



Original Article

Fostering spirituality and psychosocial health through mind-body practices in underserved populations



Nishat Bhuiyan^a, Lorna H. McNeill^b, Melissa Bopp^c, Danielle Symons Downs^{c,d}, Scherezade K. Mama^{b,*}

^a College of Health Solutions, Arizona State University, Phoenix, AZ, United States

^b Department of Health Disparities Research, The University of Texas MD Anderson Cancer Center, Houston, TX, United States

^c Department of Kinesiology, College of Health and Human Development, The Pennsylvania State University, University Park, PA, United States

^d Department of Obstetrics and Gynecology, The Pennsylvania State University College of Medicine, Hershey, PA, United States

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ABSTRACT

Background: This study examined changes in spirituality and psychosocial outcomes among African American and rural adults participating in a culturally-adapted mind-body intervention.

Methods: African American ($n = 22$) and rural ($n = 38$) adults in Harmony & Health attended mind-body sessions twice a week for eight weeks and completed questionnaires on spirituality and psychosocial distress at baseline and post-intervention. Linear regression and repeated measures analyses were used to examine associations between intervention attendance and spirituality.

Results: Attendance was significantly associated with increased spirituality ($\beta = 0.168$, $p = 0.13$). Repeated measures analyses revealed a significant three-way interaction between attendance, spirituality, and study site ($F(9,31) = 2.891$, $p = 0.13$). Urban African American participants who attended $\geq 75\%$ of sessions reported greater increases in spirituality.

Conclusion: Findings suggest that mind-body practices may foster spirituality in urban African American adults. Additional adaptations are needed to strengthen spirituality in rural residents and to improve psychosocial health and wellbeing in this underserved population.

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1. Introduction

Health disparities are well-documented in racial and ethnic minorities and rural residents, with non-Hispanic Black and African American adults and rural residents faring worse and reporting poorer health outcomes than non-Hispanic white and urban residents.^{1–3} Black and African American adults are more likely to have obesity and cardiovascular disease and die from their heart disease and cancer than white adults.^{2,4} Similarly, rural residents are at greater risk of obesity, cardiovascular disease, and cancer.^{1,5} Adverse mental health outcomes, including psychological stress, depression, and anxiety, have been linked to poor adherence to

healthy lifestyle behaviors, leading to increased risk of cardiovascular disease and cancer and may contribute to disparities.⁶ Despite growing documented mental health needs,^{7–10} racial and ethnic minority adults and rural residents are less likely to seek treatment for mental health disorders, partially due to reduced access to health care and mental health services.^{5,11} Thus, innovative approaches are needed that integrate mental health care into community settings.¹²

A large proportion of American adults report a religious affiliation, and religious affiliation is higher among racial and ethnic minorities and rural adults, making faith-based settings ideal for health promotion and disease prevention efforts.^{13–15} Church-based interventions to promote healthful behaviors have been successful for increasing physical activity, improving dietary habits, and increasing cancer screening behaviors.¹⁶ Furthermore, there is promising but limited evidence on the use of faith-based set-

* Corresponding author at: Department of Health Disparities Research, The University of Texas MD Anderson Cancer Center, 1400 Pressler St., Unit 1440, Houston, TX 77030, United States.

E-mail address: skmama@mdanderson.org (S.K. Mama).

tings to improve mental health and psychosocial wellbeing among racial/ethnic minority and rural adults.^{17–20}

Cultural tailoring of interventions within faith-based settings, including adapting intervention materials to group characteristics and targeting cultural values of the target population, increases effectiveness and improves recruitment, retention, and intervention adherence.²¹ Incorporating spirituality is one strategy to culturally tailor interventions for faith-based communities and has been effective for health behavior change in underserved populations.¹⁶ Spirituality is defined by some researchers as “the way a person searches for meaning and purpose in life, as well as the relationship between himself and others, nature, and the sacred,”²² or can more simply refer to feelings of peace, meaning, and purpose in life. Culturally-tailored, spirituality-based interventions have shown promising results for improving mental health outcomes, such as stress, depression, and anxiety.^{23,24} Additionally, spirituality is increasingly being researched as a construct related to physical and psychological health.²⁵ For example, studies have shown that spiritual wellbeing may be associated with lower depression, anxiety, and stress²⁶ and reduced physiological risk factors for heart disease.²⁷ Other studies have shown that increased spirituality is associated with health behaviors, such as increased physical activity and decreased sedentary behavior.²⁸ Despite this, few interventions have sought to foster or strengthen spirituality as an intervention target versus a moderator of engagement.²⁹ Furthermore, it remains unclear whether changes in spirituality elicit changes in mental health outcomes in racial and ethnic minority and rural adults.

Harmony & Health (HH) was a culturally-adapted mind-body intervention developed in partnership with a faith-based organization to improve psychosocial wellbeing among urban African American and rural adults.^{30,31} Primary analyses demonstrated that HH was feasible and acceptable and improved psychosocial outcomes and quality of life in African American and rural adults.^{30,31} The purpose of this study was to determine the efficacy of HH for fostering spirituality in African American and rural adults and to examine the dose-response association between intervention attendance and changes in spirituality during the 8-week intervention. Additionally, we explored whether changes in spirituality were associated with changes in psychosocial outcomes, including stress, depressive symptoms, and anxiety, in African American and rural adults. We hypothesized that increased intervention attendance would be associated with increased spirituality, and that increases in spirituality would be associated with decreases in stress, depression, and anxiety over the 8-week intervention period.

2. Methods

2.1. Study design

This study is a secondary analysis of data collected from HH, a 14-week pilot intervention study assessing the feasibility and acceptability of a culturally-adapted mind-body intervention among church-going African American adults in Houston, TX and rural residents in Centre County, PA.^{30,31} In Houston, participants were randomized to the HH intervention group or a waitlist control group. In response to community desires and to meet recruitment goals, all participants in Centre County received the mind-body intervention. HH was approved by the Institutional Review Boards at The University of Texas MD Anderson Cancer Center (protocol ID: 2014–0083) and the Pennsylvania State University (protocol ID: STUDY00004310). Written informed consent was obtained from all participants enrolled in the study. Study details have been published previously and are briefly described below.^{30,31}

2.2. Participants

Participants were primarily recruited through existing church and community partnerships.^{30,31} Eligibility criteria across sites included being classified as overweight or obese (body mass index [BMI] 25.0–49.9 kg/m²), able to read and write in English, and generally healthy and able to pass the Physical Activity Readiness Questionnaire (PAR-Q).³² In Houston, all participants self-identified as Black or African American, were 18–65 years old, and self-reported being insufficiently active, defined as doing less than 75 min of exercise per week.³¹ In Centre County, all participants identified as a Centre County resident, were at least 18 years old, and self-reported being insufficiently active, defined as doing less than 120 min of exercise per week.³⁰ Detailed recruitment methods and eligibility criteria have been published previously.^{30,31} The current study sample ($N = 60$) includes Houston participants randomized to receive the HH intervention who attended at least one mind-body session ($n = 22$) and all participants in Centre County who attended at least one mind-body session ($n = 38$). The flow of participants by study site is shown in Fig. 1.

2.3. Intervention procedures

African American and rural adults participated in two in-person, group-based mind-body sessions per week for eight weeks, for a total of 16 sessions. One session in Centre County was canceled due to inclement weather; thus, a subsample of Centre County participants ($n = 25$) were offered a total of 15 sessions. The goal of the HH intervention was to promote physical and psychosocial wellbeing, and the curriculum was developed with church leaders to ensure saliency as previously described.^{30,31} The use of culturally and physically appropriate stretches and poses and daily scriptures were incorporated to culturally adapt the intervention and foster spirituality.³¹

At the start of each mind-body session, participants signed an attendance sheet, which was confirmed by a research assistant. All sessions were led by a certified yoga instructor trained to deliver the HH curriculum. Sessions consisted of a 5-min introduction, followed by 30 min of yoga-based stretching, which were culturally and physically appropriate for our target audience, as described previously.^{30,31} The final 10–15 min of each session focused on guided relaxation and breathing, during which participants were instructed to relax, reflect on the daily scripture, and focus on their breathing and God’s word. Participants were provided a scripture at the start of each session to guide their practice and to focus on during the guided relaxation portion of the session. Scriptures focused on the mind, body, strength, faith, or peace (e.g., “I can do all things through Christ who strengthens me.” [Philippians 4:14]) and rotated with each session.³¹ To promote intervention attendance and adherence, participants received weekly reminder emails and a reminder phone call the day before each scheduled mind-body session.

2.4. Data collection and outcome measures

Participants completed in-person assessments at baseline and post-intervention (8 weeks). Assessments included physical measurements and computer-based questionnaires assessing sociodemographic characteristics, spirituality, and psychosocial outcomes.

Participants reported age, gender, race and ethnicity, education, annual income, and employment status at baseline. Height and weight were measured by research staff at in-person assessments and were used to compute body mass index (BMI=kg/m²).

Spirituality was assessed via the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (FACIT-Sp) scale.³³ It

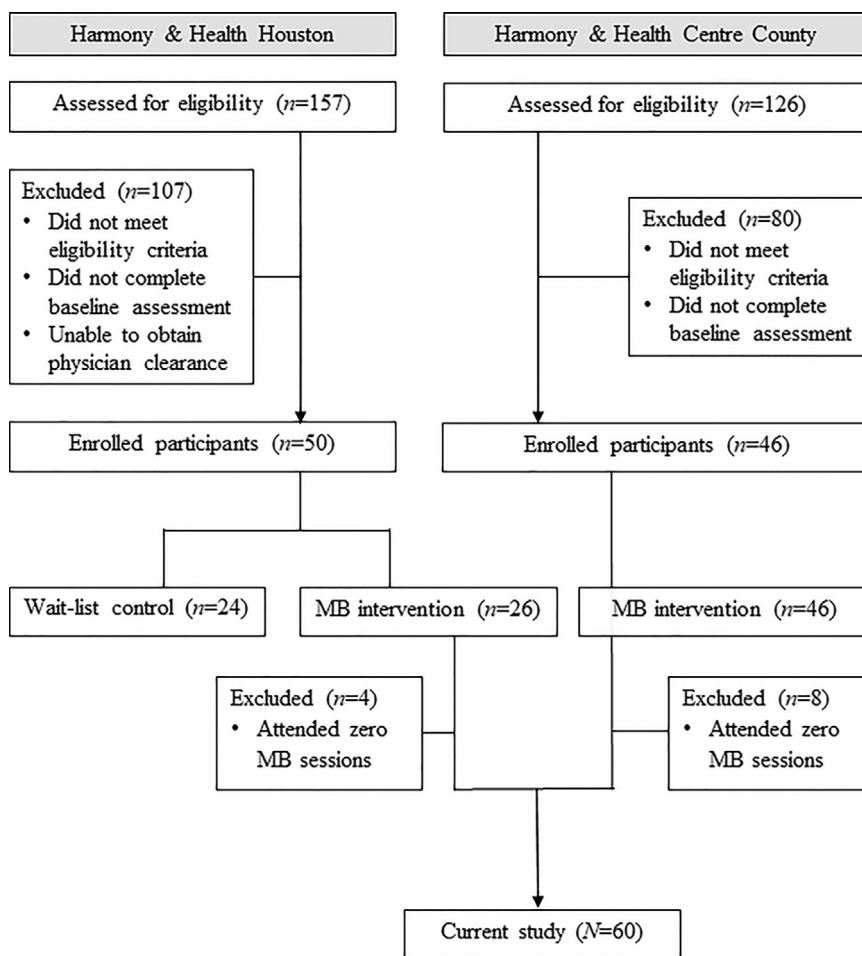


Fig. 1. Flow of study participants.

consists of three subscales, faith, meaning, and peace, with four items each assessing spiritual wellbeing, such as “I feel peaceful,” “I feel a sense of purpose in my life,” and “I find comfort in my faith or spiritual beliefs.”³³ Participants indicated to what extent aspects of their faith or spiritual beliefs contributed to their health-related quality of life over the past seven days using a 5-point scale, ranging from “not at all” to “very much.” Total scores range from 0 to 48, with higher scores indicating higher spiritual well-being. Cronbach’s alpha for the FACIT-Sp at baseline and post-intervention ranged from 0.81 to 0.85 in this sample.

Perceived stress, depressive symptoms, and anxiety were assessed at baseline and post-intervention. The 4-item Perceived Stress Scale (PSS-4) was used to assess the degree to which individuals appraise situations in their life as stressful.³⁴ Scores range from 0 to 16, with higher scores indicating greater perceived stress, and Cronbach’s alpha for the PSS-4 at baseline and post-intervention ranged from 0.61 to 0.63 in this sample. Depressive symptoms were assessed via the Center for Epidemiological Studies Depression Scale (CES-D), which consists of 20 items measuring depressive symptoms.³⁵ CES-D scores range from 0 to 60, with higher scores indicating greater depressive symptoms, and Cronbach’s alpha for the CES-D at baseline and post-intervention ranged from 0.81 to 0.88 in this sample. Anxiety was assessed via the Beck Anxiety Inventory (BAI), which consists of 21 items assessing cognitive and physiological symptoms of anxiety.³⁶ BAI scores range from 0 to 63, with higher scores indicating greater anxiety, and Cronbach’s alpha for the BAI at baseline and post-intervention ranged from 0.88 to 0.91 in this sample.

To measure attendance, a research assistant was present at each mind-body session to verify that all participants who were present at the sessions signed the attendance sheet. Attendance data were pulled from sign-in sheets, and the total number of sessions attended was used in analyses.

2.5. Analysis

Means, standard deviations, and frequencies were computed to describe characteristics of the study sample. Independent samples t-tests and chi-square tests were used to assess differences in demographic characteristics, attendance, and baseline spirituality and psychosocial outcomes between study sites. Paired samples t-tests were used to assess changes in spirituality and psychosocial outcomes from baseline to post-intervention. Study site was included as a single covariate in analyses, as it largely accounted for differences in both geographic setting and race/ethnicity.³⁷ Linear regression models were used to determine the association between attendance and post-intervention spirituality, adjusting for baseline spirituality and study site.³⁸ To further explore the dose-response association between attendance and spirituality, repeated measures analysis of variance (ANOVA) were used to examine changes in spirituality by attendance (two-way interaction) and a three-way interaction between changes in spirituality, attendance, and study site (time x attendance x study site). Lastly, linear regression models were used to explore associations between changes in spirituality and post-intervention psychosocial outcomes, adjusting for baseline psychosocial outcomes and study site. All statistical anal-

Table 1
Participant baseline characteristics and attendance by study site.

	Houston (n = 22) n (%)	Centre County (n = 38) n (%)	Total (N = 60) N (%)	p
Age (years) [M ± SD]	50.8 ± 10.1	50.5 ± 12.4	50.6 ± 11.5	.937
Attendance (number of sessions) [M ± SD]	10.5 ± 3.7	10.6 ± 4.2	10.6 ± 4.0	.870
Gender				.490*
Female	20 (90.9)	33 (86.8)	53 (88.3)	
Male	2 (9.1)	5 (13.2)	7 (11.7)	
Race/Ethnicity				.000*
White	0 (0.0)	17 (44.7)	17 (28.3)	
African American or Black	22 (100.0)	19 (50.0)	41 (68.3)	
Other	0 (0.0)	2 (5.3)	2 (3.3)	
Weight status				.063
Overweight (BMI 25–29.9 kg/m ²)	3 (13.6)	13 (34.2)	16 (26.7)	
Obese (BMI ≥30.0 kg/m ²)	19 (86.4)	23 (60.5)	42 (70.0)	
Education				.407
< Bachelor's degree	10 (45.5)	11 (28.9)	21 (35.0)	
Bachelor's degree	7 (31.8)	14 (36.8)	21 (35.0)	
> Bachelor's degree	5 (22.7)	13 (34.2)	18 (30.0)	
Annual income				.727
< \$40,000	6 (27.3)	9 (23.7)	15 (25.0)	
\$40,000–\$79,999	12 (45.5)	13 (34.2)	23 (38.3)	
≥ \$80,000	5 (22.7)	13 (34.2)	19 (31.7)	
Employment status				.898*
Employed	18 (81.8)	29 (76.3)	47 (78.3)	
Not employed	2 (9.1)	5 (13.2)	7 (11.7)	
Retired	2 (9.1)	4 (10.5)	6 (10.0)	
Spirituality [M ± SD]	37.3 ± 8.7	37.5 ± 9.3	37.4 ± 9.0	.899
Perceived stress [M ± SD]	4.5 ± 2.6	4.4 ± 3.1	4.5 ± 2.9	.820
Depressive symptoms [M ± SD]	9.9 ± 8.1	10.0 ± 8.6	10.0 ± 8.3	.809
Anxiety [M ± SD]	5.7 ± 7.2	6.4 ± 5.4	6.1 ± 6.1	.526

Note: p-values were derived using independent samples t-tests and chi-squared (or Fisher's exact, marked by *) tests where appropriate.

Table 2
Results of paired samples t-tests demonstrating changes in spirituality and mental health outcomes from baseline (T1) to post-intervention (T2) by study site.

	Houston (n = 22)				Centre County (n = 38)				Total (N = 60)			
	T1 M ± SD	T2 M ± SD	Δ	p	T1 M ± SD	T2 M ± SD	Δ	p	T1 M ± SD	T2 M ± SD	Δ	p
Spirituality	37.3 ± 8.7	41.4 ± 7.3	4.0	.010	37.5 ± 9.3	37.6 ± 9.0	0.2	.799	37.4 ± 9.0	38.9 ± 8.6	1.5	.032
Perceived stress	4.5 ± 2.6	3.9 ± 3.0	-0.6	.313	4.4 ± 3.1	3.8 ± 3.3	-0.5	.177	4.5 ± 2.9	3.9 ± 3.2	-0.6	.090
Depressive symptoms	9.9 ± 8.1	8.3 ± 7.4	-1.6	.337	10.0 ± 8.6	7.8 ± 8.1	-2.3	.002	10.0 ± 8.3	8.0 ± 7.8	-2.0	.009
Anxiety	5.7 ± 7.2	7.1 ± 7.8	1.4	.260	6.4 ± 5.4	6.5 ± 6.7	0.2	.858	6.1 ± 6.1	6.8 ± 7.1	0.6	.388

yses were performed using SPSS 24.0 (IBM SPSS Statistics, Armonk, NY), with statistical significance inferred at $p < .05$. Analyses were sufficiently powered to detect a small effect ($d = 0.17$) with a sample size of 60.

3. Results

3.1. Participant characteristics

Across study sites, the mean age of participants was 50.6 years ($SD=11.5$). Most participants were African American or Black (68.3%), female (88.3%), classified as obese (70%; $M\ BMI=32.9\ kg/m^2, SD=5.3$), employed (78.3%), and earned over \$40,000 annually (75%). With the exception of race and ethnicity, there were no significant differences in demographic characteristics, attendance, and baseline spirituality and mental health outcomes between study sites. Participant characteristics by study site are summarized in Table 1.

3.2. Changes in spirituality and psychosocial outcomes

Results of paired samples t-tests demonstrating changes in spirituality, perceived stress, depressive symptoms, and anxiety from baseline to post-intervention by study site are summarized in Table 2. Across sites, participants reported significant increases in

spirituality from baseline to post-intervention ($t = 2.2, p = .032$). Participants also reported significant decreases in depressive symptoms over time ($t=-2.7, p = .009$). There were no statistically significant changes in perceived stress or anxiety.

3.3. Dose-response association between attendance and spirituality

Linear regression models indicated that higher session attendance was significantly associated with increased spirituality ($\beta=0.1, t = 2.0, p = .047$), and this association remained significant after adjusting for study site ($\beta=0.2, t = 2.6, p = .013$). Repeated measures analysis indicated that there was no statistically significant interaction between attendance and change in spirituality ($F(12,41)=1.582, p = .135$). However, after including study site in the repeated measures model, there was a significant three-way interaction between changes in spirituality, attendance, and study site ($F(9,31)=2.891, p = .013$), as shown in Fig. 2a,b. Houston participants who attended at least 12 sessions (50% of Houston participants) reported consistent increases in spirituality, and participants who attended 15 or 16 sessions demonstrated the greatest increases in spirituality. In contrast, there was no clear dose-response relationship (i.e., number of sessions needed to yield optimal intervention outcomes) between attendance and changes in spirituality among participants in Centre County.

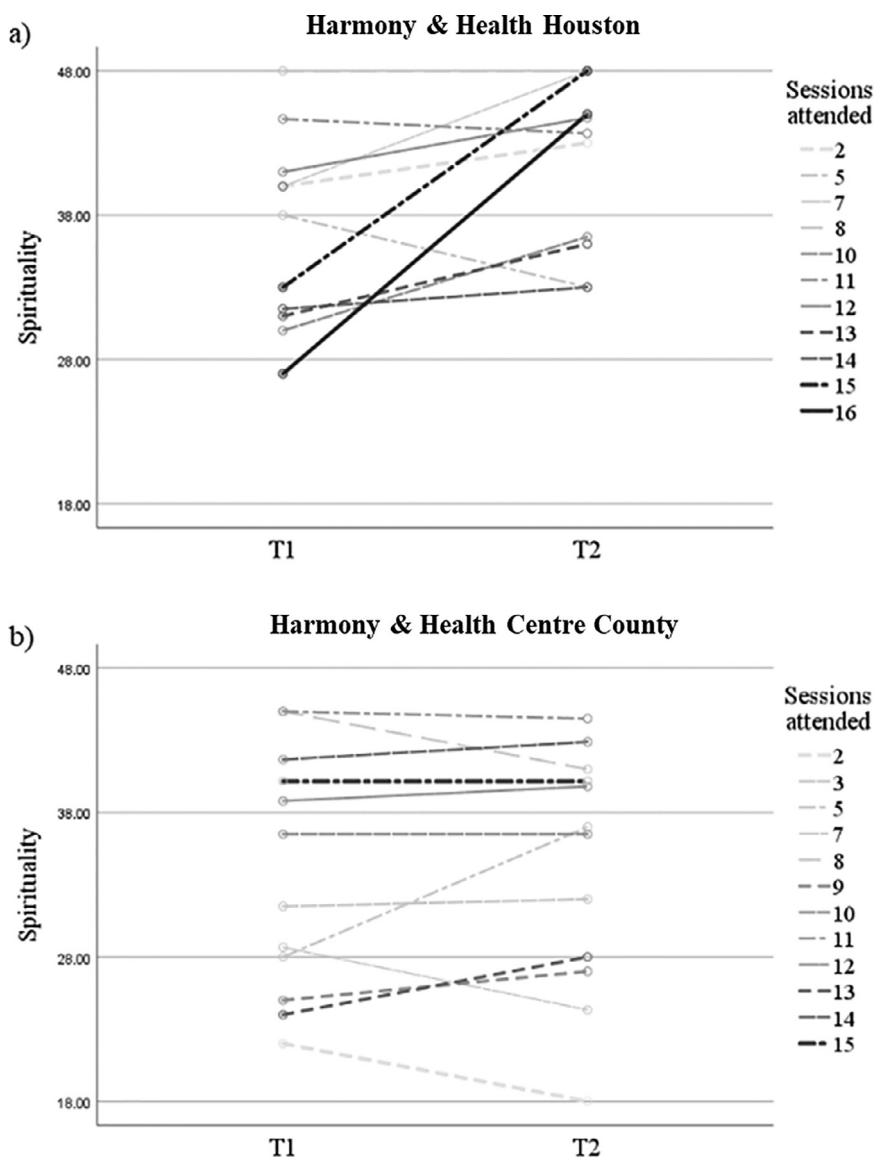


Fig. 2. a,b. Changes in spirituality from baseline (T1) to post-intervention (T2) by number of sessions attended. Changes in spirituality from T1 to T2 by number of sessions attended demonstrate a significant three-way interaction between changes in spirituality, attendance, and study site ($F(9,31)=2.891, p = .013$). In Houston ($n = 22$), spirituality consistently increased after attending ≥ 12 sessions, and participants who attended 15 or 16 sessions demonstrated the greatest increases in spirituality. In contrast, there was no clear dose-response association in center County participants ($n = 38$).

Table 3

Adjusted and unadjusted linear regression models exploring associations between changes in spirituality and changes in mental health outcomes from baseline to post-intervention.

	Unadjusted			Adjusted ^a		
	β	t	p	β	t	p
Perceived stress	-0.2	-1.6	.106	-0.2	-1.9	.063
Depressive symptoms	-0.1	-0.9	.365	-0.1	-1.1	.259
Anxiety	-0.1	-1.0	.346	-0.2	-1.3	.215

^a Adjusted for study site.

3.4. Associations between changes in spirituality and psychosocial outcomes

Linear regression models adjusted for study site showed no significant associations between changes in spirituality and changes in perceived stress, depressive symptoms, or anxiety from baseline to post-intervention. Results are summarized in [Table 3](#).

4. Discussion

Few studies have included spirituality as an intervention target to improve health outcomes^{23,24}; thus, the current study contributes to our understanding of whether a culturally-tailored spirituality-based mind-body intervention is effective for fostering spirituality in racial and ethnic minority and rural adults. We found that increased mind-body intervention attendance was significantly associated with increased spirituality overall. Further analyses suggest that HH had a threshold effect on spirituality among urban African American participants; increases in spirituality were consistently higher after attending at least 12 sessions, or 75% of intervention sessions. However, there was no clear dose-response association observed in rural adults. Results suggest that additional cultural adaptations may be needed to foster spirituality in rural residents.

We found a dose-response association between attendance and spirituality among urban African American adults who participated in HH. Although this did not translate to improvements in psy-

chosocial outcomes, results suggest that a culturally-adapted mind-body intervention may be effective for fostering spirituality and identified spirituality as an appropriate intervention target in addition to increasing engagement.²⁹ Previous studies have identified spirituality is an important component in the care and treatment of patients with serious illness^{39–41} and in the prevention of noncommunicable diseases.^{42,43} Additional research is warranted to test additional strategies to further increase intervention attendance, which may increase the potency of mind-body interventions for fostering spirituality, resulting in improvements in physical and psychosocial health outcomes. Strategies for improving and increasing intervention attendance and adherence among racial and ethnic minorities include partnering with key community stakeholders and organizations and utilizing multiple recruitment channels.⁴⁴ Additional research is needed to further identify and test these strategies in rural populations.

Although participants at both study sites were recruited from faith-based communities, there were differences between the sites which may explain why we found a threshold effect on spirituality among participants in Houston but not among participants in Centre County. One important difference between study sites was the difference in geographic setting. Houston participants were urban residents, while Centre County participants were mostly rural residents. It is important to note that there is no single widely accepted urban-rural classification system, and research on rural-urban health disparities have utilized a number of different definitions of rural.⁴⁵ In the current study we refer to the Center for Rural Pennsylvania's urban-rural classification, which is based on population density, to characterize Centre County as rural.⁴⁶ Another difference between study sites was the racial and ethnic makeup of the study samples. In Houston, all participants identified as African American, and about half of participants identified as non-Hispanic white in Centre County. Previous studies have found differences in intervention effects between rural and urban participants and between African American and white participants, and have highlighted the need to address community-specific needs of urban and rural residents and racial/ethnic groups in order to improve intervention effectiveness.^{47,48}

In addition to race and ethnicity and geographic location, differences in recruitment methods between sites may have influenced findings. In Houston, participants were recruited through one megachurch, with over 10,000 members.^{31,49} However, we faced difficulties meeting recruitment goals by exclusively recruiting via one church in Centre County, with approximately 250 members. Therefore, recruitment efforts in Centre County expanded beyond the church where intervention sessions took place and included other rural churches and community partnerships within the county.³⁰ Although most participants were members of the church, some participants may not have regularly attended church services. Previous studies have demonstrated the correlation between church attendance and spirituality.^{50,51} Therefore, differences between sites, which may represent the communal nature of our African American sample and the more individualistic nature of our rural sample, should be considered when interpreting findings. Further research is warranted exploring how characteristics such as race and ethnicity, rural-urban residency, and church membership or attendance may influence the effects of mind-body interventions on spirituality in a larger sample.

Contrary to our hypothesis, we found no associations between changes in spirituality and changes in psychosocial outcomes, including stress, depressive symptoms, and anxiety, among African American and rural adults in this study. This may be due to relatively low perceived stress and depressive symptoms reported by participants at baseline and suggests that HH may be more beneficial for racial and ethnic minority and rural adults reporting elevated psychosocial distress at baseline and who have not been clin-

ically diagnosed with depression or anxiety. Additional research is needed to further explore mechanisms through which culturally-adapted interventions that target spirituality may lead to subsequent improvements in healthy behaviors and health outcomes in underserved populations.

The current study assessed spirituality and did not specifically assess religiosity. The majority of previous research on spirituality and religious involvement and associated health outcomes explicitly addressed religiosity, or have used the terms spirituality and religiosity interchangeably.^{52–54} A growing number of U.S. adults self-identify as spiritual but not religious, with a quarter of Americans viewing themselves as spiritual but not religious, 48% reporting being both religious and spiritual, and 6% reporting being religious but not spiritual.⁵⁵ This is a trend observed across all races/ethnicities.⁵⁵ Given these distinctions, future studies should measure both constructs to elucidate whether culturally-tailored spirituality-based interventions help to foster spirituality, religiosity, or both spirituality and religiosity and whether religious fatalism, or the belief that health outcomes are predetermined or controlled by a higher power (e.g., God),⁵⁶ moderates associations between intervention attendance, spirituality, and psychosocial outcomes.

Thus far, HH has only been conducted in churches and among church-going adults.^{30,31} However, given the feasibility and acceptability among both urban African American adults and rural adults, it is worth exploring the potential for translating findings into other faith-based populations and community settings. For example, researchers could explore adapting HH for Muslim populations by working with mosque leaders and senior members to adapt the intervention materials to be in accordance with the Islamic faith. Previous studies have demonstrated success in promoting health and health behaviors among Muslim populations via mosque-based interventions.^{57,58} However, additional research is needed to confirm whether HH, specifically, can be feasibly adapted for and promote spirituality and psychosocial health among other faith groups and populations.

Limited studies exist exploring dose-response relationships between intervention attendance and spirituality in culturally-tailored or adapted interventions, making the current study a unique contribution to the literature on community-based health promotion in underserved populations. Although novel, this study is not without limitations. First, this study included a relatively small sample comprised of individuals from two pilot studies; however, we were sufficiently powered to detect a small effect and provided preliminary results regarding the efficacy of a culturally-adapted mind-body intervention to improve spirituality in two underserved populations. Second, due to sample size constraints,³⁷ analyses included a single covariate, and we were unable to further adjust for race/ethnicity and socioeconomic status. However, we were able to largely account for differences in geographic setting and race/ethnicity by using study site as a single covariate. Third, there was uneven session attendance among participants, with only one participant attending 16 sessions. Greater variability in session attendance may make it easier to establish a clearer dose-response relationship. Lastly, our sample included predominantly African American women who reported high socioeconomic status, which limits the generalizability of findings to other underserved populations, such as African American men, other racial and ethnic minority adults, and low-income populations. However, the current study extends prior research on spirituality-based mind-body interventions in urban African American and rural adults, and results may be used to inform future research in other underserved populations.

Addressing and eliminating health disparities in underserved populations, including racial and ethnic minority and rural adults, is a key public health priority.^{59,60} This study used a culturally-

tailored approach to improve spirituality and psychosocial well-being among African American and rural adults. Attendance at HH mind-body sessions was significantly associated with increased spirituality, and there was a clear dose-response association among urban African American adults. This study provides evidence for the use of culturally-adapted mind-body approaches to foster spirituality in underserved populations. Larger, fully powered studies are needed to confirm findings and test the effectiveness of fostering spirituality to improve physical and psychosocial health and reduce disparities in underserved populations.

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CRediT authorship contribution statement

Nishat Bhuiyan: Conceptualization, Formal analysis, Writing – original draft. **Lorna H. McNeill:** Writing – review & editing, Funding acquisition. **Danielle Symons Downs:** Writing – review & editing. **Scherezade K. Mama:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Supervision, Project administration, Funding acquisition.

Conflict of interest

The authors declare no conflict of interests.

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Ethical statement

This research has been approved by the Institutional Review Boards at The University of Texas MD Anderson Cancer Center and The Pennsylvania State University.

Data availability

The data will be made available upon request.

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