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Neuropsychiatric Symptoms and the Use of Mind-Body Therapies

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Abstract

Objectives—Neuropsychiatric symptoms affect 37% of US adults and present in many important diagnoses including post-traumatic stress disorder, traumatic brain injury, and chronic pain. However, these symptoms are difficult to treat with standard treatments and patients may seek alternative options. In this study, we examined the use of mind-body therapies by adults with neuropsychiatric symptoms.

Methods—We compared mind-body therapy use (use of 1 therapy of meditation, yoga, acupuncture, deep-breathing exercises, hypnosis, progressive relaxation therapy, qi gong, and tai chi) between adults with and without neuropsychiatric symptoms (anxiety, depression, insomnia, headaches, memory deficits, attention deficits, and excessive daytime sleepiness) using the 2007 National Health Interview Survey (n=23,393). We examined prevalence and reasons for mind-body therapy use in adults with neuropsychiatric symptoms. We performed logistic regression to examine the association between neuropsychiatric symptoms and mind-body therapy use to adjust for sociodemographic and clinical factors.

Results—Adults with 1 neuropsychiatric symptoms used mind-body therapies more than adults without symptoms (25.3% vs. 15.0%, $p < 0.001$). Prevalence increased with increasing number of symptoms (21.5% for 1 symptom, 32.4% for 3 symptoms, $p < 0.001$); differences persisted after adjustment for potential confounders (OR 1.39[1.26, 1.53] and 2.48[2.18, 2.82]. Reasons for mind-body therapy use among adults with 1 symptom included conventional medicine being ineffective or too expensive (30.2%). Most adults (70%) with 1 symptom did not discuss their mind-body therapy use with a conventional provider.

Conclusions—Adults with 1 neuropsychiatric symptom use mind-body therapies frequently; more symptoms are associated with increased use. Future research is needed to understand the efficacy of these therapies.

Introduction

Neuropsychiatric symptoms (memory loss, insomnia, regular headaches, anxiety, excessive sleepiness, attention deficits, and depression) are common in the general population, affecting nearly 82 million adults (37%) in the United States.¹ Furthermore, these symptoms are prevalent in many difficult to treat conditions such as traumatic brain injury (TBI), post-traumatic stress disorder (PTSD), chronic pain syndromes, and fibromyalgia.^{2–5}

Neuropsychiatric symptoms are concerning because they are independent risk factors for many other health conditions. For example, insomnia, anxiety, and depression are independent risk factors for obesity, metabolic syndrome, and cardiovascular disease.^{6, 7} Furthermore, migraine headaches with aura are independent risk factors for cardiovascular disease, stroke, and increased mortality.^{8, 9}

We previously showed that patients with these symptoms were more likely to use complementary and alternative medicine (CAM) than those without these symptoms (44% vs. 29%, $p < 0.001$), and the most common CAM therapies used by adults with neuropsychiatric symptoms are mind-body therapies.¹ However, we do not know which mind-body therapies are being used by adults with these symptoms.

Mind-body therapies are defined by the National Institutes of Health (NIH) as practices that “focus on the interactions among the brain, mind, body, and behavior, with the intent to use the mind to affect physical functioning and promote health.”¹⁰ The NIH considers mind-body therapies to include meditation, yoga, deep-breathing exercises, guided imagery, hypnotherapy, progressive relaxation, qi gong, and tai chi.¹⁰

Unlike many CAM therapies, such as certain herbal treatments, these therapies are compatible with standard treatments such as pharmacological interventions without interfering with these treatments. As largely lifestyle interventions, they may even help augment standard treatments. Furthermore, several trials using mind-body therapies such as meditation and yoga have shown the potential for beneficial neuroplasticity, which may indicate not only clinical efficacy, but a potential mechanism for longer term change.^{11–13} Additionally, for many patient populations, particularly those in the military with traumatic brain injury (TBI) or post-traumatic stress disorder (PTSD), these therapies may carry less risk than conventional treatments, such as improper use of medications and overdosing on prescription medications.¹⁴

Given this context, in this study, we extended our research using the National Health Interview Survey (NHIS) to analyze specifically the prevalence of mind-body medicine use in adults with neuropsychiatric symptoms, and the variations in prevalence based on the

¹The survey and all relevant information including actual survey questions and data are available from the Centers for Disease Control (CDC) at: http://www.cdc.gov/nchs/nhis/nhis_2007_data_release.htm

number of symptoms. Furthermore, we analyze the specific types, reasons for, and correlates of mind-body medicine use in adults with neuropsychiatric symptoms.

Methods

Data source

To allow comparison with previous studies, we analyzed data from the 2007 National Health Interview Survey (NHIS) Adult Core and Alternative Medicine Supplement, conducted by the Centers for Disease Control and Prevention, which employs a complex, multi-stage, stratified sampling design.¹ One adult, age 18 or older, was randomly selected from each household to answer the adult questionnaire.¹⁵ In 2007, the NHIS used a supplement questionnaire, sponsored by the NIH, to obtain information regarding national prevalence and reasons for CAM therapy use.¹⁵ The final adult survey included 23,393 respondents, with an overall response rate of 67.8%.¹⁵

Data Collection

Neuropsychiatric Symptoms—We analyzed the neuropsychiatric symptoms of memory loss, insomnia, regular headaches, anxiety, excessive sleepiness, attention deficits, and depression because of their relationship to many important diagnoses such as TBI, PTSD, chronic pain syndromes, and fibromyalgia.^{4, 16}

Outcomes of Interest—Our primary outcome was the use of at least one mind-body therapy (biofeedback, energy healing, hypnosis, tai chi, yoga, qi gong, meditation, guided imagery, progressive relaxation, deep breathing exercises) in the prior 12 months. We were also interested in the correlation between increasing number of neuropsychiatric symptoms and prevalence of mind-body therapy use. Sampled adults were asked, “Have you used (specific therapy) in the past 12 months?”¹⁵

Additionally, we were interested in reasons for mind-body therapy use and disclosure of mind-body therapy use to conventional providers. Respondents were asked their reasons for mind-body therapy use and answered yes/no to each of seven items: (1) to improve or enhance energy; (2) for general wellness/general disease prevention; (3) to improve/enhance immune function; (4) because conventional medical treatments did not help; (5) because conventional medical treatments were too expensive; (6) it was recommended by a health care provider; (7) it was recommended by family, friends, or co-workers.¹⁵ For each therapy used in the previous year, respondents were asked whether they disclosed their use to a conventional provider.

Correlates of Mind-Body Therapy use—Data were also collected on sociodemographic characteristics (i.e. gender, age, race/ethnicity, region of residence, birthplace, educational attainment, and marital status), indicators of illness burden (i.e. perceived health status, presence of functional limitations, and self-reported history of medical conditions), indicators of access to care (i.e. insurance status and imputed family income provided by the NHIS), and measures of health habits (i.e. smoking status, physical activity level, and alcohol intake). We also analyzed other diagnoses including pain

syndromes and rheumatic diseases such as fibromyalgia, arthritis, low back pain, and joint pain. Covariates were included if either previously reported as significant or considered important and relevant to our topic.^{17–21}

Statistical Analyses

Using bivariable analyses, we compared prevalence of mind-body therapy use, reasons for mind-body therapy use, and disclosure of mind-body therapy use to conventional providers between adults with and without neuropsychiatric symptoms. We also examined the correlation between increasing number of neuropsychiatric symptoms and prevalence of mind-body therapy use with chi square analysis. These methods are similar to methods from previous work to allow a consistent comparison with previous studies.

We fit multiple multivariable logistic regression models to determine 1) whether the association in mind-body therapy use persisted between adults with and without common neuropsychiatric symptoms after adjusting for socio-demographic characteristics, illness burden, access to care, health habits, and other diagnoses, 2) whether the number of symptoms was associated with change in the likelihood of mind-body therapy use after adjusting for covariates, and 3) the specific symptoms that were more closely associated with mind-body therapy use.

All models used the same covariates including adjustments for sociodemographic characteristics, illness burden, access to care, health habits, and other diagnoses as described above. To ensure a robust analysis, we did not eliminate any of the covariates after initial inclusion.

We excluded missing data from prevalence estimates; no individual variable had more than 5.8% missing data. We included only respondents with complete data on all covariates for the regression models. No regression model had more than 9.1% missing data.

SAS (version 9.3 Research Triangle Park, NC) was used to account for the complex sample design using NHIS parameters so that the results reflect national estimates.¹⁵ Imputed incomes were provided by the NHIS. The study was approved for exemption by the Spaulding Rehabilitation Hospital Institutional Review Board because we used de-identified data.

Results

Sample Characteristics

Overall, 8,696 adults reported experiencing at least one neuropsychiatric symptom, representing 36.6% of the US adult population (estimated 81.6 million adults nationwide). Of the total sample surveyed, 62.8% (n=14,697) of the sample reported zero neuropsychiatric symptoms, 18.2% (n=4261) reported 1 symptom, 8.5% (n=1992) reported 2 symptoms, and 10.4% (n=2443) reported 3 symptoms. Mind-body therapies were used more among those with neuropsychiatric symptoms across all sociodemographic and clinical factors except for body mass index, alcohol consumption, and smoking status (Table 1). Furthermore, female subjects with neuropsychiatric symptoms were nearly twice as likely to

use mind-body therapies compared to those without symptoms and those between ages 25–64 were the ones most likely to use mind-body therapy (table 1). Also, although in general, higher income and education had higher prevalence of mind-body therapy use, of those with less income and education, those with neuropsychiatric symptoms had double the prevalence of mind-body therapy use compared to those without symptoms in the same income and education categories (Table 1).

Prevalence of Mind-Body Therapy Use

Overall, 25.3% of US adults with 1 neuropsychiatric symptoms reported using at least one mind-body therapy in the previous 12 months compared to 15.0% of those adults not reporting any neuropsychiatric symptoms and those with increased neuropsychiatric symptoms had higher prevalence of use (21.5% for those with 1 symptom, 25.2% with 2 symptoms, and 32.4% with 3 symptoms, $p<0.001$). Even after adjusting for co-variables, those with 1 neuropsychiatric symptom were more likely to use mind-body medicine (OR 1.68 [1.55, 1.82] 95% CI, Table 2) and this likelihood increased with an increasing number of symptoms (Fig 1). Both groups used deep-breathing exercises, meditation, and yoga the most (Fig 2); however, those with neuropsychiatric symptoms used them more than those without neuropsychiatric symptoms (19.6 vs. 9.6%, 14.0 vs 7.4%, and 7.0 vs. 5.7%, respectively, $p<0.001$ for all comparisons). Each neuropsychiatric symptom was independently associated with an increased likelihood of mind-body therapy use (Fig 3). Those with anxiety were the most likely to use mind-body therapies, while those with headaches were least likely.

Reason for Use and Disclosure of Mind-Body Therapy Use

Both adults with and without neuropsychiatric symptoms used mind-body therapies primarily for general wellness and disease prevention (Fig 4). Adults with neuropsychiatric symptoms used mind-body therapies more often than those without symptoms because their provider recommended it (25.1 vs. 12.0%), conventional treatment was not effective (13.2 vs. 6.1%), or because conventional treatment was too expensive (11.0 vs. 4.7%, $p<0.05$ for all comparisons, Figure 4), but less than those without symptoms for general wellness or disease prevention (64.9 vs. 71.4%) or to improve or enhance energy (43.6 vs. 49.9%, $p<0.05$ for all comparisons, Figure 3).

While nearly 70% of adults with neuropsychiatric symptoms did not report their mind-body therapy use to a conventional provider; those with at least one neuropsychiatric symptom were more likely to disclose their use to a conventional provider compared to those without neuropsychiatric symptoms (30.9 vs. 20.8%, $p<0.001$).

Discussion

Prevalence of mind-body therapy use was higher in US adults with neuropsychiatric symptoms compared to those without neuropsychiatric symptoms. The number of symptoms and each specific symptom were also associated with a higher likelihood of mind-body therapy use. Those with neuropsychiatric symptoms had a higher prevalence of mind-body therapy use because they were recommended by a conventional provider or a conventional

treatment was considered either ineffective or too expensive. Most users of mind-body therapies did not disclose their use to a conventional provider.

To our knowledge, this is the first study evaluating the use of mind-body therapies in patients with this constellation of neuropsychiatric symptoms. A similar study using the NHIS evaluated the prevalence of mind-body therapies in adults with neurological disorders and found a similar prevalence as our study (25%).¹⁹ Another study examined the prevalence of mind-body use in adults specifically with severe headaches/migraines and found a prevalence of 30%.²² We did not specifically look at the prevalence of mind-body therapy use in adults with headaches. However, we did find that the odds of mind-body therapy use in adults with headaches compared to those without these headaches was 1.25, and this was less than the other neuropsychiatric symptoms in our study.

Because of the potential impact of neuropsychiatric symptoms on overall health, it is important to treat them effectively and safely. However, these symptoms may often be difficult to treat in many patients using standard treatments alone. This study suggests that patients with neuropsychiatric symptoms are using mind-body therapies frequently, although we do not know if individuals are using mind-body therapies specifically for treatment of their neuropsychiatric symptoms. Furthermore, approximately 1 in 4 adults with at least one neuropsychiatric symptom used a mind-body therapy because a conventional provider recommended it, suggesting that many providers may be recommending these therapies. This may suggest that providers are also open to or looking for additional, non-conventional treatment options for their patients with neuropsychiatric symptoms.

Mind-body therapies have shown benefits for neuropsychiatric symptoms. For example, studies using mindfulness based stress reduction (MBSR), a standardized 8 week class teaching meditation and yoga, have shown improvement for specific symptoms such as anxiety, insomnia, depression, and memory.^{23–25} Additionally, a systematic review and meta-analysis of tai chi for psychological well-being found that it is associated with improvements in anxiety, depression, mood disturbance, and decreased stress.²⁶

Although these studies are promising, they had small sample sizes or limited control groups and may not generalize to all populations. More research is needed to evaluate the safety and efficacy of mind-body therapies in adults with neuropsychiatric symptoms before they are routinely recommended since adverse consequences are possible. For example, for patients with a TBI or PTSD, some of the therapies may elicit unpleasant emotions or memories. This may require modifying the therapy, using another therapeutic option altogether, or being prepared to address the resulting emotions. Thus, while many patients with neuropsychiatric symptoms are using mind-body therapies, given our limited knowledge about the benefits and risks of mind-body therapy use among patients with these symptoms, future research is needed to determine if these therapies are safe and effective.

Our study has several limitations. The NHIS is conducted on US adults and the results may not generalize to other populations. The NHIS, like many surveys, is cross-sectional, relies on self-reporting, and is subject to recall bias and misclassification of information. The survey also does not address the intensity or frequency of the neuropsychiatric symptoms

and the symptoms are based on self-report. The NHIS also does not provide sufficient information regarding whether the mind-body therapies were used specifically for the neuropsychiatric symptoms. Most importantly, the cross sectional design does not allow any conclusions regarding causation; based on this study, we do not know if individuals used mind-body therapies as a consequence of their neuropsychiatric symptoms or if the symptoms were a consequence of the therapy use. Despite these limitations, this study includes a large national sample size and provides valuable information about mind-body therapy use in the general population.

Conclusion

In conclusion, our study showed that adults with neuropsychiatric symptoms used mind-body therapies more than those without these symptoms, with an increasing number of symptoms associated with increased use. Our results highlight the importance of clinicians discussing the role and reasons for of mind-body therapy therapies with patients with neuropsychiatric symptoms. Furthermore, more research is needed to better understand the efficacy of these treatments for patients with neuropsychiatric symptoms.

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Clinical Points

Neuropsychiatric symptoms are common in the general population. These symptoms can be difficult to treat with standard treatments. Patients in significant numbers are seeking treatment elsewhere, most commonly using mind-body therapies. However, many patients do not discuss these treatments with conventional providers. It might be necessary for the provider to initiate discussion of any alternative treatments patients might be using in addition to standard treatments.

Figure 1.

Figure 2.

Figure 3.

Figure 4.

Table 1

Sample Characteristics

Sociodemographic Characteristics:	% Mind-Body Therapy Use in those With Symptoms, (n=8,696)	% Mind-Body Therapy Use in those Without Symptoms, (n=14,692)	Chi Square, p value
Sociodemographic Characteristics:			
Gender			
Male	8.2	6.0	<0.001
Female	17.1	9.0	
Age (years)			
18–24	3.4	1.9	<0.001
25–44	9.6	5.8	
45–64	9.5	5.7	
65–74	1.8	1.1	
75+	1.1	0.5	
Race			
Non-hispanic White	19.4	11.3	<0.001
Non-hispanic Black	2.2	1.4	
Hispanic	1.9	1.0	
Asian	1.0	1.1	
Other	0.8	0.3	
Education			
High School or less	8.0	2.9	<0.001
>High School	17.5	12.3	
Imputed Family Income ^a (\$)			
0–19,999	4.7	1.8	<0.001
20–34,999	4.3	1.8	
35–64,999	6.7	3.6	
>65,000	9.6	7.8	
Region			
Northeast	4.2	3.1	<0.001
Midwest	6.5	3.9	
South	7.8	4.0	
West	6.8	4.0	
Marital Status			
Married/Living with Partner	14.4	9.4	<0.03
Widowed	1.5	0.7	
Divorced/Separated	3.8	1.5	
Never married	5.7	3.4	
US Born	22.9	13.0	<0.001
Foreign Born	2.5	2.1	
Insurance Status			
Uninsured	4.1	1.7	<0.001

Sociodemographic Characteristics:	% Mind-Body Therapy Use in those With Symptoms, (n=8,696)	% Mind-Body Therapy Use in those Without Symptoms, (n=14,692)	Chi Square, p value
Medicare	4.1	1.5	
Medicaid	1.7	0.3	
Private	13.3	10.3	
Other	1.9	1.2	
Needs help with ADLs^b	10.1	2.8	<0.04
Does not need help with ADLs	15.2	12.2	
Health Characteristics:			
Body Mass Index (kg/m²)			
<25	10.1	7.0	<0.07
25 to <30	7.9	5.7	
30 to <35	4.7	2.0	
35	3.3	0.9	
Perceived Health^c			
Excellent/very good/good	20.0	14.5	<0.001
Fair or Poor	5.3	0.5	
Physical Activity^d			
Low	13.3	10.0	<0.001
Moderate	5.1	2.8	
High	7.3	2.5	
Smoking			
Current/Former	13.6	5.9	<0.06
Never	12.0	9.4	
Alcohol^e			
None	1.7	1.0	<0.12
Light/Moderate/Heavy	24.2	14.5	
History of Chronic Medical Conditions^f	20.4	7.7	<0.001
Without History of Chronic Medical Conditions	4.9	7.3	
History of Pain Syndromes^g	16.3	5.1	<0.001
No History of Pain Syndromes	9.0	9.9	

Percentages are weighted to reflect national estimates

^aIncomes are imputed values provided by the NHIS.

^bADLs, activities of daily living, were defined as needing help with personal care, bathing/showering, dressing, eating, getting in/out of a chair/bed, toileting, getting around the home, routine needs, difficulty walking ¼ mile without special equipment, difficulty climbing 10 steps without special equipment, difficulty standing for two hours without special equipment, difficulty sitting for two hours without special equipment, difficulty stooping/bending without special equipment, difficulty reaching overhead, difficulty grasping small objects without special equipment, difficulty lifting/carrying 10 lbs without special equipment, difficulty pushing large objects without special equipment, or difficulty to go out or participate in social events without special equipment.

^cPerceived health is a subjective response based on respondent's perception of one's own health.

^dPhysical activity categories were defined as follows: high (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 low (no vigorous or moderate activity/week)

^eAlcohol use is defined as none if the respondent answered “lifetime abstainer, former infrequent, former regular, former frequency unknown.” All other respondents were included in the light/moderate/heavy category.

^fHistory of chronic medical conditions includes self-reported history of heart attack, coronary artery disease, angina in the past 12 months, poor circulation, history of urinary problems or weak/failing kidneys in the past 12 months, acid reflux/heart burn, bowel problems, ulcer, or liver condition in the past 12 months, history of emphysema or asthma, gout, lupus, fibromyalgia, rheumatoid arthritis, and/or arthritis

^gHistory of chronic pain syndromes includes self-reported history of dental pain past 12 months, jaw/face pain past 3 months, neck pain past 3 months, and/or low back pain in the past 3 months