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Alternative mind–body therapies used by adults with medical conditions☆,☆☆

Suzanne M. Bertisch[a,b,*], Christina C. Wee[b], Russell S. Phillips[a,b], Ellen P. McCarthy[b]

[a]*Division for Research and Education in Complementary and Integrative Medical Therapies, Harvard Medical School Osher Research Center, Boston, MA, USA*

[b]*Division of General Medicine and Primary Care, Department of Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA*

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Abstract

Objective: Mind–body therapies (MBT) are used by 16.6% of adults in the United States. Little is known about the patterns of and reasons for use of MBT by adults with common medical conditions. **Methods:** We analyzed data on MBT use from the 2002 National Health Interview Survey Alternative Medicine Supplement (n=31,044). MBT included relaxation techniques (deep breathing exercises, guided imagery, meditation, and progressive muscle relaxation), yoga, tai chi, and qigong. To identify medical conditions associated with use of MBT overall and of individual MBT, we used multivariable models adjusted for sociodemographic factors, insurance status, and health habits. Among users of MBT (n=5170), we assessed which medical conditions were most frequently treated with MBT, additional rationale for using MBT, and perceived helpfulness. **Results:** We found a positive association between MBT use and several medical conditions including various pain syndromes and anxiety/depression. Among adults using MBT to treat specific medical conditions, MBT was most commonly used for anxiety/depression and musculoskeletal pain syndromes. More than 50% of respondents used MBT in conjunction with conventional medical care, and 20% used MBT for conditions they thought conventional medicine would not help. Overall, we found high rates (68–90%) of perceived helpfulness of MBT for specific medical conditions. **Discussion:** MBT is commonly used by patients with prevalent medical conditions. Further research is needed to determine the reasons for widespread use of MBT for treatment of specific medical conditions and to evaluate the efficacy of MBT.

Keywords: Anxiety; Behavioral medicine; Complementary and alternative medicine; Depression; Meditation; Mind–body medicine

Introduction

The National Center for Complementary and Alternative Medicine characterizes mind–body medicine as a wide range of healing practices that share a common intention "to enhance the mind's capacity to affect bodily function and symptoms" [1]. While mind–body practices, such as cognitive behavioral therapy (CBT) and group therapy, can

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* Corresponding author. Division of General Medicine and Primary Care, Beth Israel Deaconess Medical Center, 330 Brookline Avenue, PBS-2, Boston, MA 02215, USA. Tel.: +1 617 754 4677; fax: +1 617 632 0215.

E-mail address: sbertisc@bidmc.harvard.edu (S.M. Bertisch).

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comprise part of standard conventional care, the term mind–body medicine is often used more broadly in the medical literature to include alternative mind–body therapies (MBT), such as meditation, yoga, and tai chi, that have been used specifically for treatment of medical and psychological conditions. MBT remains one of the most commonly used domains of complementary and alternative medicine (CAM) in the United States, with nearly one in five adults using at least one form of MBT annually [2].

Evidence suggests that when alternative MBT are part of a CBT program that includes cognitive restructuring and behavioral modification, it is effective for treating insomnia [3,4], arthritis [5,6], and back pain [7]. Furthermore, there is limited evidence that individual MBT, such as progressive muscle relaxation and yoga, may effectively treat insomnia [8,9] and low back pain [10]. However, the efficacy of MBT for many other chronic conditions is unknown. Despite the popularity of MBT for some medical conditions, little is known about the medical conditions for which adults are using MBT and their motivations for use. As evidence on the efficacy of MBT begins to emerge, understanding patterns of MBT use for treatment of specific conditions would help identify diseases with potential underuse and barriers to use, as well as potential risks of MBT use by specific clinical populations. Furthermore, exploring MBT for conditions in which there is no proven efficacy may also help further our understanding of the medical and psychosocial needs of patients with chronic medical conditions and guide future areas of research.

In this context, we examined the patterns of MBT use, which medical conditions were associated with MBT use, and for which conditions MBT was being used as a treatment by US adults. In addition, we further explored the rationale for MBT use and its perceived helpfulness in treating specific medical and psychological conditions.

Methods

Data source

The National Health Interview Survey (NHIS) is an in-person household survey of the civilian, noninstitutionalized US population. The Basic Module consists of three components: the Family Core, Sample Adult Core, and Sample Child Core. The Family Core collects information on sociodemographic characteristics, health status, insurance status, and health care access and utilization for each family member. Households are selected for face-to-face interveiws in English and/or Spanish using a multistage stratified sampling design. One adult, 18 years or older, was then randomly selected for the Sample Adult questionnaire, which elicited information about common medical conditions and health care utilization. In 2002, sample adults were also administered an Alternative Medicine Supplement, which queried respondents about the use of 19 complementary and alternative therapies, including the use of nine individual MBT. Respondents were asked, "During the past 12 months, have you used (specific therapy)?" Respondents reporting use of a specific MBT within the previous 12 months were then asked: "Did you use (specific MBT) to treat a specific health problem or conditions"; "For what health problems and conditions did you use (specific MBT)". In 2002, 31,044 adults participated in the Sample Adult component, representing a 74.3% response rate [11].

Outcomes of interest

We defined our primary outcome as use of at least one MBT within the past 12 months. Our definition included use of nine individual therapies (meditation, deep breathing exercises, progressive muscle relaxation, guided imagery, hypnosis, biofeedback, yoga, tai chi, or qigong), which have been classified as MBT by the National Center for Complementary and Alternative Medicine [1]. We excluded prayer from our definition, a distinction common in epidemiological studies on patterns of CAM use. We compared adults who used MBT to those who did not use MBT within the past 12 months.

We also separately explored use of individual therapies that had at least 1% prevalence of use in this sample, which included relaxation techniques, defined by NHIS as combined use of meditation, progressive muscle relaxation, deep breathing exercises or guided imagery; yoga; and tai chi.

Medical conditions

We considered 25 of the 63 medical conditions available in the 2002 NHIS as potential correlates of MBT. We chose conditions that were either prevalent, have somatic components, were previously reported to be treated with MBT [12], of special research interest to NCCAM [13], or we believed were potentially being treated with MBT in the clinical setting.

Additional outcomes

We also examined the following outcomes: (1) whether MBT was used to treat specific medical conditions; (2) perceived helpfulness of MBT in treating that particular condition (a great deal, some, only a little, not at all); and (3) respondents' rating of the importance of MBT for maintaining health and well-being (very, somewhat, a little, not at all important). To understand why adults use MBT for specific conditions, we assessed reasons for MBT use including conventional treatments would not help; conventional treatments were too expensive; conventional medical professional suggested it; thought it would be interesting to try; and combined with conventional medical therapies would be helpful.

Correlates of MBT use

We considered factors previously found to be associated with MBT use or CAM to be potential confounders. These included sociodemographic factors, health habits, and health care access. We considered sociodemographic characteristics including age, sex, race, income, marital status, educational attainment, region of residence, and place of birth. As a measure of respondents' health habits, we considered smoking status (current, former, never), alcohol intake, and physical activity level. Alcohol intake was categorized as abstainer (<12 drinks in lifetime), rare (<1 drink/month in past year), light (≤3 drinks/week), moderate (>3 and ≤7 drinks/week for women, >3 and ≤14 drinks/week for men), or heavy (>7 drinks/week for women and >14 drinks/week for men) based on NHIS definitions; physical activity was categorized as vigorous (vigorous activity 2 times/week or moderate activity 4 times/week), moderate (vigorous activity 1 time/week or moderate activity 1–3 times/week), or sedentary (no vigorous or moderate activity/week) using validated methods described previously [14]. We defined health care access using several proxies including insurance type (uninsured, Medicare, Medicaid, private-health maintenance organization, private fee for service); usual source of care (primary care provider, obstetrician-gynecologist, specialist, no provider but usual source of care, no usual source of care); and number of visits to health care providers per year (0, 1–2, 3–4, 5–7, ≥8). We also used indicators to assess illness burden including number of hospitalizations in the previous year (none, one, two or more) and mobility status (no impairment, minor, moderate, severe impairment) [15].

Statistical analyses

We calculated the prevalence of MBT use overall, use of relaxation techniques, and use of nine individual MBT therapies. We used descriptive statistics to characterize our sample.

We then developed separate multivariable logistic regression models to elucidate the medical conditions associated with MBT use and the most commonly used MBT therapies. Conditions with a P value of <0.15 on bivariable analyses were considered for inclusion in the multivariable models. To identify conditions independently associated with MBT use, we used stepwise backward elimination in models adjusted for sociodemographic factors, insurance status, and health habits. Only conditions with a Wald statistic P value of ≤.05 were retained in the final models. We repeated this selection process for relaxation techniques, yoga, and tai chi to identify the medical conditions associated with each therapy.

Among users of MBT (n=5170), we estimated the proportion using MBT to treat a specific medical condition, assessed which medical conditions were most frequently treated with MBT, the perceived helpfulness of MBT, and motivations for using MBT. We repeated these analyses for relaxation techniques and for combined use of yoga, tai chi, and qigong (YTQ). We collapsed categories as needed to ensure sample sizes were sufficient for analysis (i.e., n≥50).

All analyses were performed using SAS-callable SUDAAN version 9.0.1 (Research Triangle Park, NC) to account for the complex sampling design, and results were weighted to reflect national estimates.

Our study was reviewed by the institutional review boards at our institutions and was considered exempt.

Results

Sample characteristics and use of MBT

Overall, 16.6% of US adults, representing an estimated 34.1 million Americans, used at least one MBT in the past year. Table 1 lists the prevalence of use of MBT therapies in the United States. Relaxation techniques were commonly used. Among individual therapies, deep breathing exercises were most commonly used (11.4%), followed by meditation (7.5%), and yoga (5.0%). Use of hypnosis and biofeedback remains relatively uncommon among US adults.

Table 2 presents characteristics of MBT users compared to the US adult population. Overall, MBT users had higher prevalence of younger age, female sex, educational and income levels, and physical activity compared with the general population. Users of MBT also had higher prevalence of most medical conditions studied, except for hypertension, which had equal or lower prevalence among MBT users.

Table 3 presents the adjusted odds ratios for the associations between specific medical conditions and use of MBT therapies overall and individually. Adults with facial pain, neck pain, anxiety/depression, and food or odor allergy

Table 1
Prevalence of MBT use among adults in the United States *

Mind–body therapy	Sample size (n)	Estimated population †	Population% (weighted)
MBT Use overall	5170	34,065,029	16.6
Relaxation techniques overall †	4426	29,220,490	14.2
Deep breathing exercises	3552	23,456,633	11.4
Meditation	2394	15,336,000	7.5
Progressive muscle relaxation	925	6,185,000	3.0
Guided imagery	629	4,193,534	2.0
Physical modalities			
Yoga	1593	10,386,456	5.0
Tai chi	403	2,564,584	1.2
Qigong	84	526,546	0.7
Other			
Hypnosis	74	505,071	0.2
Biofeedback	44	277,557	0.1

* NHIS complex sampling scheme allows for weighted estimates of US population.

† Combined use of deep breathing exercises, meditation, progressive muscle relaxation, and guided imagery.

Table 2
Characteristics of users of MBT*

	NHIS sample	MBT users overall	MBT Therapies		
			Relaxation techniques	Yoga	Tai chi
Sample size	31,044	5,170	4,426	1,593	403
Estimated population size†	205,825,095	34,065,029	29,220,490	10,386,456	2,564,584
Weighted %		17	14	5	1
Age (years)					
18–29	22	23	22	26	24
30–39	20	21	20	27	19
40–49	21	24	24	23	18
50–64	21	23	25	20	24
>65	16	9	9	4	15
Sex					
Female	52	64	63	76	56
Race‡					
NH White	73	77	76	81	71
Hispanic	11	7	8	6	9
NH Black	11	10	11	6	10
Asian	4	4	4	5	7
Education§					
<HS Graduate	16	7	8	3	6
HS Graduate	30	22	23	15	16
Some college	28	34	34	31	35
≥College graduate	24	37	35	50	44
Income					
<$20,000	18	15	16	11	17
$20,000–$35,000	28	25	26	23	25
$35,000–$65,000	22	23	23	22	19
>$65,000	26	33	32	41	37
Region of residence					
Northeast	19	19	19	23	24
Midwest	24	26	28	24	23
South	37	31	30	27	23
West	19	24	24	26	29
Marital status					
Married	58	54	54	55	47
Single	20	21	20	24	26
Widowed	6	4	4	2	4
Divorced or separated	10	14	15	12	15
Place of birth					
United States	86	89	90	88	88
Insurance type					
Uninsured	15	13	14	12	15
Medicare	17	11	12	4	15
Medicaid	5	4	4	3	4
Private, HMO‖	23	26	26	27	24
Private, FFS¶	28	32	31	40	29
Smoking status					
Never	54	52	50	59	57
Former	22	25	25	24	24
Current	22	23	24	17	19
Physical activity#					
Sedentary	39	20	22	10	18
Moderate	22	25	25	25	18
Vigorous	38	54	53	65	63
Alcohol intake**					
Abstainer	22	14	14	9	15
Rare	27	29	31	21	29
Light	28	36	35	44	38
Moderate	14	16	15	18	14
Heavy	5	6	5	7	4
Medical conditions pain syndromes (in past 3 months)					
Face pain	5	10	11	10	10
Neck pain	14	24	25	22	23

Table 2 (*continued*)

	NHIS sample	MBT users overall	MBT Therapies		
			Relaxation techniques	Yoga	Tai chi
Medical conditions pain syndromes (in past 3 months)					
Joint pain[††]	25	34	37	27	30
Severe headache	15	24	26	21	19
Low back pain	26	36	38	31	35
Dental pain[‡‡]	13	18	19	15	19
Psychiatric (in past 12 months)					
Anxiety/depression	16	24	26	20	20
Insomnia	17	28	30	21	27
Other conditions (history of)					
Food or odor allergy[‡‡]	7	13	13	12	17
Bowel disease	6	9	10	7	9
Irregular heartbeat	9	13	14	8	13
Thyroid disease	7	10	10	8	9
Hypertension	24	23	24	13	19
COPD[a]	6	7	7	4	5

[a] COPD=Chronic obstructive pulmonary disease.

* All prevalence rates are reported as percentages and are weighted to reflect national estimates.

[†] NHIS Complex sampling scheme allows for estimates of US population.

[‡] NH=Non-Hispanic.

[§] H.S.=High school.

[¶] HMO=Health maintenance organization.

[¶] FFS=Fee for service.

[#] Physical activity levels: Vigorous=vigorous activity 2 times/week or moderate activity 4 times/week; moderate=vigorous activity 1 time/week or moderate activity 1–3 times/week, sedentary=no vigorous or moderate activity/week.

** Alcohol intake: abstainer (<12 drinks in lifetime), rare (<1 drink/month in past year), light (≤3 drinks/week), moderate (>3 and ≤7 drinks/week for women, >3 and ≤14 drinks/week for men), or heavy (>7 drinks/week for women and >14 drinks/week for men).

[††] Joint pain lasting at least 3 months.

[‡‡] Diagnosed within the past 12 months.

were more likely to use MBT; we found similar associations for use of relaxation techniques. Yoga was most strongly associated with neck pain, while lower use of yoga was associated with hypertension and chronic obstructive pulmonary disease. Food or odor allergy was the strongest correlate of use of tai chi.

Mind–body therapies for treatment of medical conditions and for well-being

Overall, 30% of MBT users reported using MBT to treat a specific condition. Specifically, 32% of relaxation techniques users and 17% of yoga, tai chi, and qigong users combined (YTQ) used their respective therapy to treat a specific condition. Table 4 presents the most common conditions treated with MBT. These conditions included anxiety/depression, back pain, and several other pain syndromes (Table 4, column 2). Anxiety/depression was the condition most commonly treated with relaxation techniques, with 26% of the relaxation techniques subgroup using relaxation techniques specifically for this condition. Low back pain was the condition most commonly treated with YTQ, with 34% of YTQ users reporting using YTQ for this purpose. Furthermore, 68–90% of respondents who used MBT to treat a specific condition perceived MBT as helping "a great deal" or "some" with their condition. The reported degree of helpfulness was similar for all subgroups of relaxation techniques and YTQ users. In addition, 35% of MBT users rated MBT as very important in maintaining their health and well-being and 33% rated their use as somewhat important.

Rationale for MBM use

We found that among respondents using MBT to treat a specific condition, more than 30% reported that a conventional medical professional recommended it, and 20% believed conventional therapy would not help (Fig. 1). Patterns were similar for relaxation techniques and YTQ users for most motivations for use.

Discussion

We found that US adults with various pain syndromes, anxiety/depression, and insomnia were more likely to use alternative MBT compared to adults without these conditions. Among adults using MBT to treat specific medical conditions, MBT was most commonly used to treat anxiety/depression and musculoskeletal pain syndromes. More than 50% of these respondents reported MBT use in conjunction with conventional medical care, 30% used MBT because a conventional medical professional recommended it, and 20% used because they thought conventional medicine would not

Table 3
Relationship between medical conditions and use of mind–body medical therapies among US adults

Medical conditions (diagnostic time frame)	Mind–body therapies overall	Mind–body therapies		
		Relaxation techniques	Yoga	Tai chi
	Adjusted OR (95% CI)*	Adjusted OR (95% CI)*	Adjusted OR (95% CI)*	Adjusted OR (95% CI)*
Pain syndromes (in past 3 months)				
Facial pain	1.46 (1.23–1.73)	1.43 (1.20–1.70)	1.52 (1.19–1.93)	N/D
Neck pain	1.45 (1.24–1.55)	1.43 (1.27–1.62)	1.76 (1.46–2.11)	1.65 (1.21–2.27)
Joint pain	1.39 (1.26–1.53)	1.37 (1.24–1.52)	NS	NS
Severe headache	1.15 (1.03–1.28)	1.19 (1.06–1.32)	NS	NS
Low back pain	1.18 (1.07–1.29)	1.21 (1.09–1.34)	NS	NS
Dental pain†	1.14 (1.01–1.28)	1.16 (1.03–1.31)	NS	NS
Psychiatric (in past 12 months)				
Anxiety/depression	1.44 (1.29–1.62)	1.44 (1.28–1.62)	1.43 (1.20–1.71)	NS
Insomnia	1.38 (1.24–1.55)	1.41 (1.25–1.59)	NS	1.64 (1.21–2.23)
Other conditions (history of)				
Food or odor allergy†	1.49 (1.30–1.71)	1.52 (1.32–1.75)	1.47 (1.20–1.80)	2.11 (1.49–2.97)
Bowel disease	1.27 (1.10–1.48)	1.25 (1.07–1.47)	NS	N/D
Irregular heartbeat	1.23 (1.07–1.41)	1.26 (1.09–1.45)	NS	N/D
Thyroid disease	NS	1.18 (1.02–1.37)	NS	N/D
Hypertension	NS	NS	.74 (.61–.89)	.71 (.52–.96)
COPD‡	NS	NS	.71 (.51–.99)	N/D

N/D=sample size was not sufficient for analysis (n<50).

* Adjusted for age, sex, race, income, educational level, region of residence, place of birth, insurance status, marital status, insurance status, smoking status, physical activity level, and alcohol consumption.

† Diagnosed within the past 12 months.

‡ COPD=Chronic obstructive pulmonary disease.

help. Overall, we found high rates (68–90%) of perceived helpfulness of MBT in treating specific medical conditions.

Our results are consistent with previous research of MBT use in nationally representative samples, with similar rates of use of MBT overall (18.9%), meditation (7.0%), and yoga (3.7%) [2,12]; however, we found different prevalences of use for other individual MBT therapies [2,12]. Our results suggest that the rate of use of relaxation techniques of 14.2% is substantially higher than the 5.0% previously reported from the 1999 NHIS [2,16]. Additionally, we found much lower use of MBT for treatment of specific medical conditions compared to previously published data [12]. For example, Wolsko et al. [12] estimated 11.2 million adults had used MBT for treatment of back pain, yet we found that fewer than 1.5 million adults with back pain used MBT for this condition. These differences may reflect the change in patterns of use over time, but may also reflect different survey instruments.

Despite the popularity of MBT use, research on its therapeutic benefits is in its infancy. While studies

Table 4
Use of MBT for treatment of common medical conditions

Condition treated	Prevalence of medical conditions among sample adults (n=31,044), n (weighted%)	Adults who use MBT to treat specified condition, n (population estimate)	Among adults who use MBT to treat a specific condition, the proportion who report that MBM helped their condition to a "great deal" or "some" degree (weighted %)
Pain syndromes (in past 3 months)			
Neck pain	4397 (14)	84 (443,471)	76
Joint pain*	7909 (25)	89 (509,281)	75
Severe headache	4744 (15)	94 (603,629)	80
Back pain	8256 (26)	222 (1,447,928)	83
Arthritis	6829 (21)	109 (716,744)	82
Recurring pain	5656 (18)	84 (492,942)	80
Psychiatric (in past 12 months)			
Anxiety/depression	5357 (16)	376 (2,178,115)	68
Insomnia	5712 (17)	97 (614,731)	79
Other conditions			
Asthma	3327 (11)	80 (529,937)	90
Hypertension†	8055 (24)	49 (303,529)	87

* Joint pain lasting >3 months.

† Estimates are based on a sample size of <50 and should be interpreted with caution.

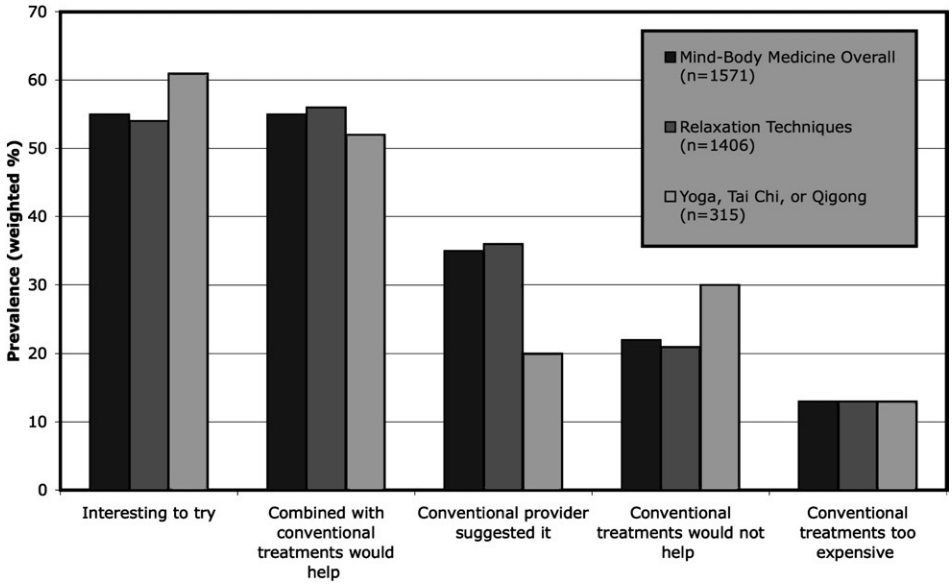

Fig. 1. Reported rationale for using MBT among those who used to treat a specific medical condition.

examining the benefit of MBT for treatment of specific medical conditions have increased in number, methodological issues, such as small sample sizes and inadequate control groups [17], have limited the interpretation and generalizability of the data. For example, a recent Cochrane review evaluating the literature on meditation for anxiety concluded that "the small number of studies [of high enough quality to be] included in this review do not permit any conclusions to be drawn on the effectiveness of meditation therapy for anxiety disorders" and "more trials are needed" [18]. Thus available data on the efficacy of MBT are suggestive at best, and no firm conclusions can be drawn at this time, thereby limiting recommendations for widespread adoption and use for treatment of specific conditions.

One example of how these methodological issues curb our ability to routinely recommend MBT can be found in the literature examining Mindfulness Based Stress Reduction (MBSR) for treatment of anxiety and depression. MBSR is a formal program that cultivates mindfulness, defined as nonjudgmental moment-to-moment awareness, through meditation, body scan (sequential attention to parts of the body while supine), and mindful movement (body awareness during yoga postures) [19]. Although results from recent clinical studies have been promising [20–23], most studies have used a wait list or treatment as usual control group, which makes it difficult to distinguish the true effects of MBSR from group effects or placebo responses. A recent review of MBSR for anxiety and mood symptoms in clinical populations [24] reported a statistically significant reduction in anxiety or depression after MBSR in eight of 15 clinical studies reviewed [20,21,25–31]. However, none of the positive studies had an active control [24]. By utilizing control groups that are commensurate with MBSR in subject contact time and attention, as well as in physical activity level, we could better discern the specific effects of mindfulness training. Furthermore, using objective measures of mindfulness would provide support that changes in outcomes are in fact mediated by cognitive shifts. Moreover, the totality of data on meditative techniques for the treatment of anxiety and depression has limited applicability in clinical populations, as several studies evaluated healthy populations, focused on situational anxiety (such as music performance), and lacked clear standardized diagnostic criteria for anxiety and/or depression [18,24].

Despite the limitations of the current literature, we found that more than two-thirds of adults who use MBT for a specific condition found MBT helpful. Reasons for the perceived beneficial effects of MBT for these conditions are unclear and may include physiological and psychological effects, or even placebo responses [32]. It should be noted that high rates of perceived helpfulness do not signify medical efficacy. Given the high prevalence of MBT use and the suggestive preliminary data, definitive randomized controlled trials, which are sufficiently large and of high quality, are needed to examine both the potential therapeutic benefits and mechanisms, as well as the potential side effects and risks of individual MBT therapies.

One surprising finding was that 30% of adults using MBT to treat a condition reported a conventional provider recommended it, even though there is no clear evidence to support its use. Limited research suggests that the factors influencing physicians' recommendations of CAM include lack of response to conventional therapies, patient preferences, physician knowledge of and belief in the efficacy of CAM, and few adverse events with CAM [33,34]. Researchers have theorized that trends in physicians' attitudes and beliefs toward CAM are likely to vary regionally [34], by provider environmental influences, and by cultural norms [35]. As data on MBT become available, it will be important to understand how physicians' knowledge,

attitudes, and beliefs of MBT affect decision-making processes, as they may serve as important advocates for or as potential barriers to the adoption of evidence-based integrative care.

With nearly 20% of US adults using MBT, little is known about which additional factors are driving the high rates of use of these "alternative" therapies, as the vast majority are not using MBT to treat a specific condition. Astin [36] found that adults used CAM "largely because they find these health care alternatives to be more congruent with their own values, beliefs, and philosophical orientations toward health and life." However, the reasons for CAM use, including MBT, remain poorly understood. We found among respondents using MBT for treatment of a specific medical condition that more than 50% used MBT because they thought that it was interesting to try; 50% also thought that MBT use combined with conventional therapy would be beneficial. Identification of additional factors influencing use of MBT would further our understanding of patient needs and expectations, and expand our current biopsychosocial model of health care.

Furthermore, given the common use of MBT, it would be important to note the potential adverse effects of MBT practice, particularly in patients with medical and psychological conditions. For instance, the association between yoga and several musculoskeletal conditions may be indicative of injuries induced by yoga [37]. In addition, with 20% of MBT users reporting they use MBT since they believed conventional medicine would not help, we may speculate that a segment of the clinical population may be using MBT alternatively, rather than complementary to conventional medicine. This theoretically may limit access to appropriate conventional care. Further research on MBT for treatment of chronic conditions would also provide important data on the risks of MBT use in specific clinical populations.

Limitations

Our study has limitations. The self-reporting nature of the NHIS may lead to misclassification and recall bias. Furthermore, MBT is difficult to define, particularly given the overlap with behavioral therapy and spirituality, and therefore we may not have accurately captured the true prevalence of use. Likewise, respondents were limited to MBT specifically queried by NHIS and NHIS categorizations, such as deep breathing exercises, may not be considered as MBT by some respondents, further impacting our ability to accurately estimate the prevalence of use. NHIS did not assess quantity or duration of MBT use either, which limits our ability to distinguish the characteristics of one-time users compared with adults practicing MBT over time. In addition, the 2002 NHIS was administered only in English and Spanish, and certain immigrant populations that are less acculturated may have different patterns of MBT use [38] that were not captured. Lastly, NHIS does not collect data on all possible reasons for MBT use, such as for peri-procedural pain control [33,39].

Conclusion

In summary, we found that MBT is commonly used in the United States and identified a wide range of medical conditions that were associated with MBT use. MBT is most often used to treat anxiety/depression and musculoskeletal pain syndromes. Although there is high prevalence of use and perceived helpfulness of MBT, current data on the efficacy of MBT for treatment of most medical conditions are limited. Thus a schism continues to exist between our scientific knowledge of these therapies and their use by patients. Better understanding of the potential efficacy of MBT for treatment of specific medical conditions would broaden our perceptions of the complex relationship between the mind and body as they relate to health and healing.

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