

Integrative Medicine

Evidence-based summaries and critical reviews on the latest developments in integrative therapies

[ALERT]

ALZHEIMER'S DISEASE

ABSTRACT & COMMENTARY

A Nutritional Approach to Prevent Alzheimer's Disease

By David Kiefer, MD, Editor

SYNOPSIS: Moderate and high adherence to a blend of the Mediterranean and DASH diets helped to slow cognitive decline over 4.5 years in a cohort aged 58 years and older.

SOURCE: Morris MC, et al. MIND diet associated with reduced incidence of Alzheimer's disease. *Alzheimers Dement* 2015 Feb 11.

Prior research has shown the benefits of certain diets for cognitive function. For example, the authors of this study review the PREDIMED (Prevención con Dieta Mediterránea), a Mediterranean diet intervention, and the DASH (Dietary Approaches to Stop Hypertension) diet, both of which show positive benefits on cognitive function and dementia prevention. They point out gaps in each of those diets with respect to phytochemicals and dietary components with central nervous system activity. The next logical step was to create a Mediterranean-DASH hybrid diet, maximizing neuroprotectant and dementia preventive components. This diet — MIND (Mediterranean-DASH Intervention for Neurodegenerative Delay) —was the focus of this study.

The MIND diet components are listed in Table 1.

There are some commonalities between MIND, DASH, and Mediterranean diets. Probably the most obvious differences are that MIND does not emphasize fruit intake beyond berries (at odds with both DASH and Mediterranean diets), high dairy consumption (an aspect of the DASH diet), nor high potato consumption (as in the Mediterranean diet). In addition, by supporting fish intake at just once a week, the MIND diet undershoots the > 6 servings per week in the Mediterranean diet. From the MIND diet foods, a score was compiled (column 2, Table 1) to quantify the extent to which the participant was eating according to the MIND diet components.

Study participants were volunteers living in retirement communities and a screening process led to 923 people being admitted to the study protocol. These 923 had

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Table 1: Dietary Components of the MIND Diet and the MIND Diet Score

General Components of the MIND Diet	MIND Diet Scoring*
Emphasis on plant-based foods	Intake of 10 brain healthy foods at a certain minimum level or higher: green leafy vegetables, other vegetables, nuts, berries, beans, whole grains, fish, poultry, olive oil (scored "1" if the primary cooking oil), wine
Limited animal foods and saturated fats	Intake of 5 unhealthy foods at a maximum level or lower: red meats, butter and stick margarine, cheese, pastries, sweets
Specifies berry and green leafy vegetables	

* Frequency of consumption was estimated and then each food group was scored as a 0, 0.5, or 1; for healthy foods, "1" represented high levels of intake, and for unhealthy foods, "1" represented low levels of intake. The maximum MIND score was 15.

to complete food frequency questionnaires (FFQ) between 2004-2013, and undergo at least two neuropsychiatric tests indicating that they didn't have Alzheimer's disease (AD) at baseline. During the course of the study, annual exams were conducted by an experienced physician, using history, physical exam, and an AD rating system based on criteria established through the National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association. Using these criteria, over the course of this study there were 144 new cases of AD, and 14 new cases of non-AD dementia, the latter being analyzed as a non-case for statistical purposes.

Based on the Harvard FFQ, the FFQ asked the participants to document the usual frequency of intake of 144 foods during the previous 12 months. Each participant's adherence to each of the three diets was scored. For the MIND diet, the scoring was 0-15, and was described above. In contrast, the DASH score ranged from 0-10, while the Mediterranean diet score ranged from 0-55; of these, the Mediterranean diet scoring system has had some corroboration in the scientific literature.

Using interviews, questionnaires, and baseline exam findings, the researchers collected information about possible confounding variables, such as age, education, cognitive activities, physical activity, depression, body mass index (BMI), and past medical history.

For the 144 AD cases in the total cohort, the mean time to diagnosis from the beginning

of dietary data collection was 3.8 years, and the average diet scores were 7.4 (MIND, range 2.5-12.5), 4.1 (DASH, range 1.0-8.5) and 31.5 (Mediterranean diet, range 18-46). No comparative diet scores were provided for the non-AD sample. However, statistical analyses were conducted on the entire sample as split into tertiles of MIND diet scores: lower tertile mean = 5.6 (range 2.5-6.5), middle tertile = 7.5 (range 7.0-8.0), and top tertile = 9.6 (range 8.5-12.5).

The researchers were able to show that the MIND diet score was linearly associated with a lower risk of AD; when the top tertile of MIND score was compared to the bottom tertile, the hazard ratio (HR) was 0.47 and the 95% confidence interval (CI) was 0.29-0.76. This indicates a 53% reduction in AD risk between these two tertiles of MIND diet adherence. The middle MIND tertile compared to the lowest tertile was also statistically significant (HR, 0.65; 95% CI, 0.44-0.98).

For the Mediterranean and DASH diets, only the highest tertiles showed statistically significant reductions in AD risk compared to the lowest tertiles (HR = 0.46 and 0.61, respectively).

The researchers analyzed for the confounding variables as listed above and found no effect on any of the diet scores, except for depression and BMI that slightly moderated the effect of the MIND diet, but not the DASH nor Mediterranean diets. That is, when depression and BMI were factored into the statistical analysis, the MIND diet effects lessened slightly to a HR = 0.50 (third tertile) and HR = 0.77 (second tertile).

Summary Points

- A blend of the Mediterranean and DASH diets emphasizing brain healthy foods, the MIND diet was studied in a cohort of people living in a retirement community.
- For those people who most adhered to the MIND diet, there was a 53% reduction in the risk of developing Alzheimer's disease as compared to the people who least adhered to the MIND diet.

■ COMMENTARY

This study takes the heavy hitters of the dietary intervention world (Mediterranean and DASH), improves them (MIND), and finds an association between the MIND diet and the risk of developing AD. On one hand this is amazing in that by (merely) changing the way we eat, it is possible to prevent, in some cases, a severe and debilitating disease. On the other hand, for those of us well-read on the adverse effects of inflammation and oxidation, and some surfacing connections with nutrition, it should come as no surprise that a greater adherence to the three diets studied here nudged people toward health. Anything, it seems, that we as clinicians can do to help people avoid standard American diet foods, the better.

Integrative Medicine Alert has profiled other studies^{1,2} that have examined the effects, sometimes positive, sometimes neutral, rarely negative, on various health and disease parameters. The MIND effect is relatively new, and adds to crucial anticipatory guidance that clinicians can offer their aging patients. The upsides far outweigh the downsides, and, given some overlaps with MIND

and DASH and Mediterranean diets, we might also steer our patients toward better cardiovascular outcomes, less pain, etc. An exciting muse that results from this study is the fact that this study cohort was living in retirement communities, and presumably already, in some cases, along the adverse brain pathophysiological track. Imagine the positive effects of encouraging our younger patients to follow the MIND diet for many years. Such a trial would be expensive and therefore unlikely to be done, but possible positive effects could be extraordinary.

The authors of this study point out, rightly so, that this type of observational study design does not offer a cause-effect conclusion. Greater adherence to the MIND diet is associated with less risk of AD, but doesn't cure or prevent AD. A well-designed randomized controlled trial would be necessary to comment on disease development. In addition, the relatively short time period (mean = 3.8 years) before the development of AD in the case population led the researchers to wonder if there was preclinical AD in the cohort. They attempted to address this by re-analyzing the data by eliminating all AD cases within 3 years of follow-up; little change in the outcomes was seen. A final possible criticism of this study almost goes without saying; FFQs are commonly inadequate and some of the MIND diet foods (berries, olive oil) relied on answers to one question, the inaccuracy of which could have affected the results.

Clinicians often have limited time to discuss preventive health issues with their patients, but it seems like topic of diet and mental health (in the context of AD) would be an important one to prioritize. ■

REFERENCES

1. Pantuso T. Prevention of diabetes with Mediterranean diet. *Integr Med Alert* 2014;17:43-46.
2. Sasser H. Dietary fats and heart health: Big numbers, but questions linger. *Integr Med Alert* 2014;17:78-81.

DIABETES

ABSTRACT & COMMENTARY

The Role of Prebiotics in Diabetes Mellitus

By William C. Haas, III, MD, MBA

Carolinas Medical Center, Department of Family Medicine, Charlotte, NC

Dr. Haas reports no financial relationships relevant to this field of study.

SYNOPSIS: Inulin supplementation may reduce levels of systemic inflammation and improve glycemic control in female patients with type 2 diabetes mellitus.

SOURCE: Dehghan P, et al. Inulin controls inflammation and metabolic endotoxemia in women with type 2 diabetes mellitus: A randomized-controlled clinical trial. *Int J Food Sci Nutr* 2014;65:1117-123.

The pathophysiology of type 2 diabetes mellitus extends beyond the chronic elevation of plasma glucose levels. Ongoing, subclinical inflammation contributes to β -cell dysfunction and insulin resistance, which is driven by cytokines such as tumor necrosis factor alpha (TNF- α), interleukin-6 (IL-6), and high-sensitivity C-reactive protein (hs-CRP).¹ Growing evidence suggests that the gut microbiota plays an important role in the development of systemic inflammation and metabolic disorders such as obesity and diabetes mellitus.² An unhealthy balance of bacteria in the gastrointestinal tract favors the production of lipopolysacaride (LPS) and results in a state of metabolic endotoxemia.

Prebiotics, non-digestible fiber compounds and other oligosaccharides, can potentially modulate the activity of advantageous bacteria in the large bowel, thereby decreasing inflammation and metabolic endotoxemia. High performance inulin (HP inulin), a prebiotic with a mix of long-chain inulin-type fructans, has been associated with positive shifts in the gut microbiota.³ Given the limited number of human studies on the topic, a group of researchers designed a randomized, double-blind, placebo-controlled trial to assess the effect of HP inulin supplementation on inflammatory biomarkers and metabolic endotoxemia in women with type 2 diabetes. The primary outcomes measured were change in hs-CRP, TNF- α , IL-10, and LPS, while secondary outcomes included change in weight, fasting blood sugar, hemoglobin A1c, fasting insulin, and insulin resistance.

Sixty-five female patients with type 2 diabetes mellitus were recruited from a single endocrinology clinic associated with an academic medical center. Inclusion criteria included a diagnosis of diabetes for more than 6 months, current use of antidiabetic medication (metformin and glibenclamide), body mass index (BMI) $> 25 \text{ kg/m}^2$, and a normal dietary pattern. A “normal dietary pattern” was not clearly defined, but dietary intake was evaluated by a nutritionist, pre- and post-intervention. Exclusion criteria were more extensive and included a history of gastrointestinal, cardiovascular, renal, thyroid, liver, or pancreatic disease, as well as women who were pregnant or lactating. Additionally, patients were excluded if they consumed any one of the following within a 2-week period prior to the study: prebiotic/probiotic supplements, antibiotics, antacids, alcohol, anti-diarrheal, anti-inflammatory, lipid-lowering, or laxative medications. After exclusion criteria were applied, 54 patients were left for randomization.

Using a block randomization procedure based on BMI and age, patients were randomly divided into two groups. The intervention group received 10 g/day of HP inulin and the control group received 10 g/day of maltodextrin. The principle investigator, statistician, and patients were all blinded to allocation. In addition

Summary Points

- Systemic inflammation plays an important role in chronic disease states such as diabetes.
- High-performance inulin supplementation may decrease systemic inflammation and improve glycemic control.

to their allocated supplement, patients also received two anti-diabetic drugs, metformin and glibenclamide. Blood samples were collected and analyzed for inflammatory (hs-CRP, TNF- α , IL-10, and LPS) as well as glycemic markers (fasting blood sugar, hemoglobin A1c, fasting insulin, and insulin resistance) at baseline and again after 8 weeks of supplementation.

Among the 54 patients randomized, 49 completed the trial with 24 in the intervention group and 25 in the control group. Data analysis was performed on patients completing the intervention with no mention of an intent-to-treat analysis. No significant differences were noted between the groups with regard to baseline characteristics, including age, weight, height, BMI, and duration of diabetes. The control group was noted to have a higher consumption of fiber intake at baseline compared to the intervention group, but no differences were otherwise noted for total caloric intake, carbohydrates, protein, or fat consumed. The glycemic indices were similar between the groups at baseline; however, the inflammatory biomarkers hs-CRP and LPS were significantly lower in the HP inulin group compared to the intervention group at baseline (8.0 vs 13.0 ng/mL and 21.4 vs 25.5 EU/mL, respectively; $P < 0.05$).

After the intervention, total energy and fat intake decreased significantly in the intervention group while remaining unchanged in the control group. The change in dietary intake was correlated with a 2.6 kg weight reduction in the HP inulin group ($P < 0.05$), but no change in the control group. With regard to primary outcomes, the inulin group experienced significant decreases in levels of hs-CPR (-35.6%), TNF- α (-23.0%), and LPS (-27.9%). On the other hand, inflammatory biomarkers did not change significantly in the control group. With regard to secondary outcomes of glycemic status, all indices improved significantly in the intervention group compared to baseline, including a 15.1 mg/dL reduction in fasting blood sugar, a 0.7 mmol/mol reduction in HbA1c, and a 39.5% reduction in insulin resistance ($P < 0.05$). No significant changes were noted in glycemic status among patients in the control group.

■ COMMENTARY

Low levels of chronic, systemic inflammation are now known to be an important factor underlying

many chronic disease states, including type 2 diabetes. Emerging research continues to highlight the possible link between the gut microbiota and inflammation. The research by Dehghan and colleagues addressed one way of positively influencing the gut microbiota in an effort to reduce systemic inflammation. Their results, in fact, suggest that supplementation with the prebiotic HP inulin decreases inflammatory markers along with many common indices of glycemic control. Interestingly, HP supplementation also resulted in decreased total energy intake as well as a reduction in weight and BMI, findings that have been mixed in other studies.⁴ Although the exact mechanism for appetite suppression and weight reduction are unclear, the fermentation of inulin is hypothesized to increase gut satiety hormones, including GLP-1, PYY, and ghrelin, which may also account for the improvements in glycemic control. The effect of inulin supplementation on systemic inflammation and metabolic endotoxemia has not been as well-studied in diabetic patients. One of the major proposed mechanisms for improvement involves changes in the gut microbiota toward strains of bacteria that are more anti-inflammatory and produce less lipopolysacaride.

Despite advancing our understanding of inulin's effect on inflammation and metabolic endotoxemia, the research methodology should be reviewed before reaching a conclusion. An important premise of the study, mainly the ability of inulin to alter the gut microbiota toward an anti-inflammatory state, was not directly tested. Adequate attention was given to markers of inflammation and glycemic control; however, direct evaluation of gut and fecal microbial composition did not occur, leaving unanswered questions regarding inulin's mechanism of action. Aside from not capturing data pertaining to the gut microbiota, the broad exclusion criteria, particularly excluding those with various comorbid conditions, may have artificially selected a population with less underlying systemic inflammation. In theory, the results may have yielded more significant reductions, but the effect on inulin supplementation on the many diabetics with end-organ damage is unknown. Finally, although the baseline difference in weight was not statistically different between

the groups, the inulin group was approximately 5 kg heavier than the placebo group prior to the intervention. A heavier starting weight in the inulin group may have resulted in a more pronounced change in inflammation and glycemic control, as individuals with higher body weight are believed to have a greater disturbance in their gut microbiota as well as a greater insulin resistance.

Ultimately, the researchers developed a rather well-designed and rigorous study evaluating the effect of high-performance inulin on inflammation and glycemic control. Although other studies have found mixed results regarding glycemic status with inulin, the present study is one of the first to evaluate the effect of inulin on systemic inflammation in type 2 diabetics. Based on their findings, inulin could be considered as a sound adjunctive treatment option for diabetics of moderate duration managed on oral therapy alone without other significant comorbid conditions. As a supplement, inulin can be easily sourced online and costs around \$10-15 per month for the daily amount supplemented in the study. Naturally, inulin can be found in many plants, including garlic, onions, yams, and chicory, although the quantity required to consume would be limiting in some foods. Despite the altered composition of high-performance inulin to contain long-chained, high-molecular weight carbohydrates, a word of caution should be advised for patients suffering from irritable bowel syndrome, as fermentable short-chain carbohydrates may be a gastrointestinal irritant in some of these patients. ■

REFERENCES

1. Goldberg RB. Cytokine and cytokine-like inflammation markers, endothelial dysfunction and imbalanced coagulation in development of diabetes and its complications. *J Clin Endocrinol Metab* 2009;94:3171-3182.
2. Cani PD, et al. Changes in gut microbiota control metabolic endotoxemia-induced inflammation in high-fat diet-induced obesity and diabetes in mice. *Diabetes* 2008;57:1470-1481.
3. Kolida S, Gibson GR. Prebiotic capacity of inulin-type fructans. *J Nutr* 2007;137(11 Suppl):2503s-2506s.
4. Dewulf EM, et al. Insight into the prebiotic concept: Lessons from an exploratory, double blind intervention study with inulin-type fructans in obese women. *Gut* 2013;62:1112-1121.

CANCER

ABSTRACT & COMMENTARY

Chemotherapy in Latinas: Stress Management Needs and Techniques

By David Kiefer, MD, Editor

SYNOPSIS: Healthcare providers and women with recent chemotherapy for breast cancer commented on some of the stress management challenges as well as techniques that are already being used to address them.

SOURCE: Martinez Tyson DD, et al. Understanding the stress management needs and preferences of Latinas undergoing chemotherapy. *J Cancer Educ* 2015 May 8 [Epub ahead of print].

The toll that a cancer diagnosis, therapy, and follow-up take on an individual and his or her family cannot be understated. The medical literature touches on many approaches to bolster physical and mental well-being during this process, but there are gaps in the research for some demographics. The authors of this study point out a particular paucity in interventions to address cancer treatment side effects and quality of life in Latinas.

This qualitative research study was designed to understand specific “stress management and information needs” of Latinas undergoing chemotherapy, ultimately to culturally tailor a well-studied stress management intervention for this demographic. The researchers used focus groups and in-depth individual interviews to collect information, both from healthcare providers (*see Table 1, column 1*) and from people with a diagnosis of cancer (*see Table 1, column 2*). Word-of-mouth and flyers were distributed, facilitated by the Tampa Bay Community Cancer Network, to recruit study participants. In addition, a “snowball” technique was used, essentially asking current study participants if they knew anyone else who might be interested in participating in the focus groups and/or interviews.

Ten health care providers were interviewed using a semi-structured interview guide. The results from these interviews were used to develop the topics and questions for the Latina patients’ focus groups and interviews. A total of 20 Latina patients were interviewed, and four focus groups were held involving 13 Latinas. Table 2 lists some of the topics of discussion and questioning for the providers and patients. All of these interviews and focus groups were recorded with permission and transcribed. The transcriptions were then coded by the lead author to identify emergent themes. Demographic information was collected on the Latina patients with respect to years in the United States, country of origin, language(s) spoken, cancer stage at diagnosis, and presence of stress management tools during chemotherapy.

The 10 providers were all women, 60% Latino, and a mixture of physicians, nurses, social workers, and support group leaders. Seventy percent had worked with Latina cancer survivors for more than 6 years. The 33 Latina patients, average age of 50, represented 10 countries, and 64% did not have any formal stress management techniques during chemotherapy. The length of time patients had been in the United States was slightly skewed to < 5 years and > 15 years (bimodal).

With respect to themes, healthcare providers honed in on logistical hurdles experienced by patients, including transportation, finances, and a lack of stress management programs, providers, or available referrals. Patients mentioned some of those same logistical issues, but elaborated by saying there was often a

Summary Points

- This qualitative research study collected information from 33 Latinas with cancer, as well as healthcare providers with experience working with that demographic.
- Many themes emerged, including poor communication by health care providers about stress during chemotherapy, concerns about family responsibilities, and the importance of spirituality during such difficult health/disease times.

lack of information (in Spanish, especially) and poor communication with providers. A major area of stress for Latina patients was related to family and perceived inability to meet responsibilities or fear of causing burden, in addition to the difficulties of being away from family if their family was still in their home country.

Latina patients turned to several “techniques” to manage stress during chemotherapy. A connection to, and interacting with, family was vitally important to Latina patients. Also, patients mentioned faith, prayer, and spirituality, as well as exercise, reading, listening to music and watching television; of this list, healthcare providers only mentioned those related to spirituality, perhaps illustrating a discordance between providers’ and patients’ perceptions.

Of note, only one of 33 patients had been given information about stress management by their health care provider.

■ COMMENTARY

This is a very important and interesting article, illustrating some important stress management themes relevant to a specific demographic (Latinas), but with some more general relevancy as well. If we believe these results, and the fact that the authors mention saturation of their findings with subsequent focus groups and interviews, then healthcare providers need to do a better job of addressing stress management in their Latina patients undergoing chemotherapy. Chemotherapy is not easy, often causes untoward effects, and patients would arguably benefit by having some help during the process to emerge in better physical and mental health. In this demographic, as illustrated by an extensive literature about Latino cultural beliefs,¹ it would behoove healthcare providers to focus on family and spirituality/religion as their patients cope with stress and stressors. In our own research in Madison, WI, we used similar research methods to investigate herbal medicine use in the Latino community.² This is an effective approach for

Table 1: Inclusion Criteria for Study Participants

Health care providers	Latina patients
<ul style="list-style-type: none"> • Experience with community Latina cancer patients • Knowledge of Latino culture • Knowledge of cancer patients' needs 	<ul style="list-style-type: none"> • Adult • Latina/Hispanic as self-identified • Breast cancer diagnosis • Spanish-speaker • Chemotherapy treatment in last 12 months

Table 2: Topics for Interviews and Focus Groups

Health care providers	Latina patients
<ul style="list-style-type: none"> • Experience working with Latina cancer survivors • Stressors during cancer treatment 	<ul style="list-style-type: none"> • Experience with chemotherapy • Chemotherapy stressors • Stress management beliefs and techniques

gathering general information about trends or attitudes in a particular demographic. It can lead researchers, public health experts, community organizers, and clinicians to better assess community needs, strengths, and weaknesses, just as in this research project; it answers the question “What is happening in demographic with respect to health beliefs?” From this project, we understand just that. Issues surrounding family, logistics, and communication are paramount, and many techniques were used to deal with stress, only some of which were mentioned by the healthcare providers. We clinicians can probably always improve in the patient-centered provision of care, finding out about our patient’s approaches to health and healing, and supporting it. A study like this helps to bring to light some of the general themes; it is up to us in clinic, face-to-face, to personalize our care.

One positive aspect of this study is that the researchers queried about country of origin and years in the United States, two major factors relevant to a person’s health cosmology and experience with the healthcare system. I would have liked to see some efforts at correlating those variables with the researchers’ qualitative findings. Is it more likely that someone from Mexico turn to spirituality to cope with stress than someone from Chile? The longer that someone is in the United States, is television more their “go-to” rather than family? And, how much are these choices based on country of origin as opposed to the personal experiences of each individual? These connections would be important, but

the researchers didn’t comment, so we don’t know if these relationships exist.

Compared to the plethora of data about nutrition, dietary supplements, and herbal medicine, there is a relative “faith desert” in the medical literature. It was good to see the topic of spirituality finding its way into these results, corroborating what has been some intriguing research of late³ as well as some recent issues of *Integrative Medicine Alert*.^{4,5} This study touches not only on spirituality, but on the many psychosocial factors that weave together to contribute to a person’s totality of health and well-being, including community and family support. It begs the question of where the line exists between what we call integrative health/medicine and simply high-quality, whole-person provision of healthcare. Religion and spiritual practices have been in play long before these topics received a tab on the web page of the National Center for Complementary and Integrative Health.

That said, studies such as this one are a good reminder for clinicians to entertain the totality of health for all patients, perhaps especially for those with a diagnosis such as cancer. There is no downside to helping patients to engage in all aspects of their life for the healing that they need. In addition, the appearance of this multi-faceted approach to health and well-being may very well be culture specific. We all know, and this study re-affirms, that the top of the list for our Latino patients’ adjunctive cancer therapy may (or may not) differ from our Caucasian, African American, Hmong, and Asian patients; we will need to ask and be open to the answers for all of our patients, regardless of their background. At least, clinicians will want to have a basic idea of cultural preferences, not unlike those shared in a ground-breaking book about Hmong healing practices⁶ or any one of the multitude of sources about caring for Latino patients.¹ ■

REFERENCES

1. Juckett G. Caring for Latino patients. *Am Fam Physician* 2013;87:48-54.
2. Kiefer D, et al. A pilot study of herbal medicine use in a midwest Latino population. *WIS Med J* 2014;1113:64-71.
3. Kim NY, et al. Effects of religiosity and spirituality on the treatment response in patients with depressive disorders. *Compr Psychiatry* 2015 Apr 24.
4. Sasser H. Spiritual Care at the End of Life: Who Defines a Good Outcome? *Integr Med Alert* 2014;17:1-3.
5. Sasser H. Spirituality and in vitro fertilization. *Integr Med Alert* 2014;17:40-43.
6. Fadiman A. *The Spirit Catches You and You Fall Down: A Hmong Child, Her American Doctors, and the Collision of Two Cultures*. Farrar, Straus and Giroux; 1997.

Meditation Types and Clinical Use

By *Traci Pantuso, ND, MS*

Adjunct Faculty, Bastyr University, Seattle, WA; Owner Naturopathic Doctor Harbor Integrative Medicine, Bellingham, WA

Dr. Pantuso reports no financial relationships relevant to this field of study.

Meditation has gained popularity not only as a practice to gain awareness and maintain calmness but also as an integrative mind-body treatment for a multitude of different clinical conditions.¹⁻³ In a survey of people 50 years of age and older, 11% of individuals between the ages of 50-64 reported using mind-body practices while only 5% of individuals 65 and older did.²

Meditation is derived from the Latin word “meditatri,” which is defined as engaging in contemplation or reflection.^{3,4} The practice of meditation is found in most spiritual traditions and cultures throughout the world and has been practiced in some cultures for more than 5000 years.^{3,4}

A multitude of different meditation techniques are practiced worldwide, and most techniques are based on realizations of a specific group or teacher within a traditional cultural framework (*see Table 1*). According to the National Institutes of Health, “there are many types of meditation, but most have four elements in common: quiet location, specific comfortable posture, focus of attention, and an open attitude.”⁵

Mantra meditation incorporates the use of a word or phrase, which is repeated either silently or aloud during the meditative practice while sitting in a comfortable position with eyes closed.^{3,4} There are numerous types of mantra meditation — three that are standardized with directions published in manuals and include transcendental meditation (TM), relaxation response (RR), and clinically standardized meditation (CSM).^{3,4}

TM developed from the Vedic tradition, and cardiologist Herbert Benson developed RR in the 1970s.^{3,4} Patricia Carrington developed CSM in the early to mid-1970s as more flexible and accessible than TM.^{3,4}

Another category, mindfulness meditation (MM), generally refers to practices that cultivate awareness, paying attention to the present moment, practicing non-judgment, and acceptance.^{3,4} The types of MM include Vipassana, Zen Buddhist meditation, mindfulness-based stress reduction (MBSR), and mindfulness-based cognitive therapy (MBCT). Developed for patients with chronic pain and stress-related complaints, MBSR is an

Summary Points

- Eighteen million adults in the United States report using some form of meditation.
- A variety of meditation techniques are practiced worldwide.
- Research investigating the clinical effectiveness of meditation practices is rapidly growing.

8-week group program with weekly 2.5-hour sessions and one all-day silent retreat.^{3,4} MBSR also incorporates sitting meditation, walking meditation, Hatha yoga, and a body scan, which is a mindfulness practice in which attention is sequentially focused on different parts of the body.^{3,4}

MEDITATION RESEARCH

Prior research investigating the clinical efficacy of meditation includes studies of poor methodological quality, making interpretation of the overall research difficult.³⁻⁶ There has also been a strong positive bias toward publishing positive results.⁷ Many research studies that have shown positive effects with meditation have yet to be replicated.³⁻⁶ Other issues that are rampant throughout the larger body of literature include lack of randomized controlled trials (RCT), absence of control or comparative control groups, studies of short duration that are cross-sectional not longitudinal in design, and post-hoc analysis.³⁻⁶ More recently, a number of methodologically sound meditation studies have been published that investigated the effect of meditation in clinically relevant populations.^{5,6} More methodologically sound research is needed to be able to understand the clinical effectiveness of different meditation techniques.

MECHANISM OF ACTION

The mechanisms that impart the effects of meditation are still unknown, although some studies have reported effects in multiple brain regions, such as cerebral cortex, subcortical grey and white matter, brain stem, and cerebellum.^{3,4} There is evidence to demonstrate that meditation improves attention and that areas

Table 1: Types of Meditation, Techniques, and Traditional Background

	Name of Meditation Technique	Treatment	Traditional Background/Founder
Mantra	Transcendental meditation	Personalized mantra	Vedic Hindu
	Relaxation response	Mantra	Herbert Benson; 1970s
	Clinically standardized meditation	Mantra	Patricia Carrington; 1970s
Mindfulness Meditation	Vipassana	Mindfulness	India
	Zen Buddhist meditation	Zazen	Japanese/Chinese
	Mindfulness-based stress reduction	Sitting meditation, walking meditation, hatha yoga, and body scan	Jon Kabat-Zinn of the University of Massachusetts
	Mindfulness-based cognitive therapy	Mindfulness meditation and cognitive behavioral therapy	Zindel Segal, Mark Williams, and John Teasdale
Contemplative Centering Prayer	Contemplative/centering prayer	Sacred word; prayer; lectio divina	Catholic/Christian

Adapted from: Rakel, D. *Integrative Medicine*. Philadelphia: Elsevier/Saunders, 2012. ISBN 978-1-4377-1793-8

in the brain involved in attention also demonstrate structural and functional changes. Emotional regulation has demonstrated improvements with mindfulness meditation.⁶

CLINICAL CONDITIONS AND THE EVIDENCE FOR MEDITATION

Anxiety, Stress Reduction, and Depression. In a 2014 meta-analysis investigating the effects of mindfulness meditation on anxiety, depression, pain, stress, and mental health-related quality of life, 17,801 citations were reviewed with 47 trials included.⁵ A total of 3320 participants were included in the study, and the authors found that mindfulness meditation programs have moderate evidence to improve anxiety (effect size, 0.38; 95% confidence interval [CI], 0.12-0.64 at 8 weeks), depression (effect size, 0.30; CI, 0.00-0.59 at 8 weeks), and pain (effect size, 0.33; CI, 0.03-0.62), and a low level of support for the improvement of mental health-related quality-of-life and stress.⁵ The authors found either low evidence or insufficient evidence of any effect of meditation programs on substance use, eating, positive mood, attention, sleep, and weight.⁵ The effect size for mindfulness meditation programs' improvement in depression is comparable to those found in a primary care population treating depression with antidepressants.⁸

Sleep. A 6-week RCT in 49 older adults (≥ 55 years old) investigated "mindfulness awareness practice," a weekly 2-hour, 6-week intervention, and compared it to a sleep hygiene intervention. The mindfulness awareness practice improved the Pittsburgh Sleep Quality Index by 1.8 points (95% CI, 0.6-2.9).⁹ The authors also found a clinically relevant improvement in sleep quality (effect size, 0.89) compared to the sleep hygiene intervention.⁹ In comparison, behavioral interventions

for improvement in sleep quality have an effect size of 0.76 in older adults.⁹ Another RCT that investigated MM in 54 adults with chronic insomnia also found MM to be an effective treatment for chronic insomnia.¹⁰ In a 2014 meta-analysis, there was insufficient evidence that MM improved sleep.⁵ MM may be a clinically effective intervention to improve sleep and will require more methodologically sound trials to demonstrate its efficacy in systematic reviews.

Substance Abuse Disorders and Tobacco Cessation. The evidence for meditation as an effective treatment for substance abuse disorders is mixed; there are a number of research studies demonstrating benefit, though also studies showing little or no effect. More rigorous research needs to be conducted to further understand the role of meditation in treating substance abuse disorders.^{4,11}

An RCT investigating the effects of a form of mindfulness meditation called integrative body-mind training compared to relaxation training in smokers showed a significant reduction in the smoking amount in the integrative body-mind training group ($P < 0.01$) but not in the relaxation training group ($P > 0.05$).¹²

In another RCT investigating a specific mindfulness training developed for active smoking cessation compared to the American Lung Association's Freedom From Smoking (FFS) program for smoking cessation, mindfulness training demonstrated a greater decrease in cigarette smoking than FFS ($F = 11.11$, $P = 0.001$).¹³

Hypertension and Cardiovascular Disease (CVD). In 2009, an RCT investigating TM in 298 university students demonstrated the effectiveness of TM in reducing blood pressure -2.0/-1.2 (systolic blood pressure/

Table 2: Summary Table of Meditation Techniques and Clinical Effectiveness

Condition	Treatment	Clinically Effective
Hypertension	Transcendental meditation	Yes
Cardiovascular disease	Mindfulness meditation	Yes for improvements in quality of life, anxiety, and overall survival
Anxiety, depression	Mindfulness meditation	Yes
Sleep	Mindfulness meditation	Most likely; however more research is needed
Substance abuse disorders	Mindfulness meditation	Insufficient Evidence
Smoking cessation	Mindfulness meditation Relaxation training	Most likely, however more research is needed
Pain	Mindfulness meditation	Yes, in certain types of pain; more research is needed to better define which types of pain respond best
Inflammatory bowel disease, irritable bowel syndrome	Mindfulness meditation	Improvement in quality of life and may improve symptom severity
Vasomotor symptoms in menopausal women	Mindfulness meditation	More research is needed

diastolic blood pressure) mmHg ($P = 0.15$) in comparison to a wait-list control group (+0.4/+0.5 mmHg) ($P = 0.15$).¹⁴ This significantly reduced blood pressure was found in association with reduced psychological stress with increased coping.

TM is associated with significant reductions in both systolic and diastolic blood pressure in a number of studies. In a 2008 meta analysis with 367 individuals in the active group and 344 in control groups with a study duration between 8-52 weeks, TM was associated with significant reductions in systolic (-4.7 mmHg; 95% CI, -1.9 to -7.4) and diastolic (-3.2 Hg; 95% CI, -1.3 to -5.4) blood pressure compared with the control group.¹⁵ These reductions were demonstrated similarly in individuals with hypertension and those with normal blood pressure.¹⁵

The American Heart Association supports the use of TM to lower blood pressure and gives it a Class IIB, Level of Evidence B for its blood pressure lowering efficacy.¹⁶ Due to the paucity of data regarding other meditation techniques, only TM is graded as Class IIB; other meditative techniques were given Class III, no benefit, Level of Evidence C recommendation.¹⁶

Meditation has also shown some promising effects in CVD, as it has demonstrated reductions in improved quality-of-life outcomes, such as anxiety and depression, and has demonstrated survival benefits.¹⁷ Meditation is an activity that many individuals with CVD are able to participate in at home and has benefit in reducing anxiety associated with CVD.¹⁷

Pain. A 2013 meta-analysis that retrieved 133 studies investigating the affects of mindfulness meditation on

pain included 16 trials that met their inclusion criteria.¹⁸ According to the authors, 58 of the 133 studies did not have pre- and post-pain intensity ratings and were excluded.¹⁸ The authors concluded that mindfulness-based interventions reduce pain intensity with a medium effect size.¹⁸ These findings were further supported by a 2014 meta-analysis which found that mindfulness interventions reduce pain to a small degree with an effect size of 0.33.⁵ There was variability in the effect size depending on the condition: two studies were in musculoskeletal pain patients, one was in patients with irritable bowel syndrome, and one was in a non-pain population.⁵

Visceral pain had a large and statistically significant relative 30% improvement in pain severity, while musculoskeletal pain showed 5-8% improvements that were considered non-significant.⁵ Cramer et al found inconclusive evidence that MBSR improved low back pain in a 2012 systematic review that included three trials with 117 participants.¹⁹ More research is required to understand why mindfulness meditation is demonstrating improvements in pain in certain populations and not in others, and whether this is due to the type of pain or other variables.

Gastrointestinal. A 2014 systematic literature review investigating the use of mindfulness meditation on irritable bowel syndrome (IBS) symptoms found 119 studies; however, 106 studies excluded and only seven randomized studies were included in the review.²⁰ The results indicated that there was an IBS symptom severity decrease that ranged from 23% to 42%.²⁰ In a 2011 prospective RCT with 75 women, the mindfulness training group showed a greater improvement in IBS symptoms compared to the support group/control

(26.4% vs 6.2% reduction, respectively; $P = 0.006$).²¹ The effectiveness of mindfulness in inflammatory bowel disease has shown improvement in quality of life but not on other parameters.²²

Immune Parameters. There are a number of immune markers that appear to be influenced by mind-body therapies.²³ Psychological stress and depression are known to affect the immune system by decreasing antiviral responses and modifying innate immune responses.²³ The sympathetic nervous system and the hypothalamus pituitary adrenal (HPA axis) are believed to be the effector pathways through which psychological stress, depression, and mind-body interventions may modulate the immune response.²⁴ A 2014 meta-analysis, which the authors report as the first in the literature, found a number of effects of mind-body therapies after 7 to 16 weeks of practice on the immune system, including a reduction in C-reactive protein (effect size 0.58; 95% CI, 0.04-1.12), and negligible effects on natural killer cells (effect size 0.12, 95% CI -0.21 to 0.45) and CD4+ cells (effect size 0.15; 95% CI, -0.04 to 0.34).²³ More research is needed to further understand the effects of mind-body therapies on the immune response.

Taking immune system effects to the next step, researchers are now connecting meditation with clinical outcomes. For example, Barrett et al demonstrated a decrease in acute respiratory illness (ARI) severity ($P < 0.05$; coefficient range, 333.1 to 484.5) and a reduction in ARI duration ($P < 0.05$) in a mindfulness meditation group.²⁵

Menopausal Symptoms. In a 2011 randomized trial investigating the effects of MBSR and severity of hot flashes, MBSR treatment demonstrated a significant decrease in severity of hot flashes compared to the control group.²⁶ More research needs to be performed to assess the effectiveness of meditation on vasomotor symptoms in perimenopausal women.

CONCLUSION

There are promising results for meditation and its clinical efficacy, even though there is the need for more evidence (see Table 2). More rigorous research is required to further understand which types of meditation practices are beneficial for which conditions and how individual people respond. Delineating the mechanism of action of meditation practices may prove to be useful in future research and may also help to guide clinical recommendations.

There are large numbers of U.S. adults using integrative therapies to not only prevent disease and promote wellness but also to treat painful conditions and to treat specific conditions. Meditation may be effective in promoting wellness, helping to reduce pain, and serving

as an adjunctive therapy in treating specific conditions. TM has demonstrated efficacy in treating hypertension, and the American Heart Association has concluded that it may be considered in clinical practice to lower blood pressure. Unfortunately, more research needs to be done to understand if TM is actually clinically superior to other meditative practices for blood pressure lowering.

Meditative practices are safe, relatively easy to learn, can be performed at home, carry low emotional and physical risks, and are inexpensive. Patients can take an active role in treatment by using meditative techniques that are safe and may be effective in treating different conditions.

On the down side, meditative practices do require adherence and time commitment depending on the type of meditation technique. Some forms of brief meditative practices (5 days to 8 weeks) have demonstrated improvement in neuropsychological, metabolic, and clinical profiles. To further understand how meditation fits into treatment in different conditions more longitudinal, RCTs with large numbers of participants that have comparative control groups will be of importance. ■

REFERENCES

1. Clarke TC, et al. Trends in the use of complementary health approaches among adults: United States, 2002–2012. National health statistics reports; no 79. Hyattsville, MD: National Center for Health Statistics. 2015.
2. AARP, NCCIH. Complementary and Alternative Medicine: What People Aged 50 and Older Discuss With Their Health Care Providers. Consumer Survey Report; April 13, 2010.
3. Ospina MB, et al. Meditation Practices for Health: State of the Research. Evidence Report/Technology Assessment No. 155. (Prepared by the University of Alberta Evidence-based Practice Center under Contract No. 290-02-0023.) AHRQ Publication No. 07-E010. Rockville, MD: Agency for Healthcare Research and Quality. June 2007.
4. Dakwar E, Levin FR. The emerging role of meditation in addressing psychiatric illness, with a focus on substance use disorders. *Harvard Rev Psychiatry* 2009;17:254-267.
5. Goyal M, et al. Meditation programs for psychological stress and well-being: A systematic review and meta-analysis. *JAMA Intern Med* 2014;174:357-368.
6. Tang YY, Holzel BK, Posner MI. The neuroscience of mindfulness meditation. *Nature Rev Neurosci* 2015;16:213-225.
7. Ong JC, et al. A randomized controlled trial of mindfulness meditation for chronic insomnia. *Sleep* 2014;37:1553-1563.
8. Fournier JC, et al. Antidepressant drug effects and depression severity: A patient-level meta-analysis. *JAMA* 2010;303:47-53.
9. Black DS, et al. Mindfulness meditation and improvement in sleep quality and daytime impairment among older adults with sleep disturbances. *JAMA Intern Med* 2015;175:494-501.
10. Ong JC, et al. A randomized controlled trial of mindfulness meditation for chronic insomnia. *Sleep* 2014;37:1553-1563.
11. Zgierska A, et al. Mindfulness meditation for substance use disorders: A systematic review. *Subst Abus* 2009;30:266-294.
12. Tang YY, et al. Brief meditation training induces smoking reduction. *Proc Natl Acad Sci* 2013;110:13971-13975.
13. Brewer JA, et al. Mindfulness training for smoking cessation: Results from a randomized controlled trial. *Drug Alcohol Depend* 2011;119:72-80.
14. Nidich SI, et al. A randomized controlled trial on effects of the

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- transcendental meditation program on blood pressure, psychological distress, and coping in young adults. *Am J Hypertension* 2009;22:1326-1331.
- Anderson JW, et al. Blood pressure response to transcendental meditation: A meta-analysis. *Am J Hypertens* 2008;21:310-316.
- Brook RD, et al. Beyond medications and diet: Alternative approaches to lowering blood pressure. A scientific statement from the American Heart Association. *Hypertension* 2013;61:1360-1383.
- Younge JO, et al. Mind-body practices for patients with cardiac disease: A systematic review and meta-analysis. *Eur J Prevent Cardiol* 2014;00:1-14.
- Reiner K, et al. Do mindfulness-based interventions reduce pain intensity? A critical review of the literature. *Pain Medicine* 2013;14:230-242.
- Cramer et al. Mindfulness-based stress reduction for low back pain. A systematic review. *BMC Compl Altern Med* 2012; 12:162.
- Aucoin M, et al. Mindfulness-based therapies in the treatment of functional gastrointestinal disorders. A meta analysis. *Evid Based Complement Alternat Med* 2014;140724.
- Gaylord SA, et al. Mindfulness training reduces the severity of irritable bowel syndrome in women: Results of a randomized controlled trial. *Am J Gastroenterol* 2011;106:1678-1688.
- Jedel S, et al. A randomized controlled trial of mindfulness-based stress reduction to prevent flare-up in patients with inactive ulcerative colitis. *Digestion* 2014;89:142-155.
- Morgan N, et al. The effects of mind-body therapies on the immune system: Meta-analysis. *PLoS ONE* 2014; 9:e100903.
- Innes KE, Selfe TK. Meditation as a therapeutic intervention for adults at risk for Alzheimer's disease- potential benefits and underlying mechanisms. *Front Psychiatry* 2014;5:40.
- Barrett B, et al. Meditation or exercise for preventing acute respiratory infection: A randomized controlled trial. *Ann Fam Med* 2012; 10:337-346.
- Carmody JF et al. Mindfulness training for coping with hot flashes: Results of a randomized trial. *Menopause* 2011; 6:611-620.

CME QUESTIONS

- 1. Which of the following is true regarding the MIND diet?**
 - a. A greater adherence to the MIND diet leads to a slightly increased risk of Alzheimer's disease.
 - b. Brain healthy foods include butter and red wine.
 - c. There is not an emphasis on fruits beyond berries.
 - d. There is an emphasis on animal based foods.
- 2. Supplementation of high-performance inulin in type 2 diabetic female patients may reduce HgA1c by:**
 - a. None
 - b. 0.0-0.5 mmol/mol.
 - c. 0.05-1.0 mmol/mol.
 - d. > 1.0 mmol/mol.
- 3. In this study, Latinas turned to all of the following to manage their stress during chemotherapy EXCEPT?**
 - a. Watching television
 - b. Connection to family
 - c. Faith, prayer and spirituality
 - d. Driving
- 4. Which of the following is true regarding transcendental meditation?**
 - a. It is a form of mantra meditation, and has shown efficacy in treating hypertension.
 - b. It is a form of mindfulness meditation and has demonstrated efficacy in treating hypertension.
 - c. It is a form of mantra meditation and has shown efficacy in treating substance abuse.
 - d. It is a form of mindfulness meditation and has shown efficacy in treating substance abuse.

CME OBJECTIVES

Upon completion of this educational activity, participants should be able to:

- present evidence-based clinical analyses of commonly used alternative therapies;
- make informed, evidence-based recommendations to clinicians about whether to consider using such therapies in practice; and;
- describe and critique the objectives, methods, results and conclusions of useful, current, peer-reviewed clinical studies in alternative medicine as published in the scientific literature.

[IN FUTURE ISSUES]

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