

SCIENTIFIC INVESTIGATIONS

Use of Complementary and Alternative Medicine Treatments by Patients with Obstructive Sleep Apnea Hypopnea Syndrome

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Study Objectives: To assess the proportion of patients with obstructive sleep apnea hypopnea syndrome (OSAHS) reporting previous or current use and interest in future use of complementary and alternative medicine (CAM) therapies.

Design: Cross-sectional, point-of-care, anonymous survey.

Setting: Sleep disorders center at a Midwest tertiary care center.

Participants: Six hundred forty-six consecutive patients undergoing polysomnography.

Measurements: The survey instrument comprised 45 items specifically related to CAM therapies, in addition to obtaining baseline data.

Results: Response rate was 81% (522/646). A total of 406/522 (78%) patients were diagnosed with OSAHS. Mean age \pm SD was 57 ± 14 years, and 267 participants (66%) were men. Overall, 237 (58%) participants reported ever using CAM. Ever and current CAM use specifically

for improving sleep was reported by 20% and 7% of the participants, respectively. Twenty-six percent of participants reported ever using biologic products, and 52% reported ever using nonbiologic CAM treatments. A high proportion (58%) of the participants showed interest in future CAM use for improving sleep.

Conclusion: A high proportion of patients with OSAHS report previous or current use, and interest in future use, of CAM treatments. This underscores the need to conduct further research in this field.

Keywords: Obstructive sleep apnea, complementary and alternative medicine

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Obstructive sleep apnea hypopnea syndrome (OSAHS) is a common chronic disorder of impaired airflow during sleep associated with oxyhemoglobin desaturation, sleep disruption, neurobehavioral consequences, and cardiovascular sequelae.¹ The initial treatment option for most OSAHS patients is continuous positive airway pressure.² Other conventional treatments for OSAHS include weight reduction,³ sleep position restriction,³ oral appliances,⁴ and a variety of surgical procedures.⁵

Complementary and alternative medicine (CAM) is defined as a group of diverse medical and health care systems, practices, and products that are not presently considered to be a part of conventional medicine.⁶ The 5 subgroups of CAM therapies are alternative medical systems (e.g., Ayurveda), mind-body interventions (e.g., meditation), biologically based therapies (e.g. herbal supplements), manipulative and body-based methods (e.g., chiropractic therapy), and energy therapies (e.g., magnetic therapy).⁷ CAM is very popular in the United States. According to a survey conducted by the Centers for Disease Control and Prevention in-

volving more than 31,000 participants, 49.8% of the US adults reported ever (previous or current) use of CAM.⁸

There are multiple reasons why OSAHS patients might consider CAM. Some of the features of OSAHS, such as fatigue and fragmented sleep, are nonspecific, and most cases of OSAHS remain undiagnosed.⁹ Thus, patients with undiagnosed OSAHS may seek relief through CAM not realizing their symptoms are attributable to OSAHS for which conventional treatment options exist. Some patients may be deterred by the perceived inconvenience of a formal sleep evaluation and seek CAM options as a "quick fix."¹⁰ For patients with known OSAHS, conventional therapies may be dissatisfying. Compliance with modalities such as continuous positive airway pressure may be challenging, adverse events may occur, and impact on daytime sleepiness, neurobehavioral performance, quality of life, and cardiovascular morbidity may be incomplete.²

The use of CAM by patients with OSAHS has not been reported in any previous study. Herein we present the results from a cross-sectional survey of 646 patients undergoing evaluation for the presumptive diagnosis of OSAHS. Participants were asked about their previous or current use, and interest in future use, of CAM treatments. The study was conducted at the sleep disorders center at a tertiary care center in the Midwest.

Disclosure Statement

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METHODS

Study Participants

Patients undergoing evaluation for OSAHS at the Sleep Disorders Center at the Mayo Clinic, Rochester, MN, between January

2005 and March 2005 were surveyed. Primary inclusion criteria were a willingness to participate in the study and ability to read, write, and understand English. The study was approved by the Mayo Clinic Institutional Review Board.

Survey Instrument

A 25-question survey was developed in consultation with the survey research group at the Mayo Clinic. In addition to providing basic demographic and medical information, patients were asked specific questions about previous or current CAM use. The survey questions included 25 items about biologic products and 20 items about "other CAM treatments."

Participants were provided a free-text entry area for CAM interventions not covered in the survey. Information about interest in future use of CAM and reasons for this interest were obtained. Participants were also asked whether they used the specific CAM modality to improve sleep or for other symptoms.

Administration of the Survey

All patients had been evaluated and requested to undergo a laboratory-based, technologist-attended polysomnogram by a board-certified sleep specialist in our center. Patients were approached to complete the survey questionnaire on the night of their sleep study. A study coordinator collected the survey from the patients the following morning. A copy of the polysomnography results was obtained for each patient the same morning to sort respondents into those who did and did not have OSAHS. At this point, all identifiers were removed from the survey form. The identifiers were removed to allow us to collect the data in an anonymous fashion without obtaining a written informed consent.

Definitions

OSAHS was defined by sleep-related symptoms and an apnea-hypopnea index (AHI) of at least 5 during a minimum of 120 minutes of sleep recorded by laboratory-based, attended polysomnography.¹¹ Obstructive apnea was defined as cessation of airflow for at least 10 seconds despite respiratory effort. Hypopnea was defined as at least a 30% drop in airflow for at least 10 seconds despite respiratory effort and accompanied by at least a 4% drop in oxyhemoglobin saturation. Airflow was analyzed using a nasal pressure transducer (Pro-Tech Services, Inc., Mukilteo, WA). Polysomnograms were performed using a digital polygraph (NCI-LAMONT Medical Inc., Madison, WI, or Bio-logic Systems Corp., Mundelein, IL). The polysomnograms were analyzed by board-certified sleep specialists blinded to the survey data. Sleep stages¹² and arousals¹³ were scored using recognized standards.

The term *biologic product* includes botanicals, animal-derived extracts, vitamins, minerals, fatty acids, amino acids, proteins, prebiotics and probiotics, whole diets, and functional foods as per the National Center for Complementary and Alternative Medicine definition.⁶ Use of vitamins and minerals was not considered as CAM treatment in our study because the widespread use of vitamins and minerals in the population was likely to inflate the data about overall CAM use. CAM modalities in the section of "Other CAM treatments" included mind-body treatments (biofeedback, hypnosis, meditation, relaxation, stress management, therapeutic audiotape, yoga), energy medicine (acupressure, acupuncture,

magnetic therapy, reflexology, tai chi), manipulative therapies (chiropractic therapy, massage), alternative medical systems (Ayurvedic treatment, homeopathy, naturopathy), and other miscellaneous treatments, including nasal strips and throat sprays.

Ever use of CAM was defined as previous or current use of CAM. *Current use of CAM* was defined as use of CAM at the time of the survey. Because nasal strips and throat sprays could be considered part of conventional treatment, data on overall CAM use are provided both including and excluding nasal strips and throat sprays. Data for the rest of the results section excludes nasal strips and throat sprays as CAM.

Data Analysis

Tabular summaries of survey responses were created to describe the frequency distribution. Data was summarized for ever (previous or current) and current use of CAM. Information about the use of CAM for improving sleep was specifically obtained. A multivariable logistic regression analysis was performed to assess the impact of OSAHS diagnosis on CAM use while adjusting for age, sex, and body mass index.

RESULTS

Demographics

The survey was returned by 522 of the 646 patients (80.8%), of which 16 were excluded due to missing or incomplete information. Of the 506 patients with complete surveys, 406 patients were diagnosed as having OSAHS, based on the results of polysomnography. The primary results of this study are based on these 406 subjects. Mean age of these patients was 57 years (Table 1), with 66% being men. Mean AHI was 25.0 ± 26.6 . The majority of subjects had either obtained a 4-year college degree or had some post high-school training. More than half (58%) of the subjects had private health insurance, and 91% received their health care through a primary care physician. Half of the study subjects had sleep-related symptoms for 6 or more years. The most common symptoms were snoring (69%), lack of energy (58%), difficulty staying asleep (51%), and daytime sleepiness (50%).

Overall CAM Use

Ever CAM use was reported by 58% of the participants, with 21% of the participants reporting current CAM use. If nasal strips and throat sprays were included as CAM, the corresponding numbers were 67% and 24%, respectively. A higher proportion of women reported CAM use, compared with men (Table 2). Ever CAM use for improving sleep was reported by 20% of the participants, whereas 7% reported current CAM use for improving sleep. Alternative medicine practitioners were consulted by 20% of the participants who were currently using CAM. Only 17% of the current CAM users reported discussing the use of these treatments with their primary care physician.

Use of Biologic Products

Ever and current use of biologic products was reported by 26% and 9% of the participants respectively, with a significantly high-

er proportion of women reporting ever or current use, compared with men (Table 2). A total of 13% of the participants reported ever using these products for improving sleep (Table 3), with only 4% of the participants reporting current use of biologic products for improving sleep. The most commonly used biologic product for improving sleep was melatonin.

Use of Other CAM Treatments

Ever and current use of other CAM interventions was reported by 52% and 18% of the participants, respectively, with a significantly higher proportion of women reporting ever or current use, as compared with men (Table 2). A total of 11% of the participants reported ever using other CAM treatments for improving sleep (Table 4), with 5% of the participants reporting current use of other CAM treatments for improving sleep.

Comorbidities and Influence of Comorbidities on CAM Use

The comorbidities noted were hypertension (52%), depression (30%), diabetes (20%), anxiety (18%), coronary artery disease (13%), migraine (11%), chronic obstructive pulmonary disease (7%), peptic ulcer disease (7%), congestive heart failure (5%), and history of stroke (4%). CAM use was stratified based on the number of comorbidities (< 2 vs \geq 2 comorbidities). Participants with 2 or more comorbidities had a higher prevalence of CAM use (61% for ever and 23% for current CAM use), compared with participants with fewer than 2 comorbidities (54% for ever and 19% for current CAM use). These differences were not statistically significant.

Patients were also further stratified based on their AHI into 3 groups: AHI less than 15, (n=195); AHI 15 to 30 (n=99); and AHI greater than 30 (n=112). Ever CAM use was 62%, 61%, and 51% in the 3 groups, respectively ($p = 0.17$); whereas current CAM use was 28%, 21%, and 11% ($p = 0.002$).

Interest in Future CAM Use

A high proportion of patients (58%) showed interest in the future use of CAM for improving sleep. Women were significantly more likely than men to show interest in future CAM use (69% vs 53% $p=0.002$). Massage (29%), relaxation (21%), herbal sleep aids (18%), and stress management (18%) were the most popular interventions (Table 5). The most common reasons for future interest in CAM included desire to first try natural products (27%), desire to supplement conventional treatments (23%), and concern about the side effects of conventional medicine (22%).

Table 1—Characteristics of 406 Patients with a Diagnosis of Obstructive Sleep Apnea-Hypopnea Syndrome Surveyed at the Sleep Disorder Center

Characteristics	n	%
Age, y	57 (14.2)	
Sex		
Men	267	65.8
Women	139	34.2
Level of education		
High-school graduate or less	128	32
Some college/post high-school training	132	33
4-year college degree or more	139	35
BMI		
< 25	30	8
26-30	90	24
31-35	117	31
\geq 36	138	37
Duration of sleep symptoms		
\leq 5 years	187	50
\geq 6 years	188	50
AHI	25.0 (26.6)	

Data are presented as number and percentage, except age and apnea-hypopnea index (AHI), which are shown as mean (SD). BMI refers to body mass index.

CAM use by Patients Who Were Not Diagnosed with OSAHS

Demographically, patients who were not diagnosed with OSAHS tended to be younger (50.1 vs 57 for patients with OSAHS, $p < 0.001$), were more likely to be women (55% vs 34.2% for patients with OSAHS, $p < 0.001$), and had a lower body mass index (31 vs 34, $p = 0.001$) but had a similar duration of sleep symptoms (33% \leq 3 years vs 31%, $p = 0.804$). Of the patients who did not have OSAHS, 74% reported ever CAM use (80% with nasal strips and throat sprays included in CAM), and 31% reported current CAM use (32% with nasal strips and throat sprays). Both ever and current CAM use was significantly higher in patients who were not diagnosed with OSAHS, compared with patients with OSAHS ($p = 0.004$ for ever and $p = 0.048$ for current). However, when adjusted for age, sex, and body mass index in a multivariate model, no significant difference was present in the 2 groups ($p = 0.39$). Interest in future CAM use was reported by 66% of patients who did not have OSAHS, not significantly different compared with patients with OSAHS ($p = 0.173$).

DISCUSSION

The present study shows that approximately 60% of patients with a diagnosis of OSAHS report ever CAM use. Use of biologic

Table 2—Use of CAM Treatments by 406 Patients Diagnosed with Obstructive Sleep Apnea-Hypopnea Syndrome

Treatment	Ever use of CAM				p Value	Current use of CAM				
	Women		Men			Women		Men		
	139		267			139		267		
	n	%	n	%	n	%	n	%		
Any CAM	101	73	136	51	< 0.001	46	33	41	15	< 0.001
Biologic products	50	36	57	21	0.002	23	17	14	5	< 0.001
Other CAM treatments	94	68	118	44	< 0.001	38	27	35	13	< 0.001

CAM refers to complementary and alternative medicine, excluding nasal strips and throat sprays.

Table 3—Most Commonly Used Biologic Products by 406 Patients Diagnosed with Obstructive Sleep Apnea-Hypopnea Syndrome

Biologic Product	Ever use for any symptom		Ever use for improving sleep	
	n	%	n	%
Herbal Tea	67	17	16	4
Melatonin	36	9	29	7
Chamomile	31	8	16	4
St. John's Wort	23	6	3	1
Lavender	21	5	13	3
L-Tryptophan	9	2	4	1
Valerian	9	2	4	1
Kava	5	1	3	1
Yohimbine	4	1	3	1
Hops	2	<1	2	<1

products was reported by 26% and other CAM treatments were used by 52%. Ever CAM use specifically for improving sleep symptoms was reported by 20% of the participants, and 7% were currently using CAM treatments for sleep symptoms at the time of their formal sleep evaluation. Presence of comorbidities and severity of OSAHS did not have significant impact on ever CAM use. The majority of the CAM users (83%) did not discuss use of these treatments with their physicians. A high proportion of patients (58%) expressed interest in the future use of CAM.

Several previous studies have evaluated use of CAM treatments. In a large population-based survey of the United States population, 49.8% of the patients reported ever having used CAM.⁸ Analysis of the data from the same survey showed that 4.5% of the patients with insomnia used some form of CAM in the previous 12 months to treat their sleep problem.¹⁴ A specific evaluation of these patients for OSAHS was not performed. There are several reasons why patients with OSAHS might turn to CAM, including underdiagnosis of OSAHS and thus no opportunity to pursue conventional treatments, hope for a “quick fix” that might allow polysomnography to be circumvented, or anticipatory dissatisfaction with conventional treatment options. The overall prevalence of 58% in our study might still be an underestimate, since CAM use is significantly more common in women and 66% of the patients in the present study were men. However, we cannot exclude the possibility that a high proportion of CAM use in our sample likely reflects referral bias, since this study was conducted at a tertiary care center.

Use of botanical treatments was reported by 26% of the participants. Several of the botanicals that participants used (melatonin, chamomile, lavender, valerian, kava, and hops) have a sedative effect. Because patients with OSAHS are sometimes cautioned about using prescription sedative agents, it might also be important to discuss the use of herbal sedative agents in clinical practice.

Other CAM treatments were used by 52% of the participants. Nasal strips and throat sprays, which might no longer be considered CAM and are not included in the above proportion, were the most commonly used nonconventional treatments for improving sleep. Nasal strips seek to increase nasal cross-sectional area and improve nasal airflow by exerting lateral traction on the nasal vestibule via springs embedded in the adhesive strip. The antisnoring action of throat sprays is thought to be through lubrication of the upper-airway structures by aerosolized oils. The reported use of these treatments is striking, given the minimal supportive scientific evidence. The Clinical Practice Committee of the American Academy of Sleep Medicine reviewed the medical literature on

Table 4—Most Commonly Used “Other CAM Treatments” by 406 Patients Diagnosed with Obstructive Sleep Apnea-Hypopnea Syndrome

Other CAM treatments	Ever use for any symptom		Ever use for improving sleep	
	n	%	n	%
Chiropractic therapy	138	34	5	1
Massage	103	25	8	2
Relaxation	54	13	20	5
Meditation	43	11	8	2
Acupuncture	43	11	0	0
Stress management	42	10	5	1
Acupressure	26	6	1	<1
Yoga	24	6	2	0
Therapeutic audiotape	23	6	8	2
Biofeedback	23	6	1	<1

CAM refers to complementary and alternative medicine, excluding nasal strips and throat sprays.

these products and concluded that nasal strips and throat sprays may have efficacy in reducing snoring, but neither was indicated for treatment of OSAHS.¹⁰

Several of the other CAM treatments were also of interest for future use for treating OSAHS symptoms. Most of these treatments, particularly the mind-body treatments, energy-based therapies, and manipulative and body-based systems, generally have few adverse effects. Current treatment options for patients with OSAHS may result in incomplete symptom relief, which underscores the need to study CAM treatments in controlled clinical trials as adjunctive therapies for patients with persistent symptoms. Given the high popularity of CAM and low risk of adverse effects with some of these interventions, even modest efficacy might translate into clinically relevant effectiveness.

Interestingly, patients who were not diagnosed with OSAHS had a higher prevalence of CAM use, as compared with patients who were diagnosed with OSAHS, in a univariate comparison. This likely reflects difference in demographics between the 2 groups, primarily a higher proportion of women in the group that was not diagnosed with OSAHS, since women are more likely to report CAM use, as shown in this study and other previous studies.⁸

The strengths of this study include our ability to survey consecutive patients, the excellent response rate, and the inclusion of

Table 5—CAM Treatments of Interest for Future Use in 406 Patients Diagnosed with Obstructive Sleep Apnea-Hypopnea Syndrome

Treatment	n	%
Massage	118	29
Relaxation	84	21
Stress management	75	18
Herbal sleep aids	74	18
Acupuncture	68	17
Meditation	63	16
Chiropractic	62	15
Acupressure	61	15
Hypnosis	46	11
Biofeedback	44	11
Tai chi	42	10

CAM refers to complementary and alternative medicine, excluding nasal strips and throat sprays.

a large number of CAM modalities in the survey. However, our study also has several limitations. First, this study was carried out at a tertiary care center with the inherent referral bias and limited generalizability. Second, the study was designed as a point-of-care-survey, increasing the possibility of recall bias. The recall bias might also be increased because we could not include all the available CAM treatments in the survey questionnaire. To minimize this bias, we provided participants a free-text entry area for any additional treatments they might have used. Information obtained from the free-text entry area, however, was limited. Finally, the term *current use* was vague and could have been interpreted differently by different participants.

In summary, approximately 60% patients with a diagnosis of OSAHS reported previous or current use, and interest in future use, of CAM; 20% reported ever having used CAM specifically for improving sleep. This serves as a reminder for sleep medicine providers to inquire about CAM use and underscores the need to conduct future studies of CAM in patients with OSAHS.

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Institution where study was performed: Mayo Clinic College of Medicine, Rochester, MN

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