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Mindfulness-Based Stress Reduction and Transcendental Meditation: Current State of Research

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Abstract This article summarizes the current state of meditation research, specifically focusing on mindfulness-based stress reduction and transcendental meditation. Despite significant methodological problems with the studies reported to date on the subject, there is consistent evidence that meditation can produce changes in the nervous system and physiology of the meditator, and can help with various psychological markers of well-being. Regarding improvement in specific clinical diseases, research is generally mixed and preliminary. Strong recommendations cannot be made based on current evidence, and further studies are needed. In general, there is a stronger body of evidence supporting mindfulness-based stress reduction than for transcendental meditation. (*J Patient-Centered Res Rev.* 2015;2:64-68.)

Keywords meditation, transcendental meditation, mindfulness-based stress reduction

The purpose of this paper is to summarize relevant portions of the research on two types of meditation practices. Meditation is a heterogeneous discipline. Different methods might fall into the category of “meditation,” ranging from mindfulness-based stress reduction (MBSR) to tai chi to yoga to prayer. This article focuses on two relatively defined entities with significant research literature — MBSR and transcendental meditation (TM). Challenges in interpretation are numerous, but a significant body of research has nonetheless accumulated and is discussed herein. The goal is to provide an easily accessible resource for physicians and other health care professionals to use when recommending these types of meditation to patients.

MBSR is a behavioral medicine program created by Jon Kabat-Zinn in the late 1970s.¹ It uses the foundation of “mindfulness” to help people better deal with their lives. It is a secular method that requires training/certification to lead, and has standardized methods. It involves mindfulness meditation training, body scanning and simple yoga postures. Largely due to its secular nature,

MBSR has been studied at some length. Likewise, TM is a simple method of meditation involving focusing on a mantra. A mantra is a word or set of words that is repeated as an object of focus. It may or may not have a clear meaning — sometimes the sound itself is the object of focus rather than an intellectual meaning.² It has roots in the Hindu tradition of India, but also could be considered a secular technique as it does not require a belief system. In general, it consists of meditating on a mantra for 15–20 minutes, twice per day, with eyes closed. It also is one of the more widely studied forms of meditation. Despite having a fairly large body of published research, it was decided that yoga would not be included in this analysis. It was felt this would be more confusing than helpful given the fundamental difference between a physical yoga technique and these more sedentary meditation techniques.

METHODS

PubMed searches with no restrictions regarding publication date were performed for the keywords meditation, mindfulness-based stress reduction, MBSR, mindfulness, transcendental meditation and immune response. There were no strict inclusion or exclusion criteria, the primary reason being that the purpose of this paper is a general overview, not a formal systematic analysis. The investigative methods used in the resulting articles vary greatly and do not lend themselves to strict selection criteria. To exemplify this

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point, the 2012 meta-analysis by Sedlmeier et al.³ used strict inclusion/exclusion criteria and omitted almost 75% of the papers available. We determined important information may be left out by the use of strict criteria while fully acknowledging the subjective aspects of this narrative review. In general, an effort was made to include well-constructed, specific studies with relevant findings. Numerous studies relating to highly specific interventions (such as one-on-one interventions with a particular person) and studies with undefined methods of meditation were excluded.

RESULTS

In total, 55 articles were examined and 36 were summarized in this review within the context of three subheadings: physiology, clinical psychology and clinical medical research.

Physiology

It appears clear changes occur in the central nervous systems of those who meditate, such as increases in grey matter concentration, decreased in brain activity in areas related to stressful states of mind, and neural rewiring. These changes were found in the frontal lobe, anterior cingulate gyrus, fusiform gyrus, occipital lobe, amygdala, hippocampus, thalamus and brainstem,⁴⁻⁸ and were found in healthy individuals, individuals with generalized anxiety disorder and patients with Parkinson's disease. In no cases were these changes associated with any negative outcomes, and the changes were sometimes correlated with positive psychological outcomes such as self-acceptance, purpose in life, autonomy and others.⁶ Eight of the studies examined primarily dealt with physiology, and all of these included significant changes between the control group and its respective study group.

Apart from the central nervous system, there is evidence for various other physiological changes with MBSR, including increased telomerase activity, which is a marker of cellular aging, psychological stress and disease risk. In patients with breast cancer, MBSR increases activity in peripheral mononuclear cells, suggesting potential beneficial effects of MBSR on cell longevity in this setting.⁸ In addition, use of MBSR has been associated with increased natural killer cell activity in patients with human immunodeficiency virus (although no significant clinical differences),⁹ lower inflammatory responses,⁹ increase in antibody titers to an influenza

vaccine¹⁰ and improvements in immune system function after strenuous physical stress.¹¹

Clinical Psychology

Regarding psychological effects of meditation, it appears MBSR can help prevent burnout in various fields, including nursing, teaching, medicine and family caregiving.¹²⁻¹⁵ A beneficial effect for patients with posttraumatic stress disorder (PTSD) was repeatedly shown with both TM and MBSR, including improvements in depression, fatigue and tension.^{16,17} Generally, MBSR was found to help with insomnia, though it was not superior to cognitive behavioral therapy.¹⁸⁻²¹ Regarding stress, anxiety and depression, MBSR has a significant research basis supporting benefit.²²⁻²⁷ A 2011 meta-analysis concluded that MBSR is a "useful method for improving mental health and reducing symptoms of stress, anxiety and depression."²⁴ In regards to TM, there is some evidence it can be helpful for anxiety and depression, but it also has been noted that there are considerable flaws in many TM studies as well as a possibly strong selection bias toward people favorable to the practice.²⁸⁻³⁰

Clinical Medicine

This is the weakest area of positive research findings on meditation. Regarding prehypertension or hypertension, a weak positive effect was found for MBSR but only in clinic readings.³¹ Regarding TM and hypertension, a 2004 review concluded there were many methodological problems with the research to date on TM's effect on hypertension, and the authors all had affiliations with TM, suggesting possible bias.³² Only a weak recommendation could be made for MBSR to treat fibromyalgia.³³ MBSR was not found to affect the rate or severity of exacerbations in patients with ulcerative colitis.³⁴ However, it can be noted that MBSR did increase quality of life in those patients despite not decreasing their exacerbations. Of note, many of the aforementioned physiological studies potentially suggest there may be clinical benefits from meditation in various medical diseases, such as cancer, immune system problems and inflammatory diseases, but there is not a strong body of evidence in support of actual clinical outcomes at this point.

In all of the studies analyzed for this paper, the author did not discover any reason to avoid the use

of meditation. There were no major complications reported and no increase in mortality or morbidity.

DISCUSSION

In general, there are quite significant limitations to a review such as this, and each will be broken down in a systematic manner. However, it is worth noting that significant research has been reported, and it may be unwise to completely dismiss these findings based on analytical shortcomings.

First, regarding the challenge of analyzing meditation, there is a fundamental problem with defining the word or category.³⁵ Much like there are many activities — bowling, basketball, swimming, etc. — listed under the category “sports,” there are many subcategories of meditation with different methods, goals and results. This makes the study of “meditation” as a whole quite difficult from a large-scale perspective. Therefore, this paper mostly focuses on two relatively well-defined types of meditation, MBSR and TM. MBSR is, at least in theory, well-defined in its implementation, and TM is relatively standardized in its practice. However, even within this structure, there are likely substantial differences between one practitioner or teacher and another.

Second, there were no defined inclusion or exclusion criteria because of the vast heterogeneity of the studies done on meditation to date. Most studies are relatively small, with low overall power, and methods vary greatly.³⁶ The populations also vary greatly or are not specifically defined. Many or most of the studies would be considered pilot investigations, which might show some preliminary data and suggest a role for further research. If strict inclusion criteria were imposed, the majority of papers would be excluded for these reasons. Certainly it is worth noting that many of the articles included in this paper’s reference list are from 2013 or 2014, and new articles are coming out rapidly. This seems to show there is significant interest from the research community in the topic, presumably based on the (often promising) preliminary research to date.

Given the absence of inclusion and exclusion criteria, there is also the possibility of personal bias on the part of the author. The author has practiced meditation for more than a decade and feels it is a worthwhile pursuit. It is possible this could have resulted in selection bias.

The author attempted to present a fair overview of the current evidence.

Third, as mentioned, due to the nature of the reported research, many of the conclusions simply do not have strong statistical power. There are occasions of conflicting results or weak study methods. Again, most studies to date are of a “preliminary” nature. An attempt was made to delineate such studies in the Results section, but the simple fact is that many of the studies had a small budget, a small population and, as such, small statistical power. As stated in many of the papers analyzed, more rigorous, large-scale studies would have to be performed in order to get strong statistics.

Finally, and the author believes this is a crucial point, the risk-benefit analysis of these techniques is important. As stated centuries ago, our first priority is *primum no nocere*, or do no harm. In all of the papers examined, no significant negative effects from the practice of meditation, whether TM or MBSR, were reported. Theoretically, one could argue that meditation could be harmful if used in place of other more established treatment without significant evidence for benefit, that is, if used as a primary treatment without sufficient evidence. However, as an adjunctive treatment, it appears to be safe and cost-effective, and the studies published to date suggest potential benefit in many cases. Of note, despite no clear contraindication for patients with psychotic features based on clinical studies, it appears reasonable to withhold recommending meditation to these patients until stronger evidence exists.

As a counterpoint, we can consider the need for evidence to support new pharmacological agents. Research supporting a new medication approval must be highly rigorous, as the pharmaceuticals we use can often have severe side effects. Historically, the potential for harm with a new (or even somewhat established) drug is moderate to high, whereas the potential for harm when a clinician recommends meditation appears to be minimal.

In general meditation, at best, is an efficient, essentially harmless, potentially beneficial adjunct to other medical treatment. Implementation is relatively low cost compared to other interventions, but this cost advantage is somewhat offset by lack of insurance coverage — MBSR training, for example, may cost a patient ~\$400.³⁷⁻³⁹ More benefits may be uncovered by future research and experience. At worst, meditation costs a relatively small

amount of money for training, takes up a relatively small amount of time and may provide no actual benefit.

Meditation is a difficult to define clinical entity, and rigorous broad-scale research has thus far encountered significant obstacles. However, research to date does suggest that it may have a role in patient care. Many small studies on meditation suggest there could be benefit in a wide range of clinical applications, from enhancement of immune response to improvements in psychological well-being to better clinical outcomes for certain medical problems. The strongest research demonstrates clear benefit in various psychological markers and various physiological changes, with weaker evidence for potential benefit in some clinical disease states. However, as a whole, the current state of the literature is preliminary and generally not statistically powerful. Large-scale research is needed to further define the clinical roles that meditation could effectively play. Specific to this paper, it appears there is currently a stronger body of evidence in support of MBSR than of TM, partly due to flaws in many studies related to the latter.

CONCLUSIONS

Despite a heterogeneous and mixed-quality body of evidence, given the risk-benefit ratio and current evidence, it is a reasonable clinical decision to suggest or recommend a meditation practice like mindfulness-based stress reduction as an adjunctive treatment for selected clinical conditions such as anxiety, depression, insomnia, PTSD, burnout or cancer, and to promote general well-being. This assertion can be made largely because the potential for harm is extremely low, the cost includes only that of training, and preliminary studies suggest meditation may be of potential benefit in several clinical or behavioral situations.

Patient-Friendly Recap

- Structured meditation can provide physiological and psychological health benefits.
- Its role in clinical medicine for treating various stress-related health conditions remains inconclusive.
- No complications or harmful effects are noted in the literature for those who practice mindfulness-based stress reduction or transcendental meditation.

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Conflicts of Interest

None.

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