), single motherhood (Cain & Combs-Orme, 2005), and perceived discrimination/racism (Krieger, 1990; Kwate, Valdimarsdottir, Guevarra, & Bovbjerg, 2003; Sims *et al*., 2012). In the 20 years between 1990-2009, AAs were the segment of the U. S. population that earned the least income of all racial/ethnic groups, earning as little as half the income of Asian and Pacific

Islanders and approximately 72% of the income of Whites. AAs also had the highest unemployment rates of all the racial/ethnic groups in similar proportions as income; additionally, AAs were second only to individuals of Hispanic origin in medical insurance coverage in the U.S. (U.S. Census Bureau, 2010). Low socio-economic status is associated with having hypertension, obesity, and T2D (Gebreab *et al*., 2012), and having a low subjective social status is inversely related to depression, which is both an antecedent to and an outgrowth of stress (Subramanyam *et al*., 2012). Lifetime discrimination, a construct that captures the cumulative impact of discrimination over the course of one's life, cause AAs to suffer an undue amount of depression, stress, anger, and hypertension (Parham *et al*., 2011; Sims *et al*., 2012; Watts-Jones, 1990) and may contribute to the symptoms that characterize depression and stress (Azibo, 2003). In AA women specifically, stress and depression are positively correlated with increased BP (Artinian, Washington, Flack, Hockman, & Jen, 2006).

Because AA women value the appearance of strength in the face of multiple stressors (Beauboeuf-Lafontant, 2007; Woods-Giscombé, 2010), they practice self-silencing (Grant *et al*., 2011; Jack & Dill, 1992; Jones & Shorter-Gooden, 2004), the act of masking one's pain and suffering. Part of self-silencing in AA women includes embracing being physically large as a physical manifestation of strength (Beauboeuf-Lafontant, 2005). Self-silencing, however, is viewed as paradoxical and deleterious to stress response pathways and warrants addressing in this vulnerable target group (Jack, 2011). In AAs, stress is a mental health syndrome that may account for unrelenting cardiometabolic disease prevalence (U.S. Department of Health and Human Services, 2001). Cardiometabolic manifestations such as atrial fibrillation and increased blood pressure are preceded by stress and other culture-bound manifestations that can be overlooked by health care providers. Missing these symptoms during patient assessments has

resulted in sustained high mortality rates despite sophisticated screening technology and pharmacotherapy. Researchers and health care providers should investigate self-silencing as a possible affective mediator between social context and depression/stress.

In AAs, stress can be implicated in the mortality associated with MetS. AA men have the lowest BMIs and waist circumferences of all ethnic groups (Williams, 2009), implying a lowered risk of CVD morbidity. However, AA men are second to AA women in terms of death from heart disease, suggesting a weaker connection between BMI and CVD mortality than the one between stress and CVD death. One might expect that these stress-related morbidities would align with individuals of a lower socioeconomic status; however, high morbidity and mortality from CVD, T2D, and MetS are also seen in AA individuals of higher socioeconomic status (Williams, 2009; Yancey et al., 2005), further supporting the concept that stressful lives are a key factor in CVD mortality for AAs.

In this study, the participants reported stress from family situations, economic problems, and work/job-related concerns. In some cases, economic burdens were preventing the women from participating in stress-reducing self-care practices, (e.g., vacationing or spa treatments). Some of the women were in multi-caregiver roles in which they were responsible for caring for individuals beyond their nuclear families. AA women in the study anecdotally reported feeling "stressed" in many areas of their lives. In preliminary interviews prior to commencement of the intervention, the women considered yoga-based activity to be "me/my time," or time set aside for oneself. Yoga and other mindfulness-based therapies may offer protection from the stressors that have a negative impact on AA female health (Woods-Giscombé, 2010).

Social Support

Social support from kinship networks and one's perception of social status play key roles in mediating the deleterious impacts of stress (Taylor, Budescu, & McGill, 2011). Social support, an important feature of PA uptake and maintenance (Murrock & Madigan, 2008), could enhance YD participation and make yoga-based activity more enjoyable. Additionally, given that spirituality is a key factor in the lives of AAs, and that spiritual settings provide social support (Bopp et al., 2012), situating YD in a faith-based and/or faith-placed environment may be a method that avails itself to a setting accessible to AA women. Because AAs currently utilize faith and prayer when seeking health care (Newlin, Knafl, & Melkus, 2002), a spiritually-oriented approach should be acceptable for incorporating tenets of healthy living and physical wellness into their daily lives. Presenting YD as a means by which the participant can quiet her mind for meditation or obtain relief from tension provides a way to lower stress and enhance the spiritual lives of the YD participants.

Finally, the women found their families to be a source of social support for their YD activities. The women found their children and/or partners to be curious about what they were learning and doing using the YD videos and often began to join in the activities. Adequacy of social support is an essential factor affecting PA and other weight management behaviors (Wolfe, 2004). A family-based approach to preventing obesity and increasing PA may be effective in AAs (Barr, Adams, DiSantis, & Kumanyika, 2013). Adding culturally appropriate male- and children-oriented cultural dance activities to the YD video catalog would encourage family involvement in the YD intervention, thus enhancing the women's social support and increasing participation in YD.

Dance

Dance-based fitness is currently being used commercially to increase motivation and activity levels in individuals. Dance makes PA fun and palatable, as experienced by the women in this study. Dance also can reverse the signs of stress by relaxing stress-induced tension (Hanna, 1988). Dance builds a higher tolerance level to stressors, provides resistance against illness, and enhances wellbeing, contributing to the prevention of stress through cognitive and physical processes. Specifically, folk, ethnic, and/or cultural dance is associated with stress reactivity. In people of African descent, the significance of dance is far greater than in most Western countries (Hanna & Hanna, 1971). In addition to being a physical behavior, it is considered also to be an artistic, cultural, social, psychological, communicative, and religious behavior. Depending upon the dancer's religious belief, trance states achieved through dancing cause a sleeplike state during which sensitivity to stimuli is reduced (Hanna, 1988). The spiritual core of African culture is comprised of the belief that, as a result of self-silencing and despondency, one can experience spiritual illness and the remedy for this is manifestation of spiritual energy, which may be possible through ritual drumming and dance (Parham *et al*., 2011). Cultural dance promotes fitness, catharsis, and insight into one's psychological and affective problems (Hanna, 1973). In patients with heart failure, the functional and cardiovascular benefits of dancing were comparable to those experienced during formal exercise (Kaltsatou, Kouidi, Anifanti, Douka, & Deligiannis, 2013).

Enhancing the yogic postures with a cultural dance-based warm-up activity made the YD program acceptable to the women in the study. The women revealed that they found the dance to be an activity to which they looked forward. Often, if the women only had time for one 10-minute video, they would select the African-dance warm-up instead of the 10-minute 'mini-

lesson' videos demonstrating YD postures. The women in the study also reported that their families would often gather around the TV/computer monitor when the warm-up began to play. The women generally considered the African-based activities to be identity-affirming and tension-relieving. Ethnic/cultural identity is strongly related to positive well-being (Smith & Silva, 2011). In the YD videos, drums and music encouraged movement and provided timing cues. The drums drew in the children to participate in YD with their mothers, and when family members joined in with their practice, the women committed to longer periods of YD activity. Having the opportunity to have brief, 10-minute sessions of dance-based activity enhanced the translatability of YD to AA women.

Role Modeling

In the YD study, using models of various shapes and BMIs was acceptable to the women who spoke of feeling disconnected from the "skinny, White women" who currently make up the largest demographic of yoga users in the United States. The women in the study did not initially relate to yoga-based activity as they saw it as an activity that did not fit the attributes they associated with PA (i.e., sweating, intense movement). Using varied types of body images and being accepting of large BMI women as models in the video was affirming to the women in the study and instilled confidence in the women's ability to have bodies that were large yet strong and healthy.

The women's acceptance of the YD intervention also may have been linked to their trust in the study coordinator, also an AA woman. Time was taken to establish rapport with the women and to respect their needs for multiple attempts to gain information about the study before deciding to enroll. The first author also was a model in the YD videos, demonstrating the 10-minute African dance-based warm-up and alternate YD poses from those being demonstrated

by the primary model, a certified yoga instructor. The third model was an extremely obese (BMI >40) AA woman demonstrating modified poses for participants who were experiencing tightness in their muscles and required modified ranges of motion. Additionally, the first author conducted all of the in-home baseline clinical and anthropometric measures and the semi-structured interviews. Trust is an important aspect of AA health care and health research participation (Adderley-Kelly & Green, 2005). Researcher over-involvement can introduce bias into an intervention; however, this bias is weighed in balance with the trust in the coordinator that 86% of the participants displayed by remaining in the study to completion.

Implications

The science of complementary health-enhancing approaches is challenged by difficulties standardizing yoga practice and other therapies (Sherman, 2012). Future YD study designs will use more rigor by having comparison groups and larger samples powered to detect differences in cardiometabolic risk factors. Multiple-arm studies that compare the impact of yoga, dance, and YD would be useful in delineating which aspects of YD the women find most useful and the aspects of the intervention that are most effective in reducing MetS symptoms. Comparative effectiveness studies that examine the impact of the psychological benefits of mindfulness versus the physical postures of YD to determine the mechanisms for stress relief and subsequent improved clinical outcomes in the target population also are warranted. Because finding valid self-report measures that accurately estimate PA in all populations, including AA women, remains a challenge (Banks-Wallace & Conn, 2002), future intervention studies would be preceded by validation tests of the modified IPAQ, which was used in the current study as an assessment tool. Also, valid and objective measures of PA such as accelerometry would be used to validate subjective self-report of PA. Most smart phones contain a built-in accelerometer in

addition to a gyroscope and altimeter that, when worn on the body, can be programmed to track actual PA and/or yoga-based activity in future studies, offering improved data collection in an efficient, cost-effective manner. Additionally, devices such as the Fitbit® accelerometer/actigraph/altimeter, which can differentiate yogic movements from other types of movement, would be useful in providing direct measures of yoga-based PA. Technological implements such as mobile apps offer an objective means for administering study surveys, direct measures of PA (e.g., accelerometry, number of minutes of activity), clinical outcomes (e.g., blood pressure, heart rate), anthropometric data (e.g., weight, BMI, waist circumference), and social support to enhance intervention participation.

The African American Collaborative Obesity Research Network (AACORN) advocates for looking beyond individual lifestyle changes towards the social and environmental forces influencing PA behaviors (Kumanyika, Prewitt, Banks, & Samuel-Hodge, 2010). YD was designed with certain ecological factors (e.g., low access to PA resources, unsuitable built environments, and cultural sensitivity) in mind. This pilot study, however, relied on selected PA-modifying individual characteristics (e.g., demographics, biologic characteristics, and previous experiences with PA) to demonstrate feasibility for YD. Given its general acceptability, the YD intervention forms the foundation for a program of research to evaluate the ways in which the aforementioned ecological factors influence YD and PA participation.

Health Promotion

According to Garcia and colleagues (2011), “the major focus of many public health nursing activities is primary prevention” (p. 16). As increasing PA has been a public health priority since the inception of the *Healthy People 2020* initiatives, effective interventions that emphasize prevention of chronic diseases are of great value. Primary prevention targets healthy

individuals, secondary prevention targets those individuals newly diagnosed with disease, and tertiary prevention benefits individuals with chronic disease. YD and yoga-based activity have the ability to impact patient outcomes on all three levels of care.

Primary Prevention

Primary prevention occurs before a problem develops and targets well populations. Raising awareness of heart disease in AA women may increase early diagnosis and treatment, thus reducing consequences that arise from their delay in seeking treatment (Eastwood *et al*., 2013). Although AA women's level of awareness of the signs and symptoms of CVD has doubled since 1997, their level of awareness in 2012 mirrors that of White women in 1997, suggesting a need to target educational efforts directly towards AA women (Mosca, Hammond, Mochari-Greenberger, Towfighi, & Albert, 2013). Preconceived notions about AA women's ambivalence about their health and their own self-silencing delay care and treatment and elevate the risk of death from chronic, but preventable disease (Eastwood *et al*., 2013). Primary prevention strategies must include widespread culturally sensitive health education that provides current, updated information about risk factors and symptomology (Mosca et al., 2011)**.**

Nurse-managed health centers (NMHC) are providing new models for health promotion and wellness around the country (Hansen-Turton, Bailey, Torres, & Ritter, 2010). NMHCs are attempting to meet the challenges the United States is facing in transforming health care and promoting the health of the public, particularly at the primary level (Institute of Medicine U.S. Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, 2011). Nurses are innovating health care delivery and improving access to preventive services by implementing community-based education and wellness programs. Using a future-oriented theory of human caring (Bent, Moscatel, Baize, & McCabe, 2007), nurses are working to

develop independent practices and create new nurse-led, multi-disciplinary models of care delivery. The potential for YD research to take place within a NMHC model (Ferrari & Rideout, 2005) would be significant, as this type of model would be supportive of a community/family-based primary prevention intervention that uses complementary and supportive therapies to allay symptoms of MetS and subsequent sequelae. A family-based model would allow families to interact with one another and to share social support networks, providing much-needed primary prevention strategies for this high-risk group. Family/community-based, nurse-managed wellness centers also would provide opportunities for community-engaged research examining multi-intergenerational epigenetic patterns of stress, hypertension, obesity, and T2D.

Secondary Prevention

Implemented after a problem has begun, secondary prevention identifies risks and treats these before problems become more serious. Given the state of the science on BMI thresholds for determining mortality risk in AA women with MetS-related symptoms, the provision of more relevant and race-specific BMI scales are needed. Current BMI scales are inaccurate in predicting risk for disease and death in AA women (Katzmarzyk, Bray, Greenway, Johnson, Newton, et. al., 2011). The American Heart Association recommends that health care researchers and providers develop improved screening mechanisms for improving clinical outcomes that use factors associated with an increase of CVD in women (Mosca et al., 2011). Instead of pathologizing women based on high BMIs and reports of typical symptoms, health care providers, through careful listening to the stories and presenting symptoms and asking assessment questions in ways that address culture-bound symptomology (e.g., stomach triggers, headache), clinicians may be able to diagnose earlier mental health issues and heart disease risk in AA women. The propensity to pathologize AAs as morbidly obese, psychotic, and non-

adherent is discriminatory and lends to the overprescribing of medications in a group that is at risk for polypharmacy, the simultaneous use of several drugs to treat one condition. Meanwhile, diagnoses of acute, life-threatening clinical conditions are being missed in this disparate group. A new diagnostic screening measure for AA women is needed that does not make chest and left arm/jaw pain its main focus for assessing risk of death from myocardial infarction. Prior to experiencing angina and coronary artery disease, AA women tend to describe shortness of breath, stomach triggers, and other atypical, culture-bound symptoms not reported by other ethnic/racial groups (Eastwood *et al*., 2013). This cluster of symptoms presenting in AA women may be a barrier to diagnoses and treatment, as patients lacking chest pain receive less effective care and have worse outcomes. Cultural sensitivity is necessary to capture the nature of the symptomology and to produce appropriate, specific diagnostic screening measures. Health care providers must adapt their care models to accurately assess disease risk and symptomology, given that AA women themselves may not recognize atypical symptoms.

When recruiting AA women to PA research or when treating these women for CVD, focus on lowering the BMI without clinical justification may result in non-adherence and missed opportunities for education and screening. Women's own perceptions of their bodies as too thin or too large should be taken into perspective when planning interventions. When marketing yoga-based interventions to AA women, strategies that emphasize stress relief and relaxation may be more successful than those that emphasize weight and BMI reduction. Secondary prevention could include support and awareness of and empowerment for accurately capturing those women at high risk for and experiencing early evidence of heart disease. Embracing an idea of how one can be 'fleshy and fit' versus targeting only lowering the BMI may enhance PA engagement and maintenance in AA women.

Tertiary Prevention

After a disease has occurred, tertiary prevention limits problems from getting worse and restores individuals to their optimal levels of function. Currently, thiazide diuretics are the most commonly used hypertensive medication; although calcium channel blockers are the standard of care in monotherapy for AAs (Harman *et al*., 2013), hypertensive individuals using only calcium channel blockers are less likely to meet their target BP goals than persons using thiazides alone. Obesity is associated with heart failure (HF) and diastolic HF, which carries a 4-fold increased risk of mortality when compared to an individual without HF, is likely to occur with hypertension and T2D (Gary & Davis, 2008). Standard treatment therapy for HF includes diuretics; however, because AAs are diagnosed with HF at a higher rate than other comparison groups, present with different symptoms, and die more quickly (Owan & Redfield, 2005), more effective preventive therapies are needed to prevent worsening of disease. Diastolic HF is connected with diabetes, demonstrating a multifaceted relationship between T2D, CVD, and the stress response. Atrial fibrillation (Afib) often accompanies HF in AA woman who are older and have lower BPs (Mitchell *et al*., 2011), causing them to carry a higher burden of illness and risk of death. New pharmacological treatment regimens are being developed for HF with accompanying Afib (Mitchell *et al*., 2011); however, these also can be expensive and have unwanted side effects. Yoga practice provides protection from HF (Pullen *et al*., 2010), hypertension, (Cade *et al*., 2010) and Afib (Lakkireddy *et al*., 2013), offering an ideal cardiac rehabilitation tertiary level health promotion practice. Afib is associated with anxiety and depression (Olazabal Eizaguirre, González-Torres, & Gaviria, 2013; Patel *et al*., 2013) and sudden cardiac events. To reduce the health disparities associated with the aforementioned conditions, health care providers will have to develop new screening/diagnostic tools to address

the gaps in understanding the unique culture-bound symptoms that AA women have. However, when AA women present with disease, yoga-based activity can be an effective supportive and rehabilitative therapy following a cardiometabolic disease diagnosis.

Future Study Design Using Mobile Apps

Modifications to the study design would enhance the researchers' abilities to accurately measure improvements in MetS-related symptoms. Recording videos that use multiple on-screen models along with edits that display multiple viewing angles would make the YD videos more acceptable, as would the addition of more specific, well-defined audio cues. In terms of indirect measures and mediators of PA and MetS risk, stress warrants attention as a mediator of CVD and mortality. Previous research involved stress measures that were unstable and complicated to capture. Though more research is warranted, genomics, a burgeoning field exploring the intergenerational patterns of epigenetic biomarkers for stress, type 2 diabetes, and hypertension (McCormack & Grant, 2013; Neel, 1962; Stoger, 2008), has begun to show promise as indicators of health and disease. Anthropomorphic risk factors, including body fat percentage and waist circumference, also warrant further study to determine the relationships of these variables to obesity and MetS. In terms of T2D, metabolic and endocrinological influences, such as insulin sensitivity, glycolated hemoglobin, and fasting blood sugar, each plays a role in T2D development and is deserving of further investigation. Measures of CVD risk factors, including cholesterol, triglycerides, ejection fraction, electrocardiograph, and BP, should be examined in future efficacy studies examining the impact of YD on MetS risk. The use of technology in health care research makes this theory-based, culturally appropriate approach translational to AA women with and at risk for MetS.

The YD study is the first of its type to examine the experience of and acceptability of yoga by AA women. YD is theory-based and addresses issues of time and cost efficiency, accessibility, and translatability. YD is culturally tailored and enlists participant trust by having been pilot tested using multiple integrated methods for collecting data and reporting the results. YD is translational as it has real-world application in the lives of the participants. Using a closed Internet-based Web site to deliver the YD intervention provided opportunities for improved intervention fidelity. Using videos to standardize intensity, duration, and variety in poses allows for the study to be replicated in similar populations. YD has the potential to be a self-care health promotion practice that complements traditional health care by improving cardiometabolic risk factors and disease.

Determining the feasibility of YD and understanding the experiences that influenced its use forms the foundation of a program of nursing research that can have an impact on the improvement of clinical obesity-related outcomes such as CVD and T2D for AA women. Understanding the complex factors that mediate PA and providing additional empirical support for efficacious, theory-based PA programs further advance the nursing and public health discourse, offering fresh and personal perspectives previously understudied in sedentary AA women.

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APPENDICES

Table of Contents

Appendix A: YD Pre-Screening Checklist

Y D Pre-Screening Questionnaire

Close Instructions

This survey will help the study team determine whether or not you are able to participate in this study. Please answer the following questions.

1. **Are you an Black woman?**
   - a. No
   - b. Yes
2. **Are you between 35-64 years old?**
   - a. No
   - b. Yes
3. **Do you think or have you been told that you are considered overweight or obese?**
   - a. No
   - b. Yes
4. **Do you have email access?**
   - a. No
   - b. Yes
5. **Do you have Internet access?**
   - a. No
   - b. Yes

Next ›

6. **Do you have a laptop or desktop computer at home?**
   - a. No
   - b. Yes
7. **Do you have a working DVD player?**
   - a. No
   - b. Yes

Appendix B: Physical Activity Readiness Questionnaire (PAR-Q)

Physical Activity Readiness Questionnaire

Close Instructions

This survey will help the study team determine whether or not physical activity is appropriate for you. Please answer the following survey questions.

1. **Has your doctor ever said that you have a heart condition and that you should only perform physical activity recommended by a doctor?**
   - a. No
   - b. Yes

2. **Do you feel pain in your chest when you perform physical activity?**
   - a. No
   - b. Yes

3. **In the past month, have you had chest pain when you were not performing any physical activity?**
   - a. No
   - b. Yes

4. **Do you lose your balance because of dizziness or do you ever lose consciousness?**
   - a. No
   - b. Yes

5. **Do you have a bone or joint problem that could be made worse by a change in your physical activity?**
   - a. No
   - b. Yes

Next ›

Close Instructions

This survey will help the study team determine whether or not physical activity is appropriate for you. Please answer the following survey questions.

6. **Is your doctor currently prescribing any medication for your blood pressure or for a heart condition?**
   - a. No
   - b. Yes

7. **Do you know of any other reasons why you should not engage in physical activity?**
   - a. No
   - b. Yes

‹ Back

Submit

Appendix C: Individual Characteristics Form (ICF)

Individual Characteristics Form

Close Instructions

This survey will help the study team determine your health status and eligibility to participate in Yogic Dance. Please answer the following questions.

1. **Age (years)**

2. **Race/Ethnicity (Select all that apply.)**
   - a. Black/African-American
   - b. Bi-racial
   - c. Multi-racial

3. **Marital status (Select all that apply.)**
   - a. Single
   - b. Divorced
   - c. Separated
   - d. Married
   - e. Partnered

4. **Education (years)**

5. **Employed? (Select all that apply.)**
   - a. No
   - b. Yes

Next ›

Individual Characteristics Form

Close Instructions

This survey will help the study team determine your health status and eligibility to participate in Yogic Dance. Please answer the following questions.

6. Insurance Status (Select all that apply.)

- [ ] a. Uninsured
- [ ] b. Medicaid
- [ ] c. Medicare
- [ ] d. Private Insurance

7. Yearly income range (Select all that apply.)

- [ ] a. $0-$9,999
- [ ] b. $10,000-$19,999
- [ ] c. $20,000-$29,999
- [ ] d. $30,000-$39,999
- [ ] e. $40,000-$49,999

8. Total number of adult and child dependents in home

9. Are you a (non-paid) caregiver for someone not in home? (Select all that apply.)

- [ ] a. No
- [ ] b. Yes

10. Caregiver status (Select all that apply.)

- [ ] a. Primary
- [ ] b. Secondary

‹ Back Next ›

Individual Characteristics Form

Close Instructions

This survey will help the study team determine your health status and eligibility to participate in Yogic Dance. Please answer the following questions.

11. Family history of cardiovascular disease: heart attack, high cholesterol, high blood pressure, dysrhythmias, congestive heart failure (Select all that apply.)

- ☐ a. No
- ☐ b. Yes, Primary
- ☐ c. Yes, Secondary

12. Family history of obesity (Select all that apply.)

- ☐ a. No
- ☐ b. Yes, Primary
- ☐ c. Yes, Secondary

13. Family history of type II diabetes (Select all that apply.)

- ☐ a. No
- ☐ b. Yes, Primary
- ☐ c. Yes, Secondary

14. Menopause status (absence of menstrual cycle for one year or surgical intervention) (Select all that apply.)

- ☐ a. No
- ☐ b. Yes

15. Weight (pounds)

‹ Back Next ›

Individual Characteristics Form

Close Instructions

This survey will help the study team determine your health status and eligibility to participate in Yogic Dance. Please answer the following questions.

16. **Weight (kilograms)**

17. **Waist circumference (cm)**

18. **Systolic blood pressure (mmHg)**

19. **Diastolic blood pressure (mmHg)**

20. **Resting heart rate (beats/minute)**

Appendix D: International Physical Activity Questionnaire (IPAQ)

International Physical Activity Questionnaire

Close Instructions

This survey will help the study determine your level of physical activity. Please answer the following questions.

1. **In general, how many days per week do you do vigorous activities like running, heavy lifting, aerobics, or fast bicycling for at least ten minutes in a row? Do not count any vigorous activities you did for less than 10 minutes in a row? Assume that one week is seven (7) days.**
   - ○ a. 0 days per week
   - ○ b. 1 day per week
   - ○ c. 2 days per week
   - ○ d. 3 days per week
   - ○ e. 4 days per week
   - ○ f. 5 days per week
   - ○ g. 6+ days per week

2. **On the days that you do vigorous activities, how much time do you usually spend doing them? Only count the time that you spend doing vigorous activity for at least 10 minutes in a row.**
   - ○ a. I do not do vigorous activity for more than 10 minutes in a row.
   - ○ b. 10-15 minutes per day
   - ○ c. 16-30 minutes per day
   - ○ d. 31-45 minutes per day
   - ○ e. 46-60 minutes per day
   - ○ f. more than 60 minutes per day

3. **In general, how many days per week do you walk for at least 10 minutes in a row? Think about all the walking you do during the day including walking for exercise, walking to get places (transportation), walking at work or home, or any other walking that you do during the day. Do not count any walking you did for less than 10 minutes in a row. Assume that one week is seven (7) days.**
   - ○ a. 0 days per week
   - ○ b. 1 day per week
   - ○ c. 2 days per week
   - ○ d. 3 days per week
   - ○ e. 4 days per week
   - ○ f. 5 days per week
   - ○ g. 6+ days per week

4. **On the days you walk, how much time do you usually spend walking? Only count the time you spend walking at least 10 minutes in a row.**
   - ○ a. I do not walk for more than 10 minutes in a row.

International Physical Activity Questionnaire

- b. 10-15 minutes per day
- c. 16-30 minutes per day
- d. 31-45 minutes per day
- e. 46-60 minutes per day
- f. more than 60 minutes per day

5. **Of the time you spend walking for at least 10 minutes in a row, how much of that time is spent in brisk walking that increases your heart rate and gets you breathing faster normal?**
   - a. I do not walk briskly for more than 10 minutes in a row.
   - b. 10-15 minutes per day
   - c. 16-30 minutes per day
   - d. 31-45 minutes per day
   - e. 46-60 minutes per day
   - f. more than 60 minutes per day

Next ›

6. **In general, how many days per week do you moderate activities like carrying light loads, playing doubles tennis or regular bicycling for at least 10 minutes in a row? Assume that one week is seven (7) days.**
   - a. 0 days per week
   - b. 1 day per week
   - c. 2 days per week
   - d. 3 days per week
   - e. 4 days per week
   - f. 5 days per week
   - g. 6+ days per week

7. **On the days that you do other moderate activities, how much time do you usually spend doing them? Only count the time you spend doing moderate activity for at least 10 minutes.**
   - a. I do not do moderate activity for more than 10 minutes in a row
   - b. 10-15 minutes per day
   - c. 16-30 minutes per day
   - d. 31-45 minutes per day
   - e. 46-60 minutes per day
   - f. more than 60 minutes per day

‹ Back

Submit

Appendix E: Goal-setting Worksheet

Goal-setting Worksheet/Contract: Part I: Past Experience with Physical Activity

Close Instructions

This worksheet will help you think about setting goals for increasing your weekly physical activity. The worksheet ends with a physical activity Contract for you to sign and date.

1. **What attempts have you made in the past to be physically active?**

2. **What did you learn from these experiences**

Submit

Goal-setting Worksheet/Contract: Part 2: Benefits and Barriers of Physical Activity

1. **What are the personal benefits of becoming more active?**

2. **What problems (barriers) might you have trying to be active**

3. **Which list is longer your list of benefits or your list of barriers?**

4. **What are some ways to overcome the barriers to becoming more physically active?**

Submit

Goal-setting Worksheet/Contract: Part 3: Role Models

1. **Is there anybody in your family or any of your friends who is physically active 3-5 times every week? If so, who, and what do they do?**

2. **Is there anybody outside of your family or friends who you consider a role model for being physically active? If so, who, and what do they do?**

Submit

Goal-setting Worksheet/Contract: Part 4: Setting Goals for Becoming More Physically Activie

1. **Are you ready to set goals and develop a plan to become more active?**
   - a. No
   - b. Yes

2. **What is your short-term physical activity goal?**

3. **How will you measure your goal?**
   - a. number of minutes per session
   - b. number of minutes per day
   - c. number of days per week
   - d. number of weeks per month
   - e. number of dress sizes lost
   - f. number of miles walked
   - g. other

4. **Do you think this goal is something you can achieve?**
   - a. No
   - b. Yes

5. **How do you know this is a realistic goal for you?**

Next ›

Goal-setting Worksheet/Contract: Part 4: Setting Goals for Becoming More Physically Activie

6. **How many days will pass before you check to see if you are on your way to reaching your short-term goals?**
   - ○ a. 1
   - ○ b. 2
   - ○ c. 3
   - ○ d. 4
   - ○ e. 5
   - ○ f. 6
   - ○ g. 7 or more

7. **What will the reward be if you meet your goals?**

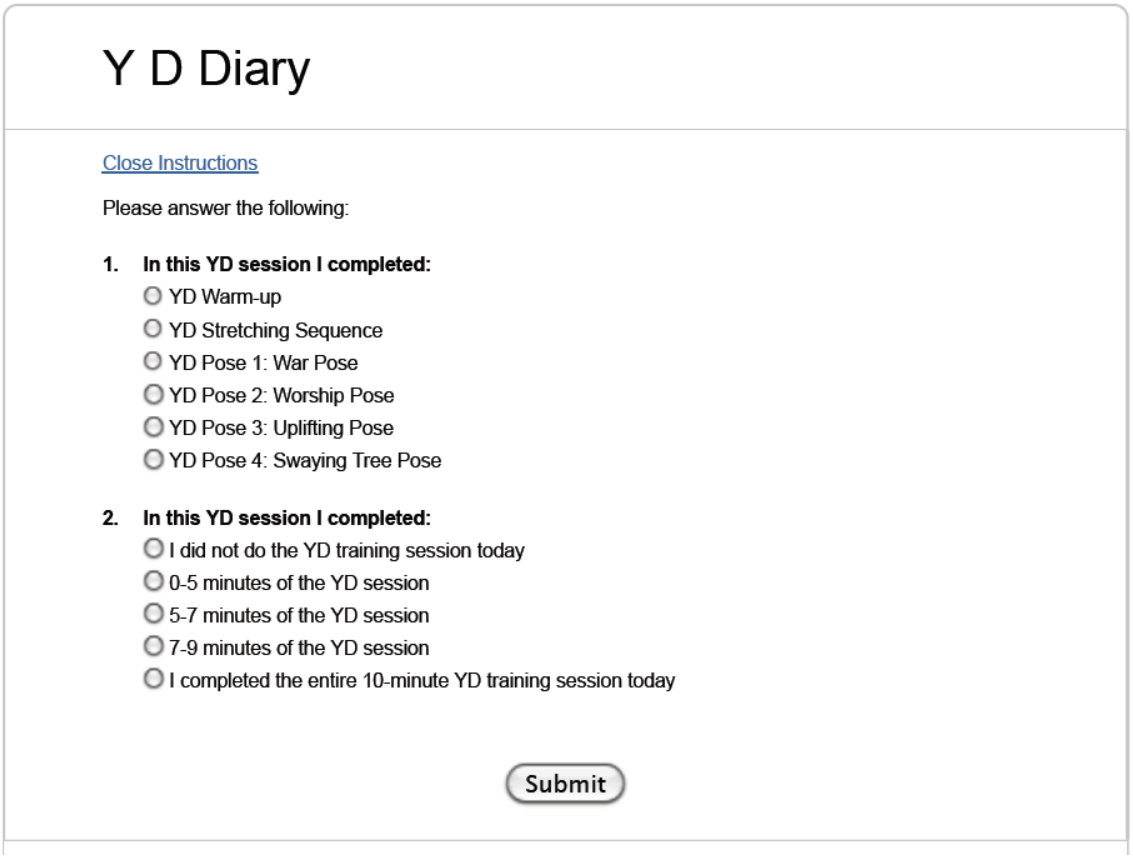
8. **What will you do to remind yourself of your goal to increase your physical activity (Select all that apply.)**
   - ☐ a. use a physical activity diary to keep up with my physical activity
   - ☐ b. keep my activewear out and easy to get to so I can be reminded to be physically active
   - ☐ c. program an alarm on my cell phone or computer to remind me to do physical activity
   - ☐ d. other strategies

9. **To whom (besides yourself) will you hold yourself accountable for reaching your goals? This person will look at your goals and sign off on them.**

10. **I will make a commitment to practice 30 minutes of physical activity, specifically yogic dance practice 5 days per week for 4 weeks after today.**
    - ○ a. No
    - ○ b. Yes

‹ Back

Appendix F: YD Diary



Y D Diary

Close Instructions

Please answer the following:

1. **In this YD session I completed:**
   - ○ YD Warm-up
   - ○ YD Stretching Sequence
   - ○ YD Pose 1: War Pose
   - ○ YD Pose 2: Worship Pose
   - ○ YD Pose 3: Uplifting Pose
   - ○ YD Pose 4: Swaying Tree Pose

2. **In this YD session I completed:**
   - ○ I did not do the YD training session today
   - ○ 0-5 minutes of the YD session
   - ○ 5-7 minutes of the YD session
   - ○ 7-9 minutes of the YD session
   - ○ I completed the entire 10-minute YD training session today

Submit

Appendix G: YD Program Evaluation

YD Program Evaluation

1 I found the Orientation Tips video useful.

- ○ Strongly Disagree
- ○ Disagree
- ○ Undecided
- ○ Agree
- ○ Strongly Agree

2 I found the UVaCollab Tips Sheet helpful.

- ○ Strongly Disagree
- ○ Disagree
- ○ Undecided
- ○ Agree
- ○ Strongly Agree

3 I found the goalsetting video useful.

- ○ Strongly Disagree
- ○ Disagree
- ○ Undecided
- ○ Agree
- ○ Strongly Agree

4 I found the discussion of the BMI table useful.

- ○ Strongly Disagree
- ○ Disagree
- ○ Undecided
- ○ Agree
- ○ Strongly Agree

5 When I was watching the goalsetting video, I found the graphs and charts such as the ones below to be useful.

- ○ Strongly Disagree
- ○ Disagree
- ○ Undecided
- ○ Agree

- Strongly Agree

6 I found the SMART goal-setting method useful.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

7 I enjoyed the 10 minute warm up.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

8 I enjoyed the Dynamic Head Tilt.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

9 I enjoyed the Dynamic Head Turn.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

10 I enjoyed the Dynamic Arm Across.

- Strongly Disagree
- Disagree

- Undecided
- Agree
- Strongly Agree

11

I enjoyed Dynamic Faucet Hands.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

12

I enjoyed Dynamic Rotated Flyaway.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

13

I enjoyed Dynamic Chest.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

14

I enjoyed Dynamic Clasp & Round.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

15

I enjoyed Dynamic Side reach.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

16

I enjoyed Dynamic Arch.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

17

I enjoyed Dynamic Side Lunge.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

18

I enjoyed Static Lunge.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

19

I enjoyed Forward Bend.

- Strongly Disagree
- Disagree

- Undecided
- Agree
- Strongly Agree

20

I enjoyed The Fan.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

21 I found the Worship Pose 'mini-lesson' enjoyable.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

22 I found the Swaying Tree Pose 'mini-lesson' enjoyable.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

23 I found the War Pose "mini-lesson" enjoyable.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

24 I found the Uplifting Pose 'mini-lesson' enjoyable.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

25

I enjoyed learning about the Soli traditional dance.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

26

I enjoyed learning about the Kuku traditional dance.

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

27

Please use this space to share any thoughts, concerns, complaints, or other feedback to the Yogic Dance study.

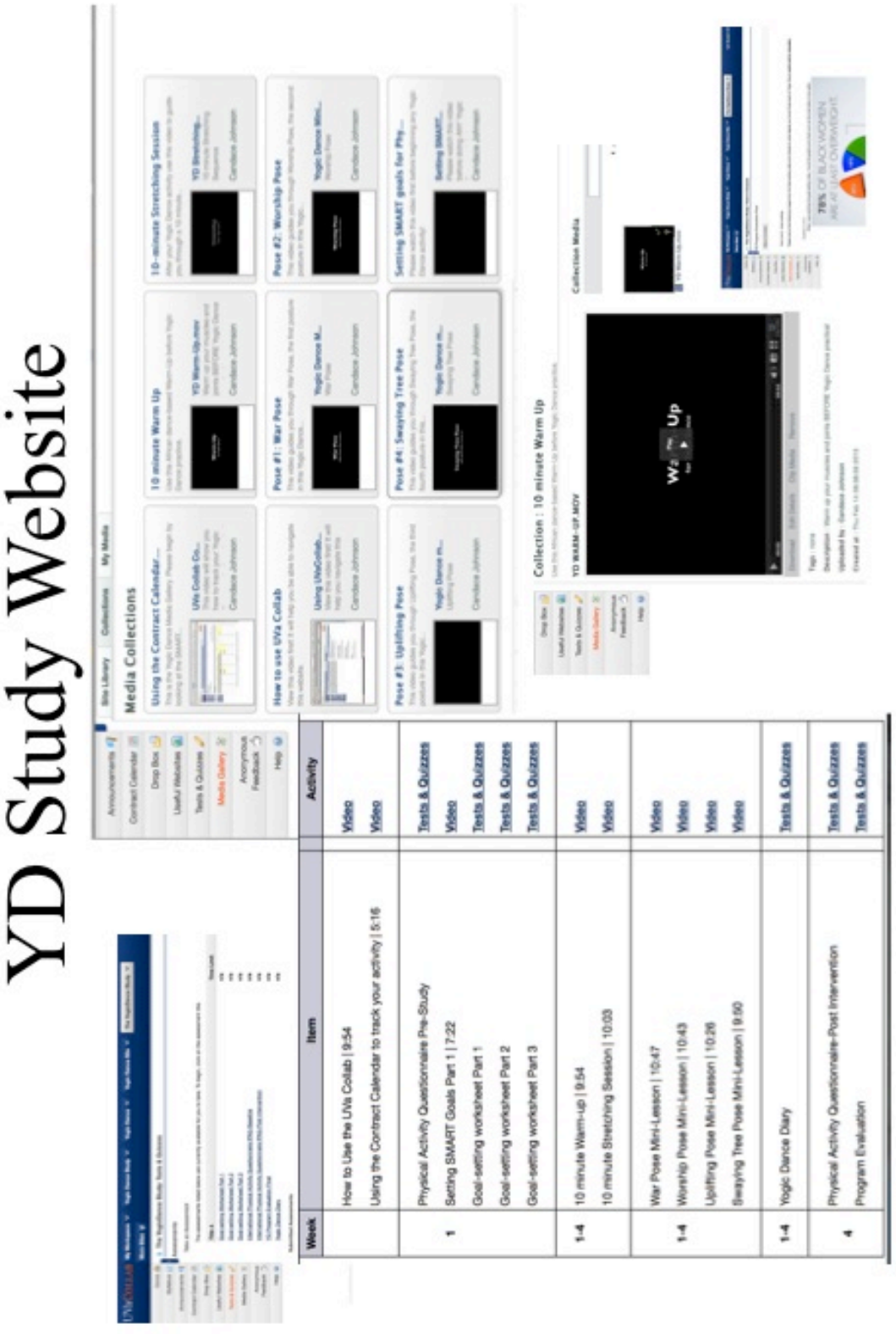
Appendix H: Ankh Symbology Images

Ankh Symbology

Obosom **Ptah** "ankhing" the Per Aa

Appendix I: YD Facebook™ Event Page Images

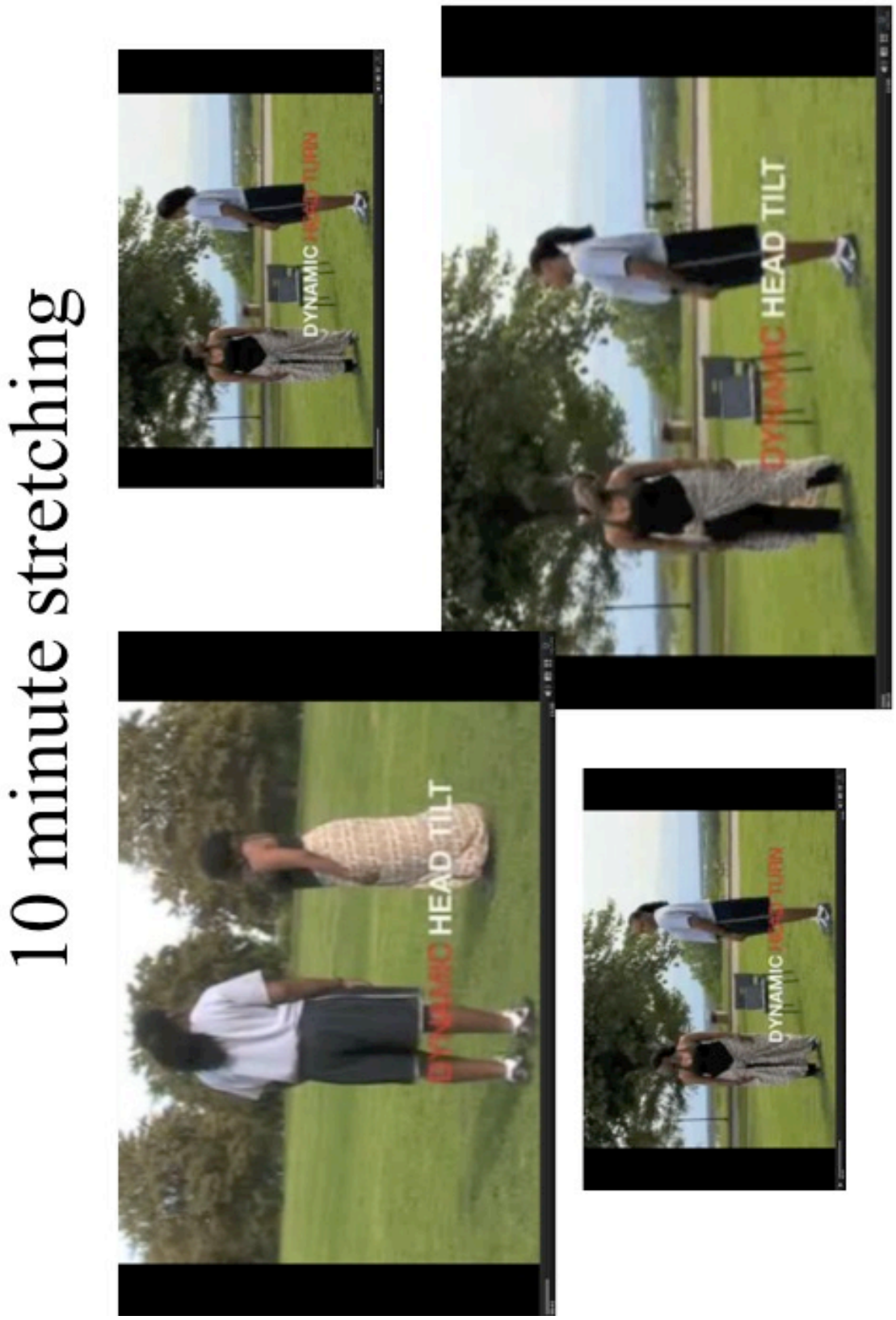
Appendix J: YD Study Web Site Images



Week	Item	Activity
	How to Use the UVa Collab | 9:54	Video
	Using the Contract Calendar to track your activity | 5:16	Video
1	Physical Activity Questionnaire Pre-Study	Tests & Quizzes
	Setting SMART Goals Part 1 | 7:22	Video
	Goal-setting worksheet Part 1	Tests & Quizzes
	Goal-setting worksheet Part 2	Tests & Quizzes
	Goal-setting worksheet Part 3	Tests & Quizzes
1-4	10 minute Warm-up | 9:54	Video
	10 minute Stretching Session | 10:03	Video
1-4	War Pose Mini-Lesson | 10:47	Video
	Worship Pose Mini-Lesson | 10:43	Video
	Uplifting Pose Mini-Lesson | 10:28	Video
	Swaying Tree Pose Mini-Lesson | 9:50	Video
1-4	Yogic Dance Diary	Tests & Quizzes
4	Physical Activity Questionnaire-Post Intervention	Tests & Quizzes
	Program Evaluation	Tests & Quizzes

Appendix K: 10-minute Warm-up Images

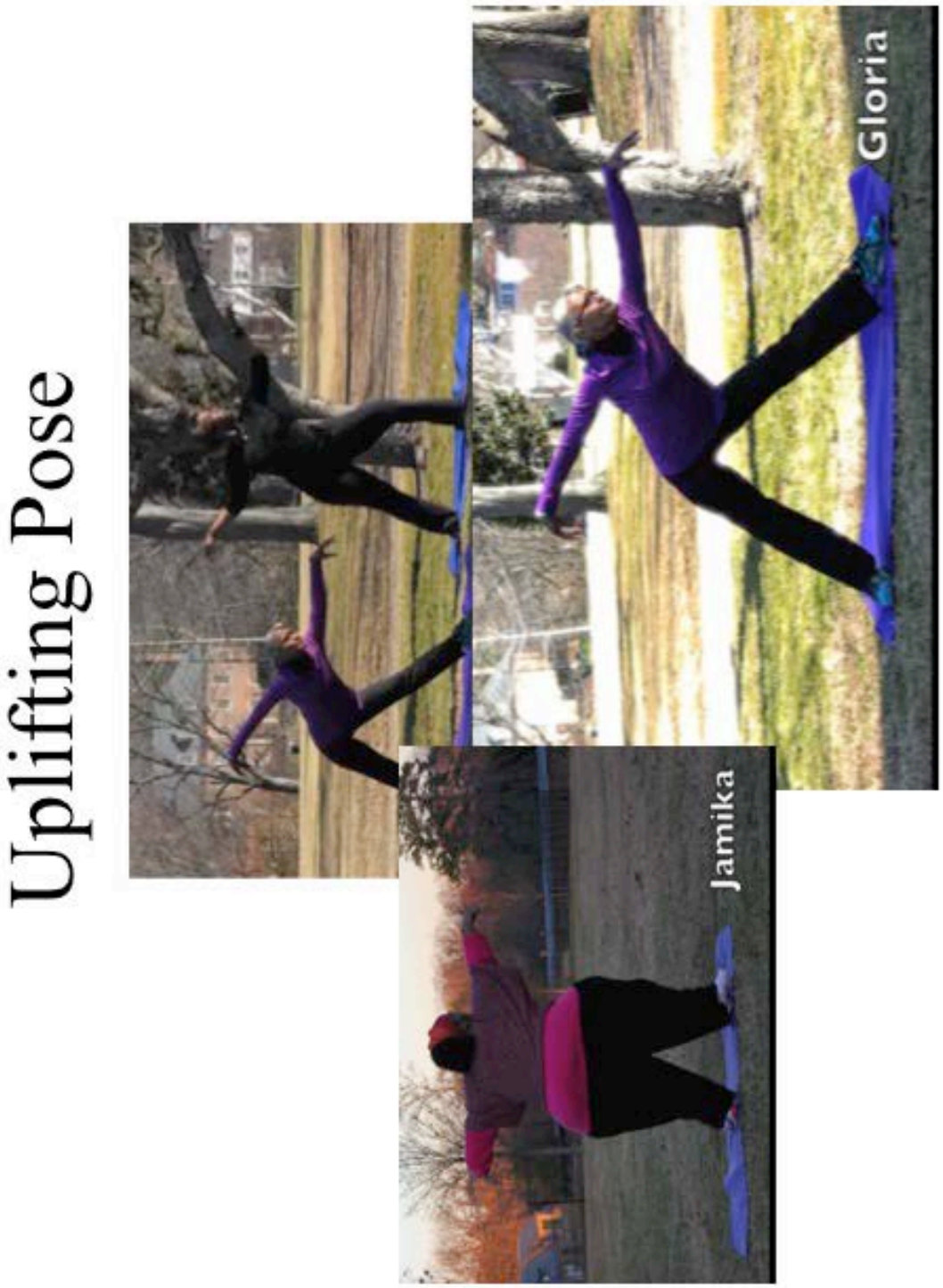
Appendix L: 10-minute Stretching Images



Appendix M: War Pose Images

Appendix N: Worship Pose Images

Appendix O: Uplifting Pose Images



Appendix P: Swaying Tree Pose Images

Appendix Q: Additional Exemplar Quotations by Theme and Source

Theme	Quotation	Source
#1: With some modifications for ease-of-use, the Internet is an acceptable means for delivering YD	I think I preferred the DVD just because I have symptoms of ADHD and so I need it on the TV where it's louder and then it's probably just the way my house is set up, you know there's more room over there near the TV so I know even logging on to UVA's collections this and that I was overwhelmed and just shut down once my password didn't work.	Participant 1 Focus Group 1
	I did have to actually put it as a favorite so I wouldn't get frustrated with the logging in because trying to log in I would forget so I had it as a favorite that helped me,	Participant 2 Focus Group 1
	but I do find when I did the internet, I did have to turn a certain way to be able to see you and do what you were doing in the mirror because I had a mirror in front of me so I had to turn a certain way, so I guess the DVD would have been better in that aspect…	Participant 3 Focus Group 1
	As for the mini videos (war pose, worship pose, etc), I could've used better examples/demo similar to the warm-up.	Program Evaluation-P5
	Participant 2: I did the internet and I didn't care for the grid that was to the left like you had to click on some stuff. Some of the stuff you click on to do to add to it. I know I didn't have to do that part, I don't think I did all I had to do was the videos, but I wanted to try to add to it to keep up with what I was doing. It just wasn't as user friendly. **Moderator:** Had it been more user-friendly, do you think accessing it you would have preferred to access it online over the videos or do you find that in the end the videos were the best way? **Participant 2:** No the Internet would have been just fine.	Participant 2 Focus Group 1
	I wish the segment poses were together or one 10-min showing to rotate them. It was a good program. I thought some of it moved slow, so I improvised.	Participant 12
#2 Social support would be an important mediator for YD	I think the group setting because I'm social, even like us meeting today, I think my commitment would go up because I would be thinking about me letting you down and they're waiting for me, so I do think that if I was in a group setting, I would be more vested. It feels like it's for me and I mean it feels good.	Participant 1

Theme	Quotation	Source
(cont'd) #2 Social support would be an important mediator for YD	I agree with that because I was doing a church workout regimen and because it was a group setting, I would make sure I made it there, but doing it individually, you know, that's on the back burner, it would be the last thing because it was rude, like you said that commitment or that camaraderie of us working out together… You know so now that I know that, I would be willing to come back to the same group next week and say let's do some of this yoga you know and knock it off.	Participant 2
	the social part is good, I like that, I like that. I like to get to meet people I haven't met before, but on the same hand I have to have a determination and a commitment to myself to do something if I want the correct results.	Participant 3
	Sometimes doing activity alone is discouraging	Goal-setting Worksheet- P3
	Just today and us being here and all the conversation that we had pertaining to the yoga dance, and just the connectivity of us period as black women, I think that part is, if you want to call that spiritual it does something to our insides, you know so, not particularly spiritual in a sense of Christianity or anything like that, but just the fact that we are connecting and we set down and talked. We had not even met each other before, but yet we had a connectivity because of our understanding and our knowledge and that is saying to me that we can do this anywhere with any group of women because of we are women and that our minds basically function the same way.	Participant 3
	The only thing that I would have liked more is if maybe I could have done it with a group.	Participant 4 Program Evaluation
	I had some difficulty following the individual poses because I was not quite sure if I was supposed to hold the pose or go in and out of the pose. I would have liked more structure to each session to make it easier to follow.	Participant 10
#3 Cultural dance favorably enhances the YD experience.	I like when every time [the narrator] came on, [she] explained the culture of what you were doing the dance, so that had the spiritual connection for me, like where it came from, where it was derived from and a lot of it was over there in Africa, so that to me was the spiritual piece for me that I enjoyed learning the history of what I was doing.	Participant 1
	So, with the different body types in the video that made me feel good, with the history piece that made me feel prideful, it's just more of a connection, so I would say that was more spiritual for me.	Participant 2

Theme	Quotation	Source
(cont'd) #3 Cultural dance favorably enhances the YD experience.	The women really seem to enjoy the cultural dance aspects of the video and the explanations of the meanings behind the movements. They were using the names of the dances in the warm-up chapter when they spoke with me on the telephone and in their homes. Embodiment and movement seems to be more appealing and motivating than the YD poses where there are longer periods of holding still.	Field notes
	I really enjoyed the warm-up and stretching videos the most. They were easy to follow and the instructions were clear with step-by-step. Lastly, I plan on using the warm-up/stretching to begin a personal journey for myself. Thanks for allowing me to take part in this study.	Program Evaluation Participant 5
	I did appreciate the information given about each pose and its definition and purpose.	Participant 10
	The warm-up & stretching were my favorite! My husband & little kids (ages 1-4) joined me at times when I did those during day hours (not 5:30 am).	Participant 12
	Whenever I put the video in my 4 y.o. did it with me. He loves music so it was inviting and made him want to try it. He even tried the posing and the stretching.	Participant 8