Complementary Therapies in Medicine 52 (2020) 102501

Contents lists available at ScienceDirect

Complementary Therapies in Medicine

journal homepage: www.elsevier.com/locate/ctim

Mind-body practices in U.S. adults: Prevalence and correlates

Kallol Kumar Bhattacharyya*, Gizem Hueluer, Hongdao Meng, Kathryn Hyer

Florida Policy Exchange Center on Aging, School of Aging Studies, University of South Florida, Tampa, FL, USA

ARTICLE INFO

Keywords:
Mind-body practice
MIDUS
Yoga
Physical activity
Health outcomes

ABSTRACT

Objectives: Mind-body practices (MBP), such as Yoga or Tai-Chi, have increased in popularity in the past 25 years in the US. These activities may help promote a less sedentary lifestyle and may have positive effects on health. The objective of the present study is to understand the prevalence and trends of MBP in US adults and the factors associated with their use in a population-based adult lifespan sample.

Methods: We used data from three waves of the Midlife in the United States (MIDUS) survey (1995, 2005, and 2015), a population-based longitudinal study of community-dwelling adults. Only data from participants with valid observations across three waves (N = 2262) aged 24–74 years at baseline (M = 46; SD = 11) were used. We examined the prevalence of MBP, longitudinal patterns, and correlates of MBP use over 20 years.

Results: Rates of MBP use were relatively stable over time in this sample, with 20%, 17%, and 18% of participants using MBP at wave 1, 2, and 3, respectively. A number of sociodemographic and health variables were independently related to frequency of MBP use over 20 years: Women, participants with higher levels of education, never married participants, and participants who suffered from multiple chronic health conditions were more likely to use MBP.

Discussion: Our findings suggest that MBP may provide an opportunity for physical activity for individuals suffering from chronic health conditions. More research is needed to understand whether this, in turn, results in better health outcomes for these individuals.

1. Introduction

A major public health challenge has been the disconnect between the strong scientific evidence base for the importance of physical activities and the persistently low levels of their practice, and concomitantly high levels of chronic disease burden among the US population. Physical activity is associated with reduced risks of morbidities and mortality.[1,2] It is well-established that a sedentary lifestyle is among the major causes of metabolic diseases, hypertension, and cardiovascular diseases.[3,4] Recent data suggests that 6 in every 10 adults in the US have a chronic disease, and 4 in every 10 US adults have two or more.[5] Currently, only a small proportion of US adults meet the Department of Health and Human Services guidelines for physical activity, with decreasing adherence as age increases. For example, in 2017, only 24% of all US adults met aerobic activity and muscle-strengthening guidelines,[6] while only 16% of those aged 65–74 years and 9% of adults aged 75+ years met the physical activity guidelines.

Given this challenge, mind-body practice (MBP) may offer a broader array of health-promoting physical activity options for the adult population. MBP may complement and supplement the traditional physical activities due to high adaptability to individual capabilities, relatively low cost, and their potential for integrative benefits to multiple physiological systems and mental processes. MBP may be defined as "…techniques designed to enhance the mind's capacity to affect bodily function and symptoms".[7] Despite relatively low practice rates, MBP (such as yoga, tai-chi, or pilates) have gained in popularity in the United States in recent decades.[8] All these activities consist of both exercise and meditative components; thus, they may promote positive interactions between various physiological and mental functions.[9,10] Yoga is an ancient Indian technique of mind-body interrelated practice that consists of physical movement (asanas), breathing exercises (pranayama), and meditation (dhyana), and has been shown to have a positive impact on health status.[11–14] Tai-chi is a traditional Chinese introspective practice that consists of balance exercises and movement sequences combined with concentration and relaxation techniques.[15,16] Pilates is a physical exercise which consists of low-impact flexibility and muscular strength and endurance movements.[17,18] The use of these complementary health practices may be an accessible and cost-effective solution to increase physical activity in order to improve health.

Improvements in physical and mental health have also been observed in previous intervention studies that focused on MBP.[13,19–22] Because of cultural predisposition, to date, most of the studies on MBPs

* Corresponding author at: School of Aging Studies, 4202 E Fowler Avenue, Tampa, FL 33620, USA.
E-mail address: kallolkumar@usf.edu (K.K. Bhattacharyya).

https://doi.org/10.1016/j.ctim.2020.102501
Received 21 May 2020; Received in revised form 10 June 2020; Accepted 1 July 2020
Available online 02 July 2020
0965-2299/

were performed among Eastern populations.[13] However, MBP may be equally effective in Western cultures. To date, little population-based data are available on how US adults engage in MBP and factors associated with this practice.

Despite the volume of recent scientific evidence,[10,23] it remains unclear the primary facilitators and barriers in the use of MBPs for health promotion. The goal of the present study is to examine, for the first time, the long-term trend in the use of MBPs spanning three decades (1990s–2010s), including different practices such as yoga, tai-chi, or pilates, which share similar exercise and meditative components. Previous studies primarily examined the use of MBPs for medical purposes. Second, in addition to studying MBP at a given time point, we also examine the correlates of persistent MBP over 20 years. Third, the inclusion of a wide range of health measures, including various health conditions, functional status, health behaviors, and self-rated physical and mental health enables us to examine important questions regarding the differences in health status between users and non-users using the unique and rich dataset of the longitudinal Midlife in the United States (MIDUS) study to address the following research questions: (1) How prevalent is MBP among United States adults from the 1990s to 2010s? (2) What are the key individual factors related to long-term engagement in MBP?

2. Method

2.1. Participants and procedure

We used longitudinal data from the MIDUS study obtained from a national sample of US adults. The first longitudinal wave (MIDUS 1) was conducted with 7108 participants in 1995–1996 through random digit dialing of US households in the 48 contiguous states.[24] In MIDUS 1, participants' age ranged from 24 to 75 years (M = 46, SD = 13).[25] Longitudinal follow-ups of the original MIDUS study were conducted in 2004–2006 (MIDUS 2) and 2013–2015 (MIDUS 3), respectively. MIDUS 2 was conducted with 4963 participants (75% of the original respondents in MIDUS 1), while MIDUS 3 was conducted with 3294 participants (including 77% of MIDUS 2 participants).[26] All data were collected directly from respondents.

For the current analyses, we used data from participants who had valid information on all study variables at all 3 waves. This resulted in a sample of 2262 participants. We did not seek IRB approval for the current study because analyses are based on data that are publicly available through the Inter-University Consortium for Political and Social Research (ICPSR).

2.2. Measures and procedure

2.2.1. Dependent variable

The dependent variable is MBP use. Participants were asked the following question: "In the past 12 months, either to treat a physical health problem, to treat an emotional or personal problem, to maintain or enhance your wellness, or to prevent the onset of illness, how often did you use – exercise or movement therapy (yoga, pilates, tai chi, etc.)?" Participants rated their practice status on a 5-point scale ranging from 1 ("performing a lot") to 5 ("never"). To quantify the prevalence of MBP, this variable was transformed into a binary variable with 1 indicating engagement in MBP ("a lot," "often," "sometimes," and "rarely") and 0 indicating no MBP ("never").

2.2.2. Independent variable. Health and functional status

Participants rated their current physical and mental health on a five-point scale from 1 (excellent) to 5 (poor). Because few participants endorsed the categories fair and poor, we grouped these variables into four categories: excellent, very good, good, and fair/poor. Participants were asked whether they had functional limitations in activities of daily living (ADL) and instrumental activities of daily living (IADL). Responses indicating any limitations ("a little" to "a lot") were coded as 1, responses indicating no limitation were recoded 0. The scores for ADL and IADL limitations indicated the sum of limitations reported by each participant. Participants were asked whether they engaged in vigorous and moderate physical activities with the questions "How often do you engage in vigorous physical activity that causes your heart to beat so rapidly that you can feel it in your chest and you perform the activity long enough to work up a good sweat and to breath heavily?" and "How often do you engage in moderate physical activity, that is not physically exhausting, but it causes your heart rate to increase slightly and you typically work up a sweat?", respectively. Participants rated their answers on a 6-point scale ranging from 1 ("several times a week or more") to 6 ("never"). We coded the responses as 1 (doing physical activities regularly, i.e., "several times a week or more") or 0 (not doing physical activities regularly, i.e., either in lesser frequencies or "never"), for both summer and winter. Finally, we created a binary variable, each indicating whether participants engaged in physical activity regularly in any season (coded as 1) or not (coded as 0) separately for vigorous and moderate physical activity, respectively. Other health variables included body mass index (BMI; 1 = underweight [<18.5], 2 = normal [$18.5-24.9$], 3 = overweight [>24.9-29.9], and 4 = obese [>29.9]), using tobacco (1 = current smoker, or 0 = not) or alcohol (1 = regular drinker, or 0 = not), and number of chronic health conditions (0, 1, 2, 3, 4, and 5 or more). Participants were asked whether they had (1 = yes, 0 = no) recent history (within past 12 months) of blood pressure (BP), stroke, heart problems, diabetes/high blood sugar, cancer, aches/joint stiffness (last 30 days), and chronic sleep problems. Mental health was assessed with a single binary item, indicating whether participants felt sad/depressed for more than two weeks (1 = yes, 0 = no) within the past 12 months.

2.3. Covariates

2.3.1. Demographics

In our analyses, we used data on six core demographic variables including age group ($<=34$, $35-44$, $45-54$, $55-64$, ≥ 65), gender (0 = male, 1 = female), race (1 = White, 2 = Black, 3 = Other), marital status (1 = married, 2 = separated/divorced, 3 = widowed, 4 = never married), education (1 = no/some school, 2 = high school graduate/in college, 3 = graduated from college, 4 = having Master's/professional degree), and employment (1 = currently working, 2 = self-employed, 3 = retired, 4 = unemployed, 5 = other).

2.4. Statistical analysis

Statistical analyses were conducted in[27] 15.1 (College Station, TX). Descriptive analyses indicated the prevalence of MBP and differences between participants who engaged in MBP vs. not. We then examined differences between participants who engaged in MBP in all waves vs. those who practiced to some extent or not at all using an ordinal logistic regression model. Persistent MBP was defined as the outcome variable indicating MBP frequency (0: never, 1: at one wave, 2: at two waves, 3: at all waves). This model only included predictor variables that showed significant group differences associated with MBP frequency. Because this study is based on a large national population-based sample, statistical significance was evaluated at $p<.01$ (two-sided) for a more rigorous test. We also report odds ratios (OR) and 99% confidence intervals (CI).

3. Results

Table 1 shows prevalence of MBP separately for all three time points, as well as frequencies of different longitudinal patterns with three waves of data. Among the participants, who took part in all three waves, in the first wave (1995), the prevalence of MBP was low, with 80% of participants reporting never having engaged in any MBP in the

Table 1
Prevalence of mind-body practice: Frequencies and trends (n = 2262).

MBP prevalence	Frequency	Percentage
MBP at wave 1	448	19.8
MBP at wave 2	386	17.1
MBP at wave 3	414	18.3
Longitudinal MBP pattern		
MBP1-MBP2-MBP3 = 0−0−0	1391	61.5
MBP1-MBP2-MBP3 = 0−0−1	186	8.2
MBP1-MBP2-MBP3 = 0−1−0	152	6.7
MBP1-MBP2-MBP3 = 0−1−1	85	3.8
MBP1-MBP2-MBP3 = 1−0−0	241	10.7
MBP1-MBP2-MBP3 = 1−0−1	58	2.6
MBP1-MBP2-MBP3 = 1−1−0	64	2.8
MBP1-MBP2-MBP3 = 1−1−1	85	3.8

past 12 months. Only 20% of participants reported having engaged in MBP in varied intensity (from a lot or often to rarely). This rate was 17% in the second wave in 2004 and 18% in the third wave in 2013. Table 1 also shows the longitudinal patterns with three waves of data showing 62% never used MBP in any of the three waves, 26% used MBP in at least one wave, 9% used MBP in any two of the three waves, and only 4% participants used MBP in all the three waves.

Table 2 presents differences between those who engaged in MBP at all waves vs. at some waves vs. at no waves. Women, more educated people, and those who were never married were more likely to engage in MBP throughout the study period. Participants who engaged in moderate and vigorous physical activity at baseline were more likely to engage in MBP in a persistent way at subsequent waves. Participants having functional health limitations with IADL reported higher rate of engagement with MBP. Participants experiencing a chronic sleep problem at baseline, participants who felt sad/depressed for more than two weeks in the last 12 months at baseline, and participants experiencing more chronic conditions were more likely to engage in MBP persistently at subsequent waves.

Table 3 shows results from an ordinal logistic regression analysis with persistent MBP as the outcome. In this analysis, female gender (OR = 1.73, 99% CI = 1.37, 2.19), having higher education, i.e., Master's/professional degree (OR = 1.91, 99% CI = 1.07, 3.40, reference: no/some school), and being never married (OR = 1.85, 99% CI = 1.30, 2.63, reference: married) continued to be associated with persistent MBP. Participants suffering from two (OR = 1.52, 99% CI = 1.07, 2.14), four (OR = 1.74, 99% CI = 1.12, 2.71), and five or more (OR = 1.67, 99% CI = 1.11, 2.51) chronic diseases (reference: no chronic disease) were more likely to engage in MBP over 20 years persistently.

4. Discussion

In the present study, we examined the prevalence, trend, and correlates of MBP use over a 20-year span in a population-based sample of US adults. This study measured MBP more broadly than previous studies (which primarily focused on single MBPs) and incorporated a wide range of sociodemographic and health variables as predictors. Furthermore, our study adds to previous research by examining the correlates of persistent MBP over 20 years.

Our first research question was related to the prevalence of MBP in US adults. In the present study, 20%, 17%, and 18% of participants reported having engaged in MBP in the past 12 months in the wave 1, 2, and 3 respectively. These numbers as well as longitudinal patterns of MBP use suggest that participants' MBP use was relatively stable over the 20-year period. Our estimate of MBP prevalence is in line with previous research by Wolsko and colleagues (2004). They reported that 19% of US adults in a population-based survey engaged in MBP, even though their study focused on mind-body therapies for medical purposes only. Several more recent studies also examined the prevalence of different MBPs in the US. Some studies reported increase in MBP use

Table 2
Correlates of persistent engagement in mind-body practice across three waves of MIDUS (n = 2262).

Variable (based on M1)	Never (n = 1391, 61.5%)	In one wave (n = 579, 25.6%)	In two waves (n = 207, 9.2%)	In all three waves (n = 85, 3.8%)	*p*-value
Age in years mean	46.8	45.3	44.0	46.3	.03
<35	15.3	18.1	22.2	11.7	
35−44	26.9	31.4	32.3	30.5	
45−54	31.5	27.8	27.0	34.1	
55−64	19.8	17.1	13.0	21.1	
≥65	6.2	5.5	5.3	2.3	
Female	50.5	59.6	67.3	75.3	<.01
Race/ethnicity					.68
White	94.0	93.2	92.7	94.1	
Black	3.0	2.6	2.9	3.5	
other	1.9	3.3	3.9	1.2	
missing	1.1	0.9	0.5	1.2	
Marital status					<.01
married	77.2	68.7	64.2	62.3	
separated/divorced	11.8	15.5	17.8	12.9	
widowed	2.4	3.8	1.9	4.7	
never married	8.4	11.9	15.9	20	
Education					<.01
no/some school	5.3	5.4	3.9	1.2	
graduated from school/in college	48.9	46.2	35.4	35.3	
graduated from college	32.1	33.4	41.8	36.5	
Master's/ professional degree	13.7	15.0	18.9	27.0	
Employment					.76
working	63.4	63.0	58.9	57.7	
self-employed	12.3	12.8	13.5	17.7	
retired	8.8	8.1	7.2	4.7	
unemployed	2.3	2.4	2.9	2.3	
other	13.2	13.6	17.4	17.7	
Health and functional status (past 12 months)					
BMI kg/m2 mean	26.8	26.3	25.7	26.3	.07
underweight (<18.5)	1.7	2.1	2.5	1.2	
normal (18.5−24.9)	36.7	41.4	46.8	47.0	
overweight (25−29.9)	40.1	35.3	35.9	31.3	
obese (>29.9)	21.5	21.2	14.8	20.5	
Tobacco user	17.9	17.4	10.1	11.7	.02
Alcohol user	40.6	38.8	38.1	42.3	.78
Physical activity					
vigorous	59.0	65.6	67.1	68.2	<.01
moderate	86.8	90.6	89.3	96.4	<.01
Self-reported physical health					.35
excellent	20.0	18.3	21.7	23.5	
very good	41.4	39.2	40.1	35.3	
good	31.0	32.3	32.4	36.5	
fair/poor	7.6	10.2	5.8	4.7	
Self-reported mental health					.75
excellent	29.6	28.5	29.5	28.2	
very good	27.7	40.6	43.0	35.3	
good	27.3	25.6	21.2	30.6	
fair/poor	5.3	5.3	6.3	5.9	
Difficulty in ADL	7.4	10.1	7.7	10.5	.20
Difficulty in IADL	59.8	63.9	57.4	75.2	.01
Number of chronic condition/s mean	1.8	2.1	2.2	2.6	<.01
0	26.4	20.6	22.2	16.5	
1	25.6	19.2	15.0	14.1	
2	16.6	20.9	21.7	15.3	
3	12.7	14.5	14.5	14.1	
4	7.3	9.3	14.1	17.6	

(*continued on next page*)

Table 2 (*continued*)

Variable (based on M1)	Never (n = 1391, 61.5%)	In one wave (n = 579, 25.6%)	In two waves (n = 207, 9.2%)	In all three waves (n = 85, 3.8%)	*p*-value
5/more	11.4	15.5	16.4	22.3	
Had pain/joint stiffness	58.6	65.9	58.9	68.2	.01
Had sleep problem	8.2	11.9	12.6	18.8	<.01
Felt depressed for >2 weeks	20.4	26.9	24.1	32.9	<.01
Had diabetes/high blood sugar	3.0	2.9	2.4	3.5	.95
Had heart trouble	9.8	10.3	8.2	15.2	.32
Had high blood pressure	14.2	15.0	13.5	11.7	.84
Had cancer	6.5	7.2	10.1	8.2	.29
Had stroke	0.1	0.5	0.0	0.0	.34

Note. Correlates taken at baseline (MIDUS 1). All values are in percentages, unless otherwise specified. BMI = body mass index, ADL = activities of daily living, IADL = instrumental activities of daily living.

Table 3
Ordinal logistic regression model predicting persistent engagement in mind-body practice across all three waves of MIDUS (n = 2262).

Variable	MIDUS (waves 1, 2, and 3)		
	OR	*p*-value	99% CI
Female	1.73	<.01	(1.37, 2.19)
Marital Status (ref. married)			
separated/divorced	1.36	.01	(0.99, 1.88)
widowed	1.34	.25	(0.70, 2.54)
never married	1.85	<.01	(1.30, 2.63)
Education (ref. no/some school)			
graduated from school/in college	1.08	.69	(0.64, 1.84)
graduated from college	1.58	.03	(0.92, 2.71)
Master's/professional degree	1.91	<.01	(1.07, 3.40)
Physical activity			
vigorous	1.33	.08	(0.88, 2.02)
moderate	2.36	.18	(0.45, 12.48)
Number of chronic conditions (ref. 0)			
1	0.86	.25	(0.61, 1.21)
2	1.52	<.01	(1.07, 2.14)
3	1.37	.03	(0.93, 2.00)
4	1.74	<.01	(1.12, 2.71)
5/more	1.67	<.01	(1.11, 2.51)
Chronic sleep problem	1.18	.36	(0.80, 1.72)
Felt sad/depressed	1.10	.50	(0.84, 1.44)

Note. OR = odds ratio, CI = confidence interval, IADL = instrumental activities of daily living.
Table 3 only includes the significant (p < .01) predictors from Table 2.

over time: Using cross-sectional data from the 2012 National Health Interview Survey (NHIS),[28,29] found that lifetime and 12-month prevalence of yoga practice among US adults (N = 34,525) were 13% and 9%, respectively. Another study found that the age-adjusted rate of yoga practice has increased from 9.5%–14.3% between 2012–2017 (4.1%–14.2% for meditation).[30] Wang et al.[31] found the participation rates of yoga, tai-chi, and qigong have increased from 5.8% (2002) to 14.5% (2017). All studies to date suggest that the rates for some MBPs continued to be low: Based on the 2002, 2007, and 2012 waves of the NHIS, participation rates for tai-chi were 1% at all three waves.[8] The finding that rates of MBP use are increasing in cross-sectional, but are stable in longitudinal analysis indicates that cohort differences might be at play. More recent generations of US adults may be more likely to engage in MBP, thus leading in increase in prevalence rates. However, looking at the same historical time, participants from earlier generations did not increase in MBP use. While the increase in different MBPs is encouraging, there still remain great opportunities for growth, especially in older generations who may not be as familiar with MBP as more recent generations.

Our second research question was related to correlates of persistent engagement in MBP. We focused on a broad range of sociodemographic and health factors, including health behaviors, functional health, self-rated mental and physical health, and number of chronic health conditions. In line with earlier research on yoga practice,[32,33] women, more educated, and unmarried participants were more likely to engage in MBP over 20 years. Previous research on this topic found that people practiced yoga for specific health purposes, such as managing back pain (20%), stress (6%), and arthritis (6%). Analyzing data from a large sample of US adults in the 2002 wave of the NHIS (N = 31,044), Birdee and colleagues (2008) examined correlates of yoga practice for health. Participants who practiced yoga were more likely to be White, female, young, and college-educated.[34,35] Also, participants who suffered from musculoskeletal conditions, mental health conditions, severe sprains, and asthma were more likely to practice yoga.[34] These same health conditions were also related to the practice of tai-chi and qigong for health.[16] However, participants with hypertension and chronic obstructive lung disease were less likely to practice yoga.[34] In a survey of 4307 individuals randomly selected from yoga studios across the country, the majority of participants reported that yoga improved their happiness (87%), energy (85%), sleep (69%), social relationships (67%), and weight (57%).[36] In sum, people experiencing various health conditions reported practicing yoga and experienced that the practice improved some of their symptoms. Adding to this previous research, our findings showed that comorbidity, indicated by experiencing multiple health conditions was related to a higher frequency of MBP use over 20 years independent of key sociodemographic characteristics. This finding suggests that those engaging in MBP might do so because they expect positive health benefits. Also, MBP may give individuals suffering from health conditions an opportunity to remain physically active.

Taken together, our findings have several implications for the health promotion community. First, the finding that only a relatively small minority (17–20%) of participants have engaged in MBP suggests there may be a lack of knowledge and opportunities related to MBP, despite its increasing popularity in recent generations. Second, our finding that MBP is significantly associated with chronic health conditions suggests that it may be used by people with poor health who seek alternative therapies to alleviate their symptoms. These findings will help researchers, clinicians, payers, and policymakers design better strategies to promote their use in community and clinical populations in the US and beyond.

The present study had several limitations. First, we did not have any information on why people engaged in MBP or if there was any subsidy for MBP through a health insurance product. For example, it is not clear whether it was a leisure activity or used for therapeutic purposes (e.g. the MBP was part of an intervention). Second, there was no information about how participants engaged in MBP, for example, whether they received instruction or practiced with others vs. on their own. Third, our measure of persistent engagement was based on three measurements over 20 years, because more frequent assessments were not available. Finally, we defined MBP based on the MIDUS question that used the terminology “exercise or movement therapy” that included yoga, tai-chi, pilates etc., which might create confusion among the respondents regarding the activities that would qualify as MBP. Despite these limitations, this is the first large population-based data on a representative US sample with a follow-up over 20 years.

5. Conclusion

In the present study, we examined the prevalence and correlates of MBP in a population-based sample of US adults over 20 years. A small proportion (17–20%) of US adults engaged in MBP despite its

increasing popularity in recent decades. Longitudinally, rates of MBP use were stable. Women, more educated, and unmarried individuals were more likely to engage in MBP. Furthermore, the current findings suggest that MBP may provide an opportunity for physical activity for individuals suffering from chronic health conditions. More research is needed to understand whether the use of MBP is associated with better distal health outcomes for these individuals. Future research is also needed to determine whether MBP participation changes when costs are subsized by health promotion or health insurance programs.

Funding source

This research did not receive any funding from agencies in the public, commercial, or not-for-profit sectors.

Declaration of Competing Interest

The authors declare that they have no conflict of interest.

References

1. Haskell WL, Blair SN, Hill JO. Physical activity: health outcomes and importance for public health policy. *Prev Med.* 2009;49(4):280–282. https://doi.org/10.1016/j.ypmed.2009.05.002.
2. Warburton DE, Nicol CW, Bredin SS. Health benefits of physical activity: the evidence. *CMAJ.* 2006;174(6):801–809. https://doi.org/10.1503/cmaj.051351.
3. Gibbs BB, Hergenroeder AL, Katzmarzyk PT, Lee IM, Jakicic JM. Definition, measurement, and health risks associated with sedentary behavior. *Med Sci Sports Exerc.* 2015;47(6):1295–1300. https://doi.org/10.1249/MSS.0000000000000517.
4. Manson JE, Skerrett PJ, Greenland P, VanItallie TB. The escalating pandemics of obesity and sedentary lifestyle. A call to action for clinicians. *Arch Intern Med.* 2004;164(3):249–258. https://doi.org/10.1001/archinte.164.3.249.
5. Centers for Disease Control and Prevention: Chronic Diseases in America. (2019). (accessed on 24 February 2020); Available online: https://www.cdc.gov/chronicdisease/resources/infographic/chronic-diseases.htm.
6. Centers for Disease Control and Prevention: Exercise or Physical Activity (2017). (accessed on 24 February 2020); Available online: https://www.cdc.gov/nchs/fastats/exercise.htm.
7. Tindle HA, Wolsko P, Davis RB, Eisenberg DM, Phillips RS, McCarthy EP. Factors associated with the use of mind body therapies among United States adults with musculoskeletal pain. *Complement Ther Med.* 2005;13(3):155–164. https://doi.org/10.1016/j.ctim.2005.04.005.
8. Clarke TC, Black LI, Stussman BJ, Barnes PM, Nahin RL. Trends in the use of complementary health approaches among adults: United States, 2002-2012. *Natl Health Stat Report.* 2015;79:1–16.
9. Francis AL, Beemer RC. How does yoga reduce stress? Embodied cognition and emotion highlight the influence of the musculoskeletal system. *Complement Ther Med.* 2019;43:170–175. https://doi.org/10.1016/j.ctim.2019.01.024.
10. Tran BX, Harijanto C, Vu GT, Ho R. Global mapping of interventions to improve quality of life using mind-body therapies during 1990-2018. *Complement Ther Med.* 2020;49:102350https://doi.org/10.1016/j.ctim.2020.102350.
11. Cramer H, Quinker D, Pilkington K, Mason H, Adams J, Dobos G. Associations of yoga practice, health status, and health behavior among yoga practitioners in Germany-Results of a national cross-sectional survey. *Complement Ther Med.* 2019;42:19–26. https://doi.org/10.1016/j.ctim.2018.10.026.
12. Hariprasad VR, Koparde V, Sivakumar PT, et al. Randomized clinical trial of yoga-based intervention in residents from elderly homes: effects on cognitive function. *Indian J Psychiatry.* 2013;55(Suppl 3):S357–S363. https://doi.org/10.4103/0019-5545.116308.
13. Rocha KK, Ribeiro AM, Rocha KC, et al. Improvement in physiological and psychological parameters after 6 months of yoga practice. *Conscious Cogn.* 2012;21(2):843–850.
14. Uebelacker LA, Kraines M, Broughton MK, et al. Perceptions of hatha yoga amongst persistently depressed individuals enrolled in a trial of yoga for depression. *Complement Ther Med.* 2017;34:149–155. https://doi.org/10.1016/j.ctim.2017.06.008.
15. Abbott R, Lavretsky H. Tai Chi and Qigong for the treatment and prevention of mental disorders. *Psychiatr Clin North Am.* 2013;36(1):109–119. https://doi.org/10.1016/j.psc.2013.01.011.
16. Birdee GS, Wayne PM, Davis RB, Phillips RS, Yeh GY. T'ai chi and qigong for health: patterns of use in the United States. *J Altern Complement Med.* 2009;15(9):969–973. https://doi.org/10.1089/acm.2009.0174.
17. Kloubec JA. Pilates for improvement of muscle endurance, flexibility, balance, and posture. *J Strength Cond Res.* 2010;24(3):661–667. https://doi.org/10.1519/JSC.0b013e3181c277a6.
18. Vergeer I, Bennie JA, Charity MJ, et al. Participation trends in holistic movement practices: A 10-year comparison of yoga/Pilates and tai chi/qigong use among a national sample of 195,926 Australians. *BMC Complement Altern Med.* 2017;17(1):296. https://doi.org/10.1186/s12906-017-1800-6.
19. Elsenbruch S, Langhorst J, Popkirowa K, et al. Effects of mind-body therapy on quality of life and neuroendocrine and cellular immune functions in patients with ulcerative colitis. *Psychother Psychosom.* 2005;74(5):277–287. https://doi.org/10.1159/000086318.
20. Grossman P, Tiefenthaler-Gilmer U, Raysz A, Kesper U. Mindfulness training as an intervention for fibromyalgia: evidence of postintervention and 3-year follow-up benefits in well-being. *Psychother Psychosom.* 2007;76:226–233.
21. Ross A, Thomas S. The health benefits of yoga and exercise: a review of comparison studies. *J Altern Complement Med.* 2010;16(1):3–12.
22. Tse ACY, Wong TWL, Lee PH. Effect of low-intensity exercise on physical and cognitive health in older adults: a systematic review. *Sports Med Open.* 2015;1:37. https://doi.org/10.1186/s40798-015-0034-8.
23. Nelson EA, Dowsey MM, Knowles SR, et al. Systematic review of the efficacy of pre-surgical mind-body based therapies on post-operative outcome measures. *Complement Ther Med.* 2013;21(6):697–711. https://doi.org/10.1016/j.ctim.2013.08.020.
24. Brim OG, Ryff CD, Kessler RC, eds. *How healthy are we?: A national study of well-being at midlife.* University of Chicago Press; 2004.
25. Elliot AJ, Turiano NA, Infurna FJ, Lachman ME, Chapman BP. Lifetime trauma, perceived control, and all-cause mortality: Results from the Midlife in the United States Study. *Health Psychol.* 2018;37(3):262–270. https://doi.org/10.1037/hea0000585.
26. Hughes ML, Agrigoroaei S, Jeon M, Bruzzese M, Lachman ME. Change in Cognitive Performance From Midlife Into Old Age: Findings from the Midlife in the United States (MIDUS) Study. *J Int Neuropsychol Soc.* 2018;24(8):805–820. https://doi.org/10.1017/S1355617718000425.
27. Stata Corp. *Survey data reference manual.* College Station, TX: Stata Press; 2013.
28. Cramer H, Thoms MS, Anheyer D, Lauche R, Dobos G. Yoga in Women With Abdominal Obesity: A Randomized Controlled Trial. *Dtsch Arztebl Int.* 2016;113(39):645–652. https://doi.org/10.3238/arztebl.2016.0645.
29. Cramer H, Ward L, Steel A, Lauche R, Dobos G, Zhang Y. Prevalence, patterns, and predictors of yoga use: results of a U.S. Nationally representative survey. *Am J Prev Med.* 2016;50(2):230–235. https://doi.org/10.1016/j.amepre.2015.07.037.
30. Clarke TC, Barnes PM, Black LI, Stussman BJ, Nahin RL. Use of yoga, meditation, and chiropractors among U.S. adults aged 18 and over. *NCHS Data Brief.* 2018;325:1–8.
31. Wang CC, Li K, Choudhury A, Gaylord S. Trends in yoga, tai chi, and qigong use among US adults, 2002-2017. *Am J Public Health.* 2019;109(5):755–761. https://doi.org/10.2105/AJPH.2019.304998.
32. Park CL, Braun T, Siegel T. Who practices yoga? A systematic review of demographic, health-related, and psychosocial factors associated with yoga practice. *J Behav Med.* 2015;38(3):460–471. https://doi.org/10.1007/s10865-015-9618-5.
33. Wolsko PM, Eisenberg DM, Davis RB, Phillips RS. Use of mind-body medical therapies. *J Gen Intern Med.* 2004;19(1):43–50. https://doi.org/10.1111/j.1525-1497.2004.21019.x.
34. Birdee GS, Legedza AT, Saper RB, Bertisch SM, Eisenberg DM, Phillips RS. Characteristics of yoga users: results of a national survey. *J Gen Intern Med.* 2008;23(10):1653–1658. https://doi.org/10.1007/s11606-008-0735-5.
35. Saper RB, Eisenberg DM, Davis RB, Culpepper L, Phillips RS. Prevalence and patterns of adult yoga use in the United States: results of a national survey. *Altern Ther Health Med.* 2004;10(2):44–49.
36. Ross A, Friedmann E, Bevans M, Thomas S. National survey of yoga practitioners: mental and physical health benefits. *Complement Ther Med.* 2013;21(4):313–323. https://doi.org/10.1016/j.ctim.2013.04.001.