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To what extent does Transcendental Meditation (TM) relieve symptoms in patients with PTSD?

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**To what extent does Transcendental Meditation (TM) relieve symptoms in patients
with PTSD?**

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Transcendental Meditation and PTSD

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To what extent does Transcendental Meditation relieve symptoms in patients with Post Traumatic Stress Disorder?

Abstract

Post Traumatic Stress Disorder (PTSD) is a disorder that is currently increasing among the general public. Unfortunately, researchers have yet to find an effective treatment. Due to the lack of treatment, Transcendental Meditation has become a popular option and may potentially be an alternative treatment therapy. The aim of this paper is to investigate the extent to which Transcendental Meditation (TM) relieves symptoms in patients with PTSD by analyzing brain activity. A comparison was also made between traditionally used PTSD therapies and TM. Because the research regarding this topic is relatively new and was more heavily focused on patients with severe PTSD, the investigation focuses on analyzing studies done on war veteran PTSD patients.

It was concluded that TM did greatly reduce symptoms of PTSD patients. Compared to the control group who used the regular PTSD therapies, the experimental group that practiced TM had clinically significant results. Unlike the other therapies, TM is able to reduce the “flight-or-fight” response seen in PTSD patients, as well as heal the overactive amygdala. TM is easier to practice compared to most PTSD therapies and is more effective, making this technique preferable among PTSD patients.

Introduction:

Transcendental Meditation (TM) is a silent mantra meditation technique developed by Maharishi Mahesh Yogi. This meditation facilitates transcendence, which is defined as achieving self-awareness while in a state of physical relaxation simultaneously. TM should be practiced twice a day for 20 minutes with the use of a mantra unique to the individual. The mantras’ rhythmic repetition facilitates in the effort of relaxation as opposed to other meditation practices, which require more concentration to center the practitioner's thoughts. One of the most prominent aspects of TM is that it allows wavering thoughts while meditating. According to Indian Journal of Health and Wellbeing, TM is known for “reducing anxiety and blood pressure, and promoting cognitive performance, positive personality growth, and self-actualization” (Trama and Cheema, 2016, pg. 928). In addition to physical relaxation, TM and its benefits are being researched in conjunction with other treatment options for anxiety disorders.

Transcendental Meditation is thought to have profound effects on specific disorders, such as Post Traumatic Stress Disorder (PTSD). PTSD is an anxiety disorder triggered by traumatic events such as life threatening situations, violent assaults, harrowing accidents, natural disasters, human-made disasters, or war (National Center for Complementary and Integrative Health, 2011). PTSD symptoms are varied and complex and can often be confused for other anxiety disorders or physical maladies. While there has been extensive research on PTSD, no effective cure has been found; instead there are only treatments available for this disorder. This brings up the question of to what extent does Transcendental Meditation (TM) relieve symptoms in patients with PTSD?

This essay will investigate background information concerning PTSD and Transcendental Meditation with regards to TM's effect on brain activity. It will also make a comparison between original PTSD therapies and the TM technique, as well as address clinical studies done on war veterans with PTSD to further support the efficacy of TM.

PTSD Background and PTSD Symptoms

Experiencing traumatic or life-threatening events can cause a psychiatric disorder, known as PTSD. Common physical behaviors specific to PTSD include: reliving a traumatic experience through flashbacks or nightmares, developing insomnia or aggressive behaviors, depression, substance abuse, or memory or cognition problems. Psychologically, patients with PTSD endure an inability to function in a normal social setting or family life, which can, unfortunately, lead to attempted suicide (Iribarren, Prolo, Neagos, and Chiappelli, 2005). In addition to the hindrance of one's ability to function in his or her daily life, the commonalities of symptoms between PTSD and other anxiety-related disorders, such as panic disorder or obsessive compulsive disorder, often lead to misdiagnosis (Kennard, 2010).

Commonly known as PTSD, severe Post Traumatic Stress Disorder is specifically diagnosed in soldiers and veterans. Combat-related PTSD patients were found to be more resistant to treatment than those who develop the disorder from other traumas. Clinical psychologists hypothesize that the difference in symptoms and treatment between veterans and other patients with PTSD is that veterans are more inclined to greater chronicity, high comorbidity, and/or pervasive dysfunction (Iribarren et al., 2005).

Current statistical reports show that of the 70% of adults who have experienced some type of traumatic event at least once, 20% of people - or 44.7 million people - develop Post Traumatic Stress Disorder (PTSD United, 2013). In the next decade or so, the number of individuals with PTSD is expected to increase due to various factors, such as a rise in terrorism, extended combat, presence of environmental toxins, etc.

Due to the common misdiagnosis and lack of an outright cure of PTSD, researchers and clinical psychologists are still looking for effective treatments that could potentially reduce symptoms in what is now known as severe PTSD. Due to its serious condition, further research of the disorder is encouraged for deeper understanding, better treatment, or intervention (Iribarren et al., 2005). Currently, clinical psychologists are focusing on methods to reduce PTSD symptoms. Treatment is aimed toward avoiding any memory or thought associated with the traumatic event. In other words, treatment focuses on diminishing the patient's reaction, as well as acuity, to the recurring memory. Types of approved treatment include psychodynamic psychotherapy, peer-counseling groups, and cognitive-behavioral therapy.

Regrettably, therapy treatments tend to prove ineffective since PTSD patients often opt-out or continue to have recurring flashbacks/nightmares, resulting in an expensive and lengthy treatment process. The alternative and financially-preferred option to therapy is medication,

which is traditionally used to treat patients with severe PTSD. However, PTSD medication abuse is common and can lead to worsening symptoms, such as depression or anxiety. The persistent feeling of fear, guilt, and other negative emotions caused by a traumatic event eventually leads to depression, substance abuse, suicidal thoughts, and/or anxiety (Anxiety and Depression Association of America, 2016).

In addition to other treatments, an emerging form of an alternative treatment known as CAM is becoming more prominent. Complementary and Alternative Medicine (CAM) is a form of treatment that uses methods not associated with mainstream medical care. It is also being integrated as part of an ongoing clinical and translational research project on PTSD (Hankey, 2006).

Cognitive-Behavioral Therapy in the Treatment of PTSD and its Limitations

Cognitive-behavioral therapy is traditionally used in treating PTSD patients. This treatment seeks to reduce negative emotions or eliminate irrational thoughts associated with traumatic experiences. Dr. Barnes (2016), a clinical-research psychologist, claims that forms of cognitive-behavioral therapy include “Prolonged Exposure (PE), Cognitive Processing Therapy (CPT), and Eye Movement Desensitization and Reprocessing,” and that these therapies are, “recognized first-line treatments for combat-related PTSD and AD/OS [, anxiety disorders not otherwise specified in the current diagnosis system]. Although these interventions are associated with significant reductions in PTSD symptoms, they do not extinguish them completely” (pg. 56).

Prolonged Exposure treatment dropouts are common and meta-analytic review suggests that about half of the patients enrolled in these treatments experience clinically significant reduction in PTSD symptoms. Therefore, the limitations of PE suggest a need for alternative PTSD treatments which can assist patients resistant to established therapies. TM was noted to be more efficient than PE, showing that the TM technique was preferable for PTSD patients (Rutledge, Nidich, Schneider, Mills, Salerno, Heppner, Gomez, Gaylord-King and Rainforth, 2014). Dropout rates with PTSD patients tend to be fewer when TM technique was involved, since the technique is easier to practice compared to more demanding therapies. Furthermore, in comparison to the exposure and anxiety habituation model utilized in PE that involves direct or imaginal exposure to features of the patient’s trauma, the gentle pace and minimal effort of the TM technique may offer a comparatively less stressful approach to PTSD treatment. Rutledge and his research group’s (2014) study described the rationale and design of a randomized controlled trial comparing TM to an established cognitive-behavioral treatment known as Prolonged Exposure (PE), and an active control condition health education (HE) for PTSD. This trial recruited a large random sample size of 210 veterans who met the criteria for PTSD. The testing was conducted in three months for PTSD symptoms, depression, mood disturbance, quality of life, behavioral factors, and physiological/biochemical and gene expression mechanism using validated measures like the Clinically Administered PTSD Scale (CAPS). To the extent that TM is similarly efficacious to PE for improving PTSD symptoms, a less intensive treatment experience could translate into better treatment adherence for some patients. These results indicate that TM treatment may have particular value in application toward PTSD.

Brain Activity Affiliated with TM in relation to PTSD Cognitive Process

TM is a type of meditation that, unlike other forms of meditation, allows stress to be released in a natural way, making it a uniquely simple technique that provides a state of restful alertness. Restful alertness occurs when the body is in a state of complete relaxation while the mind remains attentive to the environment. TM requires a personal instructor to ensure effective practice and to teach the meditator to perceive a thought until the mind transcends to the “least excited” state of consciousness, where there is a decrease in mental activity but also a maintained state of complete mental awareness (Trama and Cheema, 2016).

Self-awareness is a key aspect of Transcendental Meditation. While self-awareness has a broad definition with multiple interpretations, in terms of TM, it “refers to the content of conscious experience” in which five processes are involved: “(1) interpersonal cognitive relations, (2) remembering on a first-hand basis one’s past actions or experiences, (3) awareness of any object; (4) immediate awareness of one’s mental processes, and (5) the totality of mental experiences that constitute our conscious being” (Travis and Arenander, 2004, pg. 1). These five processes are crucial to achieve “pure consciousness,” the ultimate purpose of TM. Pure consciousness is the mental state in which an individual’s mind has reached the maximum level of peacefulness of his or her own awareness and is free from all mental activities.

Practicing TM significantly improves one’s daily life since there has been a reported increase in the levels of energy and clarity. Other meditations require intense focus to keep the mind from wandering. This concept is also known as mindfulness, or bringing one’s attention to experiences in the present, which requires more practice. TM, however, allows for meandering thoughts to pass through the mind which makes the process of transcending less strenuous and effective.

Although some studies have found no physiological or behavioral differences between TM and other relaxation techniques in CAM treatments, it is significant to note that subjects reported meditational experiences as more profound and enjoyable than their comparative control groups, who only participated in the traditional forms of PTSD treatment (Nagel, 1999). The fact that this type of meditation is simple to learn and can be practiced at any time, anywhere makes this meditation particularly advantageous in treating combat-related PTSD patients (J. Rosenthal, Grosswald, Ross, and N. Rosenthal, 2011).

Recently, the TM technique is known to have significant effects on PTSD patients. To further understand this phenomena, researchers have taken a biological approach to the process that occurs during TM. Brain activity during TM is monitored and recorded using electroencephalography (EEG) (Maharishi University of Management, 2017). This test measures the brain’s electrical activity by analyzing the electrical impulses in the brain, which are later translated into brain waves on the computer screen.

The amygdala, the part of the brain that controls survival instincts, emotions, and memory, is triggered when a PTSD patient is having an episode. An overactive amygdala causes one to develop stronger fear and reflexive responses than is normal to outside stimuli (eg. screaming). Neurologist Dr. Kaplan (2011) states that “the state of restful alertness during TM is exactly the opposite of what we see with amygdala overactivity. And, we see these EEG changes during TM even in new meditators, so a few weeks or months of practice can be expected to significantly reduce the negative impact of repeated episodes of emotion-laden memories” (para. 5). TM is characterized through these brain wave patterns of alpha activity which coincides with a great decrease in oxygen consumption, indicating a state of restful alertness (Westcott. 1973). Theta bursts, which are associated with early stages of the REM cycle and waking activity, is another primary brain wave pattern that increases during TM, further providing evidence of the positive effects, called “self-awareness,” during the meditation (Bromer, 2016).

Though practicing TM twice a day may not entirely erase traumatic memories, it can improve cortical functioning of the brain. According to Rees and his research group (2014), “this practice [TM] cultures the nervous system to sustain settled mental functioning outside the meditative period, minimizing the intrusive thoughts, sleep disturbance, and other adverse symptoms associated with PTSD” (pg. 114). With this evidence, several studies were conducted on PTSD patients by replacing their regular therapy with TM into their daily lives and found outstanding results. The regular practice of TM produced long-term changes in the nervous system - more specifically, the sympathetic nervous system - as evidenced by the decrease of the overactive “flight-or-fight” response shown by people who have PTSD. The “flight-or-response,” also known as hyperarousal, is the psychological reaction made by one in response to threatening or harmful events (Psychologist World, 2017). This response is particularly acute in soldiers and veterans, and coupled with the traumatic nature of war leaves them more susceptible to severe PTSD.

TM and PTSD Studies on War Veterans Diagnosed with PTSD

PTSD became more relevant after the Vietnam War when many veterans were diagnosed with the disorder. PTSD prevalence during the Vietnam War is estimated between 2% and 17% of all combat soldiers, and in recent wars, 12.6% of Iraqi soldiers and 6.2% of Afghanistan soldiers were also diagnosed with PTSD (Barnes, Rigg, Williams, 2013). One-third of those who were involved in therapy failed to recover, indicating that PTSD is a chronic disorder. Brooks and Scarano’s (1985) study at the Denver Vietnam Veterans Outreach Program intended to compare the TM program with psychotherapy during the treatment of Vietnam veterans with PTSD. A group of 18 male veterans, over a three-month period, practiced the TM treatment method with nine dependent variables being measured (shown in the chart below).

Measure	TM Group					Psychotherapy Group				
	Pre		Post			Pre		Post		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Post-Vietnam Stress Disorder	9.70	2.98	5.80 ^{b,z}	4.26	11.71	2.63	10.86	2.85		
Emotional Numbness Scale	3.70	1.64	1.70 ^{b,y}	1.95	3.75	1.03	3.50	1.41		
Taylor Anxiety Scale	16.50	4.72	9.10 ^{d,z}	5.34	18.25	4.43	18.62	5.01		
Beck Depression Scale	16.60	6.80	7.60 ^{d,z}	7.49	20.62	7.94	19.75	3.84		
Alcohol Consumption (4=no problem)	2.00	.63	3.67 ^{d,x}	.82	2.17	.41	2.17	.41		
Insomnia (4=no problem)	2.71	.76	3.71 ^{e,w}	.49	1.57	.53	1.43	.53		
Employment (4=no problem)	2.25	.50	3.50 ^x	.58	2.40	1.14	2.80	1.30		
Family Problems (4=no problem)	2.12	.83	3.25 ^{b,x}	.89	2.14	.90	2.29	.76		
Sensitivity to Stress (GSR)	18.80	19.46	10.50 ^{a,v}	10.92	19.16	16.95	23.00	21.11		

^a $p < .10$; ^b $p < .05$; ^c $p < .01$; ^d $p < .005$; ^e $p < .001$.

^v $p < .10$; ^w $p < .05$; ^x $p < .01$; ^y $p < .005$; ^z $p < .001$.

(ANCOVA; pretest as the covariate)
(paired t test, one tailed; pre/post)

Figure 1: Comparison between the two groups on Pre/Post measurements (Brooks and Scarano, 1985).

The TM treatment group improved significantly from pretest to posttest on eight variables; however, the psychotherapy group showed no significant improvement on any measure. The TM group showed a trend toward improvement of the physiological measure of habituation to a stressful stimulus, which is significant considering this is a primary symptom seen in most PTSD patients. The results were so remarkable that after three months, 70% of the patients went home as they required no further treatment. Clinical psychologists Dr. Brooks and Dr. Scaranos (1985) suggested “that the deep level of rest produced during TM allows the body to spontaneously heal itself or rid itself of the deep impressions incurred from past stressful experiences and commonly, veterans reported that, ‘I feel after I meditate that I no longer have the same intensity of tension, rage, and guilt inside - it’s as if a huge burden has been lifted’” (pg. 214). The TM treatment had an overall improvement, greatly outweighing the results shown by the therapy group, showing that TM offers treatment that is suitable and successful in reducing PTSD symptoms.

In a more recent study, theoretical physicist Hankey (2006) describes how CAM, in conjunction with the Transcendental Meditation program, studied 28 Vietnam veterans with PTSD. The TM program has over 600 different studies and over 100 international research institutions in 30 countries, and recently is being implemented in the form of the Transcendental Meditation program CAM. The participants were split up into two equal groups in which the control group received normal psychotherapy and the experimental group were put in the TM program. Measurements were taken before and after a three month period. The TM group displayed a decrease in stress syndrome, anxiety, alcohol use, insomnia, depression, and GRS habituation to a stressful stimulus; they also showed improvement in employment status. Hankey (2006) states that “TM’s systematic increase of coherence suggests that it can restore normal brain function after damage caused by trauma and unresolved after-effects” (pg. 132). The p-value ranged from 0.05 to .001 with the exception to the GRS where $p < .10$, indicating that there was a need for either more subjects or more time. The p-value, in which “p” stands for probability, is a statistical calculation that measures the chance of coincidence. The lower the p-value, the more certain researchers can be that their experimental results were not a coincidence. The psychotherapy control group, by comparison, had no similar changes, concluding that combat induced PTSD cannot be completely resolved through normal therapy. The low p-value

also gives a high degree of certainty as well as reliability that indicates that the TM therapy was, in fact, significantly better in providing treatment.

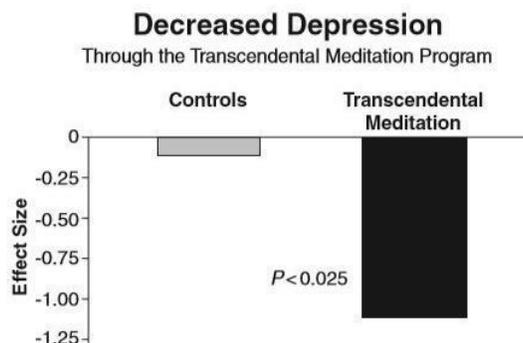


Figure 2: Comparing decreased depression between the two groups (Hankey, 2006).

While the TM therapy was beneficial for the PTSD-diagnosed soldiers, there are still limitations to consider. The limitations of this study include the small sample size and the short time frame in which the experiment was conducted. At the end of the experiment, only ten veterans had completed the study in the TM group (29% drop-out) and eight in the psychotherapy group (43% drop-out). Yet, the psychotherapy group had almost double the rate of dropouts than the TM group, implying that TM might be the best program in increasing soldiers' resilience. Despite the short three month time period, the TM group showed a significant decrease in PTSD symptoms compared to normal therapy, revealing TM's effectiveness. Hankey references Irbarren's study in stating that PTSD is increasing with six to eight million people currently suffering from the disorder, suggesting that means to reduce PTSD symptoms are still being investigated and TM proves to be an attractive option.

Rosenthal and his research group (2011) conducted a pilot study to determine if TM could help veterans from the Operation Enduring Freedom or Operation Iraqi Freedom with PTSD to relieve their symptoms. Psychiatrist Dr. Rosenthal et al. (2011) stated that "because PTSD is associated with persistent symptoms of increased arousal and an exaggerated sympathetic response to stimuli we have explored an intervention that might counteract this response through improved relaxation" (pg. 626). This study utilized the Clinician Administered PTSD Scale (CAPS), which is considered the "gold standard" for PTSD assessment according to the Department of Veterans Affairs. The study also used several other forms of measurement to produce a more well-rounded and informative picture of modern PTSD.

Patient*	Age	Length of Service in OEF/OIF	Duration of Symptoms (Years)	Type of Trauma	Most Prominent Symptoms	Psychotropic Medications at Baseline
02	25	1 Year	3	Witnessed Military/Civilian Casualties, Experienced Life-threatening Explosion	Nightmares, Insomnia, Decreased Concentration, Physiological Arousal, Amnesia, Anger Outbursts	None
08	29	2 Years	5	Involved in Torture of Prisoners, Witnessed Fellow Soldiers Killed in Combat	Distressing Memories, Insomnia, Nightmares, Flashbacks, Irritability, Hypervigilance, Physiological Arousal, Avoidance of Reminders of Trauma	Trazodone 100 mg qhs; Topamax 50 mg qd; Buspirone 60 mg qd; Temazepam 7.5 mg qhs; Prazosin 6 mg qhs; Fluoxetine 60 mg qd
09	40	1 Year	2	Trapped, and Likely Killed, Iraqi Men in Tunnel, Lived Under Constant Threat of Attack	Distressing Memories, Flashbacks, Physiological Arousal, Avoidance of Thoughts/Feelings Related to Trauma, Hypervigilance	None
10	25	10 Months	5	Witnessed Soldiers Killed in Car Bomb	Distressing Memories, Physiological Arousal, Avoidance of Reminders of Trauma, Emotional Detachment, Insomnia, Anger Outbursts, Decreased Concentration, Hypervigilance	Adderall 15-45 mg 1-3x per week; Seroquel 12.5 mg qhs prn insomnia
11	31	2 Years	6	Sent Soldiers Into Harm's Way, Witnessed Videos of Civilians Beheaded, Saw Fellow Troops Killed in Combat	Nightmares, Upset by Reminders of Trauma, Avoidance of Reminders of Trauma, Amnesia of Parts of Events, Detachment From Others, Insomnia, Anger Outbursts, Decreased Concentration, Hypervigilance	None

Figure 3: Basic demographic and clinical information of the patients (Rosenthal et al., 2011).

Patient*	CAPS ^b		PCL-M ^b		BDI ^b		QLES-Q ^c	
	Baseline	Week 8	Baseline	Week 8	Baseline	Week 8	Baseline	Week 8
02	50	26	42	28	15	3	48	61
08	114	103	78	57	39	34	29	43
09	27	5	36	19	9	0	67	80
10	88	28	76	27	38	5	34	55
11	76	36	57	38	19	22	45	49
Patient	CGI-S		CGI-I		CES			
	Baseline	Week 8	Baseline	Week 8	Baseline	Week 8		
02	4	3	—	2	25	—		
08	6	6	—	3	29	—		
09	4	1	—	1	19	—		
10	5	3	—	1	28	—		
11	4	2	—	2	22	—		

Efficacy measurements at baseline and at week 8. The CES measures degree of combat exposure at baseline. The CGI-S scores severity of illness: 1 = normal, 2 = borderline ill, 3 = mildly ill, 4 = moderately ill, 5 = markedly ill, 6 = severely ill, and 7 = among the most severely ill. The CGI-I scores improvement: 1 = very much improved, 2 = much improved, 3 = minimally improved, 4 = no improvement, 5 = minimally worse, 6 = much worse, and 7 = very much worse. *Patient numbers refer to the order in which subjects were screened. Out of 11 total subjects screened, 5 were included for analysis. ^bHigher scores reflect greater severity of symptoms. ^cLower scores reflect greater severity of symptoms.

Figure 4: Change in scores on primary and secondary outcomes between baseline and week 8 (Rosenthal et al., 2011).

For 12 weeks, five veterans were trained using the TM technique and their information was recorded on the chart.

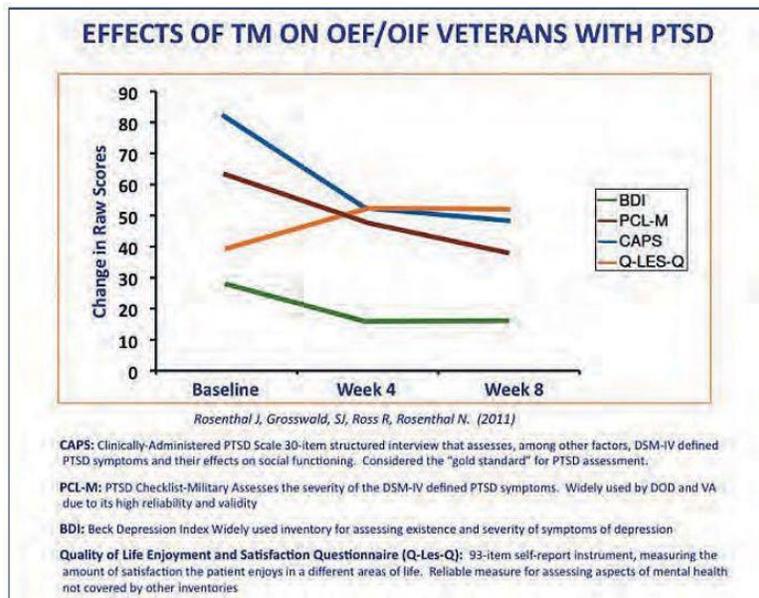


Figure 5: Effects on TM on Operation Enduring Freedom (OEF)/ Operation Iraqi Freedom (OIF) Veterans with PTSD. The legend shows a list of primary and secondary outcome measurements (Rosenthal et al., 2011).

All of the subjects improved most significantly in the primary outcome measure, the CAPS (mean change score, 31.4; $p = 0.02$). The Military Order of the World Wars (2011) assessed Rosenthal's study, and claimed veterans of the Iraq and Afghanistan wars showed a 50% reduction in their PTSD symptoms eight weeks into the practice. The subjects were described as getting along with, as well as communicating better, with family members, and subjects even reported a sense of stability within their daily social lives. The low p-value further indicates the credibility of these results.

The limitation involved in this study is the absence of a control group, thus a placebo effect could not be ruled out. Randomized selection was used to conduct the study, increasing the data's reliability; however, pilot studies are just a pre-test in order to conduct the main study. These results show a trend rather than definitive data; this, along with the use of a smaller sample size, means that pilot studies do not always guarantee success for future studies. Even though this is the case, the results of the experiment are consistent with the results hypothesized by the TM program, supporting the hypothesis that TM is a potentially effective treatment option that can be used to strengthen resilience within soldiers. This experiment correlates very closely to Brooks's study and Hankey's assessment of CAM study in which all three experimental groups experienced significant improvement in reducing symptoms of PTSD, anxiety, depression, and insomnia, as well as "measures of quality of life, such as employment, family problems, and stress reactivity"

(Rosenthal et al., 2011, pg. 629).

Barnes and his research group's (2016) study hoped to determine if there was increased psychological well being through practicing TM, and whether this practice would decrease the need for psychotropic medications in PTSD management. The sample size, this time, was much

larger as it included 74 military Service Members diagnosed with PTSD or AD/OS (anxiety disorder not otherwise specified). The group was split evenly into two groups with one that practiced TM while the other group received regular treatment; the results were recorded over the span of six months.

Time Interval	N = 74	One Month			Two Months			Three Months			Six Months		
		TM	Control	χ^2 (df)	TM	Control	χ^2 (df)	TM	Control	χ^2 (df)	TM	Control	χ^2 (df)
New Medication Introduced (N)		5.4% (2)	32.4% (12)	8.20 (1)**	10.8% (4)	18.9% (7)	0.96 (1)	2.7% (1)	27.0% (10)	8.12 (1)**	13.5% (5)	21.6% (8)	0.36 (1)
Medication Change N (8)				8.24 (3)**			2.64 (2)			16.90 (3)**			3.36 (3)
1+ Medications Cessed		5.4% (2)	8.1% (3)		13.5% (5)	10.8% (4)		13.5% (5)	0		16.2% (6)	21.6% (8)	
Medication Decreased		2.7% (1)	0		0	0		0	2.7% (1)		8.1% (3)	5.4% (2)	
Medication Stable		75.6% (28)	51.3% (19)		70.2% (26)	56.7% (21)		75.6% (28)	56.7% (21)		55.1% (18)	27.0% (10)	
Medication Increased		10.8% (4)	40.5% (15)		16.2% (6)	32.4% (12)		5.4% (2)	40.5% (15)		13.5% (5)	32.4% (12)	
Unknown		5.4% (2)	0		0	0		5.4% (2)	0		27.0% (10)	13.5% (5)	

* $p < 0.05$, ** $p < 0.005$. All χ^2 results displayed represent the total between-groups relationship for each variable at the specified time interval. Changes in the amount of medication prescribed since the start of treatment.

Figure 6: Psychotropic medication usage measured over a span of 6 months (Barnes et al., 2016).

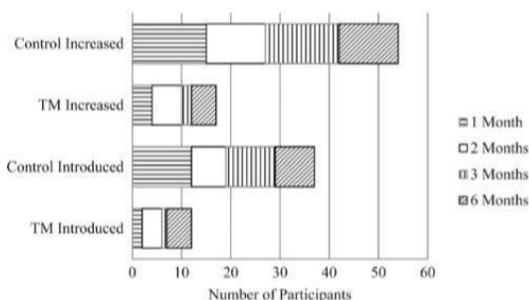


FIGURE 1. Increases in prescribed medication by treatment group: Comparison of the Transcendental Meditation (TM) and control groups on the number of participants with added medications or increased dosages over a 6-month period. Among the control group, more participants added additional medications than the TM group after 1 ($p = 0.004$) and 3 months ($p = 0.004$). The control group was also more likely to increase dosages than the TM group after 1 ($p = 0.026$) and 3 months ($p = .001$).

Figure 7: Graph shows an increase in prescribed medication by treatment group (Barnes et al., 2016).

According to Figure 6 and Figure 7, after one month, 83.7% of the TM group became stabilized (decreased medications) and 10.8% increased medication dosage in comparison to the control group by which 59.4% showed stabilizations or decreased medication and 40.5% increased medical dosage ($p < 0.03$). This pattern showed a similar result over the span of two ($p < 0.27$), three ($p < 0.002$), and six months ($p < 0.34$).

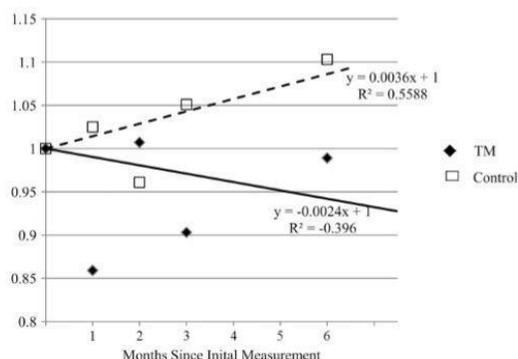


FIGURE 2. Changes in symptom severity by treatment group: Comparison of the Transcendental Meditation (TM) and control groups on the mean proportion change in psychological symptom severity from the baseline $Y = 1$, with results >1.00 signifying an increase in symptom severity. $Y = 1$ was defined as the baseline psychological score, with means over 1.0 signifying increases in symptom severity.

Figure 8: Changes in symptom severity by treatment group (Barnes et al., 2016).

According to Barnes, Monto, Williams, and Rigg (2016), “there was a 20.5% difference between groups in severity of psychological symptoms after 6 months;” in other words, in comparison to the group practicing TM, the control group experienced an increase in symptom severity as seen in Figure 8 (pg. 56). According to the results of the study, TM technique reduced baseline cortisol, a major stress hormone associated with PTSD, implying that high levels of EEG alpha coherence have contributed to reducing stress levels in PTSD patients. Although the study was limited by the lack of information regarding the specific therapy taken by the control group, which is important to consider for future studies, the sample size and time period in which this study was conducted was sufficient enough in providing a high degree of credibility to the findings of this study. These findings indicate the TM treatment is in fact beneficial as it proves to be a viable treatment modality in military treatment facilities for reducing PTSD and AD/OS psychological symptoms and associated medication use.

The most current research conducted was by Fajarito and Guzman (2017) in which the study was based upon how trauma influences PTSD symptoms, especially among soldiers. The original therapies used to treat PTSD patients were trauma-focused therapies and have a high number of drop-out rates since PTSD patients are hesitant to re-experience flashbacks inherent in this process. Fajarito and Guzman (2017) discussed future treatments, specifically those that help to “bolster soldiers’ resilience to traumatic experiences during the treatment” (pg. 1670). For improving soldier resilience, the Transcendental Meditation (TM) program was recommended, and considered to be a viable treatment option for PTSD patients. Although it is still an unapproved treatment, TM is less strenuous for soldiers with PTSD to practice, making it well-suited to combine with other forms of treatment. Positive attitude, active coping, healthy lifestyle, enhancing social support, spirituality, self-efficacy, and cognitive reappraisal all should be included in reinforcing resilience.

Although the TM technique is commonly used to assist with stress and stress-related

diseases, there is still a lack of rigorous clinical research that verifies the efficacy of these treatments overall and specifically in populations with psychiatric illness. In addition to the studies on combat-related PTSD patients, a study has also been conducted on non-veteran PTSD patients (in 2014) to see whether TM is effective in relieving those who received PTSD under different circumstances. Compared to using the TM therapy on combat-related patients with PTSD, regular PTSD patients have more positive results. It can be assumed that since TM is already effective in treating veterans with PTSD, regular PTSD patients have a far better chance of fully relieving their symptoms. However, only one study had been conducted on non-veteran PTSD patients, indicating that more studies need to be done in order to support a hypothesis that suggests TM's effectiveness in PTSD treatment.

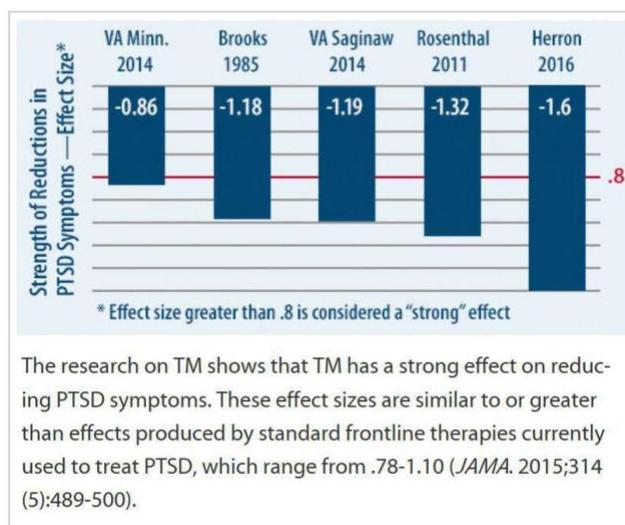


Figure 9: Reduced symptoms of PTSD in war veterans through Transcendental Meditation. This graph summarizes the results on several TM studies conducted on PTSD veterans, some of which are mentioned already in this paper (TM for Veterans, 2017).

Conclusion:

This paper delved into the background information of PTSD and TM to which a relationship was established between when analyzing studies on war veteran PTSD patients. While the studies showed the potential benefits of TM in relieving PTSD patients, there have not been enough studies conducted and thus not enough evidence to integrate TM as a professional clinical treatment therapy. However, numerous studies show that Transcendental Meditation does in fact relieve symptoms of PTSD patients. Currently, meditations of different philosophy and practice are being looked into more broadly as an alternative to treating PTSD. Researchers Dr. Talkovsky and Dr. Lang (2017) state that "this line of research is in its relative infancy, but initial evidence suggests that meditation-based approaches merit continued investigation to evaluate their efficacy, mechanisms, and implementation within Department of Veterans Affairs (VA) settings" (Talkovsky and Lang 2017, pg. 1). According to Talkovsky and Lang, over the 11,500 articles scanned with relevance to soldier's resilience, TM, mindfulness, and muscle relaxing procedures had the most supporting data, in that order. All the studies had clinically

significant results, which is defined as noticeable improvement or bringing a patient back to relative normal functioning. Before, the most popular option in treating PTSD was the CBT, which is a trauma-focused therapy treatment that had an average dropout rate of 18% (Imel, Laska, Jakupcak, and Simpson 2013). Studies claim that the perceived stigma on PTSD during treatment causes PTSD-diagnosed patients to be hesitant in seeking treatment. TM on the other hand, does not focus on trauma, which reduces PTSD patients' hesitance in committing to the treatment as they realize this simple technique does not follow an intense process. TM produces coherent cortical functioning of the brain and most importantly reduces PTSD patients' reactions to recurring traumatic memories. Understanding that TM is easier to practice while also providing direct alleviation of an overactive amygdala, even in the aftermath of the meditation, makes TM a great technique to consider for treating PTSD patients in the future.

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