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BRIEF REPORT

Reduction in Posttraumatic Stress Symptoms in Congolese Refugees Practicing Transcendental Meditation

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This matched single-blind pilot study tested the effect of Transcendental Meditation® (TM) practice on symptoms of posttraumatic stress (PTS) in Congolese refugees. Urban refugees ($N = 102$) staying around Kampala, Uganda attended introductory meetings. After initial random assignment to the TM group, 30 refugees who revealed that they were unable to attend all meetings and were eliminated from the study. The remaining 21 TM group participants were then instructed in TM and matched with refugees in the control group on age, sex, and baseline scores on the Post-traumatic Stress Disorder Checklist–Civilian (PCL-C). All participants completed the PCL-C measure of PTS symptoms at baseline, and 30-day and 135-day posttests. The PCL-C scores in the control group trended upward. In contrast, the PCL-C scores in the TM group went from 65 on average at baseline indicating severe PTS symptoms to below 30 on average after 30 days of TM practice, and remained low at 135 days. Effect size was high ($d > 1.0$). Compliance with TM practice was good; most reported regular practice throughout the study. There were no adverse events. All refugees who learned TM completed the study and were able to practice TM successfully, with subsequent substantial reduction in PTS symptoms.

The Second Congo War killed 5.4 million people and forced an estimated 80,000 refugees to flee (Hovel, 2007). Refugees are at risk for posttraumatic stress (PTS) that strains the fabric of society (Fazel, Wheeler, & Danesh, 2005). A person with PTS may be hypervigilant, sleep poorly, distrust others, have memory problems, and have difficulty making decisions and following through. Thus, traumatized populations' efforts to help themselves are challenged both by outer circumstances and by inner conditions.

Research suggests that Transcendental Meditation® (TM) practice may reduce PTS symptoms. A random assignment study of 18 Vietnam veterans reported that TM was more effective than psychotherapy in reducing anxiety, depression, insomnia, alcohol abuse, PTS symptoms, and stress reactivity (Brooks & Scarano, 1985). A recent pilot study reported significant reductions in anxiety, depression, and PTS symptoms in veterans from Iraq and Afghanistan after 3 months of practice (Rosenthal, Grosswald, Ross, & Rosenthal, 2011). The current pilot study assessed whether TM practice can reduce PTS symptoms in a refugee population, and secondarily investigated possible sex differences in the effect of TM on PTS symptoms (full database and manual available upon request.).

Method

Participants and Procedures

Refugees in this study came from the eastern Democratic Republic of the Congo. They had been exposed to combat, sexual assault, torture, and/or forced to witness the abuse or killing of loved ones. They were currently staying around Kampala, in temporary shelters, such as churches or rented accommodations, were typically unemployed, and had minimal access to mental health services.

Forty-two adults participated in this study: 21 learned TM immediately and 21 waited to learn TM until the end of the

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study forming the delayed-start group. There were 13 men and 8 women in each group, average ages were similar (TM = 32.8, *SD* = 7.3 years, delayed-start = 31.2 years, *SD* =7.8). Baseline PCL-C scores were also similar (TM = 65.2, *SD* = 7.3; delayed-start = 67.8, *SD* = 6.5). Inclusion criteria were (a) not practicing any other Eastern or Western system of meditation; (b) free of severe mental problems that would interfere with practicing TM, as assessed by the medical doctor on the team; (c) able to spend 20 minutes morning and afternoon practicing TM; (d) a score greater than 40 on the PCL-C; and (e) available for all posttests. Other issues, such as injuries, nutrition, finances, and religion, were not investigated. The study was approved by the institutional review board at the MUM Research Institute.

Community leaders informally prescreened 102 refugees for PTS symptoms. The refugees came to meetings at a rented facility in Kampala to learn about the study. They filled out a demographic form, a consent form, and the PCL-C. Participants were stratified on age, baseline PCL-C scores, and sex, and then randomized to group using computer-generated numbers.

During the recruiting process—before instruction in TM—the randomization was broken. Thirty individuals randomized to TM did not come for personal instruction. This high attrition before TM instruction may reflect a design flaw exacerbated by the situation of refugees. Participants were given a kilo of beans and rice, and a bar of soap after each testing. At baseline testing, participants did not receive food until after the PCL-C instruments were completed. Thus, some may have stayed for the baseline testing even though they could not participate in the study—just to get the food.

With randomization broken, the authors matched the 21 TM participants on age, sex, and baseline PCL-C scores with 21 of the 51 participants randomized to the delayed-start group. Once the participants learned TM, there was no further attrition from the study.

The study was single-blind. The Congolese test administrators who collected data were blind to group membership. The Ugandan TM teachers and the liaisons, who coordinated activities and so knew group membership, were not involved in data collection.

The certified African TM teachers taught TM in the standardized format: introductory lectures (1 hour), personal instruction ($1\frac{1}{2}$ hours), and three follow-up meetings of 2 hours each. Optional weekly follow-up group meetings (1 hour) were available in the facility in Kampala. A manualized treatment protocol was not used because TM instruction is standardized worldwide. Transcendental meditation training does not involve giving social support or providing other posttraumatic stress disorder (PTSD) interventions.

Originally, posttests were planned for 30 and 90 days after TM instruction. Some test administrators, however, helped with other activities, and became familiar with some of the TM participants by the 30-day posttest and with most participants by the 90-day posttest. This was discovered after the 90-day posttest. To ensure blindness of testing at posttest, independent, nonmeditating Congolese were hired to administer a 135-day posttest; they were blind to group membership.

The two previous studies on TM and PTS reported high effect sizes ($d > 1.2$). Based on Cohen's tables, 15 people in each group would be sufficient to detect significant differences between groups (Cohen, 1988). Thus, 21 participants in each group was adequate power for this study.

Measures

PCL-C. The PCL-C is a 17-item self-report questionnaire of PTS symptoms using a 5-point Likert scale (McDonald & Calhoun, 2010). Summing the responses yields a total severity score. The PCL-C scores correlate highly with scores on the CAPS (Clinician Administered PTSD Scale), $r = .93$ (Forbes, 2001). The PCL-C has high levels of validity (Wilkins, 2011), test-retest reliability ($r = .96$), and high internal consistency ($\alpha = .97$). The PCL-C was administered in Swahili, French, Lingala, or English.

The TM technique is practiced with eyes closed sitting comfortably. The individual begins silently appreciating a mantra—a sound without meaning—at "finer" levels in which the mantra becomes increasingly secondary in experience and ultimately disappears and self-awareness becomes more primary (Maharishi, 1969; Travis & Pearson, 2000; see Travis & Shear, 2010). This technique is a secular practice without a strong cultural context, and so people from all religions have learned and enjoy practicing TM (Rosenthal, 2011).

Data Analysis

The data were first tested for normality, outliers, and homogeneity of variance. Then, a repeated-measures analysis of covariance (ANCOVA), covarying for sex, compared baseline and posttest scores between groups on the PCL-C total severity score. A secondary intent-to-treat analysis was conducted with missing TM participants assigning their baseline PCL-C scores for both posttests.

Results

Compliance was not systematically assessed. Approximately half the participants reported meditating twice a day—the rest at least once a day.

Table 1 presents the baseline, 30-day, and 135-day scores on the PCL-C total severity score for the TM and delayed-start groups. As seen in this table, the TM group dropped by 36 points on the PCL-C after 30 days TM practice, and by 38.7 points at 135 days. A drop of 11 points on this measure is considered clinically significant (Reger et al., 2011).

The PCL-C baseline and change scores did not significantly deviate from normality—skewness and kurtosis were between $\pm$ 1.0. Levene's test of homogeneity of variance was not significant. An ANCOVA with baseline and posttest PCL-C scores as the variates, and sex as covariate, revealed significant Group $\times$ PCL-C Score interactions, $F(2, 38) = 88.8$, $p < .001$. Individual

Table 1
Means and Standard Deviations on the PCL-C for Controls and TM Groups at Three Time Points

	Controls ($n = 21$)		TM ($n = 21$)	
Time point	*M*	*SD*	*M*	*SD*
Baseline	67.8	6.5	65.2	7.3
30 days	74.6	7.1	29.2	6.1
135 days	73.8	5.2	26.5	5.4

Note. PCL-C = Posttraumatic Stress Disorder Checklist, civilian version; TM = transcendental meditation.

analyses of variance (ANOVAs) revealed significant reductions in PCL-C scores for the TM group, $F(2, 18) = 8.4$, $p = .003$, and no change for the delayed-start group, $F(2, 18) = 0.84$, $p = .45$. Sex was not a significant covariate, $F(2, 38) = 1.05$, $p = .36$.

Investigation of the individual scores revealed that 90% of the TM participants (19 of 21) endorse no item more than "a little bit" at both 30 and 135 days. None of the controls showed similar levels at any time during the study. No harmful or adverse effects were spontaneously reported by the experimental group or noted by teachers during the follow-up meetings.

The intent-to-treat data did not significantly differ from normality—skewness and kurtosis were between within 1.0. The ANOVA with baseline and posttest PCL-C scores as variates again revealed highly significant Group × PCL-C Score interactions, $F(2, 99) = 17.7$, $p < .001$, and significant reductions in PCL-C scores for the TM group, $F(2, 49) = 15.5$, $p < .001$.

Discussion

The PCL-C scores substantially decreased from high values at baseline—indicating severe PTS symptoms—to a lower level of symptoms after 30-days TM. The 135-day scores remained at this low level. These findings replicate previous research with Vietnam veterans (Brooks & Scarano, 1985) and Iraqi/Afghanistan veterans (Rosenthal et al., 2011).

The findings of this pilot study are preliminary: (a) random assignment was lost resulting in the matched design; (b) blindness was partially lost at the 30-day posttest; (c) tracking of TM regularity was partial; (d) control was delayed start; (e) the PCL-C, a self-report measure, was the single test employed; (f) potential bias was introduced by offering food and soap to refugees in need; (g) there may have been experimental-demand effects in the TM participants to please the teachers; and (h) the translated versions of the PCL-C were not normed before the study.

These limitations, however, would not seem to invalidate the results. First, a matched design also decreases threats to internal validity. Second, although blindness was partially lost at the 30-day posttest, external testers assured that the 135-day posttest was blind. Third, although TM regularity was not systematically assessed, there were substantial reductions in PCL scores in the TM group perhaps suggesting the reported regularity of TM was sufficient to reduce PCL scores. Fourth, delayed-start is an acceptable research design for a pilot study. Fifth, although the PCL-C was the only test instrument used, it is a valid and reliable measure of PTS symptoms. Sixth, because all participants were given food at testing, it should have affected PCL-C scores in both groups similarly. Seventh, experiment-demand effects might have affected the magnitude of the change, but a decrease to low levels is less likely. Last, the translated PCL-C forms might affect comparison to studies using the English version of PCL-C, but any anomalies in translation would affect both groups the same. Thus, a reasonable inference from this pilot study is that TM practice significantly reduced PTS symptoms in these refugees.

The changes in PCL-C scores in this study (36-point reduction) were larger than those reported with other interventions such as a 9-point change with cognitive processing therapy (Alvarez et al., 2011), no change compared to controls with biofeedback (Lande, Williams, Francis, Gragnani, & Morin, 2010), a 14-point change with virtual reality-delivered exposure therapy (Price, Gros, Strachan, Ruggiero, & Acierno, in press; Rizzo et al., 2010), and a 31-point change with prolonged exposure therapy in a single-group designed study (Wolf, Strom, Kehle, & Eftekhari, 2012).

Findings from this pilot study support investigating the efficacy of TM practice for reducing PTS symptoms. Large-scale studies assessing both quantitative and qualitative measures are warranted to investigate the effects of TM on reducing behavioral, psychological, and physiological symptoms resulting from traumatic experiences across cultures.

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